

RPS Ekologi Wallacea, HUT 3521, 2(2-0), Semester V, Wajib

Hari dan Jam Kuliah : Selasa, Jam 15.⁰⁰-16.⁴⁰

Ruang Kuliah 01 - Tutorial

Pertemuan ke - 1

22 Agustus 2024

Deskripsi Mata Kuliah Ekologi Wallacea

Mata kuliah Ekologi Wallacea mencakup topik bahasan: Kekhususan ekologi Wallacea, Bioregion Dunia dan Ekoregion Kawasan Wallacea, Penelusuran secara Molekuler Center of Origin dan Radiasi Adaptif Species di Kawasan Wallacea, Ekologi Sub Kawasan Sulawesi, Ekologi Sub Kawasan Maluku, Ekologi Sub Kawasan Nusa Tenggara, Ekoton dan Ekosistem yang Unik di Kawasan Wallacea, dan Sumberdaya Hutan di Kawasan Wallacea dan masa depannya.

CPMK (Capaian Pembelajaran Mata Kuliah)

Mampu melakukan studi ekologi hutan di Kawasan Wallacea berdasarkan pengetahuan mengenai kekhususan kondisi ekologi di Sub Kawasan Sulawesi, Sub Kawasan Maluku dan di Sub Kawasan Nusa Tenggara.

Kompetensi :

Mahasiswa mengetahui keadaan ekologi hutan di Kawasan Wallacea berdasarkan pengetahuan mengenai kekhususan kondisi ekologi di Sub Kawasan Sulawesi, Sub Kawasan Maluku dan di Sub Kawasan Nusa Tenggara.

Pengampu:

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Singkatan:

PHN

TJS

LMR

TCA

Referensi Utama	
1	Whitten. T, M. Mustafa, and G.S. Henderson, 2002. The Ecology of Sulawesi. Published by Periplus Editions (HK) Ltd., 754 p.
2	Monk. K.A, Y. de Fretes, and G. Reksodihardjo-Lilley, 1997. The Ecology of Nusa Tenggara and Maluku. Published by Periplus Editions (HK) Ltd., 966 p.
3	Tomascik. T, A.J. Mah, A. Nontji, and M.K. Moosa, 1997. The Ecology of the Indonesian Seas Part 2. Published by Periplus Editions (HK) Ltd., 745 p.
4	Burung Indonesia, 2014. Ecosystem Profile - Wallacea Biodiversity Hotspot. Critical Ecosystem Partnership Fund, 353 p.
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7	Michaux. B, 2010. Biogeology of Wallacea - Geotectonic Models, Areas of Endemism, and Natural Biogeographical Units. <i>Biological Journal of the Linnean Society</i> , 2010, 101 , 193–212.
8	Chuck Cannon, John Harting, Agus Salim and Marcy Summers, 2005. The Vegetation of Sulawesi - Coarse Filter Analysis. Report as Part of the Ecoregional Conservation Assessment, 82 p.
9	Goltenboth. F, K.H. Timotius, P.P. Milan, and J. Margraf, 2006. Ecology of Insular Southeast Asia - The Indonesian Archipelago. Elsevier, 557 p.
10	Whittaker. R.J, and J.M. Fernández-Palacios, 2007. Island Biogeography - Ecology, Evolution and Conservation. Oxford University Press, 401 p.
11	
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1	Turner. I.M, 2004. The Ecology of Trees in the Tropical Rain Forest. Cambridge University Press, 298 p.
2	O'Connor. S, D. Bulbeck and J. Meyer (Eds), 2018. The Archaeology of Sulawesi - Current Research on the Pleistocene to the Historic Period. Australian National University Press, 357 p.
3	
4	

Catatan:

1. Pembagian kelompok diskusi, akan dilakukan pada tahap awal perkuliahan, agar mahasiswa memperoleh waktu belajar dan penguasaan materi yang cukup.
2. Apabila terdapat halangan pada jam jadwal kuliah, kuliah dapat digeser pada pada minggu berjalan, atau memberitahukan kepada tim pengajar lainnya untuk pergantian waktu kuliah.
3. Materi kuliah dilakukan dengan menggunakan pola study case yang didahului oleh suatu pengantar.

Deskripsi Materi:

Materi pembahasan pada topik ini ialah tentang:

1. Prosedur dan persyaratan kuliah,
2. Penyampaian pokok-pokok bahasan, jadwal kuliah dan dosen pengajarnya,
3. Pemilihan ketua kelas dan wakilnya,
4. Pembagian kelompok diskusi,
5. Pendahuluan tentang Ekologi Hutan Wallacea sebagai suatu ilmu dimana kondisi ekosistem alami dan masalah-masalah kehutanan sangat terkhususkan di wilayah tersebut.

Materi pembahasan pada topik ini ialah tentang:

1. Prosedur dan persyaratan kuliah.

Sistem Pembelajaran : Ceramah, Study Case, Diskusi

2. Penyampaian pokok-pokok bahasan, jadwal kuliah dan dosen pengajarnya

Topik, Materi Pembelajaran, jadwal kuliah dan tim pengajarnya

No	Topik	Materi Pembelajaran	Waktu	Pengejar
1	Pendahuluan	- Ekologi Hutan Wallacea sebagai suatu Ilmu - Kekhususan Ekologi Hutan Wallacea - Masalah-masalah Kehutanan di Kawasan Wallacea - Keadaan Ekosistem-ekosistem Alami Saat ini	22-08	PHN
2	Wallacea dan Bioregion Dunia	- Bioregion dunia - Kawasan Wallacea dan Ekoregionnya - Hotspot Area (EBA) - Center of Diversity di Kawasan Wallacea - Keterwakilan dan perimbangan Areal Konservasi di Tiap Sub Kawasan	29-08	TJO
3	Penelusuran secara Molekuler Center of Origin dan Radiasi Adaptif Species di Kawasan Wallacea	- Hipotesis Center of Origin Species di Kawasan Wallacea - Radiasi Adaptif Species di Kawasan Wallacea - Penelusuran secara Molekuler	05-09	TCA
4	Ciri vegetasi Hutan Tropis di Kawasan Wallacea	- Struktur Vertikal dan Horizontal - Komposisi - Epifit, Pemanjat dan Pencekik	12-09	TCA
5	Keanekaragaman Hayati, Endemisme dan Species Penciri di Kawasan Wallacea	- Tumbuhan - Mamalia - Burung - Reptil/Herpetofauna	18-09	LMR
6	Ekologi Sub Kawasan Sulawesi	Topografi, geologi, tanah, iklim, vegetasi, fauna, biogeografi dan ekologi Sub Kawasan Sulawesi	26-09	LMR
7		- Hutan Hujan Tropis Dataran Rendah - Hutan Hujan Tropis Pegunungan - Tipe-tipe Hutan Dataran Rendah yang Spesifik - Areal Konservasi dan Keunikannya di Sub Kawasan Sulawesi	03-10	LMR
8		- Diskusi Kelompok oleh Kelompok 1, Materi Ekologi Sub Kawasan Sulawesi	10-10	PHN
9	Ekologi Sub Kawasan Maluku	Topografi, geologi, tanah, iklim, vegetasi, fauna, biogeografi dan ekologi Sub Kawasan Maluku	17-10	TCA
10		- Hutan Tropis Lembab Menggugurkan Daun Kepulauan Laut Banda - Hutan Hujan Tropis Buru - Hutan Hujan Tropis Halmahera - Hutan Hujan Tropis Seram - Areal Konservasi dan Keunikannya di Sub Kawasan Maluku	24-10	PHN
11		- Diskusi Kelompok oleh Kelompok 2, Materi Ekologi Sub Kawasan Maluku	31-10	PHN

12	Ekologi Sub Kawasan Nusa Tenggara	Topografi, geologi, tanah, iklim, vegetasi, fauna, biogeografi dan ekologi Sub Kawasan Nusa Tenggara	07-11	TJO
13		- Hutan Tropis Kering Menggugurkan Daun Sunda Kecil - Hutan Tropis Kering Menggugurkan Daun Sumba - Hutan Tropis Kering Menggugurkan Daun Timor dan Wetar - Areal Konservasi dan Keunikannya di Sub Kawasan Nusa Tenggara	14-11	TJO
14		- Diskusi Kelompok oleh Kelompok 3, Materi Ekologi Sub Kawasan Nusa Tenggara	21-11	PHN
15	Ekoton dan Ekosistem yang Unik di Kawasan Wallacea	- Ekosistem Estuari dan Hutan Pantai - Ekologi Mangrove - Ekologi Pulau-pulau Kecil - Padang Rumput dan Savana	28-11	PHN
16	Sumberdaya Hutan di Kawasan Wallacea dan Masa Depan	- Kondisi Hutan Saat Ini - Implikasi Teori Biogeografi Pulau - Kepunahan dan Konservasi - Ancaman terhadap Keanekaragaman Hayati di Kawasan Wallacea ((a.) Over-eksploitasi, (b.) Degradasi, Fragmentasi, dan Konversi Habitat, (c.) Spesis Invasif, (d.) Perubahan Iklim, dan (e.) Penyebab Ancaman secara Tidak Langsung) - Skenario dan Visi Masa Depan	05-12	PHN

3. Pemilihan ketua kelas dan wakilnya.

Untuk memperlancar proses perkuliahan, seperti:

- membuat presensi alternatif
- memastikan kuliah akan jalan sesuai jadwal
- dll

Ketua Kelas : LAURENSIUS JISESLI SANDY SUWARNA

Wakil Ketua Kelas : DIKSON RIANDY ADITYA SABAGE

Mahasiswa:

No	Nama	Nim	Kelompok
1	ANDRI PASOMBA	220311070024	1
2	ARDY VITO KAEMONG	210311070022	2
3	CHRISTIAN DAVID PANJAITAN	210311070019	3
4	DENY PERLINDUNGENTA SEMBIRING	220311070007	1
5	DIKSON RIANDY ADITYA SABAGE	220311070034	2
6	ESTER THERESIA SIJABAT	220311070036	3
7	FEBBY RATUMBUYSANG	220311070023	1
8	FELICIA SITAPA	210311070002	2

9	FITRIA JANUARIANTI	210311070011	3
10	GABRENI PAWAI	220311070013	1
11	GEIBY MARENTEK	19031107019	2
12	GLORIA DIRGAHAYU MANGA	210311070005	3
13	H E L M A	210311070008	1
14	HESTIKA ARUAN TASIK	210311070009	2
15	HOLANDO VAN MASSA	220311070014	3
16	INDRIYANI	220311070038	1
17	INTAN PUSPA SARI	210311070012	2
18	JANET ANGELICA YUNUS	210311070013	3
19	JEYS PUTRI SIMBOLON	220311070040	1
20	JOENSI ANDREAS MARBUN	220311070010	2
21	JOSUA RIZKI AUGUSTA	210311070007	3
22	JUMAWATI RANTI BULAWAN	210311070014	1
23	LAURENSIUS JISESLI SANDY SUWARNA	230311070005	2
24	LISTIANTI	230319070045	3
25	MARIA MINTU PAKANNA	210311070003	1
26	MUHAMMAD DWI PUTRA LASANTU	20031107019	2
27	MUHAMMAD TEGAR SAPUTRA	220311070016	3
28	NISTA PAEMBOAN	210311070015	1
29	ONLEE SASUE	220311070011	2
30	PUTRI ARIANTI DAENG MULISA	220311070005	3
31	RIRIN DIAN RAHAYU POLANG	220311070046	1
32	RITA FEBRIANTI	210311070016	2
33	SAMUEL .A. TUKIDJO	210311070021	3
34	TRICHINGWAN NOVELIN MANGOLO	220311070050	1

4. Pembagian kelompok diskusi

Diskusi Kel. I : 17-10
Materi : Materi Ekologi Sub Kawasan Sulawesi
Ketua Kel. I : GABRENI PAWAI
Wakil : GABRENI PAWAI
Moderator dari Kel. II : FELICIA SITAPA
Notulen dari Kel. III : GLORIA DIRGAHAYU MANGA

No	Nama	Nim	Kelompok
1	ANDRI PASOMBA	220311070024	1
2	DENY PERLINDUNGENTA SEMBIRING	220311070007	1
3	FEBBY RATUMBUYSANG	220311070023	1
4	GABRENI PAWAI	220311070013	1
5	H E L M A	210311070008	1
6	INDRIYANI	220311070038	1
7	JEYS PUTRI SIMBOLON	220311070040	1
8	JUMAWATI RANTI BULAWAN	210311070014	1
9	MARIA MINTU PAKANNA	210311070003	1
10	NISTA PAEMBOAN	210311070015	1
11	RIRIN DIAN RAHAYU POLANG	220311070046	1

12	TRICHINGWAN NOVELIN MANGOLO	220311070050	1
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Diskusi Kel. II : 07-11
Materi : Materi Ekologi Sub Kawasan Maluku
Ketua Kel. II : ARDY VITO KAEMONG
Wakil : RITA FEBRIANTI
Moderator dari Kel. III : LISTIANTI/ SAMUEL .A. TUKIDJO
Notulen dari Kel. I : FEBBY RATUMBUYSANG

No	Nama	Nim	Kelompok
1	ARDY VITO KAEMONG	210311070022	2
2	DIKSON RIANDY ADITYA SABAGE	220311070034	2
3	FELICIA SITAPA	210311070002	2
4	GEIBY MARENTEK	19031107019	2
5	HESTIKA ARUAN TASIK	210311070009	2
6	INTAN PUSPA SARI	210311070012	2
7	JOEENSI ANDREAS MARBUN	220311070010	2
8	LAURENSIUS JISESLI SANDY SUWARNA	230311070005	2
9	MUHAMMAD DWI PUTRA LASANTU	20031107019	2
10	ONLEE SASUE	220311070011	2
11	RITA FEBRIANTI	210311070016	2

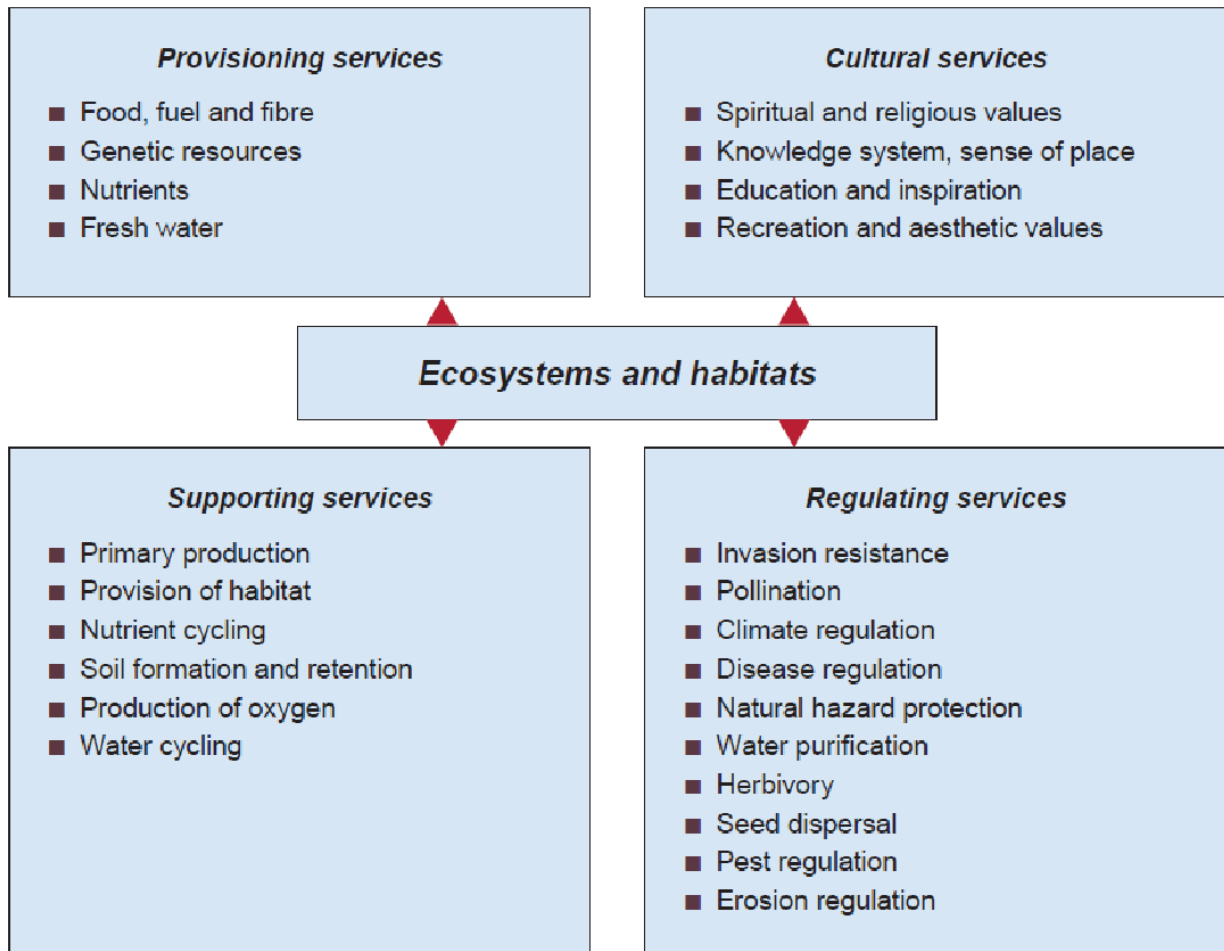
Diskusi Kel. III : 21-11
Materi : Materi Ekologi Sub Kawasan Nusa Tenggara
Ketua Kel. III : JANET ANGELICA YUNUS
Wakil : CHRISTIAN DAVID PANJAITAN
Moderator dari Kel. I : JUMAWATI RANTI BULAWAN
Notulen dari Kel. II : HESTIKA ARUAN TASIK

No	Nama	Nim	Kelompok
1	CHRISTIAN DAVID PANJAITAN	210311070019	3
2	ESTER THERESIA SIJABAT	220311070036	3
3	FITRIA JANUARIANTI	210311070011	3
4	GLORIA DIRGAHAYU MANGA	210311070005	3
5	HOLANDO VAN MASSA	220311070014	3
6	JANET ANGELICA YUNUS	210311070013	3
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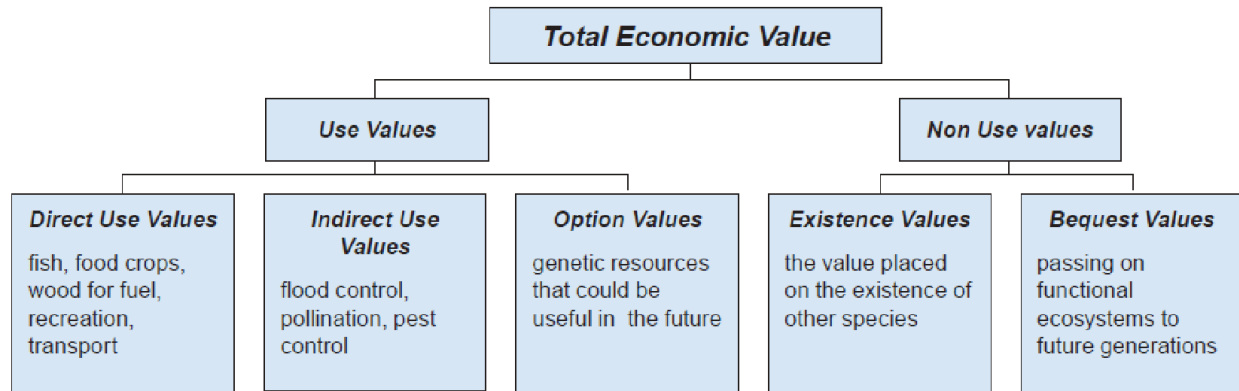
5. Pendahuluan tentang Ekologi Hutan Wallacea sebagai suatu ilmu dimana kondisi ekosistem alami dan masalah-masalah kehutanan sangat terkhususkan di wilayah tersebut.

Ecosystem services are the benefits provided to humans through the transformations of resources (or environmental assets, including land, water, vegetation and atmosphere) into **a flow of essential goods and services** e.g. clean air, water, and food (Constanza et al. 1997).

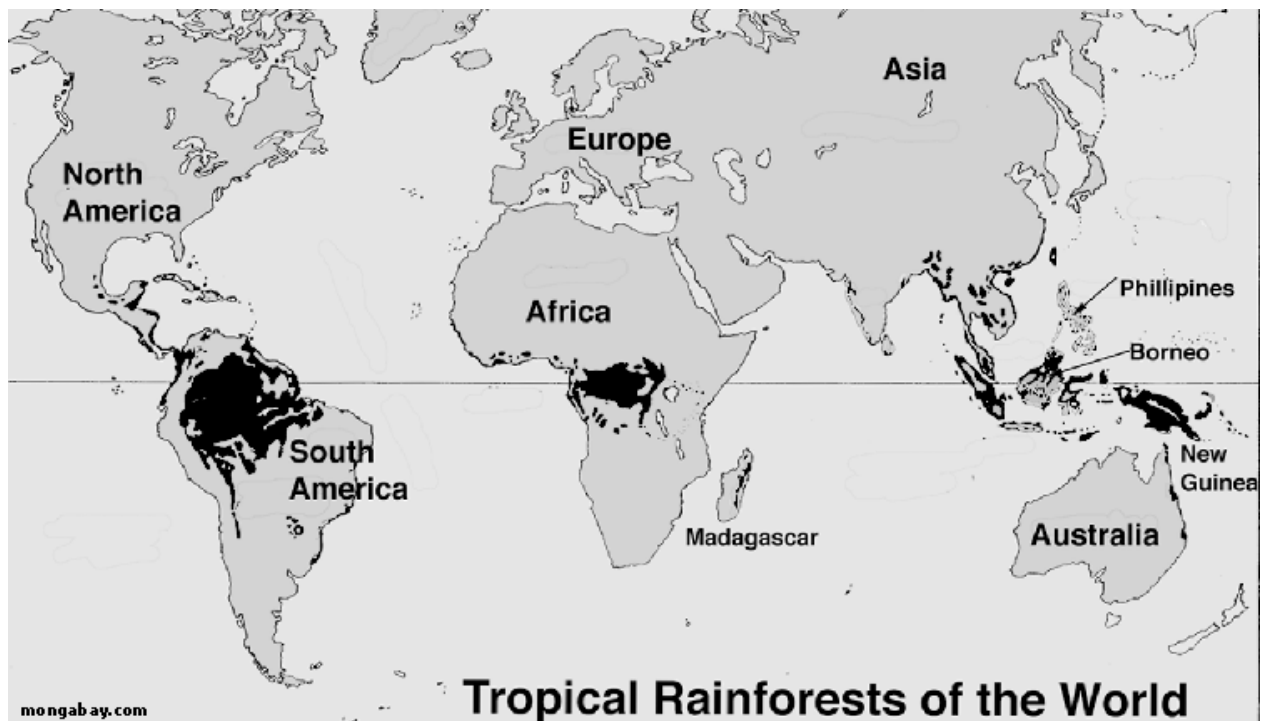
Box 3 Biodiversity's contribution to ecosystem services



Box 4 The components of total economic value

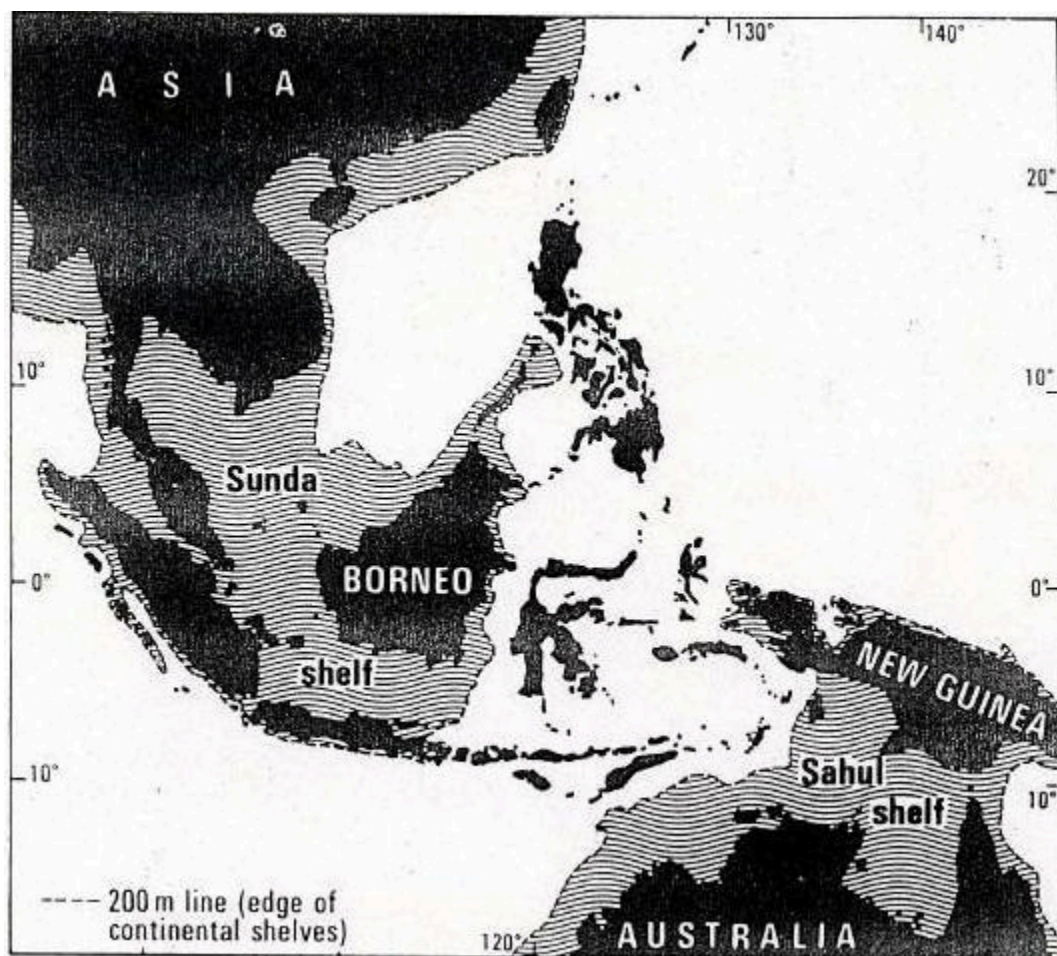


a. Wilayah Geografik Kawasan Wallacea



Tugas:

1. Cari Negara-negara di dunia yang memiliki hutan tropis
 2. Kondisi umum keanekaragaman hayati di setiap negara tersebut.
- Catatan: Gunakan referensi. Tidak boleh menggunakan blog dan wikipedia





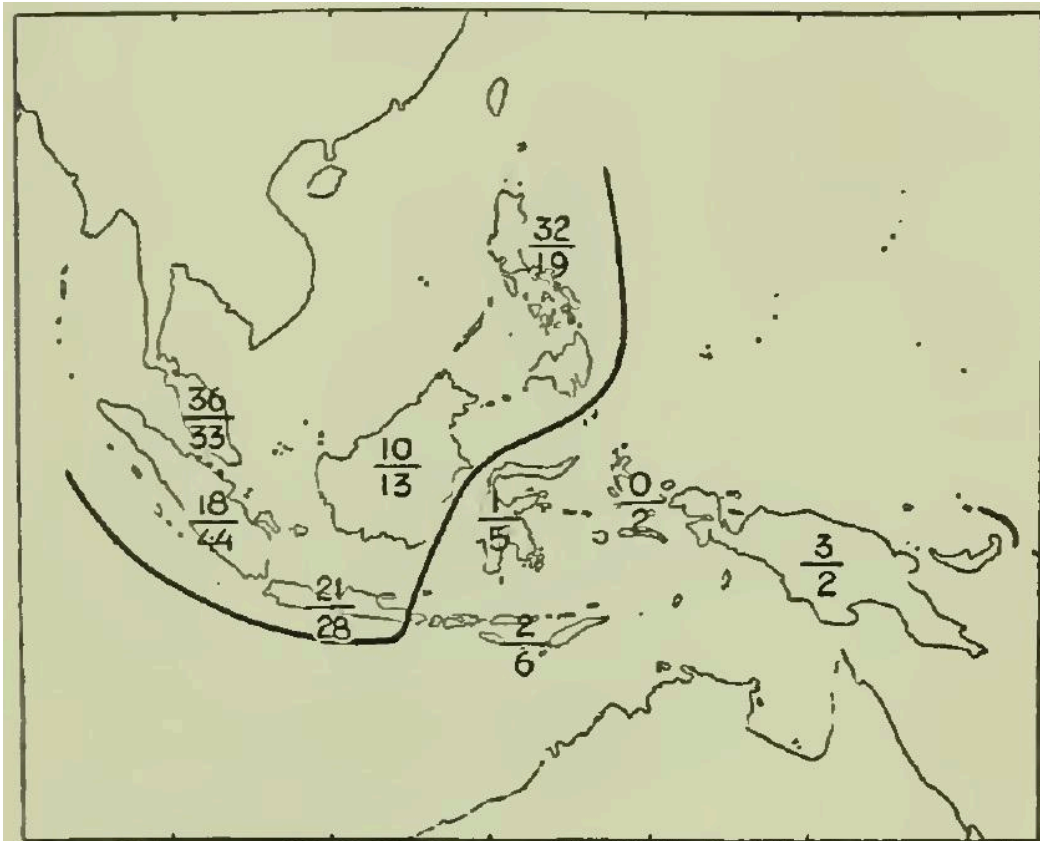


Fig. 5. Numbers of Asiatic-centred genera which are known to occur in Malaysia only in 1 island (figure above the hyphen) or 2 islands (figure below the hyphen), illustrating intensity of 'Asiatic influence' in the Malaysian flora.

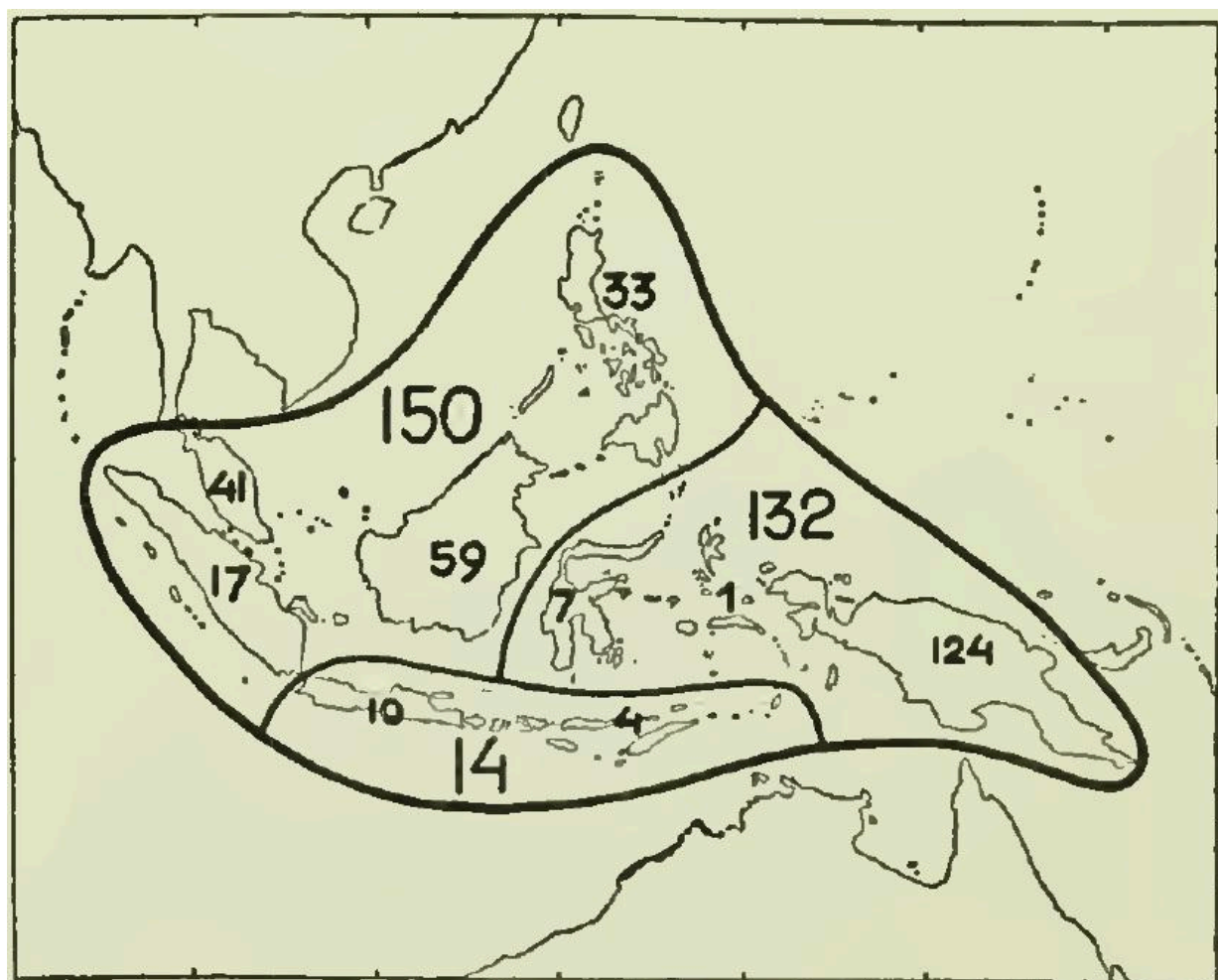
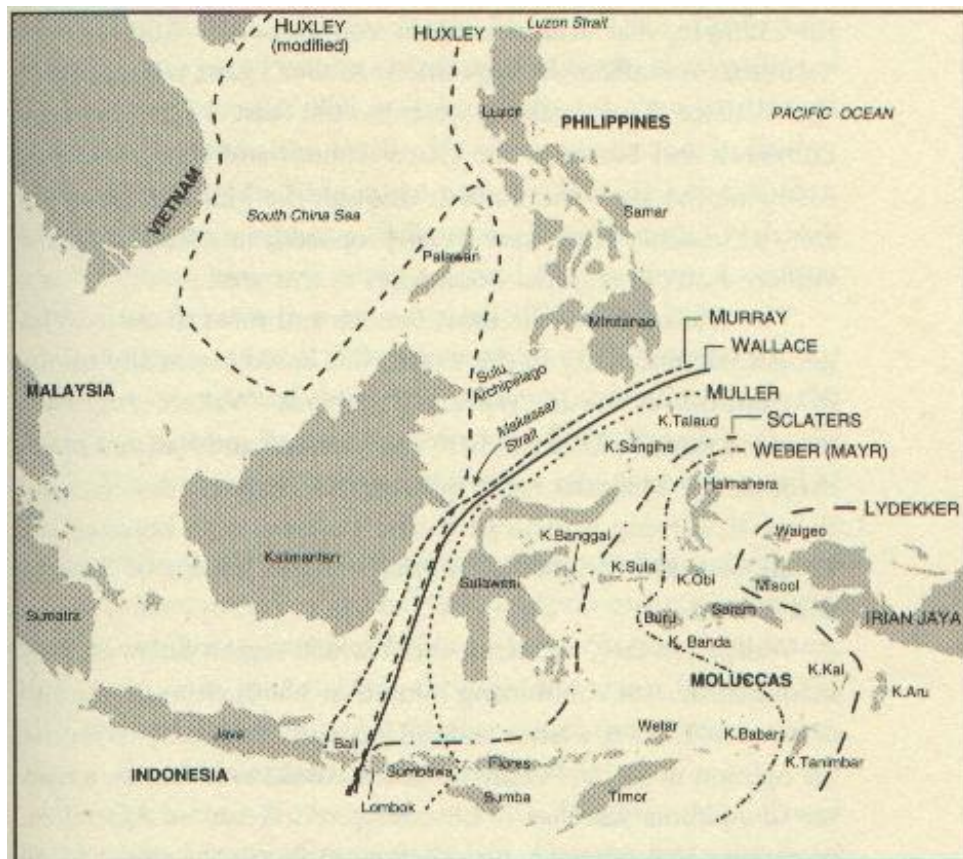
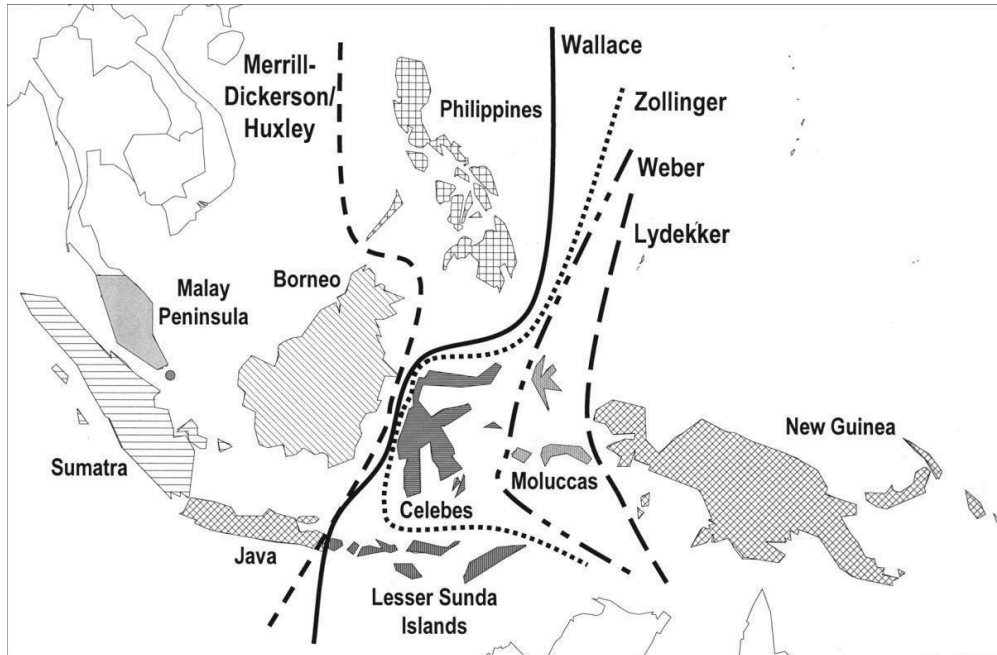
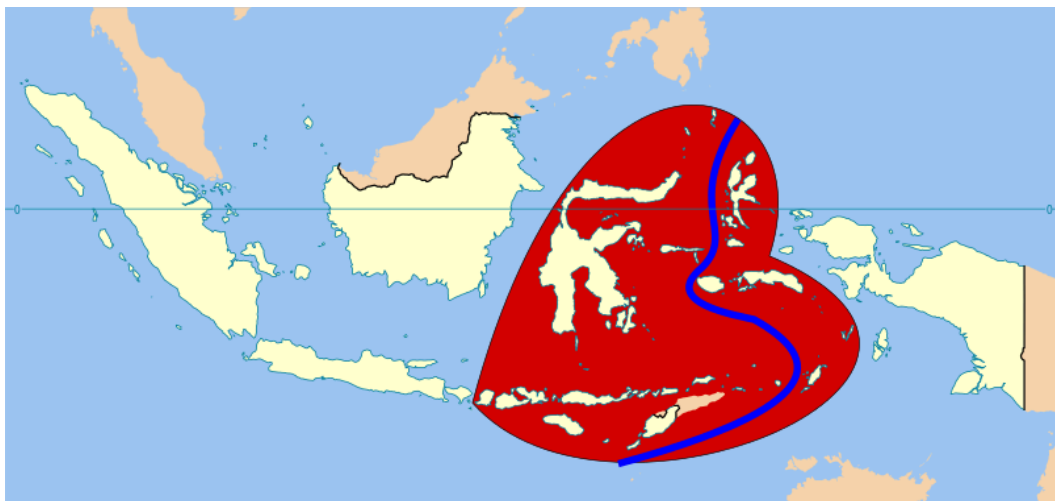
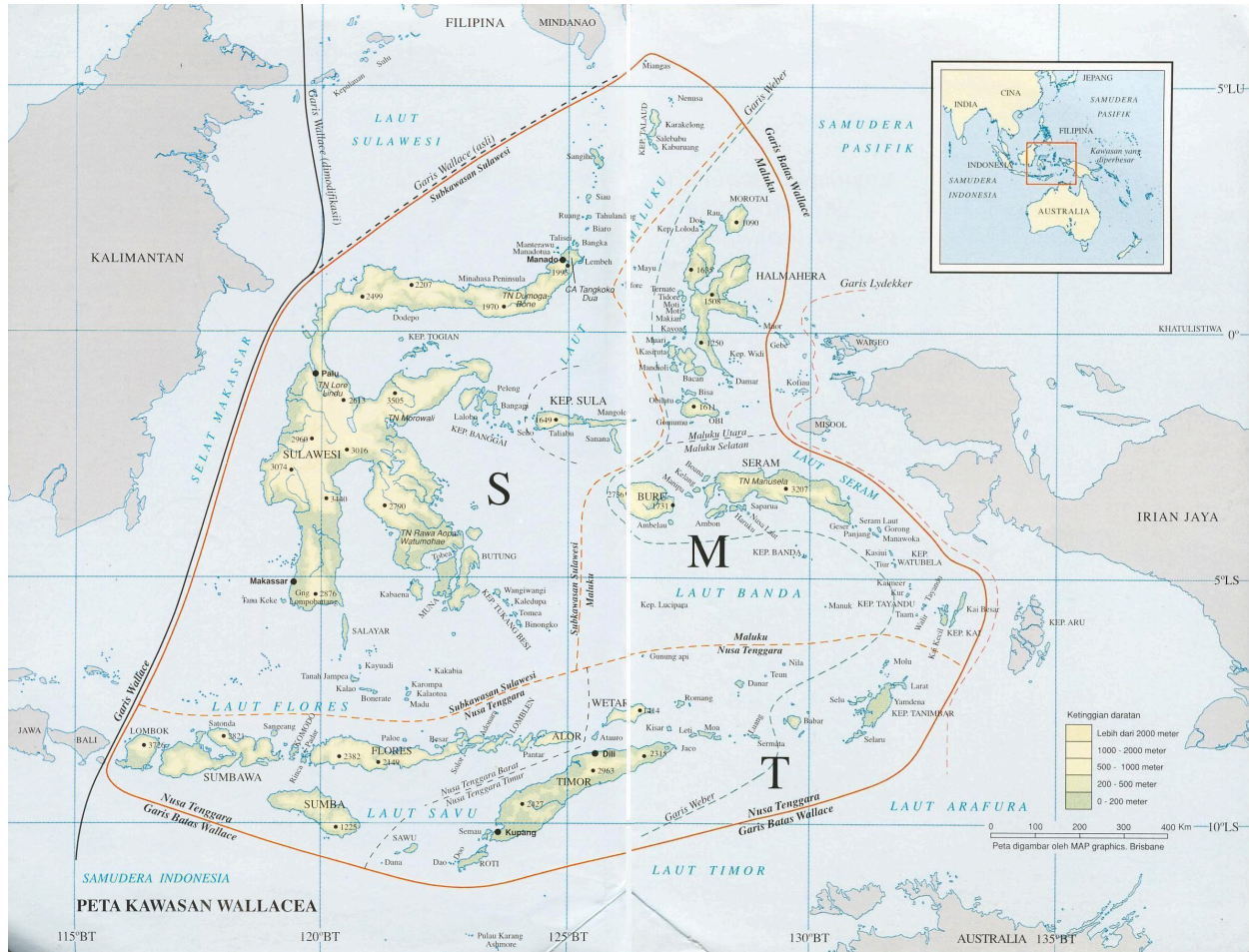


Fig. 1. Number of endemic genera of Phanerogams in the several islands and island groups of Malaysia, according to a census made in 1945.

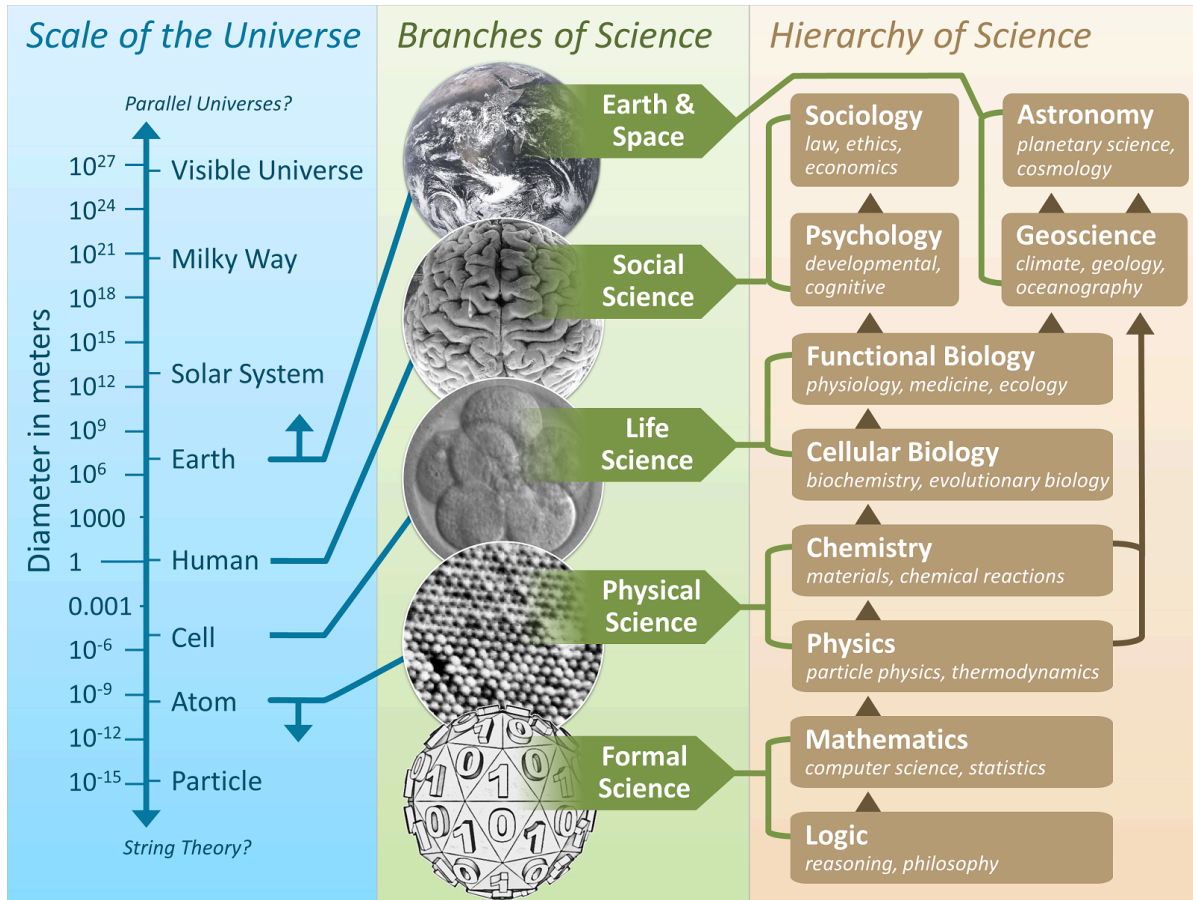


Biogeographic Lines of Wallacea

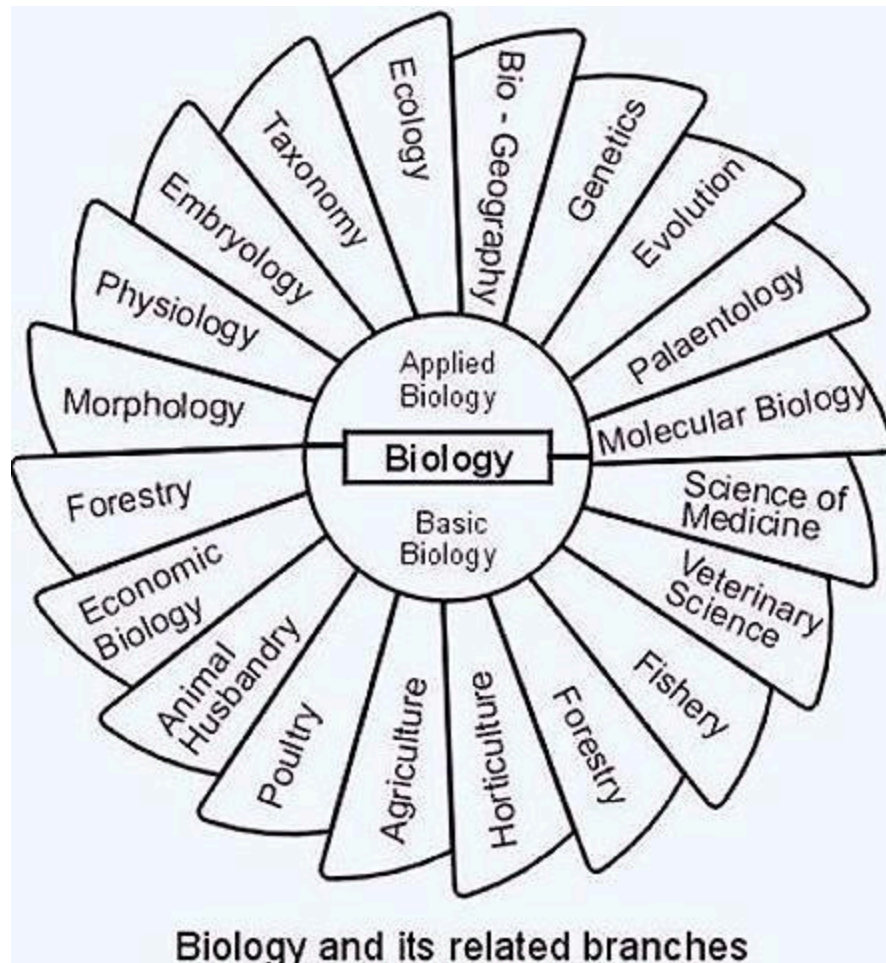


b. Ekologi Hutan Wallacea sebagai suatu ilmu

Cabang Utama Ilmu



Cabang Ilmu Biologi



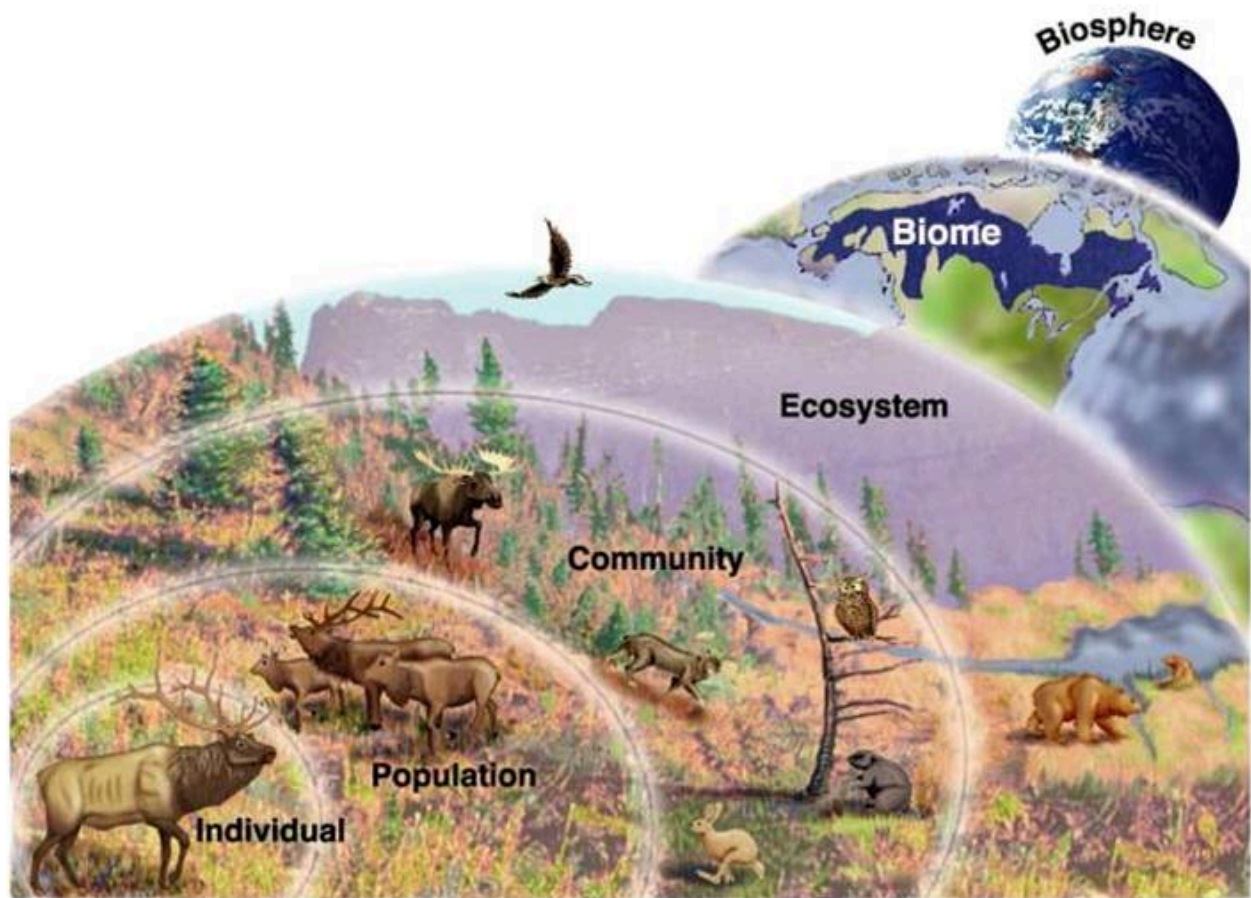
Level dari Life Systems

	Atoms	
A-cellular level and Pre-cellular level	Molecule	Groups of atoms
	Biomolecular complex	Groups of (bio)molecules
	Organelle	Functional groups of biomolecules, biochemical reactions and interactions
Sub-cellular level	Cell	Basic unit of all life and the grouping of organelles
Cellular level	Tissue	Functional groups of cells
Super-cellular level (Multicellular level)	Organ	Functional groups of tissues
	Organ system	Functional groups of organs
	Organism/Individual	The basic living system, a functional grouping of the lower-level components, including at least one cell
Ecological levels		

	Population	Groups of organisms of the same species
	Community (or biocoenosis)	Interspecific groups of interacting populations
	Ecosystem	Groups of organisms from all biological domains in conjunction with the physical (abiotic) environment
	Biome	Continental scale (climatically and geographically contiguous areas with similar climatic conditions) grouping of ecosystems.
	Biosphere or Ecosphere	All life on Earth or all life plus the physical (abiotic) environment (Air, land, fresh water, salt water)

TABLE 1.1 Ecological hierarchy and the structural and functional properties characterizing each level.

Ecological Level	Structure	Function
Global	Biome distribution Atmospheric condition Climate Sea level	Gas, water, nutrient exchange between terrestrial and marine systems Total NPP
Biome	Landscape pattern Temperature, moisture profile Disturbance regime	Energy and matter fluxes Integrated NPP of ecosystems Migration
Landscape	Disturbance pattern Community distribution Metapopulation structure	Energy and matter fluxes Integrated NPP of ecosystems Colonization and extinction
Ecosystem	Vertical and horizontal structure Disturbance type and frequency Biomass Functional organization	Energy and matter fluxes Succession NPP, herbivory Decomposition, pedogenesis
Community	Diversity Trophic organization	Species interactions Temporal and spatial changes
Population	Density Dispersion Age structure Genetic structure	Natality Mortality Dispersal Gene flow Temporal and spatial changes
Individual	Anatomy Genome	Physiology/learning/behavior Resource acquisition and allocation



Scope of Ecology

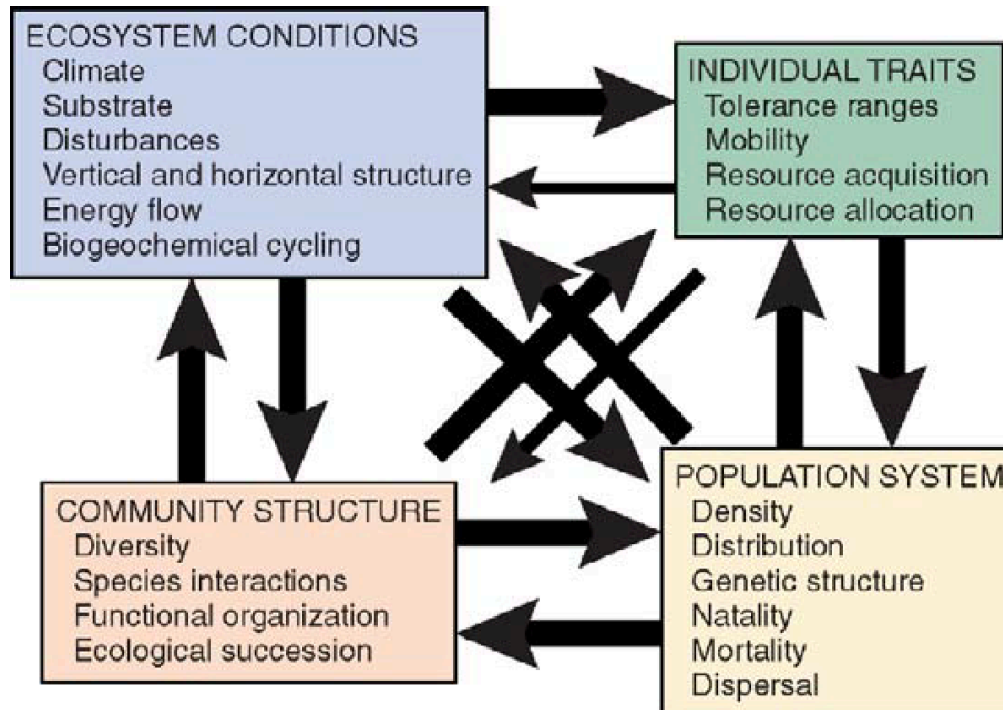


TABLE 5.1 Life history characteristics of species exemplifying the r- and K-strategies.

Attribute	Ecological Strategy	
	r (opportunistic)	K (equilibrium)
Homeostatic ability	Limited	Extensive
Development time	Short	Long
Life span	Short	Long
Mortality rate	High	Low
Reproductive mode	Often asexual	Sexual
Age at first brood	Early	Late
Offspring/brood	Many	Few
Broods/lifetime	Usually one	Often several
Size of offspring	Small	Large
Parental care	None	Extensive
Dispersal ability	High	Limited
Numbers dispersing	Many	Few
Dispersal mode	Random	Oriented

Ekologi Hutan ----- Ekologi Hutan Wallacea

What is science?

1. The intellectual and practical activity encompassing the systematic study of the structure and behaviour of the physical and natural world through observation and experiment.
 "the world of science and technology"

2. A particular area of science.
"veterinary science"
3. A systematically organized body of knowledge on a particular subject.
"the science of criminology"

Karena Ekologi Hutan Wallacea itu merupakan suatu pengetahuan yang memiliki subyek utama pada suatu areal tertentu, dan dapat dilakukan suatu studi yang sistematis secara terstruktur, maka Ekologi Hutan Wallacea itu dapat dinyatakan sebagai suatu ilmu.

c. Kondisi ekosistem alami di Kawasan Wallacea

Kondisi ekosistem alami di kawasan Wallacea, juga dimana-mana tempat di dunia ini, telah mengalami degradasi baik dalam bentuk mutu dan luas.

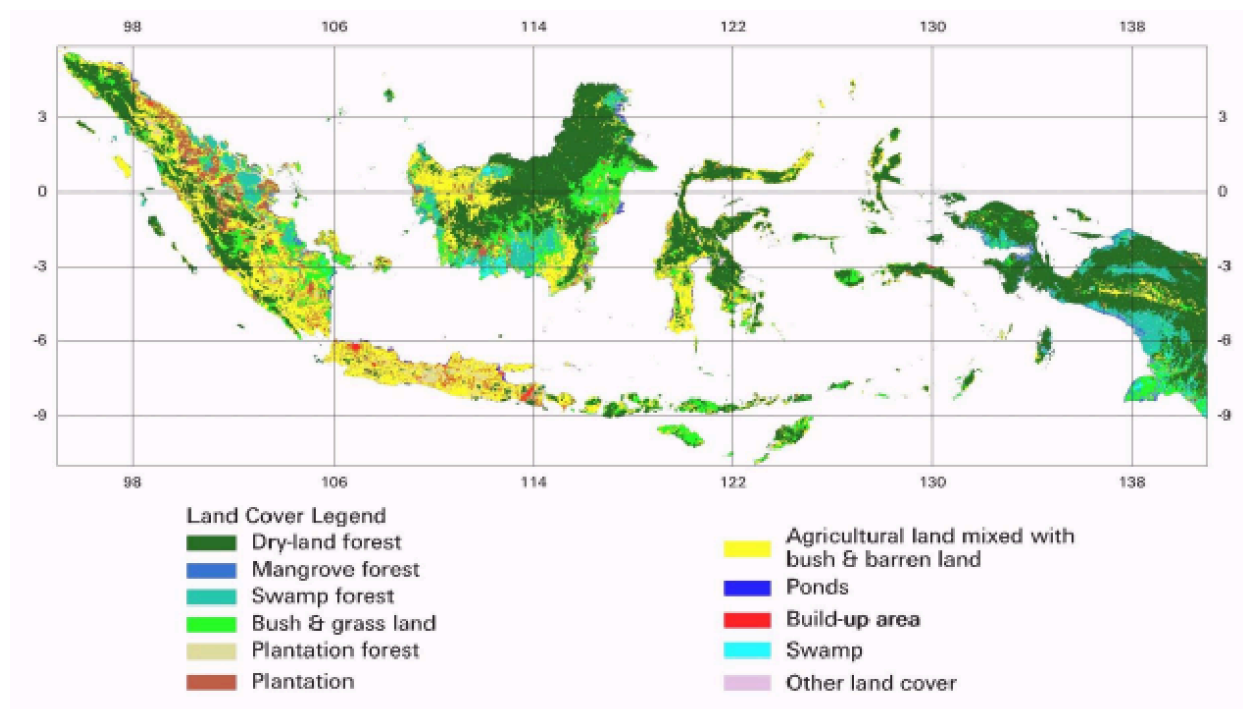


Figure 3.1. Land cover of Indonesia in 2000

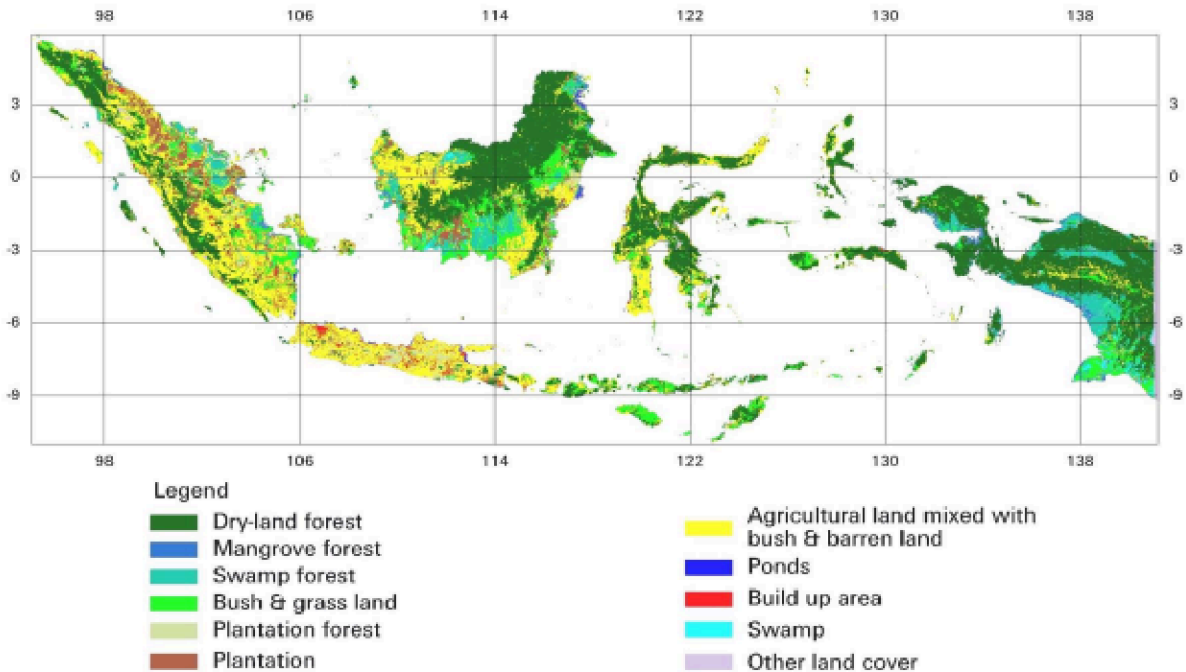
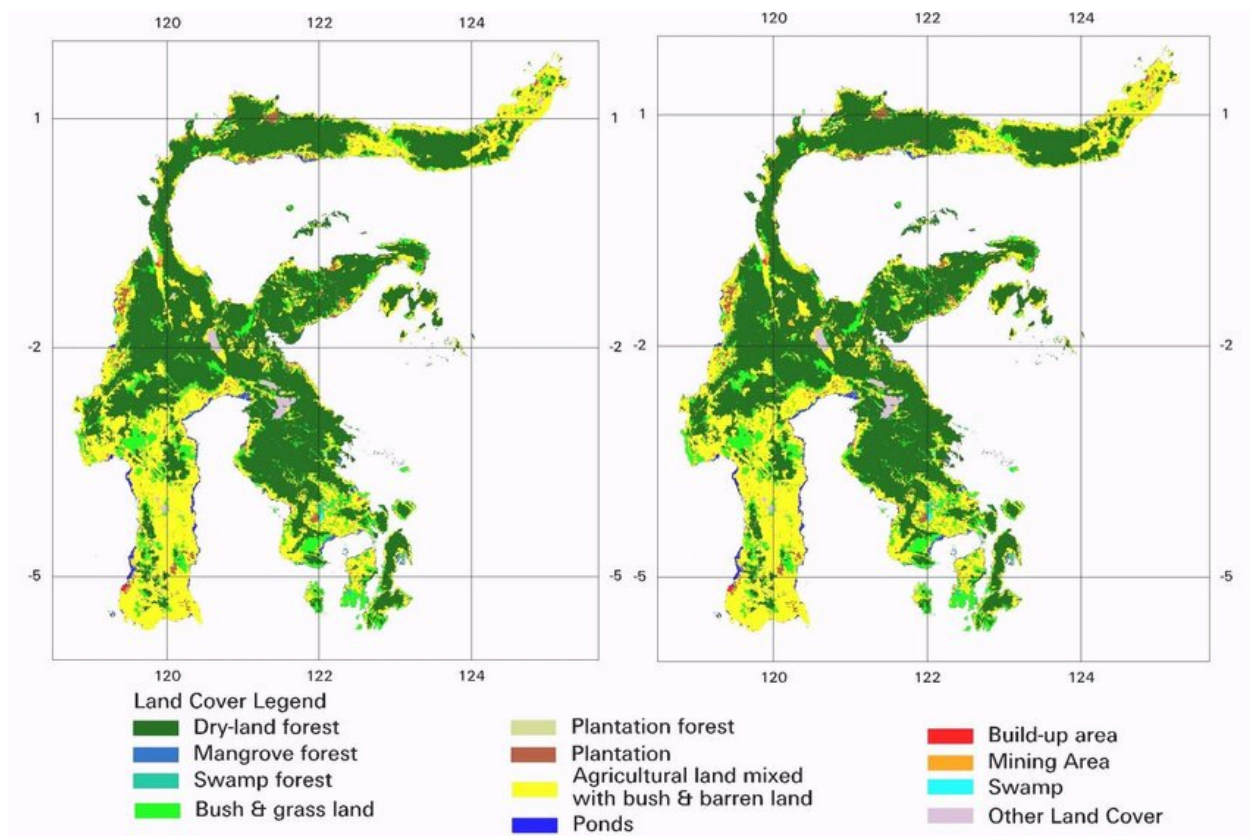


Figure 3.5. Land cover of Indonesia in 2011



Land cover of Sulawesi in 2006 (left) and 2009 (right)

[Hutan](#), [xfeature](#), [xkonservasi](#), [xLingkungan Hidup](#)

Duh, Hutan Indonesia Hilang 1,13 Juta Hektar per Tahun

di 13 December 2014

[f](#) [t](#) [in](#) [✉](#) [🔖](#)



Lima provinsi mengalami deforestasi parah, tertinggi Riau, disusul Kalteng, Papua, Kaltim dan Kalbar.

berdasarkan topik

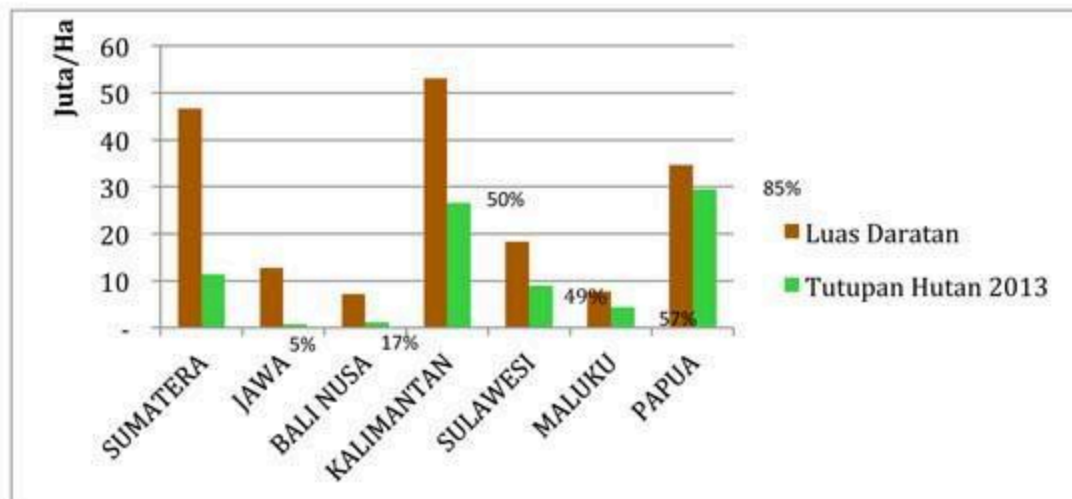
berdasarkan lokasi

Kondisi Tutupan Hutan Alam Indonesia 2009 dan 2013 (ribu hektar)

Pulau	Luas Daratan	Tutupan Hutan Alam 2009	Tutupan Hutan Alam 2013
Sumatera	46.616	12.610	11.344
Jawa	12.743	1.002	675
Bali Nusa	7.137	1.350	1.188
Kalimantan	53.099	28.146	26.604
Sulawesi	18.297	9.119	8.928
Maluku	7.652	4.577	4.335
Papua	34.632	30.006	29.413
Total	180.177	87.074	82.487

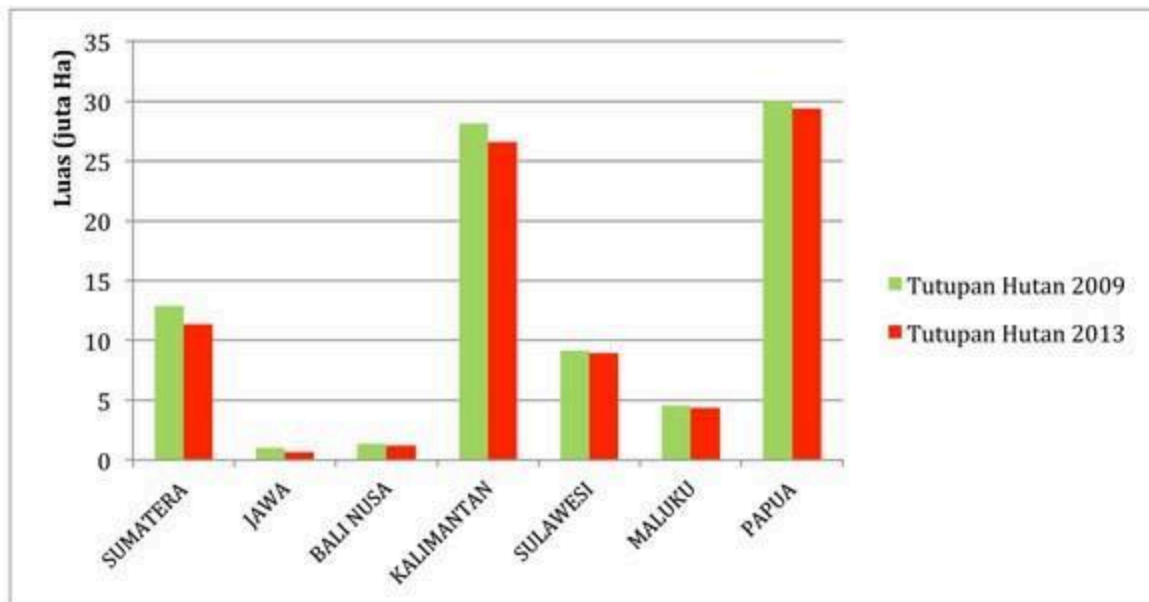
Sumber: Potret Keadaan Hutan Periode 2000-2009; Analisis Citra Satelit ETM+7, 2014

Persentase Luas Hutan Alam Dibandingkan dengan Luas Daratan 2013



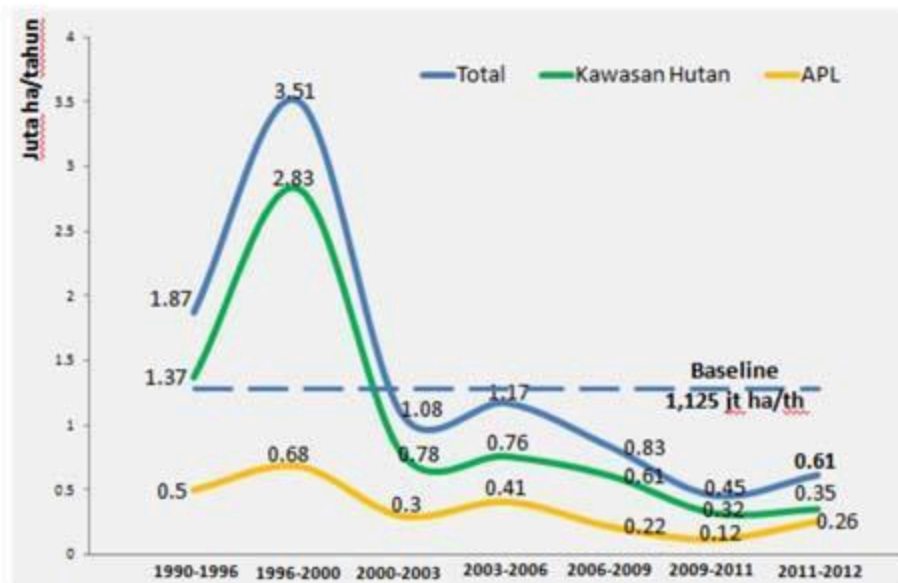
Sumber: Forest Watch Indonesia, 2014

Perbandingan Luas Tutupan Hutan Alam Tahun 2009 dengan Tahun 2013



Sumber: Forest Watch Indonesia, 2014

Deforestasi Indonesia Periode 1990-2012



Sumber: Kementerian Kehutanan 2014. Potret Kondisi Hutan Indonesia, Presentasi dari Badan Planologi Kementerian Kehutanan dalam review eksternal buku Potret Keadaan Hutan Indonesia 2014.

Deforestasi di Indonesia Periode 2009-2013

Pulau	Deforestasi 2009-2013 (Ha)	Persentase Deforestasi Terhadap Luas Tutupan Hutan Alam 2013 (%)
Sumatera	1.530.156,03	12,12
Jawa	326.953,09	32,64
Bali Nusa Tenggara	161.875,07	11,99
Kalimantan	1.541.693,36	5,48
Sulawesi	191.087,23	2,10
Maluku	242.567,90	5,30
Papua	592.976,57	1,98

Sumber: Forest Watch Indonesia 2014

Fakta ??? ----- Tugas... tim pencari fakta...

d. Masalah-masalah kehutanan di Kawasan Wallacea



YouTube

KOMPAS TV · 2 days ago



PENAMPAKAN KOTA HAWAII PASCA KEBAKARAN HUTAN

Penampakan Pulau Maui Hawaii dari Udara Pasca Kebakaran Hutan
Dahsyat

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Uploaded: Aug 11, 2023

HAWAII, KOMPAS.TV - Penampakan Pulau Maui, Hawaii dipenuhi asap-asap di beberapa bangunan pada Jumat, 11 Agustus 2023.



Karena Kawasan Wallacea terletak pada kelompok kepulauan, maka ekosistem hutan di areal kepulauan sangat rentan terhadap kepunahan.

WALLACEA - THREATS

Specific areas of Indonesia and Timor-Leste, Wallacea's two countries, are highly vulnerable to multiple climate change hazards. A warming climate will bring intense rainfall. Sea-level rise will threaten food security, health, water resources, farming and coastal livelihoods, and a wide variety of life forms in forests and the ocean. Other threats to the hotspot include:

SMALL-SCALE AND ILLEGAL LOGGING

Much of the logging in Indonesia is unsustainable, leading to serious forest degradation. In addition, logging roads allow smallholder agriculture and illegal logging to move in.

Unsustainable logging is driven by weak enforcement of regulations on cutting volumes and areas, which is caused by a lack of budget and trained and motivated staff to carry out inspections.

The damage caused to a forest by illegal logging—unplanned, unlicensed and unregulated—depends on the equipment used, the number of people involved, and the whether specific species are targeted. Illegal logging is not always small-scale; in the wave of illegal logging in Indonesia between 2000 and 2005, there were places where gangs of workers and trucks removed large volumes of timber.

In Timor-Leste, wood is used as fuel for cooking, fish smoking and heating by rural and urban households. Efforts to introduce liquefied petroleum gas or kerosene as an alternative have failed to make an impact.

UNSUSTAINABLE SMALL-SCALE FISHING

The use of bombs and poison to catch fish is not a new threat, but has grown in intensity with population growth and the ability of fishermen to travel to more distant areas. The practices destroy the reef and biota within it and—when combined with sedimentation or seawater warming—stress the coral to the point where disease and bleaching result. Once this is widespread, recovery may be very slow, and reefs may flip to algae-dominated systems. The nonspecific nature of bombing means many fish are being taken before they are mature, leading to breeding failure and population decline.

HUNTING AND COLLECTING

Customary communities throughout Wallacea have long used animal and plant products as food, medicines and for a variety of household and cultural purposes. As habitats shrink, human populations grow, and access to markets opens up. This exploitation has sometimes become unsustainable, leading to the decline or local extinction of species.

In addition to capture for local consumption, Wallacea has a long history of supplying natural products that are in demand outside the region. The capture and trade of the Critically Endangered yellow-crested cockatoo (*Cacatua sulphurea*) is an example of a market-driven process that has reduced a once widespread bird to a handful of viable populations.

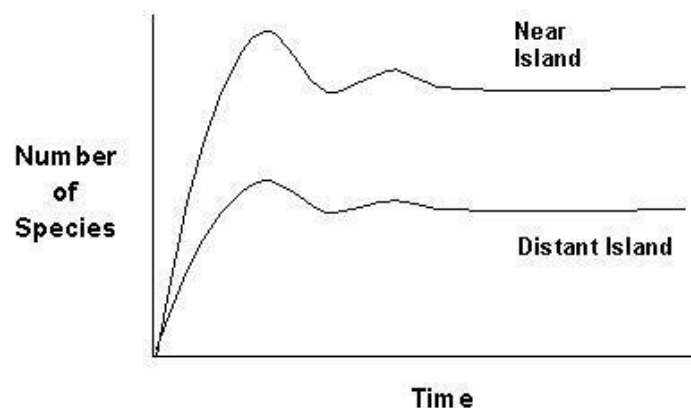
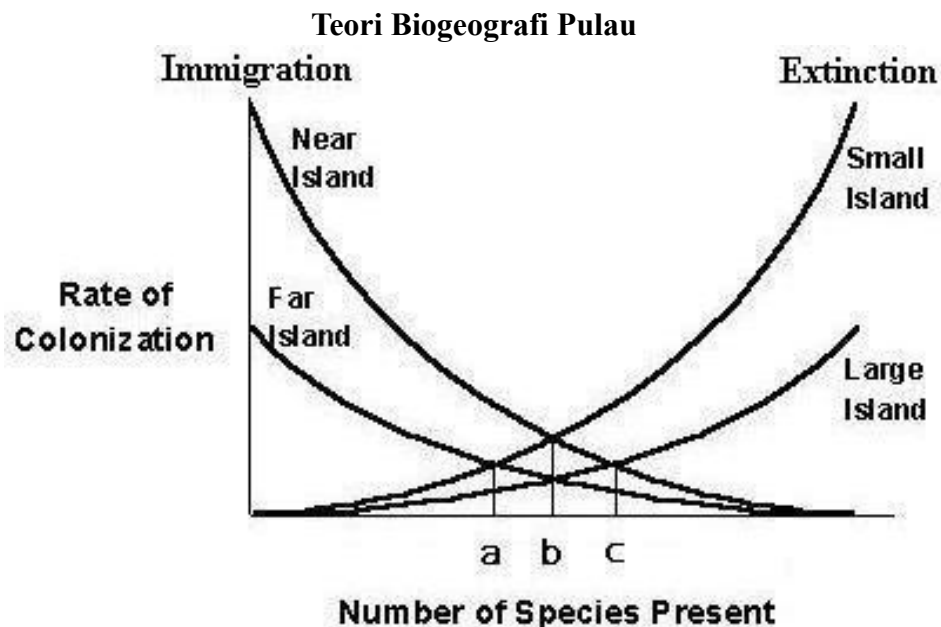
INDUSTRIAL AGRICULTURE AND FORESTRY

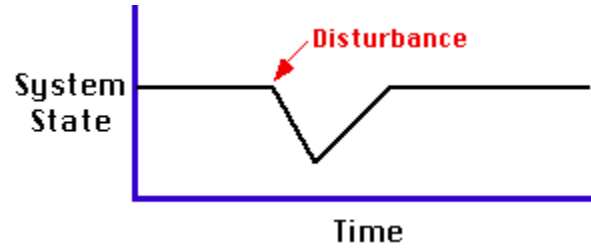
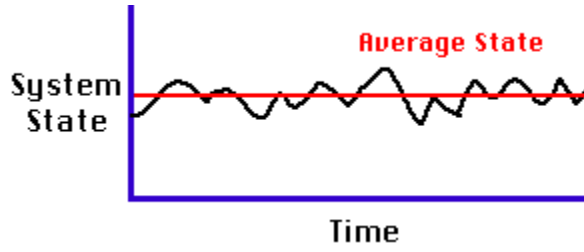
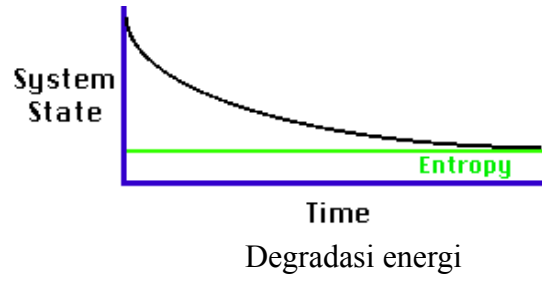
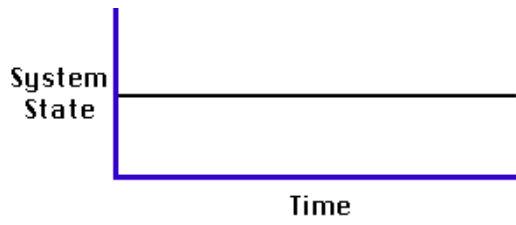
Outside the national forest estate, the expansion of industrial agriculture, predominantly for oil palm but also for sugar cane, is of increasing importance in Wallacea as a driver of land conversion. Inside the forest estate, industrial timber plantations are supposed to be planted in degraded natural forest areas, but in some cases they directly replace natural forest cover instead.

EXPANSION AND INTENSIFICATION OF SMALLHOLDER AGRICULTURE AND LIVESTOCK

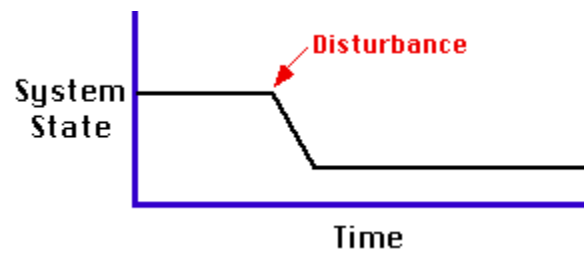
Despite urbanization and the growth of industry and services, Indonesian Wallacea's human population of 30 million is still overwhelmingly dependent on agriculture (and for a subset, fisheries) for their livelihoods.

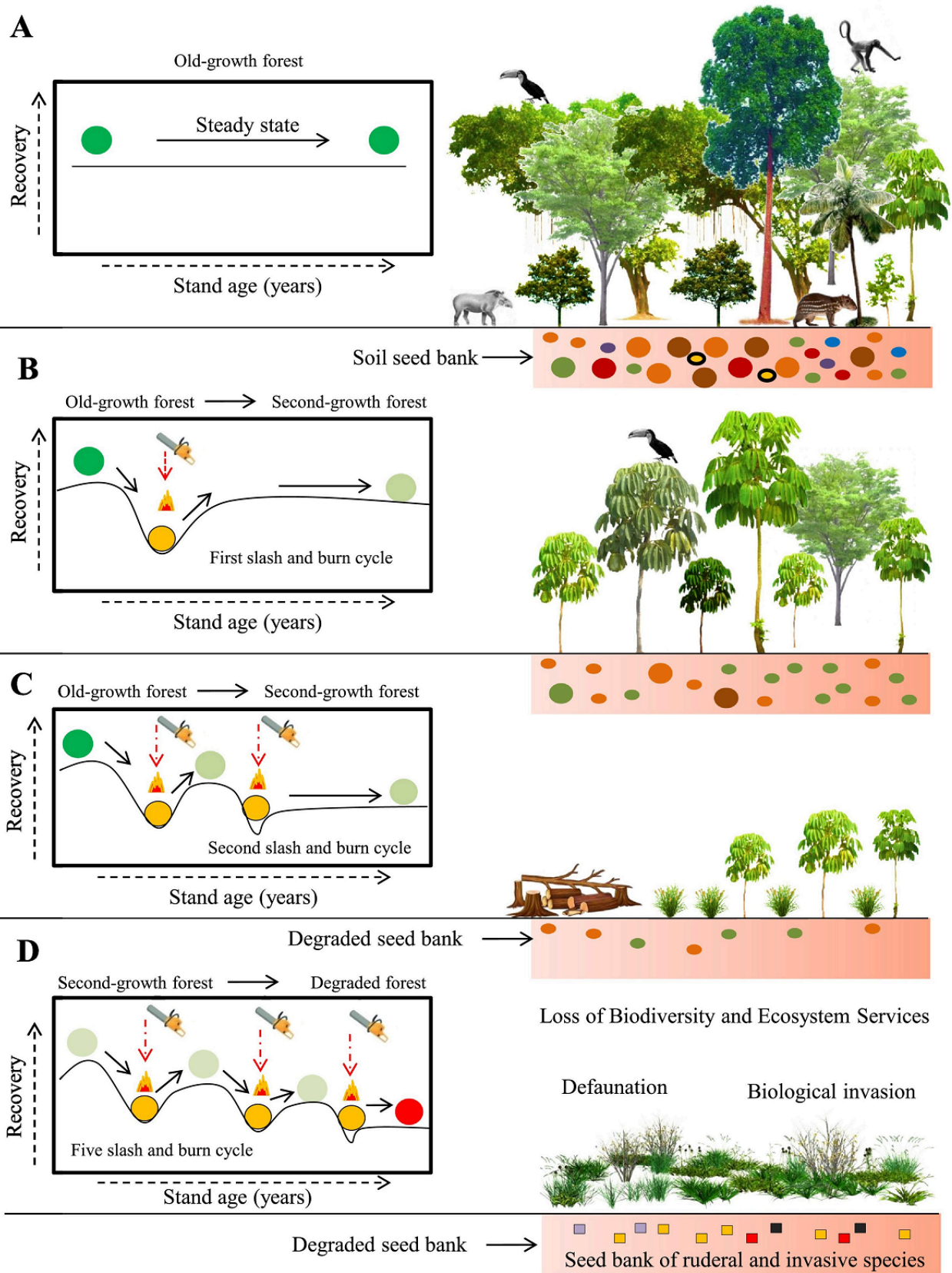
A very high percentage of Timor-Leste's population is rural, and this is unlikely to change within this generation. The population growth rate is high, and pressure on resources is likely to increase with time.





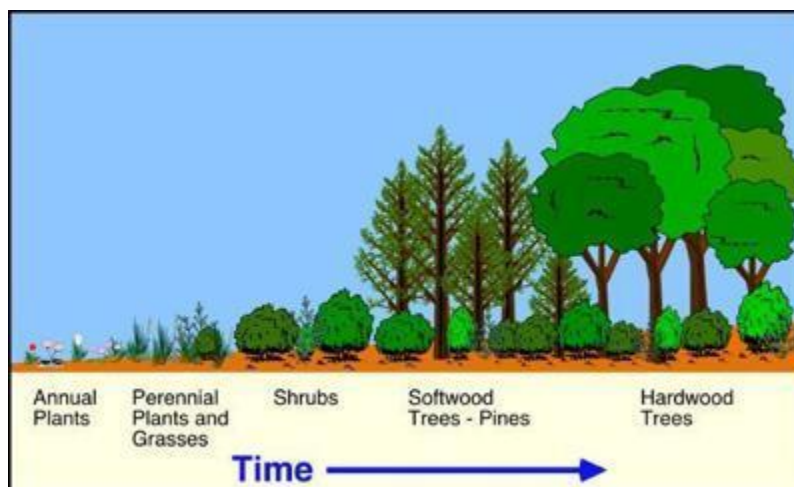
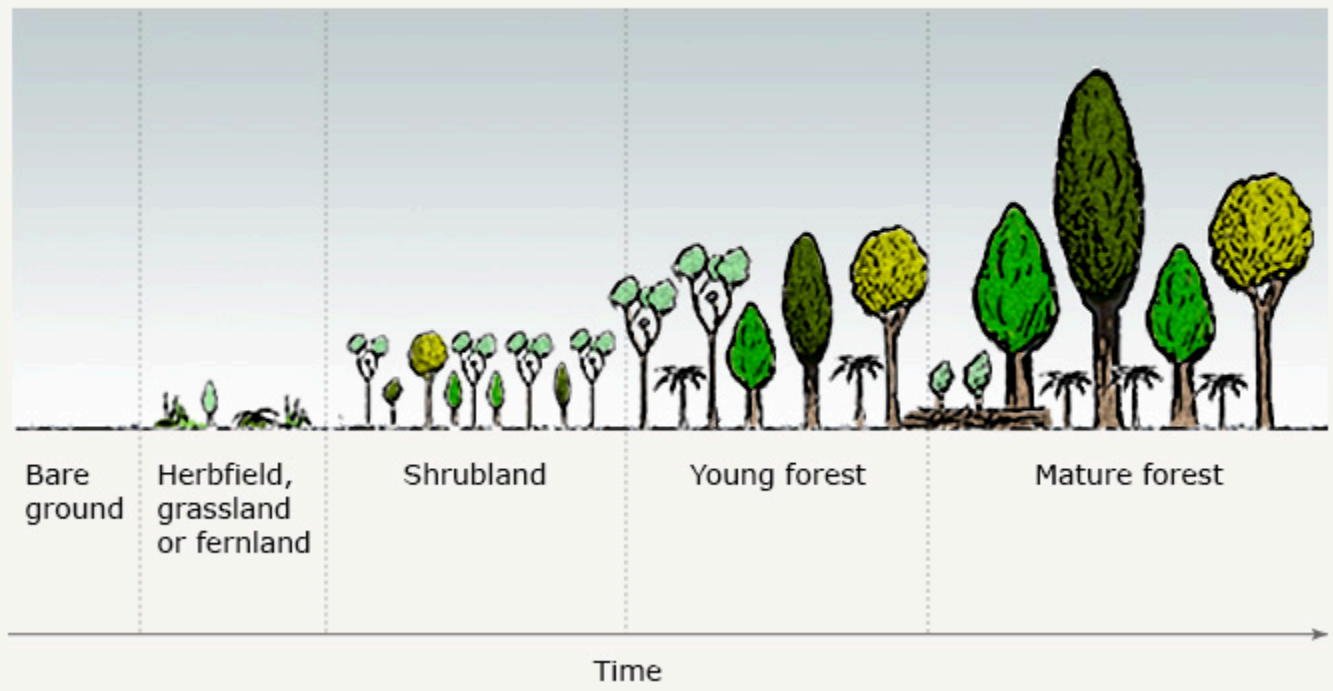
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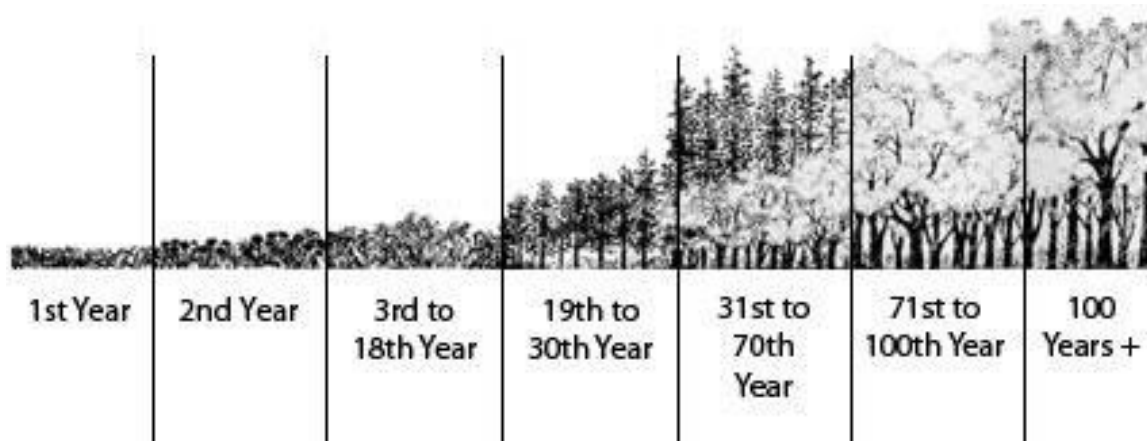


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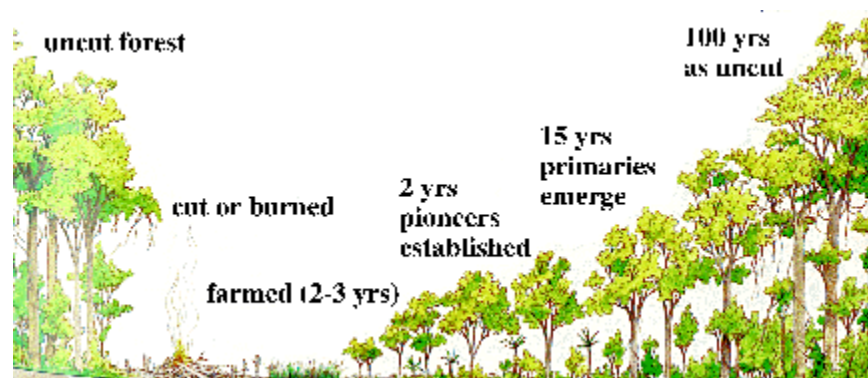
Stages of forest succession



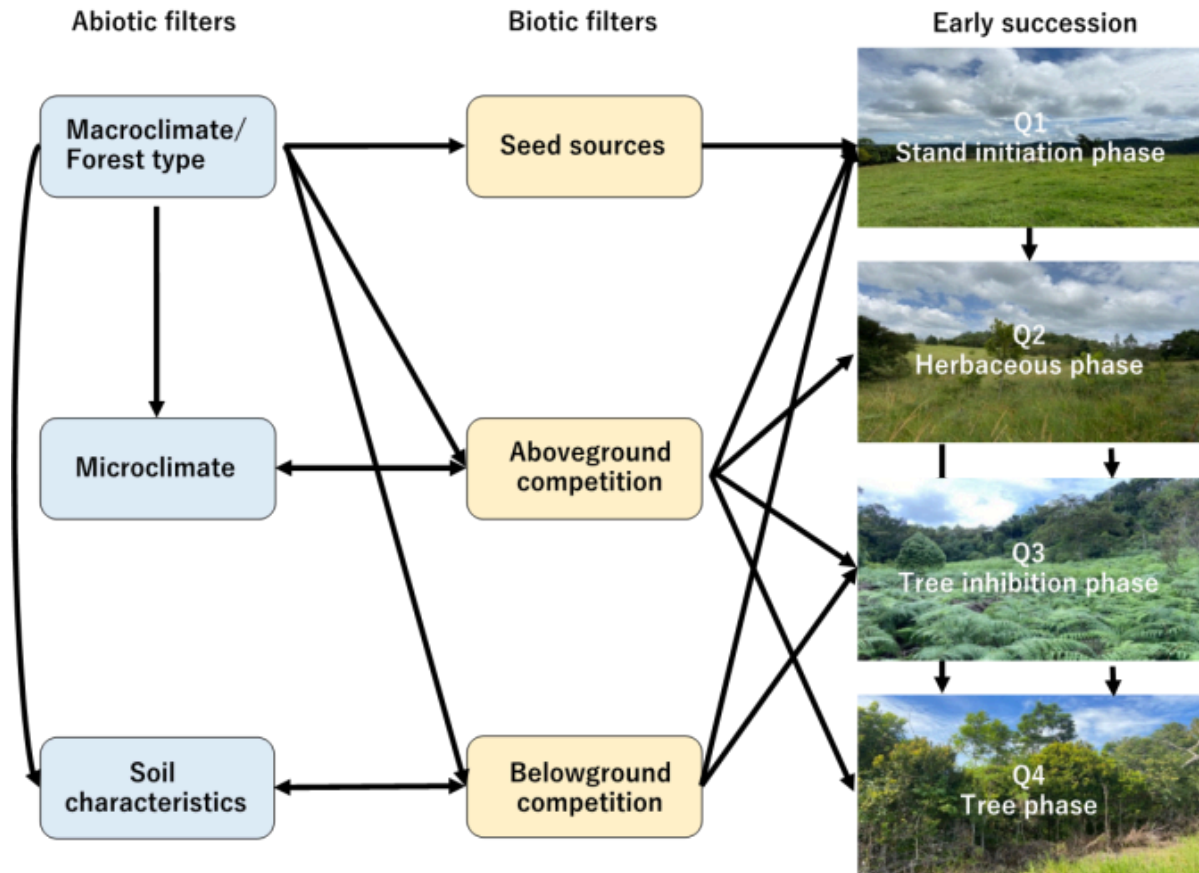
Succession in the North Carolina Piedmont



- 1st year: Horseweed dominant; crabgrass, pigweed
- 2nd year: Asters dominant; crabgrass
- 3rd to 18th year: Grass scrub community; broomsedge grass, pines coming in during this stage
- 19th to 30th year: Young pine forest
- 30th to 70th year: Mature pine forest; understory of young hardwoods 70th to 100th year: Pine to hardwood transition
- 100th year plus: Climax oak-hickory forest



Recovery time of a forest after clearing and a burn. Note that it is only after 100+ years that forest become as they were before the cut. **Forest** regrowth sequesters atmospheric carbon as plant biomass.



Conceptual diagram showing how abiotic and biotic filters affect four different stages in early succession



A babirusa (Babyrousa babyrussa), a forest pig in Nantu forest, Gorontalo. Male babirusa have large recurving tusks. Image by Simon Mitchell