

BIODIVERSITY OF ARUNACHAL PRADESH



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Arunachal Pradesh:

Brief Profile

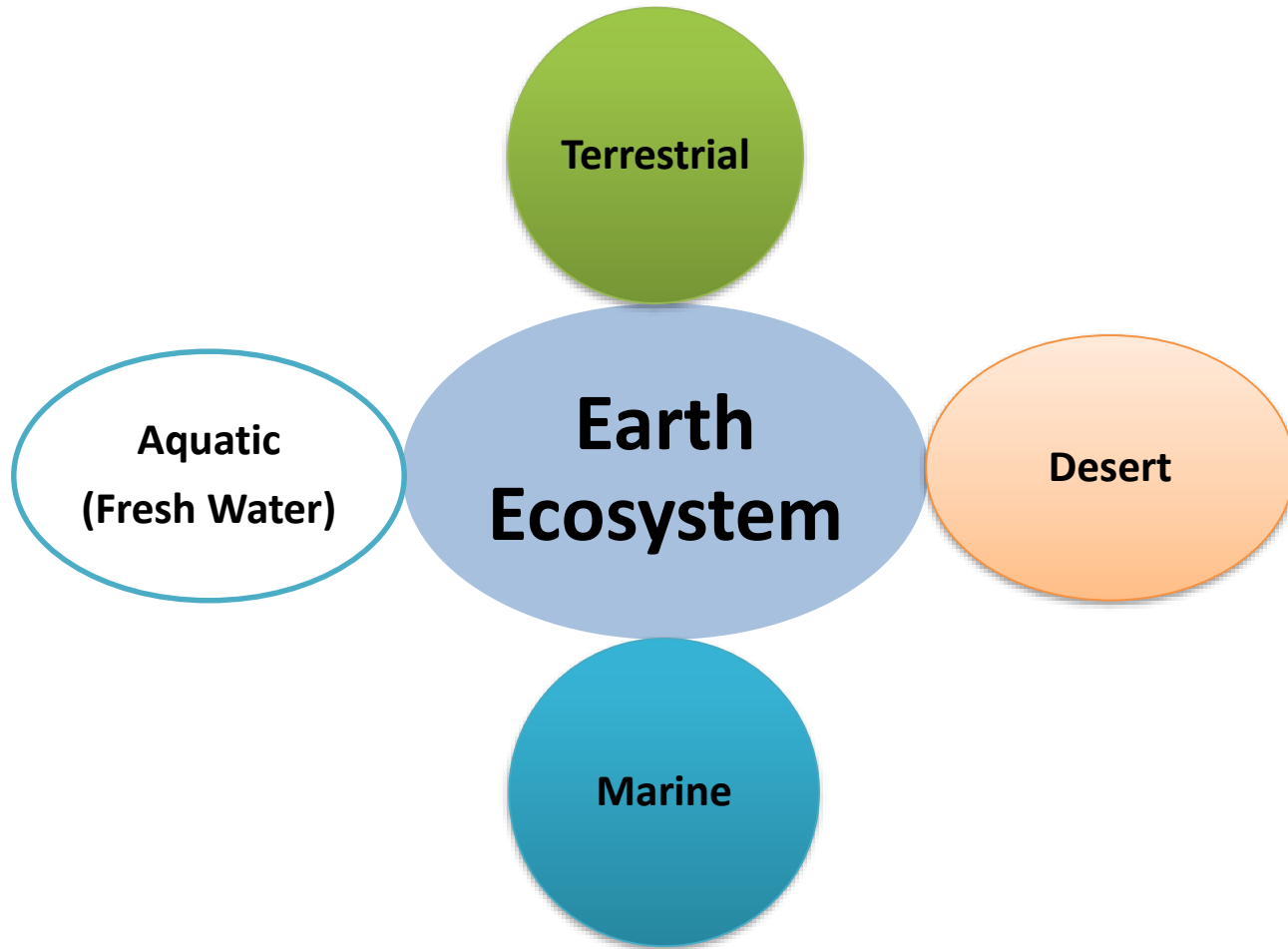
- **Largest State of North East India**
- **Geographical Area of: 83,743 sq.km**
- **Altitude: 100-7000m approx.**
- **Diverse Forest Type & Climate: Tropical to Alpine**
- **Diverse ecological habitat**
- **One of the Top 12 Global Biodiversity Hotspots**
- **Rich Biodiversity – Flora & Fauna**
- **Rich local culture and folklore**
- **There are 26 major tribes, 110 subtribes**
- **Rich Traditional/Indigenous Knowledge System**
- **Rich Herbal Healing traditional**

- State of Arunachal Pradesh is rich in both cultural and biodiversity.
- Forest is rich in endemic plants and animal species of economics, ecological and cultural significance to the region.
- The traditional knowledge heritage and ancient wisdom systems of 26 major tribes and 110 subtribes are contributing towards effective conservation and sustainable utilization of biodiversity.

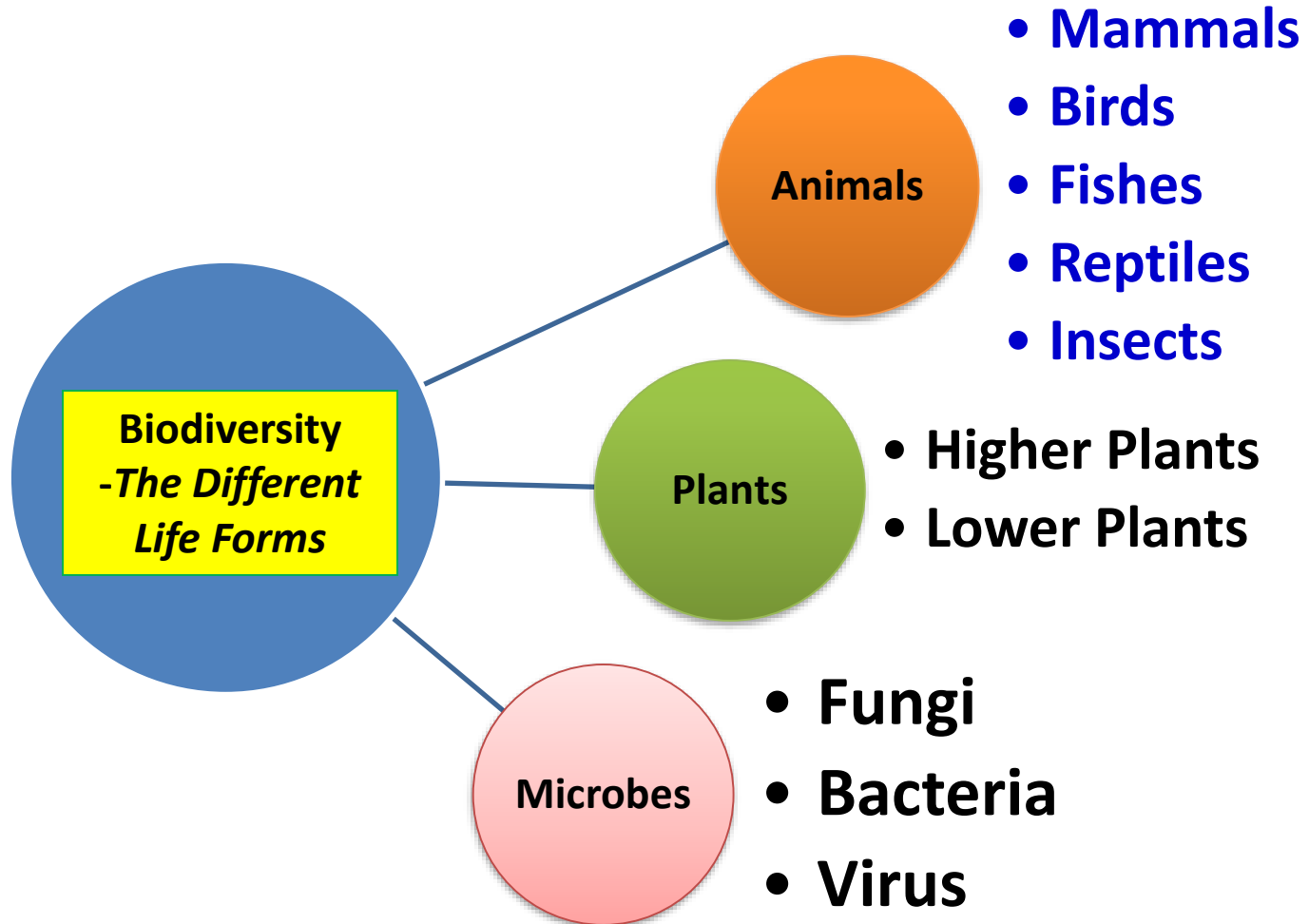
Biodiversity Conservation: Local Community's Perspective

- Tribal communities of Arunachal Pradesh considers Forest Ecosystem and Biodiversity as inseparable and holistic entity.
- The Traditional Knowledge of tribal communities understand that the coordinated function of Forest Ecosystem and Biodiversity is essential to maintain uninterrupted flow of ecosystem Goods and Services

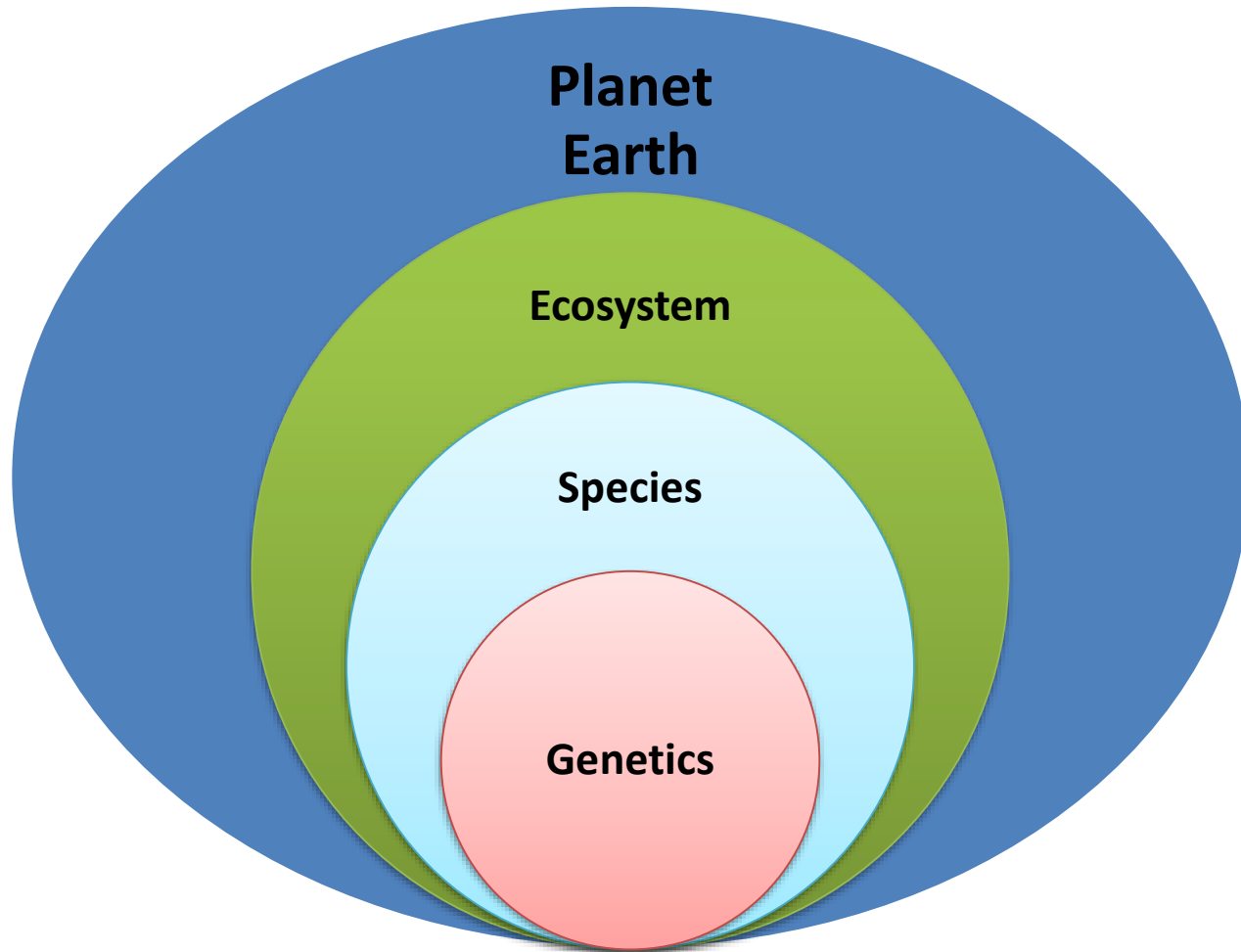
Earth Ecosystems



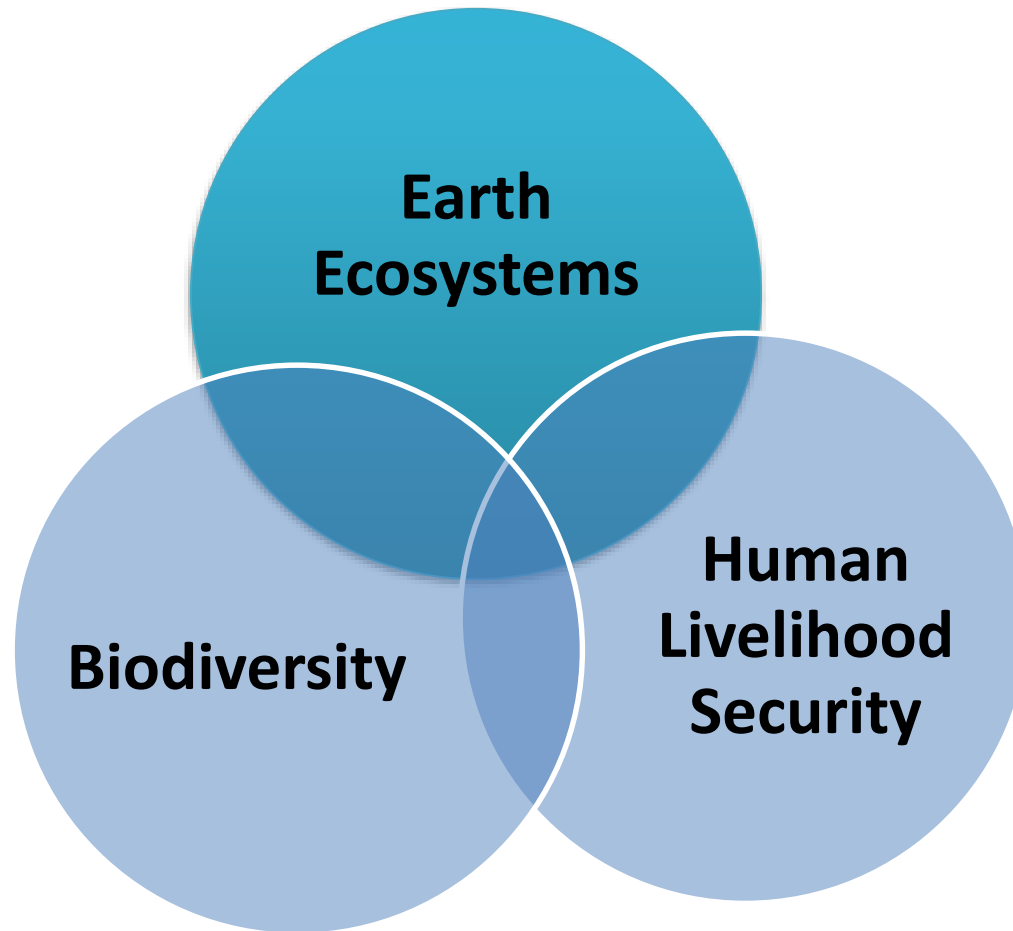
Components of Biodiversity



Level of Biodiversity



Holistic Nexus between Earth Ecosystem, Biodiversity & Human Livelihood Security

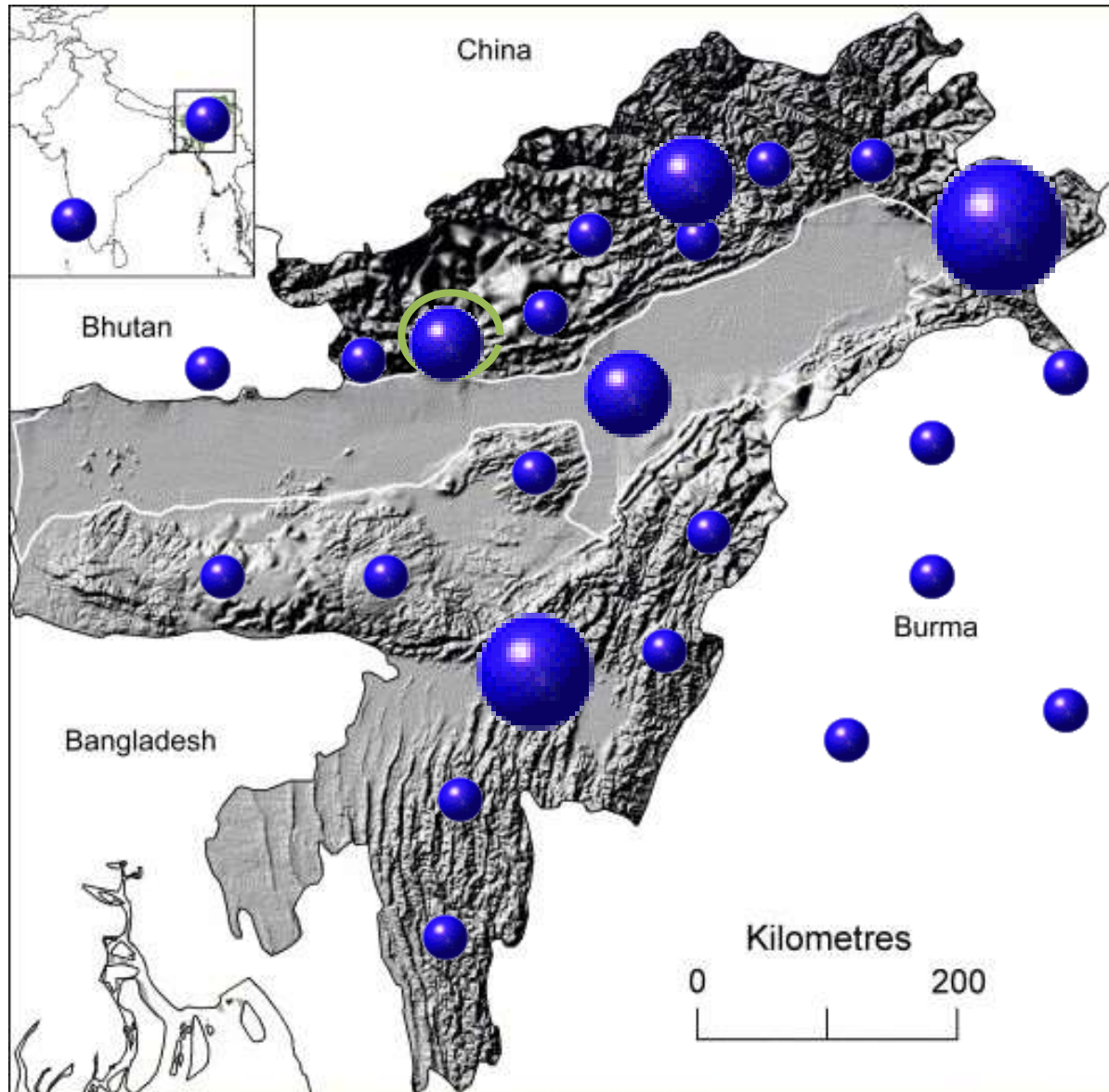


Himalaya & Indo Burma Region: Top 12 *Global Biodiversity Hotspots* (IUCN, 2000)



HIMALAYAN HOTSPOT AND INDO-BURMA BIODIVERSITY HOTSPOT IN NE INDIA

NORTHEAST INDIA:BIODIVERSITY HOTSPOT MAP

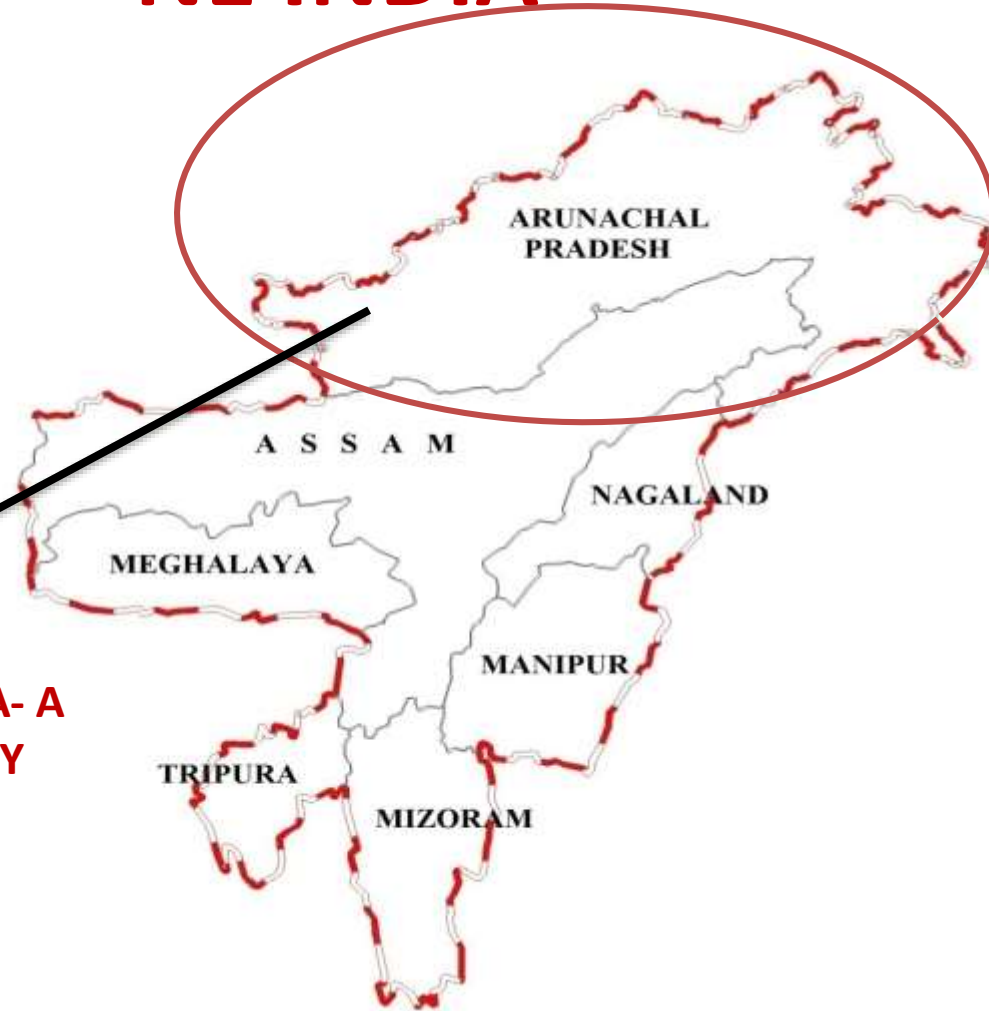


NORTHEAST INDIA:BIODIVERSITY HOTSPOT MAP

Biodiversity Conservation Initiatives in NE INDIA

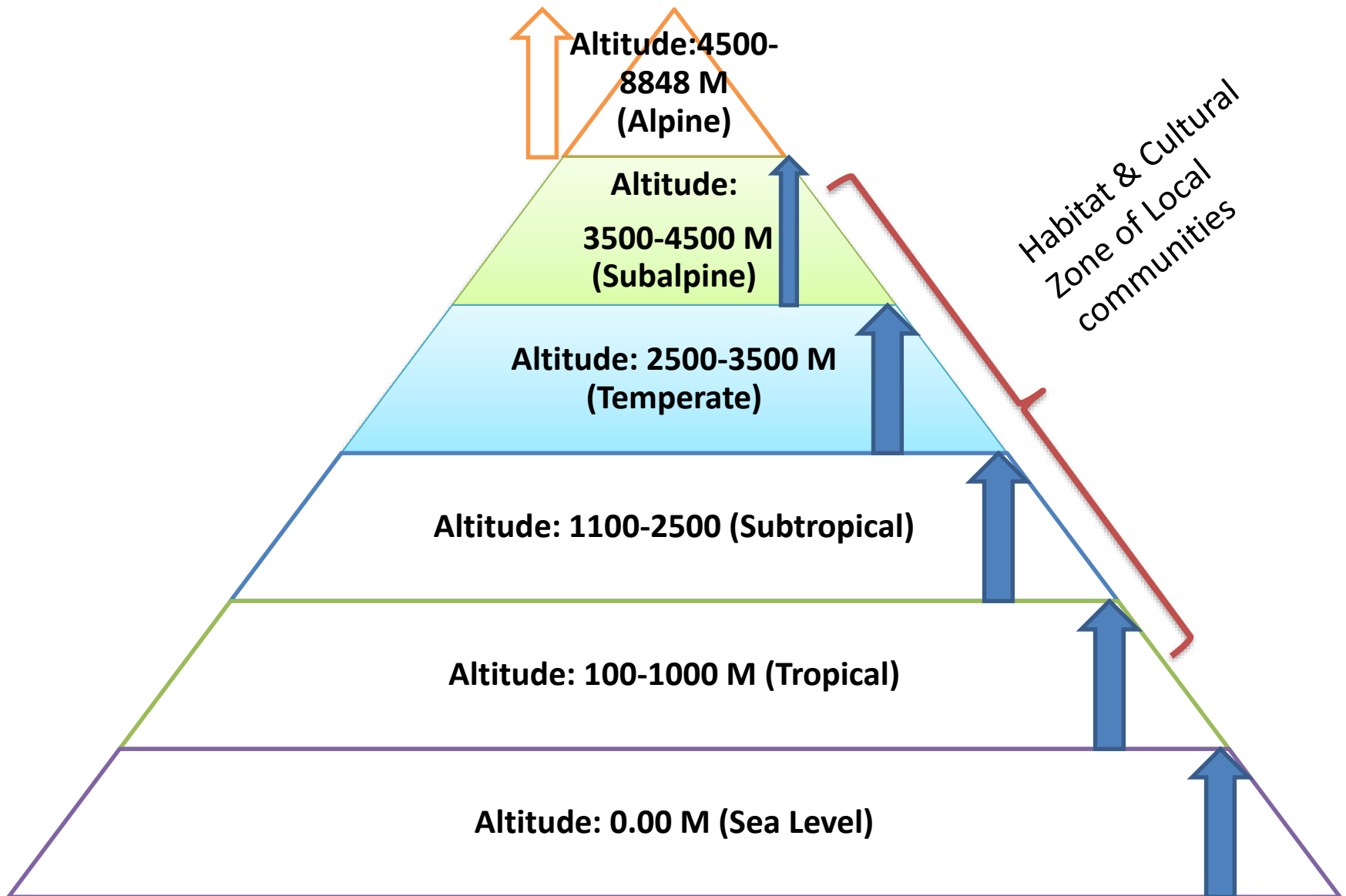


NE INDIA



**ARUNACHAL HIMALAYA- A
GLOBAL BIODIVERSITY
HOTSPOT**

Climatic Zone of Arunachal Pradesh



Forest Coverage & Biodiversity

- The state of Arunachal Pradesh is considered as one of the top 12 Global Biodiversity Hotspots
- It harbors over 5000 species of flowering plants (both vascular and non-vascular origin) out of which 238 are endemic to the state
- The total forest area of Arunachal Pradesh in terms of area is 82,964 sq km which is next to Madhya Pradesh (87,414 sq km) in the country
- According to the India State of Forest Report (ISFR) 2017, since 2015, there has been a substantial decrease in the forest area of Arunachal Pradesh (about 190 sq km per year)

Forest Coverage & Biodiversity.....

- The state is rich in agrobiodiversity and has been a centre of origin for a number of crop plant species. The vegetation/forest are classified under 06 major categories viz. tropical, subtropical, temperate, subalpine and alpine vegetation, secondary forest and aquatic vegetation; each comprising subtypes primarily based on altitude and climate change
- The state has amazingly rich avifauna with over 650 bird species. Out of 16 primates in the world 07 are found in Arunachal Pradesh

FOREST COVER IN ARUNACHAL PRADESH (LANDSAT IMAGE)

Total Area: 83,743 sq.km

Forest Coverage: 80%

Plant Diversity: 8000 sp.



Wildlife Sanctuary & National Park

Plant Diversity in Arunachal Pradesh

Angiosperms (FLOWERING)	5000
Gymnosperms (CONIFEROUS)	39
Ferns	400
Bamboos	89
Rattan & Canes	18
Medicinal Plants	500
Wild & Edible Plants	400
Orchids	605

**INDIGENOUS PLANT
BIODIVERSITY OF High Altitude–
*EASTERN HIMALAYA
LANDSCAPE***



Sela Lake in summer (13700ft)



Alpine herbs- *Megacodon stylophora*



Climbing along altitudinal gradient in Arunachal Himalayas (100 – 4500 m)









Biodiversity – medicinal plants of
Subalpine and Temperate
Arunachal Pradesh

Cirsium sp –alpine medicinal herb (13000 ft)



Abies –subalpine vegetation



Rhododendron



Subalpine Conifer – *Abies* species in winter



Medicinal & Ornamental



Acorus calamus



Cannabis sativa



ARTIMISSIA SPECIES – ANTI-MALARIAL SOURCES



Plantago major

Taxus wallichiana – source of anti-cancer drug



Antimalarial and antidiarrhoeal plant



Good for heart disease



Fertility enhancer and immunomodulatory plant



***Rhododendron flower* – Squash and juices**













Cupress sp.

Impatiens sp. (Ecorestorative sps.)



***Pinus wallichiana* (Oleoresin for eye disease)**
(Himalayan Blue Pine)





Illicium griffithii & *Swertia chirayita*



Traditional Spice & Anti-malarial drug source

***Berberis wallichiana* DC**
(Berberidaceae) – dye yielding source



***Paris polyphylla* Franch**
(Trilliaceae) – anti-cancer



***Rubia cordifolia* L.
(Rubiaceae) – dye yielding**



***Piper pedicellatum* C.DC
(Piperaceae)-Food & medicinal**

Zanthoxylum rhetsa* & *Zanthoxylum armatum
(Rutaceae)



leaf consumed as vegetable, and used as traditional medicine (antiviral and antiseptic)

***Mahonia nepaulensis* DC**
(Berberidaceae) – Dye yielding plant



Panax arunachalensis M. Taram & H. Tag
Fertility enhancer & Antiaging Plant
(Panacea for Humanity)



Conservation of Medicinal Plant Biodiversity & Utilization of Wild Plants

- **Encourage forestry/Forest Gene Bank**
- **Propagate germplasm in natural habitats**
- **Cultivation in degraded community land**
- **Intervention of Biotechnological approach**
- **Product Development**
- **Market channel**
- **Sustainable Economic growth**
- **Better Livelihood of local community**

***Cultivated & Commercial species:
How happy & successful is the owner??***





Mountain Crop Races: Food Security for the High Altitude Local Community



K I W I

(Actinidia deliciosa)





Temperate Orange



Temperate Sugarcane



Aleo vera



Colocasia esculenta



Local Name: Ngaglin

Wild & Edible





Local Name: Shabse

Medicinal plant



Local Name: Nfef

WILD & EDIBLE berries



Medicinal and Ornamental Orchid



ORCHID DIVERSITY IN ARUNACHAL PRADESH



Cymbidium devonianum



Dendrobium transparens



Eria tomentosa

ORCHID DIVERSITY IN ARUNACHAL PRADESH (CONTD...)



Aerides rosea



Coelogyne nitida



Phaius tancarvillei

SOME MEDICINAL IMPORTANT PLANTS



SOME MEDICINAL IMPORTANT PLANTS CONTD...



Begonia roxburghii



Plantago major



Cinnamomum tamal



Zanthoxylum armatum



Mimosa pudica



Diplazium esculentum

Sl. No	Botanical Name	Family	Vernacular names	Part used
1.	<i>Allium cepa</i> L.	Amaryllidaceae	Piyaz	Rhizome
2.	<i>Allium sativum</i> L.	Amaryllidaceae	Losun	Whole plant
3.	<i>Aloe vera</i> (L.) Burm.f.	Xanthorrhoeaceae	Aloe vera	Leaf pulp
4.	<i>Azadirachta indica</i> A. Juss	Meliaceae	Neem	Leaf, Bark
5.	<i>Manifera indica</i> Linn.	Anacardiaceae	Aam ahi	Tender leaves
6.	<i>Centella asiatica</i> (Linn.)	Apiaceae	Ngiiyangakho hamang	Whole plant
7.	<i>Panax pseudoginseng</i> Wall.	Araliaceae	Mishmi teeta	Roots and berry
8.	<i>Crassocephalum crepidioides</i> (Benth.) S.Moore	Asteraceae	Genda hamang	Leaf
9.	<i>Diplazium esculentum</i> (Retz.) Sw.	Athyraceae	Hiika hamang	Young frond
10.	<i>Begonia roxburghii</i> A.DC.	Begoniaceae	Bekhoo, Lukhu	Leaf
11.	<i>Brassica juncea</i> (L.) Czern.	Brassicaceae	Giiyan	Leaf, seed

Ethnobotanical use of some of the medicinal plants in Arunachal Pradesh

Sl. No	Botanical Name	Family	Vernacular names	Part used
12.	<i>Catharanthus roseus</i> (L.) G.Don	Apocynaceae	periwinkle	Leaf
13.	<i>Callicarpa tomentosa</i> (L.) L..	Lamiaceae	Tato, yalu, Yahorin	Bark
14.	<i>Saccharum spontaneum</i> L.	Poaceae	Tapi	Young shoots
15.	<i>Solanum viarum</i> Dunal	Solanaceae	Bengela tang	Fruit
16.	<i>Momordica charantia</i> L.	Cucurbitaceae	Karela/kairu	Fruit and seed
17.	<i>Beta vulgaris</i> L.	Chenopodiaceae	Beet	Root
18.	<i>Ipomoea batatas</i> (L.) Lam.	Convolvulaceae	MithaAloo	Aerial part
19.	<i>Coccinia grandis</i> (L.) Voigt	Cucurbitaceae	Jojuru	Fruits and root
20.	<i>Cucumis melo</i> L.	Cucurbitaceae	Tape	Fruits
21.	<i>Momordica dioica</i> Roxb. ex Willd.	Cucurbitaceae	Bhat kerala	Fruits

Ethnobotanical use of some of the medicinal plants in Arunachal Pradesh (Contd..)

Sl. No	Botanical Name	Family	Vernacular names	Part used
22.	<i>Trichosanthes dioica</i> Roxb.	Cucurbitaceae	Potol	Fruits and roots
23.	<i>Phyllanthus emblica</i> L	Euphorbiaceae	Amloki	Tender leaves
24.	<i>Glycine max</i> (L.) Merr.	Fabaceae	Ammiiperung	Seed
25.	<i>Ocimum tenuiflorum</i> L.	Lamiaceae	Tulsi/Eulochi	Leaf
26.	<i>Cinnamomum tamala</i> (Buch.-Ham.) T.Nees &Eberm.	Lauraceae	Tej pat	Stem, bark, root.
27.	<i>Mimosa pudica</i> L.	Leguminosae	Haniang	Whole plant
28.	<i>Psidium guajava</i> L.	Myrtaceae	Muduri	Leaves
29.	<i>Plantago major</i> L.	Plantaginaceae	Mepi hamang	Root, leaves stem
30.	<i>Zanthoxylum armatum</i> DC.	Rutaceae	Yorkhung	Fruit / leaves

Ethnobotanical use of some of the medicinal plants in Arunachal Pradesh...

Traditional food plant resources & Local Food Security of Arunachal Pradesh



Name of Product:-

Akmar
(Height of Plant)
20-25 Feet.



Importance/Use:-

- i) It is consumed with local wine.
- ii) It is also used as substitute of Albendazole to kill the worms in human body.
- iii) It is also used as medicine in urine disorder.

SHENGMAR



Importance/Use:-

- i) It is used as hair oil.**

- ii) It is consumed with local wine.**



Name of Product:-

**Shengmar
Plant Height
(10-20 Feet)**

FINMAR



WOORSENG





Name of Product:-

Woorseng

(Height of Plant)

20-30 Feet.

Importance & Use:-

- i) It is consumed as Ghee.
- ii) It is used in worship.
- iii) It is also used in making Jani.

Some Local Foods of Arunachal Pradesh



Churpi (Prepared from Yak Milk)



Wild Guava



Butter Tea



Processed Corn



***Panax bipinnatifidus*
(Ginseng)**



Momo-Made of Yak milk and corn



Landscape, Biodiversity, People & Culture





Indigenous/traditional Science & technology of local community



Daphne papyracea: Source of local handmade paper



Local Name: Shug Sheng

Daphne papyracea: Monpa's paper plant



Indigenous technology!!



Handmade paper ready to be used



Aromatic plant



Local Name: Dugsheng

***Traditional Knowledge - Local culture:
Faith on the power of Mountain God (Phu)
- CONSERVATION OF BIODIVERSITY***



Chilipam Monastery: Buddhism Learning



Mountain Sacred heart at Morshing - Biodiversity Conservation Ethics at Community Level



Life at below Zero Degree



People's Lifeline at subalpine



***Local Faith & Belief system: COMMUNITY FOREST-
NATURE GENE BANK***

Holistic conservation approach recognized worldwide



Community Forest Gene Bank



Temperate coniferous Forest – COMMUNITY GENE BANK REGULATED BY LOCAL CUSTOMARY LAWS



Tawang Monastery- Sheath of ancient learning



Young Buddhist Monk





Different festivals & dresses of Arunachal Pradesh
(Ethno cultural diversity)

**DONYI-POLOISM CULTURAL GROUP OF ARUNACHAL
PRADESH INCLUDES NYISHI WHO WORSHIPS MOTHER
NATURE IN ANCIENT FORM!!**

*Their age-old folklore and mythology bears ethical and
moral philosophy capable of guiding human society in
sustainable developmental path*



But education is must for physical, mental and spiritual health: every child has to pass through this stage of life!!



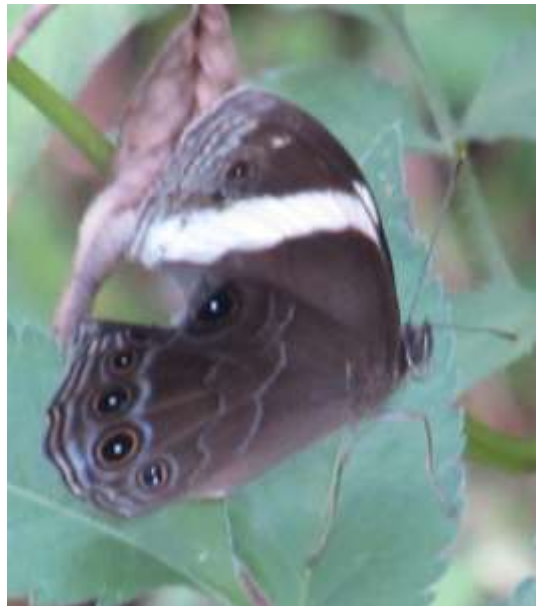


Animal Diversity of Arunachal Pradesh

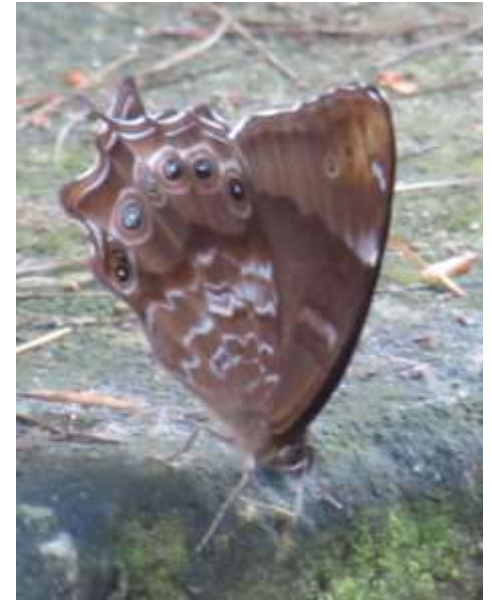
Butterfly diversity in Arunachal Pradesh



Delias belladonna



Lethe verma



Abisara fylla



Junonia iphita



Ypthima sakra



Neptis yerburi

BIRD DIVERSITY IN ARUNACHAL PRADESH



Black Drongo



Mountain Imperial Pigeon



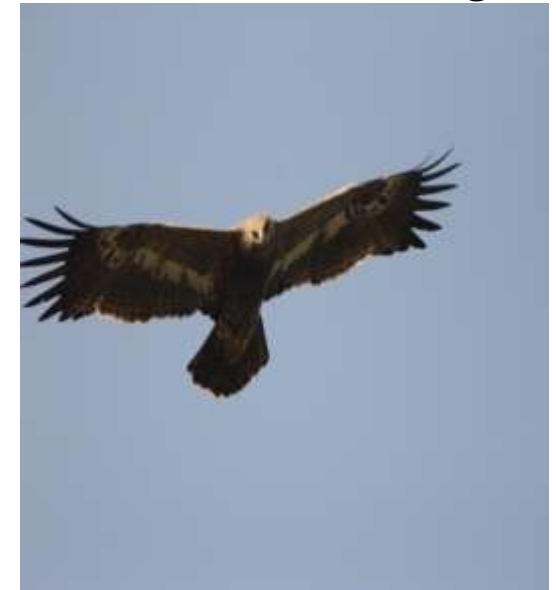
Common Kingfisher



Rock Pigeon



Red Vented bulbul



Wild Eagle

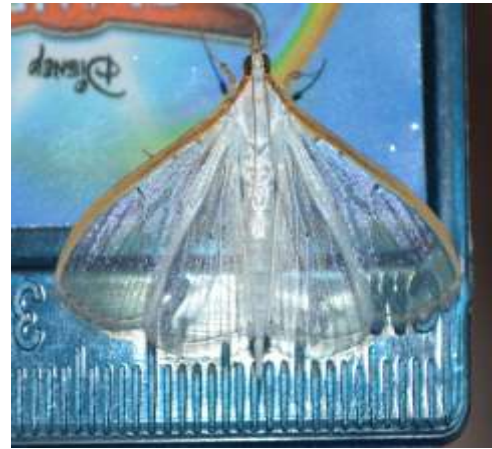
MOTH DIVERSITY IN ARUNACHAL PRADESH



Bradina diagonalis



Cydalima laticostalis



Cydalima sp.



Tridrepana sp.



Eustroma sp.



*Numenes
patrana*



Cyana sp.



Cratonotos tran

FISH FAUNA IN ARUNACHAL PRADESH



Amblyceps apangi



*Glyptothorax
pantherinus*



*Pseudecheneis
sirenica*



Exostoma labiatum



Acanthocobitis botia



Schistura Savona



Aborichthys kempfi



*Poropuntius
clavatus*



*Botia
almorhae*

FROG DIVERSITY IN ARUNACHAL PRADESH



imnonectes limnocharis



Rhacophorus bipunctatus



Polypedates



Euphlyctis cyanophlyctis



Duttaphrynus melanostictus



Hoplobatrachus tiger

Intervention of Biotechnology in Bio-productivity & Food Security



Handsome Male Yak – Friends of Monpa





Mithun (*Bos frontalis*): State Animal



Pristine glory of Arunachal Pradesh

Nature's Biotechnology!!!



***Nature's Biotechnology: Life of Migratory Bird at
alpine lake in Tawang Region***



Thanks

