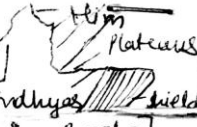


PAPER-2 PHYSICAL SETTING NOTES – MUDIT JAIN

[@muditjainblog.wordpress.com](http://muditjainblog.wordpress.com)

Paper-2 (Peninsular) MUDIT JAIN

Physical Settings



- 1) Pre cambrian
- 2) Part of Indo-Austral
- 3) Some rocks archaic type [gneissic rocks]
- 4) subdued relief. elevan: 900m
- 5) Beyond vindhyas (but present in N plain too).
- 6) shields (Dharwar, Chota)
- 7) Sim places overlain by depts [lava, seq. Met rocks]
- 8) Mineral regions. Rivers.
- 9) Pen. Mts / escarpments
- 10) Marath / Kutch / Kathiawad (Show map).
 - one of oldest • archaic • relic of fold
 - poly of ~~schist~~ schist • sedi rocks

limb, sandstone, shale, schist

elevan: 900m. sometimes 500m (ridge area)
Indruvikhar peak (summit abt.)

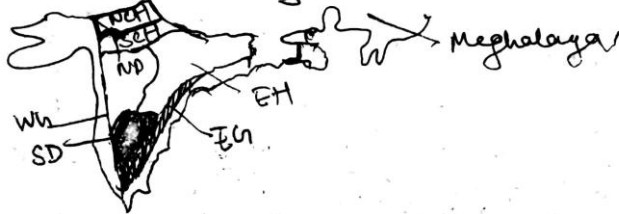
Gir.

- 2) E. ghats & hills Precambrian. (older than Himalayas)
 - Mon. Crs. → ↑ subdued. • Rivers.
 - discontinuous
 - N. circular (Orissa) + central + SoE ghats [A.P.] + Tamil upland [S] + SE
 - Bauxite
 - Mahendragiri peak N of E. ghats.
 - Rocks (Sedi + Meta + Khondalites, charnokites, Marine).
- 3) Vindhyas escarpment. N boundary • Guj-Bihar were folds (Proterozoic) [Vindhayan (small) syncline]. Poly Crs. [last due to collision w/ Eu Plate: Mesozoic] Then formed escarpment.
 - lava 4m west to Kaimur in E.
 - Narmada rift
 - Satpura block
 - Tapi rift
 - Narmada rift.
- 4) Satpura SoV vindhyas
 - Two Narmada & Tapi → blocks.
 - archaic folds once. Today due to rifting. lesser continuous than vindhyas.
 - Amorhantak radial rivers

Sources: Garul. Rajpita. Mahades. Amar. Maikal.

② Western Ghats Cenozoic
 escarpment. block. Sahyadri (Konkan)
 origin → effect on Arabian shelf
 tilted to east after formation of escarpments pronounced
 → river flow W → E (mostly)
 Paleozoic (Rifting) → Mesozoic (eruption) → Cenozoic (subsidence)
 Black soil. Deccan Trap tops.
 E. outcrops: Balaghat & Harishchandra range.
 ③ SHC N, A, C, P
 origin debatable. Escarpment due to difference in blocks / quartzite.
 Knot → Anaimudi (source of many rivers: Amravati, Bhamburda, Noyyal).
 Biosphere. coffee. Doddabeta of Nilgiris → ooty.
 ④ Uplands, highlands, Plateaus of south
 • Deccan & E. Raj. Upland
 granite, gneissic, denuded, semi-arid, red-Mda rocks
 N. Central Highlands are, M.B., Bundel
 Khandwa, Narmada valley, Vindhya.
 E. Uplands: Bhagal, Chota, Garjat, Mahanadi basin, Dandak (eastern)

Chotanagpur
 shield, gneissic, Minerals, Damodar rift → coal
 DVC [Konar, Panchet, Tilaiya, Maithon] (Hazar, N, Ranchar, S) CNP
 Rivers & tribes.
 Carboniferous rifting → Gondwana coal (98% reserves).
Bhagalpura low lying, sandstones, est. of Vindhya.
 ⑤ Deccan Maha + Kar + AP (Telangana). S of Narmada
 Narmada = Satpura + Maha
 Deccan = Kar + Telangana → Lava plateaus.
 associated with triple junction NW
 flank subsidence, reunion hotspots. Mafic → ↑ spread.
 Crust has formed inter-trappean beds.
 due to diff erosion → staircase topography
 with mesas & buttes.
 Eruption in phases → layers of igneous rocks.
 Trappens also in W. Ghats, Kathiawar, Vindhyan, Satpura etc.
 Trappens of CNP are not part of Deccan eruption.
 but Dalma
 ⑥ Meghalaya Mikir, G.K.J, ↑↑ erosion → to Peninsula
 wet rocks, etc, origin.
 inc: Mikir, Renma, Barail (escarpments).

RL Singh

Trains: KLZ

sedimentary + Sed' Meta rocks

sedimentary + Sed. Meta rocks.
origin = Tethys' Sediments. [Indo-Aus | Eurasian plate]
Avg H = 4000m [gt (6000) + middle (4000) + outer (1000)]
(inner) (Lesser Himal) (Shivalik)

- W: UK (gharwal, mussonic), E: UK (Romani),
dudhwa, Mahabharat, Nagtibba
 • Hims are broader in west & merge in E. east is higher
 origin - 5 stages

origin - 5 stages

- ① tethys contract & furrowing. ~~The~~ sea sediments.
- ② GH upliftment in eocene, oligocene. P E O M P P
 " meocene. ↑ F → G M S
- ③ MH " [Asym folds, isoclinal folds, overturned, recumbent, nappe, displaced roots, discord].
- ④ Shivalik " [Pliocene + Pleistocene]. [these don't hv marine-sedimentary rocks of accretionary prism unlike other Hs & uplifted piedmonts → hv pebbles, boulders, conglomerates]

Present Upliftment Mechanism

West	East
• broad	• <u>steeply</u>
• wide river	• <u>peaks</u>

① NW edge of plateau collides → starts upliftment
 ② Plateau rotates
 ③ NW hinge released. N/E fixed.
 ④ Hinge of NW slump & spread out [broad, ↓H]
 ⑤ N/E cont to squash & upthrust sediments [↑H].

animal-like fossil remnants ✓ of pleistocene swamp animals

Key feat. of HIMS

- Folds, C-C → doubling of crust → ↑H, H ranges, 5 phases
- MH features, steep [↑Fins, N meeting against TIB plateau].
- Hogback / orthocline sh → visible in GHS, asym folds
- also spec of ↑ snow in N → gentler.
- shinlike rocks
- HIMS convex in S with syntaxial bends or sharp
- U-hair pin bends beyond NP & NB in W & E.
- Bends due to sediments. (V)
- shape due to shape of Peninsula → coll'n → shape.
- coll'n → comp'n along N/E, NW edges of plateau → sediment bent
- NP & NR marks NW & NE parts of Plateau, now overlain.

• CCA • Flysch & ophiolite rocks. [F due to scouring on ocean floor (marine) & Q due to subducting ocean slab of tectonics]. Q are volcanic → tell V HIMS have volcanic rocks.

• Ranges sep by long, linear, strike faults. (reverse)

• strike is a dive where limbs intersect horizontal

• plate has reverse faults due to comp'n.



- antecedent rivers
- Longitudinal strike valleys (dunes) [↑↑ in MH]
- Rivers existed by upliftment ^{past} that they got blocked
- water spread along dune → longi lakes. But
- upliftment was slow → river eron → transvers
- valleys → dunes dried, ↑ fertile.

Reg div'n by Borrao & State

① Indus-Sutlej = Punjab Hims.

② Sutlej-Kali = Kumaon + Garhwal

③ Kali-Teesta = Nepal

④ Teesta-Bra = Assam

P K N A mud & rain bog

I-S-K-T-B

origin
 youngest (Quaternary)
 Depositional (fluvial, overline)
 Flat, low lying (150m MSL)

North Plains = Indus Ganga + Brah
 E-W: 3500km
 3 systems (I, G, B).
 No lithification → no rocks.
 ↑ fertility → ↑ popn.

origin & nature of basin is debatable
Blanford: It is massive reverse fault due to ↑ compres.
 But thickness is uniform & acc to theory it shud hv ~~thick~~ ^{thin}
 no gradually reduced towards Himalayas. → rejected
Blanford: Remnant of tethys basin
evidence: Marine depts, salt water remains (Luni, Sambhar etc)
 oil in Barmer. BUT absence of basalt → doubts.

Plains floor is granitic & gneissic & not basaltic
 [floor of tethys shud hv been basaltic] ^{forst normada}
Edward Suess Foredeep
 on colln, part of PP got underthrust
 on lifting, under eu plate → differential stretching creates
 shear cracks / rifts like Tapi etc & also a foredeep along
 HFF. evidence: granitic rocks on drilling, wr of
 PP that got underthrust.

N-S - str. dirn of N. Plains
 aluvial fans. 1 2 3 4
 BTBK
 3, 4: Flood Plains

Bhabar
 Himalayan piedmont plain. Formed on merger of alluvial
 fans. Fast rivers lens slow & deposit sediments
 due to Δ in slope → pans.
 ↑ Permeable → rivers disappear. No agri. ✓ forests.
Terai rivers reappear → poor slope → waterlogging, swamps
 agri x, sal ✓. But now agri done, BtH grow pines
 → pines, salinity
 B.T. are cont E-W [Punjab - ~~Kash~~ valley] but
 are wider on E due to ↑ rains there.
 called duars in Bengal. muditjainblog

Bangar older, higher elevation, pliocene, terrestrial, Madani newer, renewed, finer, ↑ fertility.
 Leaching → laterites, bauxite, barite, concretions [Bangar]
 Bangar have lime concretions [Bangar]
 * saline layers called Reh in Punjab.
 * K & B sep by intertwining slopes [River bluffs, dhayra (Punjab), Khols (Upper Ganga)]

Regional divisions of N. Plains

Indus Plains (Pak + Ind) = Indus Punjab plains & doabs
 (Chol, Rachna, Bari, Bist) + Rajasthan Plains
 (and Punjab) [Marathwada, Bagad]

Raj Plains by Ghaggar & Luni.

- ② Gangetic Plains Ganga + Yamuna.
upper: Yamuna Plains + Ramganga (Rohil Khand, Awadh)
middle: Ganges [E. UP, Bihar], Kosi river.
lower: WB + Bang (Barind + Sunderbans)
 ③ Brahmaputra Assam Plains  Hims Meghalaya

Punjab Plains semi arid, fertile, basin topo drainage
 → salinity. due to Ravi, Beas, Sutlej = Bari + Bist
 Bets are fertile plains, dhayra & river bluffs.
 Timavara streams (Chol) → soil erosion. Reh ops. but dhayra

Raj Plains east of Indus plains, Maru + s. arid Bagad.
 N. Raj. Plains are part of Punjab plains [Ganganagar plain]
 • Fluvial + loessic. dpts → ↑ fertility but ↓ H₂O.
 • Semi arid tracks of Luni + Ghaggar = Rohil Plains
 • Marine transgression (M) E-W rolling of plate → MT
 → oil in Rutch, Cambay, Barmer; saline lakes (dhayra if dry)

V. Ganga Ganga + Yamuna + Rohil + Awadh
Ramganga → Gomti + Ghagra
 • broad in west. ↑ fertile in E. Bhabar at foothills
 • fertile in E → meanders, ox-bow lakes

• Khols • Bhur (Sand dpts in E) • Foothill forest.
N. Ganga E. UP - Bihar - Bihar Plains + Ganges + Kosi's.
 ↓ slope → meander (Kosi). → ox bow, abandoned channels
 • wetter swampy reg are chairs. [these are dried upland in Bengal].
 • N. Bihar = Mithila, Kosi, Garguwar (VA)
 • S. " = Magadh, anga

Lower G. E. Bihar, Bengal [Purnia, Darjeeling]
 delta. ↑ deposition. distributaries → River Braiding.
 → riverine islands [sagar].
 R-Cr gap / subsidence, Barind (laterites) mud + pin blog

delta: upper (Rash Mains) + mature (dead) + new (active) towards sea
 rejunior → further inland deltas
 lower part of delta is swampy = BHILS
Sunderbans Assam / Bra
 narrowest of all, b/w Him d Megha, narrow channel, not distinguished N-S features. (N slopes has terrace though)

Land Resources

- 328 mHA: 3.28 mn km². (TGA). TRA = 3.04.
 DoLR classification of land uses [9].
- ① Forest + trees = 24.01 ①②
 - ② Unculturable = due to phy feat (terrain, climate, access)
 ↳ homes, dev projects. = 10-15%
 - ③ Pasture = ≈ 4%
 - ④ Fallow = ≈ 10% can be cultivated but now form badlands
 = current fallowed [$< 1yr$] + other [$> 1-5yrs$].
 - ⑤ Culturable wasteland [$> 5yrs$] = 5%
 - ⑥ NSA 46% ⑦ GrSA

Forests are +, admi declared inc too, dense forests using Mangrove using.
 10.7% of livestock of world, 16% cattle. But 5% pasture land
 assess quantity quality.

SOILS ICAR classification

Major = alluvial (40) Red (20%) Black (15) laterite (5)
 ≈ 70-80% soil capable for agri.

ARBL } → 70% good
 40 20 15 5

Alluvial 40%. Prop + area + % + quality + minerals + us
 depositional, N plain + basins in PP, coasts, deltas.
 Riverine alluvial > fertile than coastal [coarse, sandy]
 Arzonal, incptsol, immature [not very thick], weak
 horizon, any crop. ↓ N₂, ↓ humus ↓ organic

only terai has N₂. only black has Potash

Texture [fine in MAL course].

N-S divisions [BTBK] Ryt abt them, barinds

Basin topo in Punjab → waterlogging.

Salinity = Reh (Punjab), Kalar, Usar (UP), Khar (Maha)

Red (20) - Regimela - highlands (Laterite) - decan (black)
 Intrazonal [weathered].
 has lime, humus, texture, fertility.
 NO SALINITY (only major to have no salinity)
Ver in poorer areas / semi arid → following, drought
 eron etc. eron due to brick industry.
 can grow any crop except wheat n rice.
 Pulses, oilseeds, Millets, Ragi (Kor), Bajra (Raj), Jowar (Cs-Raj)
 Horticulture (C.A.P). coffee, tobacco, ground nuts etc.

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Black (15%) (Regur soil)
 not chernozem. Due to weathering of lava volcanic rocks.
 Humus: Black due to titaniferous magnetite.
 volcanic basalt. Intrazonal (only zonal chernozem)
 vertisol. ↑ clay → wet → sticky → cracks → inverted
 horizon, self ploughing.
 only to have ↑ Potash. ↑ lime, ↓ N₂, ↓ humus.
 ↑ retention due to ↑ clay. → ↑ salinity.
 cotton needs ↓ rain but ↑ H₂O at roots. (Prone to
 Pest, H₂O intensive etc).
 TN black soil due to weathering of gneissic rocks.
 Upland black soil → ↓ fertile, ↓ fine.

LATERITE **ZONAL** **OSISO** leached, oxides of Fe, Al.
 Found on slopes → ↓ profile, ↓ humus (bacterial activity)
 acidic → ↓ fertile, eron, humi.
 Plantation soil tea, coffee (nilgiri), rubber.
 Highlands / Plateaus { E.G, W.B, nilgiris, vindhya, etc. }

Minor soils (10-15%)

saline / alkaline, desert, Mt, mangrove soils.

Saline / alkaline - A prob 2nd category within Majors.

Reasons: waterlogging, arid-semi-arid (capillary action)
 in N.W Punjab alluvials, black soil [retention], terai.
 Drier areas growing water intensive crops (rice intensi)
 canals. ex: Reh; Kalar; Usar; Khari (Maha).
 Punjab (UP)

Desert: not serozems. azonal. fluvial / loessic. Myt b
 from gobi desert. ↑ nutrients, fine, fertile
 Maru, Rohi, Bagel, w. aravalli.

Mt: lithosol, azonal, spodz at ↑ regions.

Mangrove: coastal, inter-tidal, swamp, marshy,
 hydromorphic, gleiyan → Blue/green patches, thumus
 ex: Karri Peaty. High soil.

Land quality status
 assessment progressed 1990+.
 Land degradation map (2006) by national remote sensing, GIS, GPS, DGL, nbsat, MoA.
water affected (90 MHA), wind (11), saline (7), shifting (5)
 = 113 MHA affected > 30% of TGA.
degradation ≈ 80 MHA (25%).
 Land: Pop. cattle: land. veg/capita holding < 2 ha.
/capita holding of agri land is < 1 ha.

Arid (16% of TGA), semi (35%), sub-humid (16%)
 = ≈ 70% = dry region.

Rain: temporal & spatial variation, seasonal too.
 80% rain in 4 months.

Monsoon

seasonal reversal: onshore rainy, offshore dry.
 by Al-Masudi (Mausim: Arabic word).
 feat of East coasts like N. America (Mexico gulf, Florida), S. China & East China, Japan (temperate monsoon)

Brazil, Africa (Somali, Kenya, Mozambique), Guinea
 North and N/E too. S. Africa (Natal).
 Best in: S. Asia & S. E (Viet, Myanmar & Thai only)

Theories

① thermal theory of differential heating by Halley (1684)
 there are regional, land/sea breeze due to cooling/heating of land not sea.
 → summer [sea → land] winter [land → sea].

② Air mass theory by Fohm.
 these are trade winds that modify under C.F.
 ITCZ move up [25-30°N] → S/E trades move toward equator → deflects R in N → S/W wind
 * N/E trades move in at same time due to ITCZ.
 winters: ITCZ in S. N/E trades → N/W on
 deflecting left in S and rains in Aus.

1-veg ① all tropics should have ↑ rain
 ② Halley didn't explain why only tropical? as L-W diff can occur anywhere. mudtjam blog

③ Föhn cant. explain. y best over S. Asia.
 ④ can explain all feat. [reversal, alternate dry/wet, floods, droughts, burst, variability, spatial & temporal, w. disturbance, tropical cyclones, UT conditions, 2nd eq trough creates $\downarrow P$ in E/IO near $90^\circ E$ off Aus [y no rain then] in April-May.

Temporal variabilities

① Inter seasonal / ~~Inter~~ annual [wet summer, dry winters]

② Intra seasonal [break, w. disturbances].

③ Inter-annual.

Modern theories

① Rookeshwar

Summer $\rightarrow$ Tibetan Plt $\downarrow P$ (strong) (extensive) due to cyclonic surface convergence where air rises & a strong UT divergence. UT IS directs to S. deflects to right (W). Forms TEJ. It sinks at Mascarene $\uparrow P$ cell off Madagascar $\rightarrow$ surface divergence at Mascarene $\rightarrow$ S/W monsoon winds.

• Tibetan Plateau here only $\rightarrow$ best monsoons
 • $\downarrow P$ cell can have variation across T $\rightarrow$ weaker monsoons at times [inter-annual].

② IS theory of YIN In normal years, STWIS at $30-35^\circ N$. It IS in HIM late when sun heat $0^\circ \rightarrow$ bifurcation S/N of HIMS due to altitude & Paris. S. arm of STWIS has a $\uparrow P$ surface $\rightarrow$ blocks onshore winds $\rightarrow$ dry winters.

Summer $\rightarrow$ ITCZ $\uparrow \rightarrow$ wind belts move up & STWIS too. $\rightarrow$ S branch shifts to trans him regions. & merges with N branch. $\rightarrow$ $\downarrow P$ at Tibet due to heating $\rightarrow$ $\uparrow$ acceleration of winds & also due to heating $\rightarrow$ sudden burst. If branch isn't removed $\rightarrow$ delay.

Meandering STWIS $\rightarrow$ creates IS over S. Asia $\rightarrow$ breaks / seasonal variability, intra-seasonal. In winters STWIS brings w. disturbances.

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③ I/O dipole
 El Niño have diff. TAP. W: ↑ P (mascarene) due to sinking limit of Walker cell → warm. E → cold. This gets intensified sometimes [↑ IOD].
 sometimes mascarene develops ↓ P ~~intensified~~
 → opposite of normal [↓ IOD].
 ↑ IOD intensifies monsoon. ~~are~~ Reverse [↑ IOD].
↑ IOD + El Niño → weakens el Niño instead of ↑ drought.

④ El Niño ⑤ La Niña
 ENSO + IOD explain inter-annual variation.
 No 1 theory can explain all cause-effects.
 ⑥ Modoki coupled ocean-atmos phenomenon in tropical Pacific ocean. differs ENSO w/ spatial/temporal / teleconn. characters.
 → warm anomaly in C. Pacific [Not E as thought B?]
 → cold " " W & E.
La Niña modoki C. Pacific cold. W, E warm.
 opp in El Niño-modoki.

ENSO modoki = EN modoki + LN modoki.
 W. USA is wet during el Niño but dry during ENSO-modoki.
 El Niño ↓ cyclones in Arabian while modoki ↑ on Arabian. ↓ in BOB.

Seasons
 Not well distinguished in temperate regions. Primarily in terms of rain, T, wind → 4 seasons.
 ① " Winter 15 Dec - 15 Mar

N/E monsoon (offshore, dry except over TN). cold cond'n, ↑ P in N/W India. But T not as low as other nations at this date as HMs block Siberian winds, peninsular locn. 20-25°C.
Rain: Punjab-Haryana, J&K, Assam, Him, Arun, TN.
 temperate cyclone w/ med. / black sea. < 40cm
 → imp 4 Arab crops, feeds glaciers
 there are weak cyclones in BOB which can get attracted to TN.
 muditjainbleg

- ② Summer: 15 Mar - 15 June
 Land warming up. Monsoonal breeze, ITCZ shifting at locates at foot hills of Hms. 25-30°C
 Continental T > 40°C. coasts moderate, Plat interiors (35-40°). 100, dust storms, convective rains, hailstorms, pre-monsoon showers [Rajbaisahi (WB, Bihar etc), Mango (Kerala), blossom (Kash)]
 ③ Rainy: 15 June - 15 Sept S/W monsoon. PP [15th July] entire [15-July]. cond'n [ITWTSX, ITCZ ↑, onshore winds & not ||, 2nd eq trough merges with

ITCZ & strengthens it. Absence of any → Problems.

- ④ Retreating monsoon 15 Sept - 15 Dec
 ITCZ moving S. cooler cond'n forming ↑P. S/W withdraws, N/E gradually builds up. Rain ends [Pun → UP → MP].
 Water got warmed in late summers → ↑ intensity. Ad of tropical cyclones now in BOB & AS. But due to orientation of winds, BOB branch is more landwards, AS is || to coast.

> cyclones strike E. Turning in BOB is not sharp → no rain in TN but other states get. E also gets cyclones from S/E/A.
 Trop cyclones: on oceans, LH of condensation, mature/die on hitting coast. But carried further landwards due to indented coasts/valleys.
 → Sattpura, amarkantak, Chota etc.
 Some w. disturbance too during the season

Rain pattern

monsoonal. months. Pre-monsoon. w. distb, retreat.

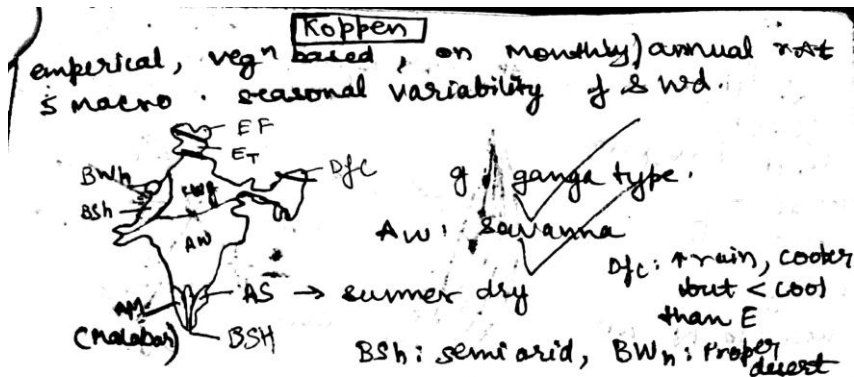
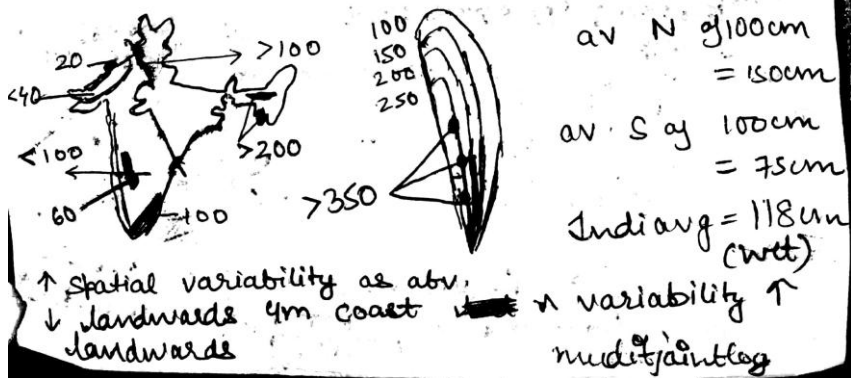
Types

orographic (Primary), cyclonic (both), convective.

Distribution

S/W → bifurcate due to coastline. AS branch intercepted by w. ghats [Malabar rains] → evergreen, leeward dry < 60 cm, < 40 in telangana...
 AS may move || to coast → Rutch Kathiawar rain
 AS may enter landwards along rifts → MP, Guj, Rajasthan, Raj rains.
 Foot hills of Hms, UK.

AS may intercept at Sauravali $\rightarrow$ relatively $>$ humid
 $\rightarrow$ well, forested
 AS may rain at TN via Palghat.
BOB S/W winds dreged N/W & W due to $\downarrow$ P.
 Eghats not as high as W, discont $\rightarrow$ $\downarrow$ rain at coast
 $\rightarrow$ enter lands $\rightarrow$ all nation.
 Intercepted by E-hime, meghalaya > 200 cm
 Phasi (Mawlynam) > 600 cm, tunneling).
 Both branches $\rightarrow$ orographic rains $\rightarrow$ Physiographic control is not latitudinal.



biased to T but 2nd climate is R dependent. He
 dont give imp to physiography [is orographic rain].
 $\rightarrow$ not good for India. T macro classification is not rep
 of India
 ewg: sub-trop climate
 rain used in 2nd level (meso regions).
 H type was later addition. $\rightarrow$ dont rep orographic rain.
 Indian vegn not well rep by map [deciduous].
 Kashmir & UK are not tundra type. Arun
 dont have D type climate.
 E say = Plat interiors (BSh) $\rightarrow$ incorrect.
 Using AM only 4 malabar & Aw for rest is false.
 mudtjam blog

Baran was partly captured by
underlying of Myanmar.

R-r gap formed during him upliftment → filled by alluvial
-ve: ① alluvials of A-I suggest they were part of
diff. systems. I: coarser deps, East has finer.
② If E has fine deps, it can't be source of river.
trans-conti - river

Enayat - Ahmed theory

-ve: ① alluvials of G.I suggest they were part of diff systems. I. coarser depts, East has finer.

② If E has five steps, it can't be source of river.

③ Trans-conti-river.

Enayat-Ahmed Theory

- ① origin in upliftment of hims.
- ② S. Tibet had many rivers even by upliftment.
→ drained into tethys. → tethys contractⁿ → these rivers

were partially blocked by Mt but rivers cut across it (antecedent) → drained into S. tethys sea.

③ foredeep formed → received tibetian. rivers → Plains.
zigzag flow shows that these

③ foredeep formed → shows that these

⑤) ~~6, 4, B~~ course reoriented on upliftments ~~R-G subsidence.~~

R-G subsidence.

NOT Himalayas -

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River-linking

① N. Juvens > 66% of SW

(2) give need of linking.

② give need of dumping.
⑤ Arthur cotton suggested inter basin transfer (1st)

④ KL 900 scheme:

④ KL 900 Schmelz
Dinehar - Dastur (garlands)

2 garland corals

link. ribs of orange → transfer
to w. (N-garland).

to w. (N. garland).
Link Ken, Son, Betna, Maha →
to Kutch (S. garland).



-ves : ① drought not only abt H₂O scarcity. coincide.

② Flood drought seasons coincide.

③ Plains (150m), plateau (900m)

③ Plains (150m) plateau (700m)
④ highlands constraints, overpassing river channel
(E-W) ⑤ Req ↑ power ⑥ submerge forest
⑦ inter country ⑧ deltas affected

4) highness (E=w) 5) Req ↑ power 6) income 7) inter country 8) delta affected. 9) benefits.

⑦ I-S rivers ⑧ inter-country projects.

(10) Internal consensus against large payoffs

CROPS

- wheat, Prod ↑ but land ↓ than rice.
- Rice** Kharif. sown in 1st rains. water intensive. lower ganga plains, Kashmir plains, terai/Haryana (commercial)
- Wheat** Rabi [W, mustard, gram]. Rain < 75 cm. w. disturbance crop.
- Millet** coarse cereals [Ragi (Karn), Jowar, Bajra (W. Raj)] Hardy crops (drought resistant) [E. Raj, S. V. Maha]
- Ragi req. more water. Bajra drought.
- Pulses** Kharif (except gram/चना) leguminous, dinkals, Potatoes, Protein
- Moong (N.E). gram/चना (W. India), arhar (N) urad (S). Now pushed to MP. [due to commercial crops]
- Oilseeds** groundnut (S. Ind + PP), with cotton.
- Mustard (W. Ind, N.W) **Yellow sru**
- sunflower (in S. Ind) (Telangana) **golden short**
- Palm oil (imported 4m. Malaysia, Nigeria).
- Green crops**
- Sugarcane**: Kharif. Rainfed. N plains (UP, Bihar). Pak, Cuba, Brazil → sugar crystal. Ind → jaggery. But India's Productivity = world's.

Shifting to South Kaveri, black soil region.

[irrigation Probs, input intensive, longer growing season in south, tropical climate suits, req ↑ sun. ↑ sugar in south, labour etc.]

Cotton Right abt soil. its probs. how it suits cotton Ahmedabad, Guj plains, mahi/sabarmati plains, S. Kaveri basin, Kurnool, Vidharba, E. Maha etc.

Minor cash crops mudit/jain blog

Tobacco: AP, coffee/tea [nilgiri, W.], assam (tea).

Spices large cardamom [assam, arun], small [W.], clove (W.). chilly (Raj, Kashmir), saffron (Kashmir). Turmeric (AP). abco (Malabar, TN, WB).

