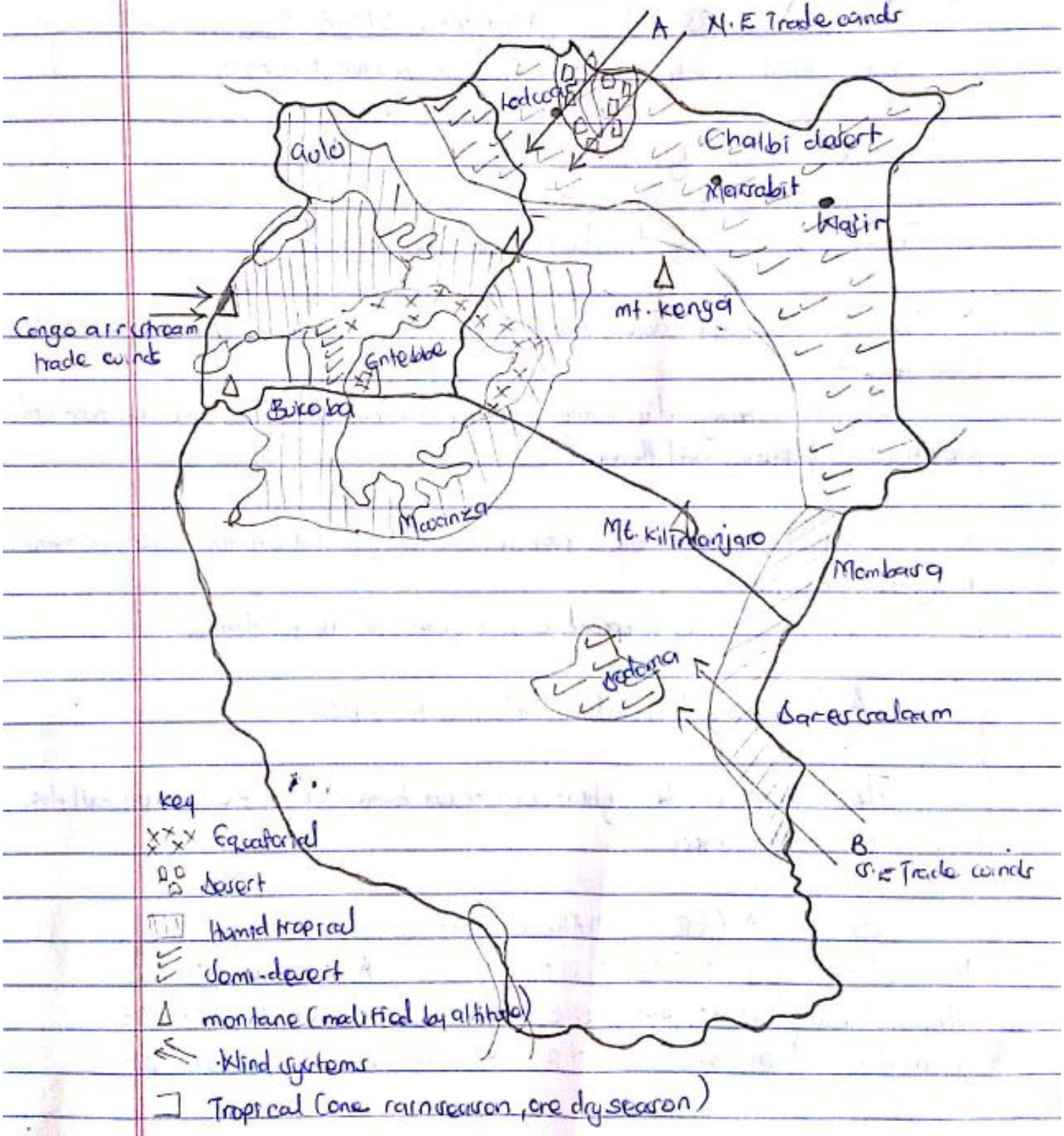
THE CLIMATE OF EAST AFRICA.

Climate refers to the average weather condition of a given place observed measured and recorded along period of time usually 30-35 years.
East Africa experiences different forms of climate and these include

1
1. Equatorial climate
2. Modified equatorial / Montane / mountain climate
3 Tropical continental / savannah climate
4 Semi-desert climate

A SKETCH MAP OF EAST AFRICA SHOWING CLIMATE REGIONS.



1. EQUATORIAL CLIMATE:

It is more experienced along a shores o lake victoria, Entebbe, Jinja, Masaka in Uganda. Hsalso coves Bukoba, Mwanza areas of Tz and parts of kisumu of kenya

X-TICS OF EQUATORIAL CLIMATE:

Heavy rainfall amounts throughout the year of over 1500mm

High level of humidity always

Temperatures are always high due to the effect of the midday sun.

Two rain fall seasons en double maxima with the first season having heavier rainfall totals than the 2nd.

Rainfall is heavy and is usually convectional. Rains often occur in the afternoon and are accompanied of lightning and thunder

The belt lies under calms pressure zone all year that attracts winds and rains throughout the year.

Annual range of temperature is very small usually less than 3°C

Average daily temperatures are 24°C to 27°C.

The difference btn the highest and lowest temperatures of the day are small due to the presence of cloud cover.

BUKOBA (EQUATORIAL CLIMATE)

Months	J	F	M	A	M	J	J	A	S	O	N	D
Rainfall (mm)	147	158	249	256	315	86	48	86	101	132	161	193
Temperature (°C)	21	21	21	21	20	21	21	21	21	21	20	19

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2. THE TROPICAL CONTINATAL ZONE / SAVANNAH.

It covers the biggest part of East Africa. Some of the areas covered by the Savannah climate include Songea, Sodoma, Gulu, Port-portal and Kasero in Uganda.

X-TICS OF SAVANNAH CLIMATE.

(1) High summer temperatures of about 35°C and heavier rains are received during the summer season

(2) High levels of humidity during winter (cool season and low during the dry season).

(3) Annual rainfall ranges btn 1000 to 1500 mm ie it is moderate.

(4) More rains are received nearer to the equator and less towards ē semi-desert region

(5) In the Northern hemisphere, rains begin in April and in October in ē Southern hemisphere

(6) Savannah vegetation. Some equatorial forests are ō common type ō vegetation found in these areas.

(7) It has two rainfall seasons ie double maxima

3. SEMI DESERT / DESERT CLIMATE.

It is found in the dry areas of masai land, of Tz and Kenya, Turkana land of, Karamoja, Sodoma, Sukuma land, Ankole Masaka dry corridor, Albertgrabs. Such areas have been occupied by pastoralists.

Rainfall (mm)	152	110	137	46	5	2			2	5	23	91
Temp (°C)	24	24	22	21	19	20	22	23	24	24	24	24
Months	J	F	M	A	M	J	J	A	S	O	N	D

Wajir in northern Kenya

Months	J	F	M	A	M	J	J	A	S	O	N	D
Rainfall	6	6	58	58	28	2	2	2	3	26	48	20
Temp	28	29	29	29	28	27	27	26	26	27	28	28

Draw the suitable graphs to show the information portrait in the tables above.

X-TICS OF DESERT CLIMATE:

1. Low levels of humidity
2. Low and unreliable rainfall is received below 500mm per annum.
3. High temperatures during day often 35°C and low temperatures during night.
4. Low or cloudless conditions are experienced.
5. High diurnal temperature range.
6. It has got a prolonged dry season.

4 ## MONTANE / MOUNTAIN CLIMATE:

It is found in very high mts of East Africa such as Rwenzori, kilimanjaro, Elgon and mt kenya.
Temperatures always decrease approximately by 0.6°C for every one hundred metres high. These mountains have low temperatures and permanently snow capped.

X-TICS OF MONTANE CLIMATE.

1. The nights are extremely cold
2. Temperatures are generally high at the foothills and very low at the top.
3. Pressure is high on the foothills and low at the top
4. The wind ward slopes of the mtn receive a lot of rainfall.

TEMPERATURE CALCULATION.

1. Total Annual temperature: This is obtained by adding up all the mean monthly temperatures of the year.

(a) Diurnal temperature range: It refers to the difference btn the highest daily temperature and the lowest daily temperature.

(b) Mean annual temperature.
This is obtained by adding up all the mean monthly temperatures in a year divided by the number of months in a year.

(c) Annual range of temperature: It refers to the difference btn the maximum mean monthly temperatures and the minimum mean monthly temperatures of a year.
maximum mean monthly temp − minimum monthly temperature
ART =

N.B: Temperature inversion refers to a situation where temperatures at higher altitudes are warmer than those in the valley.

EFFECTS of CLIMATE ON LAND are TYPES.

1. Equatorial climate
(1) Cultivation of perennial crops such as coffee, banana and tea, flowers etc.
(2) Growth of forests that give rise to lumbering.
(3) Tourism based on the natural vegetation and wild animals.
(4) Dairy farming especially on the highlands
(5) Agro based industries processing the crops grown.
(6) Dense settlement due to the heavy rainfall received.

(b) TROPICAL CONTINENTAL CLIMATE.

1. Cultivation of seasonal crops or annual crops eg maize, millet, simsim etc

2. Dev't of Agro based industries.

3. Animal rearing based on the savannah grasslands.

4. Game or wild life conservation and promotes tourism.

5. Moderate settlement due to moderate rainfall received.

(c) ARID OR SEMI-ARID

1. Animal rearing eg. pastoralism.

2. Game conservation that promotes tourism.

3. Sparse pop due to low rainfall amounts received.

4. Growing of seasonal crops that requires low rainfall during the brief rainy seasons eg millet, sorghum, and sisal.

FACTORS INFLUENCING THE VARIATION OF CLIMATE. OF E.A.

These include; -latitude
- Altitude
- Vegetation cover
- Influence of aspect
- Mans activities.
- Water bodies / distance from the sea.
- Influence of winds.
- Influence of cloud cover.

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1. THE INFLUENCE OF THE ITCZ ASSOCIATES WITH THE POSITION OF THE SUN.

The position of the sun creates low pressure belts and also influence the movt of the winds from high to low pressure belts. Winds converge at a low pressure belt or region known as the inter tropical convergence zone (ITCZ) but its not static. It keeps on moving depending on the overhead sun.

When the sun overheads the equator on 3rd march and end on September 27 every year, the belt receives intensive heating and diverges from the north and south flow in to replace the rising air. This come in as North East and South East trade winds Convergence (ITCZ) at the equator brings rainfall and thus the area receives two peaks of rainfall (double maxima).

When the position of the sun shifts north words to the tropic of Cancer in around June, the rainfall belt (ITCZ) shifts to the north

The ITCZ shifts south words to the tropic of capricon in December and so is the rainfall belt.

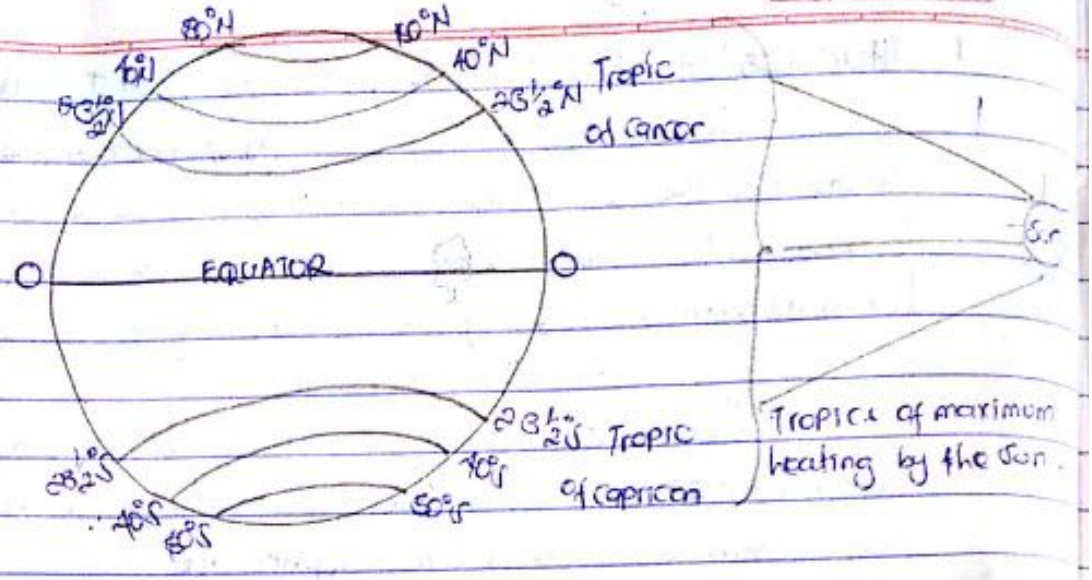
Therefore areas north of the Equator, Northern parts of Uganda, experience on rain season (single maxima) from April to August and other months remain dry.

Southern parts of Tanzania experience one rainy season (single maxima) in October to March and the rest of the year is dry for areas south of the equator

2. INFLUENCE OF LATITUDES.

The tropics with in (areas btn 23½° N and 23½° S of the equator) do receive most of the heat since the sun shines almost directly over head year round therefore temperatures are always hot.

East Africa is located within the tropics, astride the equator 4°N and 12°S therefor East Africa receives the Tropical Equatorial climate with constant insolation or heat and thus convectional rainfall and low pressure.



3 INFLUENCE OF ALTITUDE:

This refers to the height of the land above sea level. As altitude increases temperatures decrease at an average rate of 0.5°C for every 100 metres high. Temperatures do fall at greater heights above sea level. The rate at which temperatures fall with increase in altitude is called normal or environmental lapse rate.

N.B: The higher you go the cooler it becomes. Meaning that the atmosphere is warmed from below not from above.

High lands of East Africa have cool temperatures while the low lying areas such as the Coastal regions and the rift valley experience hot temperatures. It explains why there are snow capped mountains and such mts include Ruenzori, kilimanjaro, kenya etc.

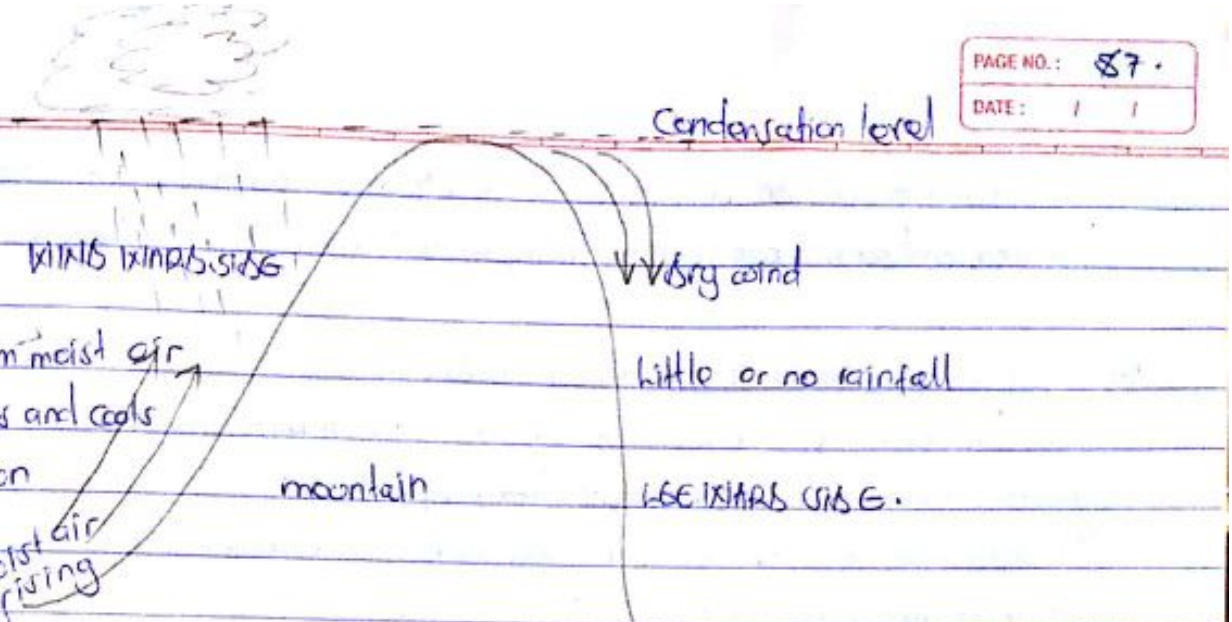
4 INFLUENCE OF RELIEF

Relief refers to the general appearance of the landscape ie mountains plateaus, hills, plains and valleys.

Relief leads to formation of relief rainfall. It is formed when warm moist winds are forced to rise. When they blow towards mts, moisture condenses, forms clouds and later rainfall

Very rainfall usually occur on the wind ward side (the side facing the prevailing wind) and at the top of the mts.

The lee ward side (side sheltered from the winds) is usually dries with little rainfall at all and is said to be in a rain shadow.



Areas ~~are~~ experience ~~a~~ rain shadow effect (low rainfall) in East Africa include;

- North Eastern Uganda
- Rift valley areas and central Tanzania.
- North and North Eastern Kenya, North East and North Western slopes of mt. Elgon
- Kasese, Eastern Ankole, Western Masaka and Nakasongola in Uganda.
- C

5. INFLUENCE OF HUMAN ACTIVITIES.

Land use activities such as cultivation, pastoralism, mining or quarrying, industrialisation, destruction of wetlands and vegetation leads to reduction of moisture thus a decrease in rainfall and an increase in ~~a~~ atmospheric temps thus leading to dry and hot climate.

On the other hand, human activities such as forest conservation, afforestation, agroforestry, improved methods of farming, increased moisture in the atmosphere and thus wet climate.

6. DISTANCE FROM THE SEA (CONTINENTALITY).

The distance of a place from distant water bodies such as the Indian ocean East African water bodies have ~~got~~ impact on both temp and rainfall of the surrounding areas.

Areas adjacent to the Indian Ocean eg Mombasa, Tanga, Dar-es-salaam have high rainfall due to the high evaporation rates that occur along ~~a~~ water sources.

When evaporation occurs, water levels rises, condensation takes place and clouds are formed and such areas receive heavy rainfall compared to others.

7. ASPECT IN RELATION TO THE HILLY AREAS.

The position of the place in relation to the direction of the sun's rise (aspect) also influence temperatures at different times of a day.
Hillslopes that face East ward experience sunrise and become warmer than western facing slopes in the morning.

In the afternoon, western facing slopes experience more solar (sunrise) and become hotter than the Eastern facing slopes.

8. INFLUENCE OF VEGETATION COVER.

26/7/18 Areas with thick ~~tree~~ vegetation cover e.g the tropical rainforests receive higher rainfall than areas with poor vegetation due to the effect of evapotranspiration.

Areas with thick forests or vegetation leads to formation of convectional rainfall thus a cool and warm climate eg Mabira forest, Budondo Impenetrable forests and forests in Bunya in Iganda in Uganda.

On the other hand areas with little or no vegetation tend to be dry and arid or with very little rainfall due to low evapotranspiration eg Karamoja in Uganda, North Eastern Kenya etc.

9. INFLUENCE OF AIR MASSES / TRADE WINDS.

Winds carry some characteristics like their places of origin and influence rainfall distribution in East Africa. There are three major winds or air masses that affect the East African climate eg
- The north East trade winds
- The south East trade winds
- The westerlies winds

a) The north East trade winds: They blow towards East Africa from a high pressure zone of the Arabian desert. These winds are dry ie no water vapour but pick moisture on the red sea

On reaching the Ethiopian highlands, they rise, condense and form clouds thus relief rainfall. By the time they reach East Africa they are completely dry causing dry conditions in northern kenya and north Eastern Uganda thus a semi-arid and desert climate.

b) The south East trade winds: They originate from a Indian ocean and are ful of moisture, they don't cross any highland ~~and~~ until when they reach East Africa. They bring humid conditions to the East African Coast in areas of kilimanjaro and leave the low land central part of Tanzania dry.

c) The westerlies winds: They originate from the Antlantic ocean ful of moisture crossing the forests of D.R.C and reach East Africa with a reach moisture content. This bring wet conditions to parts of south western Uganda and thus contributes to heavy rf

10. INFLUENCE OF THE EARTH'S ROTATION:

As the earth rotates, winds are deflected to the right in the northern hemisphere and to the left in the southern hemisphere. Such deflection leads or causes variation in climate. It is because winds are moist and warm and thus a warm and wet climate may develop where winds are deflected eg South East shores of lake Victoria are warmer and wet in December.

The south western shores are dry due to deflection of winds to the South Eastern shores of L. Victoria and no deflection of in the south western side of lake Victoria at a time.

INFLUENCE OF INLAND

Large water bodies eg. L. Victoria influences the climate of adjacent areas through sea breeze and land breeze.

The land and sea breezes are local wind system on a daily basis created as a results of local high pressure (HP) and low pressure (LP) areas that influence their movement.

ie Air moving from colder to warmer areas to replace the risen air.

(i) SEA BREEZE AT DAY TIME.

Both the land and water bodies are heated during daytime. But the land around water bodies are heated faster since it absorbs alot of heat from the sun. Then land thus becomes hotter in the water body since it is opaque.

Air above the land is heated up, expands and rises causing a low atmospheric pressure zone. The air from a water body (high pressure zone) also is cool then moves towards the land to replace the raising air.

Cool air from the sea reduces temperatures on the land.

(ii) Land breeze at night time.

Land loses its temp rapidly when the night fall. Water bodies take along time to lose the acquired heat as they again take along time to acquire heat.

Heat from the water warms up the air above, air expands and rises causing a low atmospheric zone. When this happens, Cool air blows from the land (by high pressure zone) towards the sea to fill the vacuum formed by warm rising air.

CONCEPTS OF RAINFALL

1. Mean Annual Rainfall: It is the average of the annual rainfall totals of a year.
   MAR = Total sum of Mean monthly Rainfall / 1year
2. Total annual Rainfall.
   It is the total sum of the total mean monthly rainfall for a year
3. Mean monthly rainfall: It is the average of the total monthly rainfall of the months
4. Precipitation: It is the fall of rain, hailstones and snow
5. Rainfall duration: It refers to the length of time when its raining
6. Rainfall frequency: It refers to the number of times rainfall occurs in a period.
7. Rainfall intensity: It refers to the amount of rainfall received in a period.
8. Rainfall effectiveness: It is the ability of rainfall to support agriculture or plant growth.
9. Rain fall seasonality: It refers to the number of months or day rainfall is recorded a year.
10. Rainfall reliability: It is a degree of there being high or low probability of receiving rainfall.
11. Rainfall probability: It refers to the chances of receiving a certain amount of rainfall in a period.
12. Rainfall regime: It is the seasonal distribution of rainfall.

NATURAL VEGETATION OF EAST AFRICA.

East Africa has been a known or blessed with a wide natu Vegetation that ranges from rainforests to heath and moorland. A number of factors have always been considered to be the major determining factor in the flourishing plant life (vegetation) in East Africa according to botanists.

FACTORS THAT INFLUENCE THE DISTRIBUTION OF NATURAL VEGETATION IN EAST AFRICA.

1. Influence of Variation in rainfall. The amount of rainfall and its seasonal distribution influence the different Vegetation. The heavy rainfall amounts of over 1500 mm distributed throughout the year influence the growth of equatorial Vegetation or the tropical rainforests.

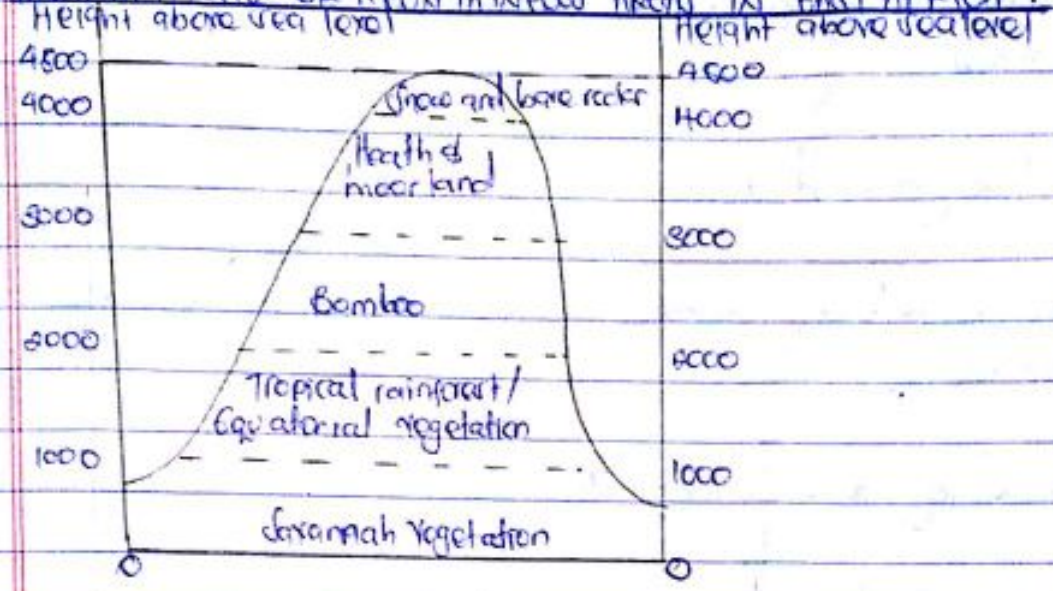
Moderate rainfall of over 1000mm to 1500mm influence the rise to Savannah Vegetation i.e Savannah grassland and savannah woodland eg Miombo woodland in Tanzania

Low and unreliable rainfall of below ~~three~~ 300mm give rise to the growth of the desert Vegetation.

2. The Variation in altitude

Most of East Africa is located at a high altitude of above sealevel. ~~ace~~ This implies that as one moves towards a high altitude, this leads to decrease in temperature. This has however discouraged the growth of equatorial forests on higher altitude.

A DIAGRAM SHOWING VEGETATION ZONATION OF HIGH ALTITUDE OR MOUNTAINEOUS AREAS IN EAST AFRICA.



③ Influence of man's activities or biotic factors.

Man has cleared the vegetation in search for fuel, building materials, cultivation and land for settlement. This has made natural forests to turn into savannah grassland or woodland. However some vegetations that has completely disappeared has led to semi desert vegetation

④ Influence of soil.

Soil has also been a major factor that influences natural vegetation distribution. Areas with fertile soils usually have luxuriant vegetation. However areas with poor soil also yield a poor vegetation type.

Note: Although East Africa lies astride the equator, its vegetation is not pure equatorial vegetation because of reasons such as influence of drainage, man's activities, variation in altitude, nature of soils etc.

TYPES OF VEGETATION.

Equatorial vegetation or tropical rain forests

The equatorial vegetation though has been cleared by man, but presently it can be observed on Mubira forest, highland forests, Buruma highlands, Mabira gamboforests, Maramagambo forest, Sese forests, Budongo and Bugoba forests

X-TICS OF EQUATORIAL VEGETATION.

1. Extensively covered by tree tall (5-50m) and evergreen equatorial forests due to heavy rainfall
2. Trees have got broad leaves
3. Forests are made of numerous tree species such as mvule, mahogany, red heart, greenheart etc
4. There are many rope like climbing plants such as the lianas.
5. Trees grow in three layers or canopies ie undercanopy, main canopy, Emergents. (The tallests) (umbrella like layer)
6. Most of the trees yeild hardwood eg mahogany, greenheart, ebony, ironwood etc.
7. Large trees grow buttress roots at the bottom eg 1 meter from the trunk

ECONOMIC IMPORTANCE OF TROPICAL RAIN FORESTS.

1. Source of poles and timber for building and construction.
2. Habbitats for wildlife eg gorillas at Mgahinga.
3. Source of wild fruits eg cocanut and mangoes.
4. Source of medicines and local herbs eg from Moringa tree and aloevera
5. Source of rivers that provide water for domestic use
6. Promotes tourism since it is a habitat for wild animals.
7. Conserves soils for future agricultural use.

8. Provision of employment opportunities to lumbering companies and saw mills
9. It facilitates rainfall formation through evapotranspiration

PROBLEMS OF THE EQUATORIAL VEGETATION. (People around)

1. It habours pests eg tsetse flies that transmit sleeping sickness and nagana to man and cattle.
2. It habours dangerous animals such as gorillas and the monkeys that may destroy crops.
3. Equatorial vegetation is a barrier to transport and communication networks.
4. It limits the total land available for agricultural practice
5. It could be used as a hiding place for anti government rebels. Eg A.D.F within Ituri Ruwenzori forest.

SAVANNAH VEGETATION.

It covers the biggest part of East Africa though much of it originates from the forest land. Savannah refers to the wide range of plant communities lying btn the tropical zone and the desert margins.

It can be classified into two or three ie
Savannah grassland
Savannah woodland
Dry Savannah

X-TICS OF SAVANNAH VEGETATION.

1. In the savannah wood lands, there are more trees of about 8-16m tall
2. The trees are deciduous ie they shade off their leaves during the dry season.

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3. Drought resistant trees such as bagobab and acacia are common especially in the Miombo woodlands of Tanzania

4. Trees are umbrella shaped. Many of the trees have long form tap roots that absorb water from deep the ground.

5. Tree leaves are broad and are highly twisting

6. Stoms of the trees are photosynthetic.

SAVANNAH GRASSLAND.

It is common in areas where rainfall ranges btn 500-750mm per annum It occurs basically in areas of northern and western Uganda, Athi plains and Nyika plateaus of Kenya and in around Kkoba in Tanzania where pastoralism is common

X-TICS OF SAVANNAH GRASSLANDS.

1. There is growth of tall grass of about 3-5m eg the elephant grass

2. There is a dense growth of grass and shrubs.

3. Grasses are green during the wet season and brown during the dry season

N.B ① Towards the desert margines, Savannah vegetations develop coarse and trees with thin leaves

② Miombo

② Miombo woodland in Tanzania is a good example of Savannah woodland in East Africa.

ECONOMIC IMPORTANCE OF SAVANNA GRASSLANDS

① Its supports live stock rearing eg in the Ankole Masaka Corridor, Teso land Turkana land, Masai land, Pokot land, Ascca ranch etc.

② Its a good site for gazating as game parks due to the presence of.

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Grasslands
~~game parks~~ e.g kidepo Valley, Tsavo and Queen Elizabeth National Park.

② It is a good site for the growth of annual crops such as maize, cotton, beans etc.

③ Apiculture ie bee keeping can be practiced due to the presence of short th

④ Game hunting e.g South Karamoja hunting ground.

⑤ Fruit gathering eg ~~Shea~~ butter nuts

6. There are fishing activities

SEMI DESERT VEGETATION.

It is found in dry areas of north Eastern Uganda (Karamoja region), Northern kenya covering Turkana land and Masai land of kenya and Tanzania as well as Central Tanzania.

X-TICS OF SEMI DESERT VEGETATION.

1. Thorny and drought resistant trees are found here, Acacia and Baobab.

2. Trees here get thin leaves and a thick bark

3. Bushland and thickets are common in areas of about 350 - 625 mm of rainfall ie bushy and thorny trees ~~are~~ of btn 4½ - 10 m tall and shrubs are common

4. Grass are not common in open areas.

5. The desert shrub is common in areas that receive rainfall of bellow 850 mm and shrub of about 1m tall are common.

N.B: The major economic activity here is pastoralism.

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SWAMP VEGETATION.

It is often near a rich grassland especially in the low lands near lakes and rivers

MONTANE FOREST VEGETATION.

It is found in areas of the high altitude e.g on the slopes of mountain Rwenzori, Muhavura, Elgon, Kilimanjaro, kenya etc.

X-TICS OF MONTANE FORESTS:

1. Trees grow in pure stands and are ever green
2. Trees form a single canopy or layer.
3. Leaves are small and are needle shape like
4. Tree trunks and branches are always twisted

N.B: MANGROOVE FORESTS:

These are found along the East African coast especially in the Rufiji delta and along the areas of Mtwapa, Tanga, Mombasa, Malindi and Lamu

X-TICS OF MANGROOVE FORESTS.

① Trees are of medium height usually less than 10m

② Trees grow to each other making the forests thick.

③ Trees have broad leaves.

④ Trees are ever green through out the year.

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A SKETCH MAP OF EAST AFRICA SHOWING THE NATURAL VEGETION TYPES.