

SPECIES FORUM

WIND – WIND HOUSE

SCHOOL OF NATURAL RESOURCES & APPLIED SCIENCES

SOLOMON ISLANDS NATIONAL UNIVERSITY

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SPECIES DIVERSITY AND HUMAN HEALTH

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PLANET EARTH

- *Homo sapiens*; Humans
- Humans first walked on earth some 195,000 years ago
- Earth is a beautiful planet – water, air, mountains, seas, land, etc.
- We share the planet earth with millions of plant, animal, insect, and microbial species
- All species are interconnected in some-ways
- Humans are part of this natural world, not independent of it.
- Edward O. Wilson once said about ants, “*We need them to survive, but they don’t need us at all*”

WHAT IS AN ECOSYSTEM?

- An ecosystem includes all the living things (plants, animals, and organisms) in a given area, interacting with each other, and also with non-living environments (weather, earth, sun, soil, climate, atmosphere)

What is Species Diversity?

- **Species diversity** is the number of different species that are found in a given area
- **Biodiversity** refers to number of species in an ecosystem or on the entire earth
(a broader term to include species diversity, ecosystem diversity and genetic diversity)
- Interchangeable terms ?
- Concept not clear

How many species live on earth??

- Approx. 1.8 million different species so far classified
- 1 million insects
- Estimated 5 – 30 million species live on Earth
- 50% of all species found are found in Tropical Rainforests
- Tropical rain forests cover only 7% of land

A tropical rain forest is an example of ecosystem that may support several species of plants and animals and therefore may have high diversity



An example of marine ecosystem



URABAN HOUSING



An urban ecology?



ECOSYSTEM DISTURBANCE BY HUMAN ACTIVITY

“Man is part of nature, and his war against nature is inevitably a war against himself”

Rachel Carson

- Leads to species loss,
- Impacts on food production
- Human infectious disease

Threats to Biodiversity? It's Real

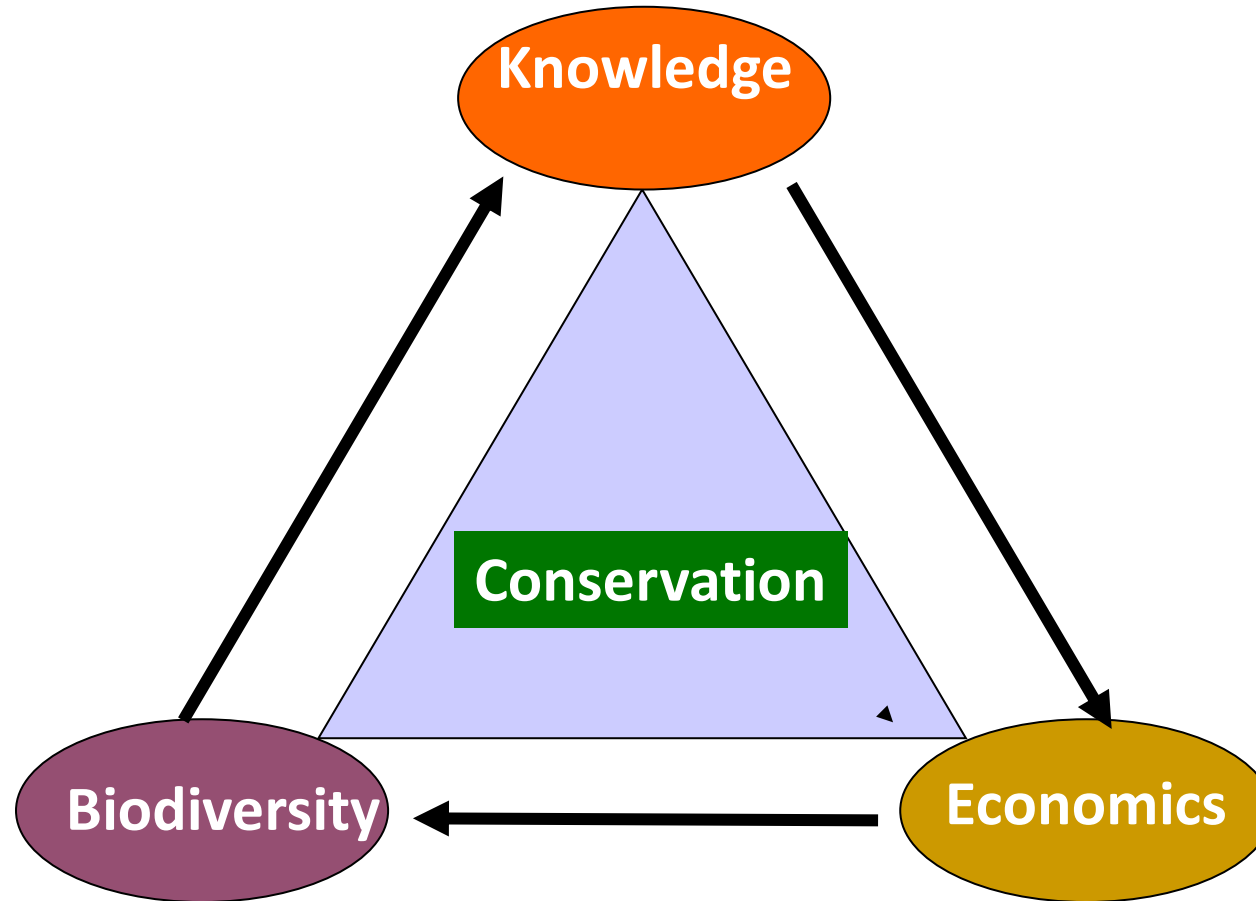
Millions of specie awaiting discovery!

“The library of life is burning and we do not even know the titles of the books”

Dr. Gro Harlem Brundtland

Former Director General of the WHO and former Prime Minister of Norway

Translating Biodiversity into Knowledge and into Economics



What is Health?

Health is a state of complete physical, mental, social and spiritual well-being and not merely the absence of disease or infirmity.

(WHO 1948)

Converting raw material into value added product – such as medicines



- Raw materials
- Semi – processed products
- Finished products

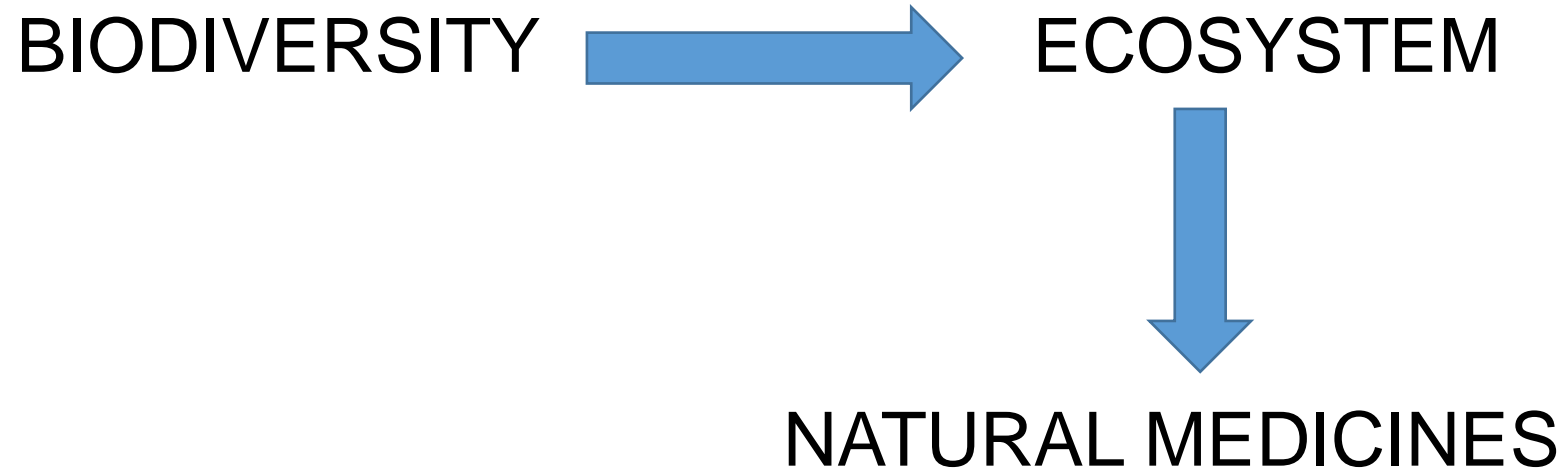
Species Diversity and Human Health

“Human health is strongly linked to the health of ecosystems, which meet many of our most critical needs”

(Maria Neira, Director of WHO's Department for the Protection of the Human Environment)

- Human health depends upon ecosystem (such as availability of fresh water, food and fuel sources), requisite for good human health and livelihoods.
- Loss of species (or biodiversity) may limit discovery of potential treatments for many diseases and health problems.

Biodiversity and Human Health



Nature remains a mainstay of medicines today

(Half or more of the prescribed medicines come from the natural sources, directly or indirectly)



PRESCRIPTIONS

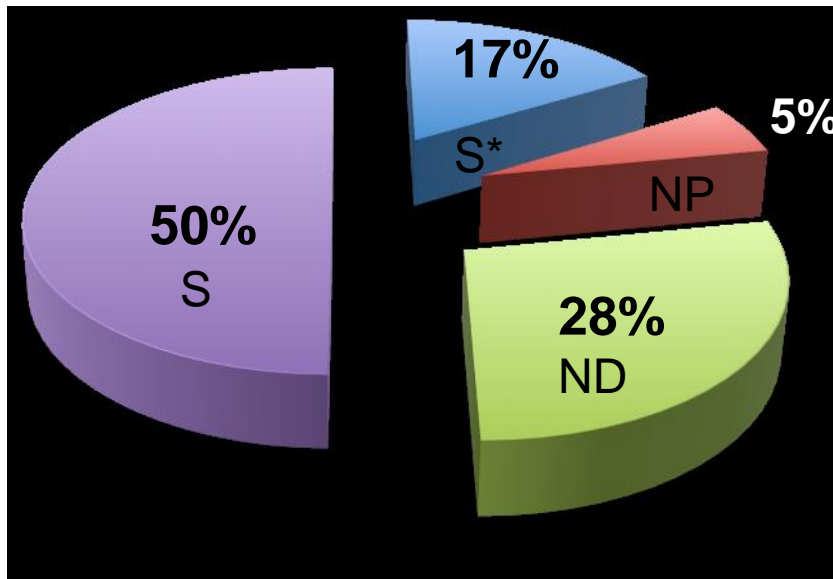


A Model Pharmacy



Natural products are a useful source of new drugs

All 1135 new drugs approved from 1981-2010



S* = NP mimic produced by synthesis!

N = NP as isolated!

ND = NP derivative, semi-synthetic!

S = completely synthetic entity

Adapted from Newman and Clark, *J. Nat. Prod.* 2012

Health and Value of Biodiversity – Example of Solomon Islands

SI suffers from poor health.

40% live on less than \$1 US per day.

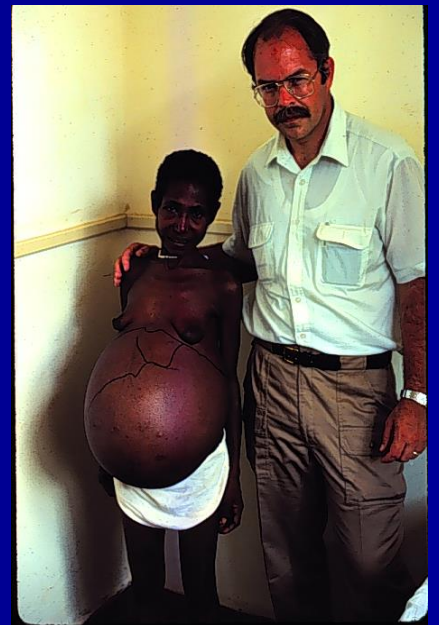
Life expectancy is less than 60 years.

Diabetes, Heart disease, Stroke, Communicable diseases (tuberculosis, gonorrhoea, HIV, malaria) and Cancer are the leading causes of deaths in SI.

Access to health care is limited

Majority of the population relies on traditional medicines for health care.

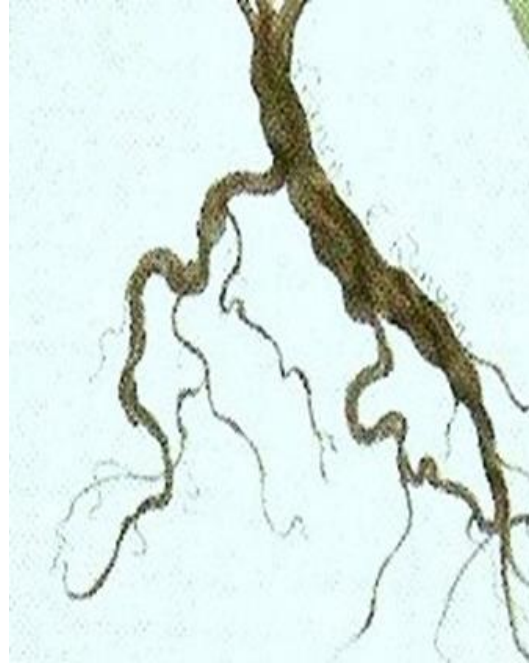
This is where the Value of Biodiversity lies



Examples of drugs derived from plants

Drug	Medicinal use	Plant source
Digoxin	Cardiac stimulant	<i>Digitalis purpurea</i>
Ephedrine	Sympathomimetic	<i>Ephedra sinica</i>
Atropine	Antimuscarinic	<i>Atropa belladonna</i>
Morphine	Narcotic analgesic	<i>Papaver somniferum</i>
Quinine	Antimalarial	<i>Cinchona pubescens</i>
Cocaine	Local anaesthetic	<i>Erythroxylum coca</i>
Taxol	Antineoplastic	<i>Taxus brevifolia</i>
Vincristine	Antineoplastic	<i>Cathranthus roseus</i>

Rauwolfia serpentina



Compound Reserpine
For Hypertension
(High Blood Pressure)

Digitalis purpurea



Digitoxin

For Heart
Disease

Catharanthus roseus



Vincristine and Vinblastine
for Leukaemia, Cancer

Papaver somniferum



Morphine

Most potent analgesic

Cinchona pubescens



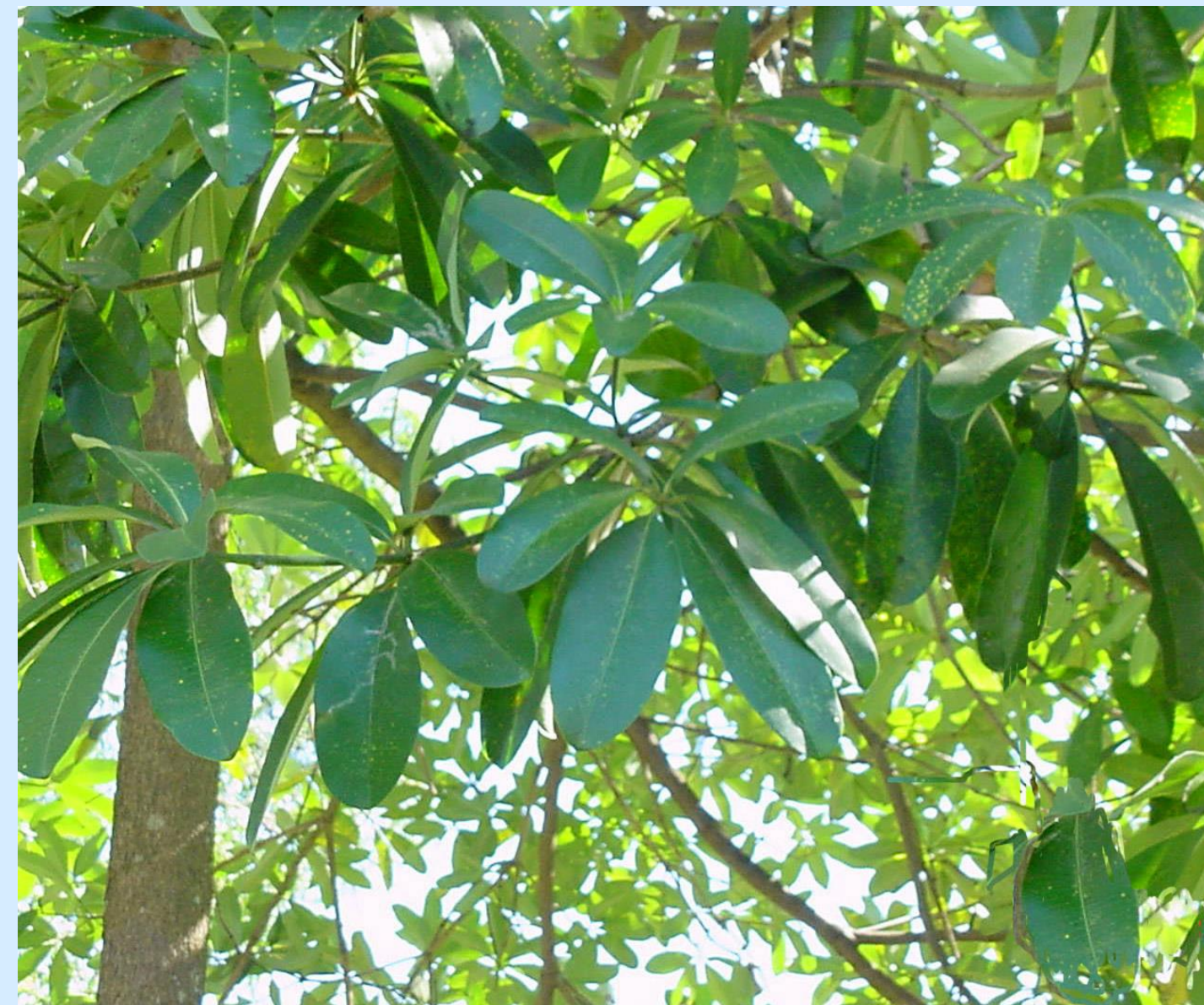
Quinine

Antimalarial

Calophyllum inophyllum



Antibacterial, antifungal and anti-HIV



*Alstonia
scholaris;*

Milky Pine

Phyllanthus niruri



Antiviral, antihepatotoxic , antipyretic and analgesic



***Centella
asiatica***

Gotu kola ; as an anti-inflammatory and wound healing herb



Ipomoea pes-caprae
– Anti-HIV

Zingiber officinale (Ginger)



Antinausea, antiemetic, to treat cold and flu

Leaves are
used to treat
Diarrhoea





Prem Rai, August 2009

Goatweed

For Headache



Prem Rai, August 2009

Herbal Medicines and Soaps

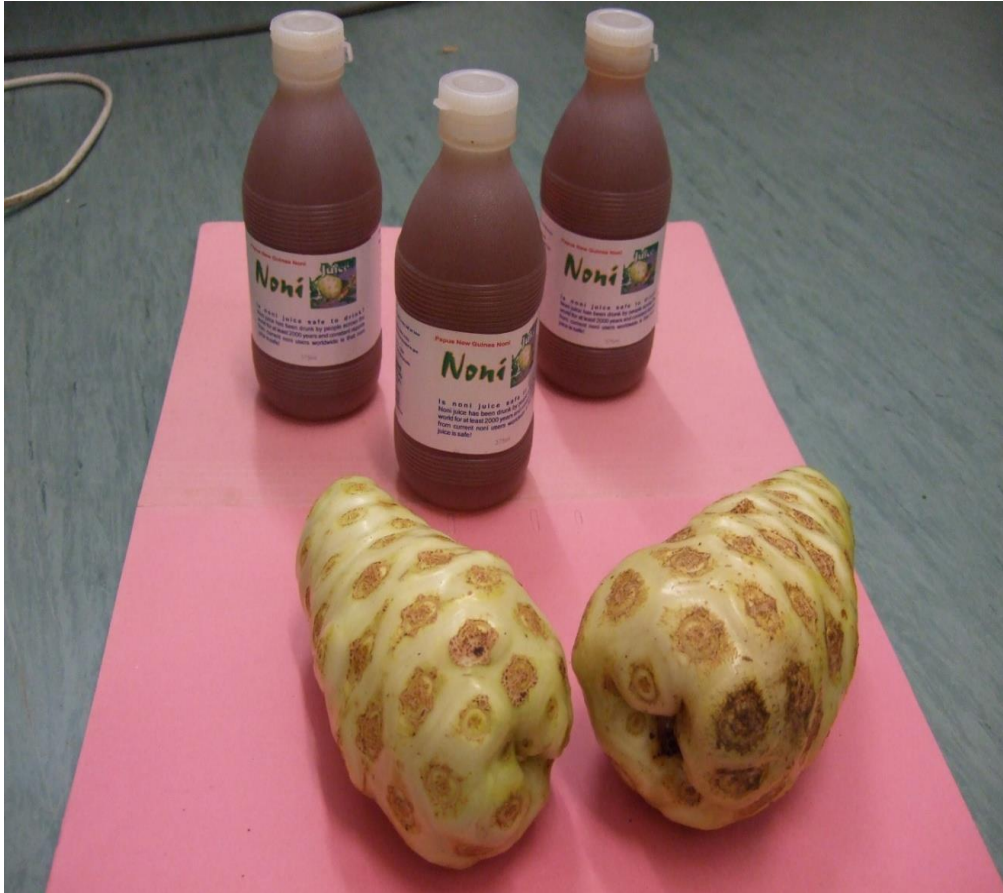


Medicinal Oils from Herbs



Powdered Herbs and Essential Oils





***Morinda citrifolia* (Noni)**



Ringworm bush (*Cassia alata*)

Message

- New diseases are emerging all the time
- We need to look for new medicines to treat new diseases and better medicines for known diseases
- Where can we find these new medicines?
- It is in the seas, forest, and mountains that we can find these new medicines
- **Our survival and sustenance depends on protecting and preserving our species, our natural habitat, and world around it.**

THANK YOU FOR YOUR ATTENTION