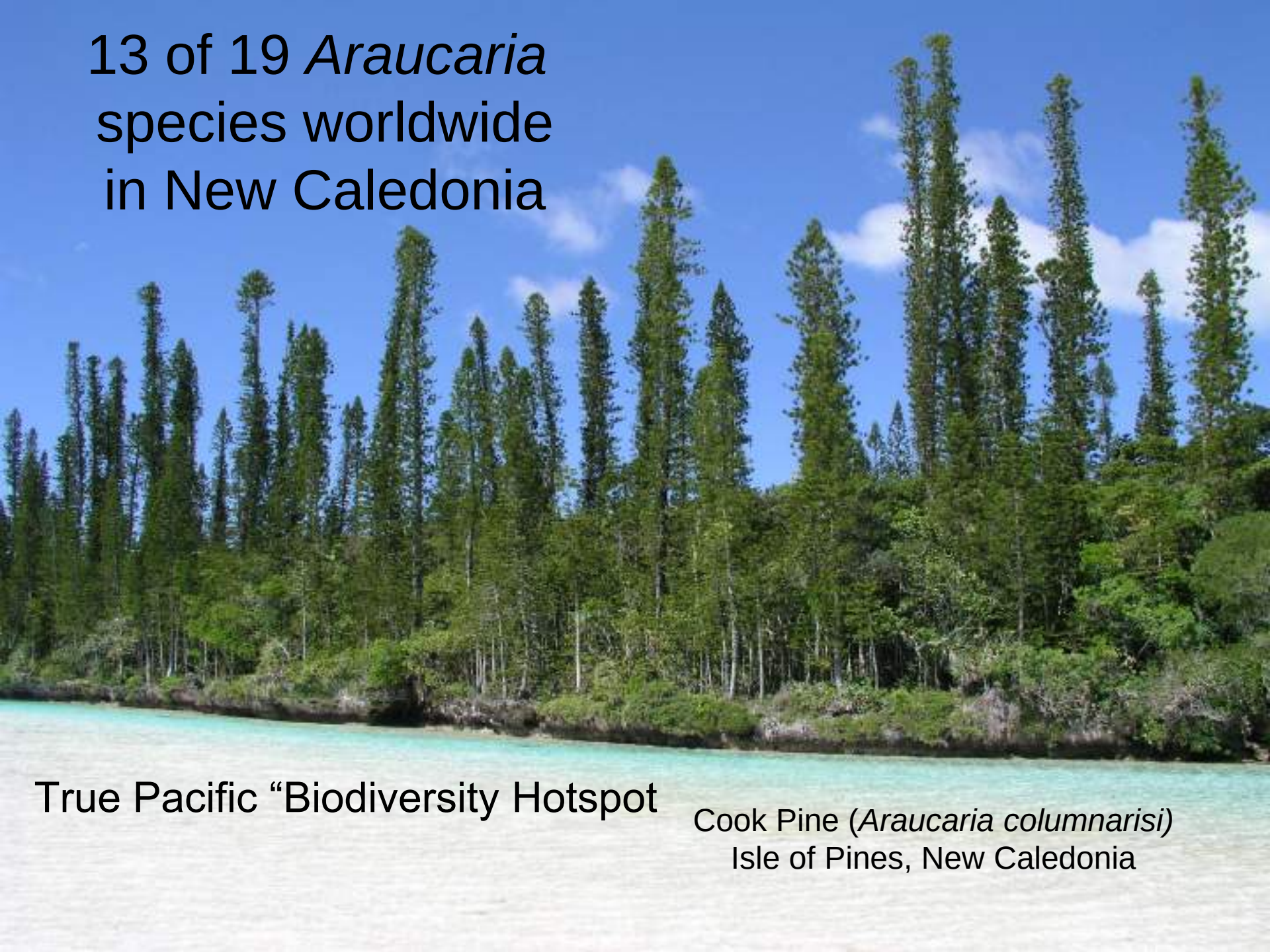
LINKING MODERN SCIENCE AND INDIGENOUS AND LOCAL KNOWLEDGE (ILK) AS A BASIS FOR SOUND POLICY AND DECISION MAKING FOR BIODIVERSITY CONSERVATION

Pacific Islands Roundtable on Nature Conservation
Nadi, Fiji 14-15 July 2016



R. R. Thaman
The University of the South Pacific
Suva, Fiji


13 of 19 *Araucaria* species worldwide in New Caledonia
True Pacific “Biodiversity Hotspot
Cook Pine (*Araucaria columnarisi)*
Isle of Pines, New Caledonia

We pay our respect to indigenous and long-resident peoples of the Pacific Islands as the custodians of their agrobiodiversity and agroforestry inheritances and destinies















An Overview of IPBES and Preliminary Thoughts on Building Synergies Between Indigenous, Traditional and Modern Science

Randy Thaman - MEP Member
The University of the South Pacific, Suva, Fiji

International Expert and Stakeholder Workshop on the Contribution of Indigenous & Local Knowledge Systems to IPBES: Building Synergies with Science
United Nations University, Tokyo, 9-11 June 2013

ipbes
Science and Policy for People and Nature

United Nations Educational, Scientific and Cultural Organization

UNITED NATIONS UNIVERSITY

Reason for IPBES



2010 International Year of Biodiversity

Biodiversity is life
Biodiversity is our life

OBLIGATE DEPENDENCE

That people AND the world have on biodiversity . . . to achieve the objectives of sustainable development.



General Messages from the MEP/Bureau Meeting

- **Building synergies between ILK & S must be seen as an IPBES branding issue.** IPBES needs to be a step forward from CBD and other initiatives and not just take note of, but integrate ILK & S, and make it integral to IPBES, which will be one of the biggest challenges (More must to be spent on how we building synergies, rather than on "recognition")

- In the MEA assessments, one of the main areas of capacity weakness was the lack of links with traditional knowledge systems.

BIODIVERSITY - Components

1. Ecosystem and Habitat diversity and Ecosystem Services

3. Species and Taxonomic Diversity

4. Genetic Diversity

5. ETHNOBIODIVERSITY (Indigenous and Modern Science)

EUROCENTRIC DEVELOPMENT THEORY

TRADITIONAL →→→→→→→→→→→→MODERN

Rural/Outer Island
Self-sufficient
Subsistence/Non-monetized
Resources renewable/biodegradable
Renewable Energy
Non-polluting/non-poisoning
Polycultural/Biodiverse
Few Invasive Alien Species
Equitable sharing of resources
RICH ETHNOBIODIVERSITY

rr

Urban and Industrial/Main Island
Dependent on Imports
Highly monetized (money-focus)
Nonrenewable/non-biodegradable
Fossil Fuel (Petroleum)
Polluting/Self-Poisoning
Monocultural/Bio-impoverished
Abundance of Alien Invasive Species
Unequal sharing
POOR ETHNOBIODIVERSITY





TRIPOD OF FOOD AND PRODUCTIVE SECURITY

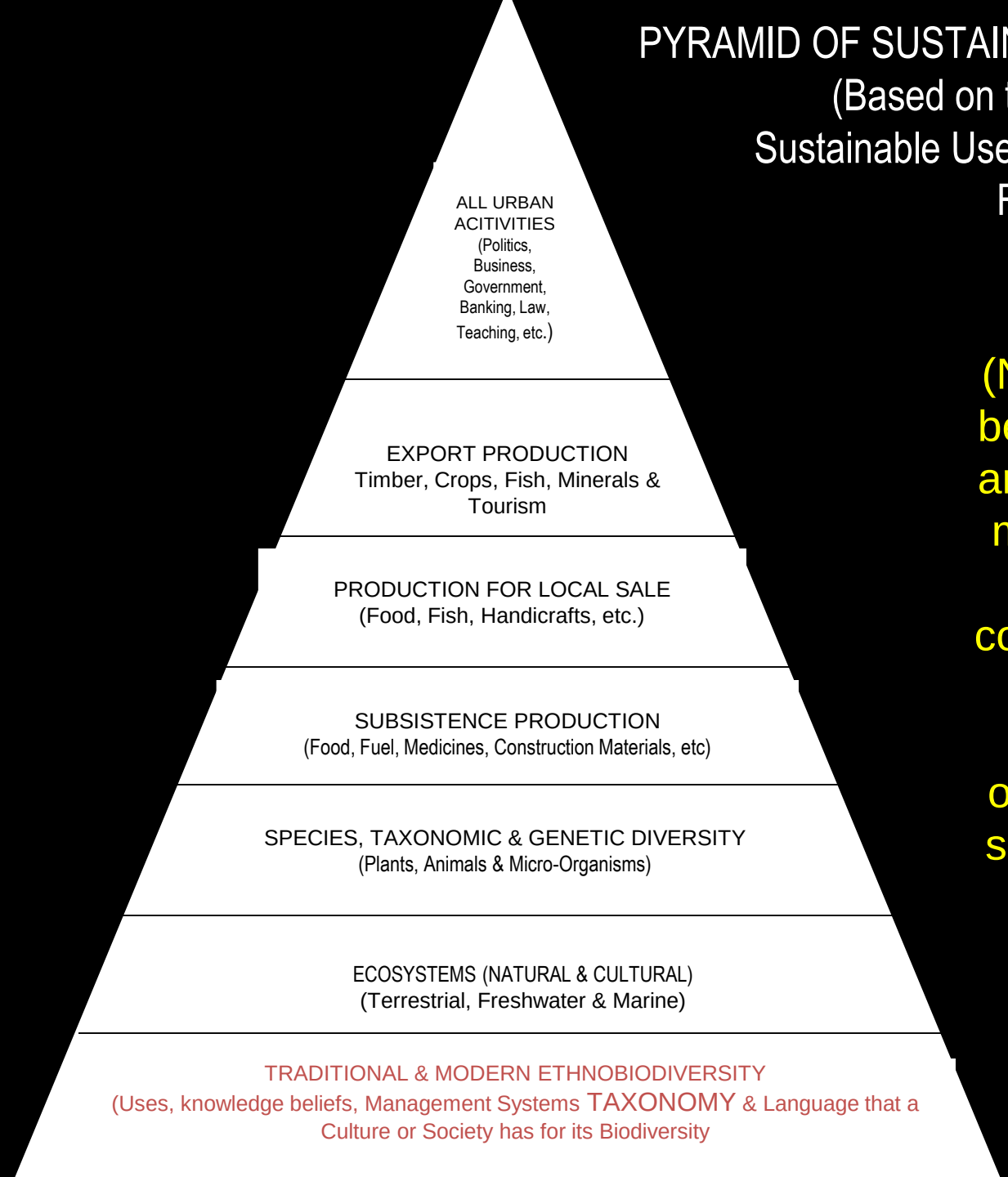
AGRICULTURE
Subsistence and Commercial



WILD HARVEST
Terrestrial and Marine
(Nuts, greens, seafoods, Fuel, medicines, construction materials, etc.)

TRADE
(Cash and Non-Cash)
(Fishing gear, construction materials, engines, remittances)

PYRAMID OF SUSTAINABLE ISLAND DEVELOPMENT
(Based on the Conservation and Sustainable Use of Island Biodiversity and Resources)



(Note: Although the lines between each level or the area within each segment may change for different islands, countries or communities, all activities will ultimately depend for their sustainability on the conservation and sustainable use of those entities beneath them)

BASIC UNDERLYING ASSUMPTION – 1: ILK and Local Communities at the Centre of Development or Adaptation Initiatives

LOCAL AND INDIGENOUS KNOWLEDGE (ILK) MUST PROVIDE THE FOUNDATION FOR PLANNING AND ACTION *for addressing issues of environmental, economic and social change as a basis for sustainable development*. *Local ILK holders are the people who best know their local environment, its environmental history and what they can do themselves, or need help in doing, to build resilience to change.*

UN Convention on Biological Diversity (CBD) Program of Work on ISLAND BIODIVERSITY Approved April 2006 by COP 8 in Curitiba, Brazil and the Voice/Involvement of Indigenous Peoples!



BASIC UNDERLYING ASSUMPTION – 2: Threatened Status of ILK

LOCAL AND INDIGENOUS KNOWLEDGE (ILK) IS UNDER SERIOUS THREAT *as the generation who have this knowledge pass away, or when the younger generation no longer has the interest or motivation to learn this knowledge, due to the cash economy and changing reward systems of a rapidly urbanizing and globalizing world*.

BASIC UNDERLYING ASSUMPTION – 3: ILK More Threatened than the Biodiversity?

This ILK, that has co-evolved with the people who have lived for generations in the island and ocean environment is ***NOW OFTEN MORE THREATENED THAN MANY OF THE ECOSYSTEMS, ECOSYSTEM SERVICES AND THE PLANTS AND ANIMALS (THE BIODIVERSITY) WE ARE TRYING TO PROTECT***

BASIC UNDERLYING ASSUMPTION – 4: Need for Preservation of ILK

If this knowledge is not preserved, recorded, learned, or incorporated into our development and adapatation plans our ability to build resilience against negative global change will be seriously undermined.

TAXONOMY AND BIOINFORMATICS FOR ALL AGES

Engaging and Educating the Next Generation of Taxonomists as a Foundation for Sustainable Habitation of Planet Earth - Challenges and Opportunities in the Pacific Islands



BASIC UNDERLYING ASSUMPTION – 5: Need to Marry ILK with Modern Science

Although this knowledge has been a foundation for sustainability of our island and ocean cultures for millennia, changing demographic, economic, social, political, technological and environmental realities and aspirations for new monetary and material goods today clearly indicate that, for sustainability in today's rapidly changing world, **ILK knowledge alone is not enough. ILK must be married with the best up-to-date modern natural and social scientific knowledge about environmental, economic and social sustainability AND UNSUSTAINABILITY.**

BASIC UNDERLYING ASSUMPTION – 6: Must Learn from both Best and Worst Practices

We must learn from the best and worst practices and science, both indigenous and modern, and marry these often parallel knowledge systems to achieve a synthesis of the best of both worlds –

BASIC UNDERLYING ASSUMPTION – 7: Need for Partnerships and Co-management with ILK communities

The marriage of the best ILK with the best up-to-date modern natural and social scientific knowledge must be done in partnerships with local ILK communities who are the only people who have time-depth/long-term practical knowledge of natural disasters, climate and tidal events, loss of biodiversity, invasive alien species, pollution and waste management problems, etc. and food, health, energy and livelihood will, in most cases, need to be the implementers, monitors and main beneficiaries of such marriages .

EMERGING OR INTENSIFYING ISSUES FROM A PSIDS PERSPECTIVE

1. Intensification of Impacts of Extreme Events
2. Invasive Alien Species (IAS)
3 .Overfishing of Inshore Waters
4. Coastal Littoral and Mangrove Deforestation and Devegetation
5. Agrodeforestation and Loss of Agrobiodiversity
6. Loss of Tropical Montane Cloud Forest
7. Breakdown in Biogenic Calcification and the Biogenic Sand and Sediment Budget
8. Coral Disease
9. Need to Protect Biodiversity Cool Spots
10. Loss of Indigenous and Local Knowledge and Biocultural Diversity/Ethnobiodiversity

1 INTENSIFICATION OF IMPACTS OF EXTREME EVENTS

- Extreme events include: cy clones, floods, droughts, El Niño/La Niña (ENSO) events, king tides, earthquakes, tsunamis, volcanic eruptions, uncontrolled fires, coral bleaching and invasive species and disease infestations

- Have always been a reality, but the impacts on the environment, biodiversity and human food, health and livelihood security are clearly intensifying in PSIDS and constitute one of the most serious obstacles to sustainable island life.

2 INVASIVE ALIEN SPECIES (IAS)

Invasive alien species (IAS) clearly constitute one of the most serious, but under-acknowledged, threats to native and cultural biodiversity and ecosystems and human wellbeing in PSIDS.

IAS have seriously undermined food, health and productive security and increased the vulnerability to environmental, economic and social change in PSIDS.

3 Overfishing of Inshore Waters

- Worldwide crisis that threatens biodiversity and livelihood security in PSIDS.

-World's top marine scientists in a 2001 *Nature* article Jackson 2001 *et al.*) said that "overfishing precedes all other human impacts on coastal ecosystems, including pollution, degradation of water quality, and anthropogenic climate change."

-Overfishing has led to "trophic cascades", the collapse of marine ecosystems and the disappearance or "ecological extinction" of larger, economically and culturally valuable species that were present in the past.

-Community Managed Marine Areas (CMAs) with MPAs offer the best solution!!

Table 1. Summary analysis of 811 taxa that have been seen for: 1) the first time ever or in 40 years or more; 2) the first time for 20 to 40 years; 3) first time in the last 10 to 20 years; or, 4) are clearly increasing in abundance or in size in the Vanua Navakavu fishing grounds (*iqoliqoli*) since the establishment of the Vueti Navakavu LMMA and MPA in 2001, based on surveys with, and field studies by, the oldest generation of male and female fishers of Navakavu Vanua, southeastern Viti Levu, Fiji Islands, 2009-2011. (Updated July 2014)

Taxa	1st time or first time in over 40 yrs	1st in 20 to 40 yrs	1st in last 10 to 20 yrs	Inc. Abund. & Size	Total Species
Total Sharks and Rays	**2**	**6**	**1**	**1**	**10**
Total Eels	**15**	**7**	**4**	**5**	**31**
Total Other Finfishes	**104**	**81**	**50**	**132**	**367**
Total Echinoderms	**12**	**8**	**6**	**19**	**45**
Total Crustaceans	**50**	**13**	**13**	**23**	**99**
Total Gastropods	**84**	**58**	**12**	**30**	**184**
Total Bivalves	**22**	**15**	**2**	**21**	**60**
Total Cephalopods, Scaphopods	**3**	**1**		**3**	**7**
Total Nudibranchs, Seaslugs, Seahares	**4**	**3**	**1**	**1**	**9**
Total Worms	**4**		**3**	**2**	**9**
Total Anemones	**2**	**2**		**2**	**6**
Grand Total	**302**	**194**	**92**	**239**	**827**

10 Coastal Deforestation/Degradation

- Coastal deforestation/devegetation and loss of littoral biodiversity is accelerating due to overexploitation or conversion to agricultural, urban or industrial uses and invasive species

-One of the most serious contributing factors to the increasing vulnerability of island communities to global change.

-Coastal and mangrove forests are clearly on the frontline against climate change and most other extreme events.

-COASTAL LITTORAL FORESTS ARE FAR MORE THREATENED AND HAVE FALLEN INTO THE GAPS IN CC AND CONSERVATION INITIATIVES PSIDS

Ethnobotany of Coastal Littoral Plants
Coastal Littoral Vegetation









6 Agrodeforestation and Loss of Agrobiodiversity

- Interspecies and intraspecies agricultural biodiversity is being lost due to monoculturalization, mechanization, pest and disease infestations and the use of inorganic fertilizers and pesticides in island agricultural systems.

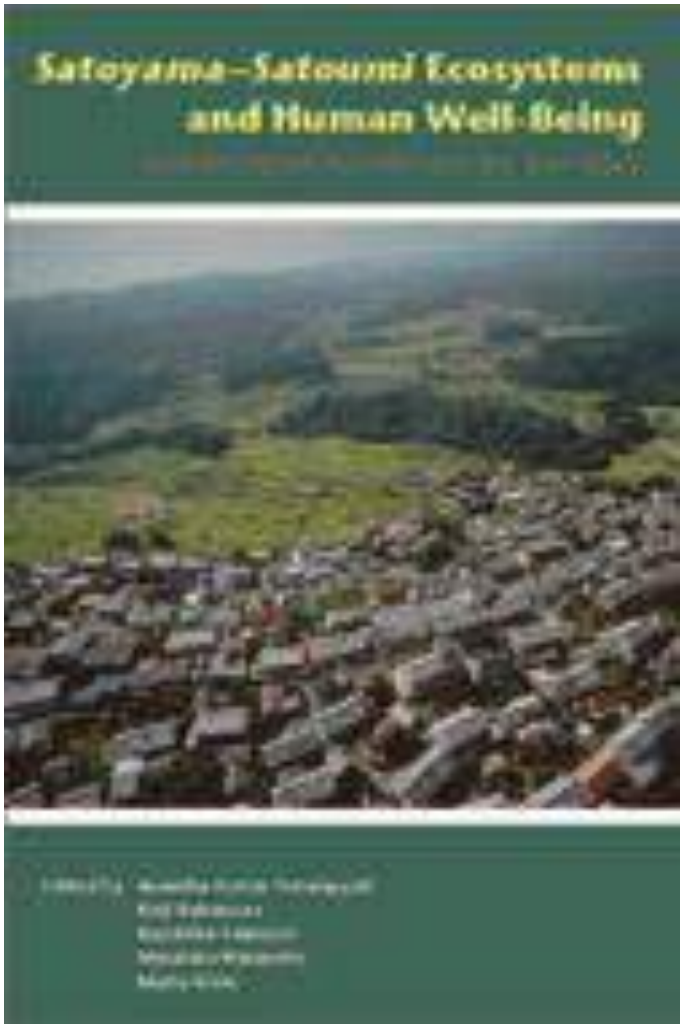
-Of particular concern is the breakdown of traditional tree-rich agroforestry systems due to “agrodeforestation

6 Agrodeforestation and Loss of Agrobiodiversity

-On atolls and small, highly populated islands there is little or no remaining forest, with most trees being found outside of forests in agricultural lands, villages and other areas.

-These remaining trees are they main sources of a wide ecologically, economically and culturally irreplaceable ecosystem goods and services and the primary foundation for food, health and productive security.

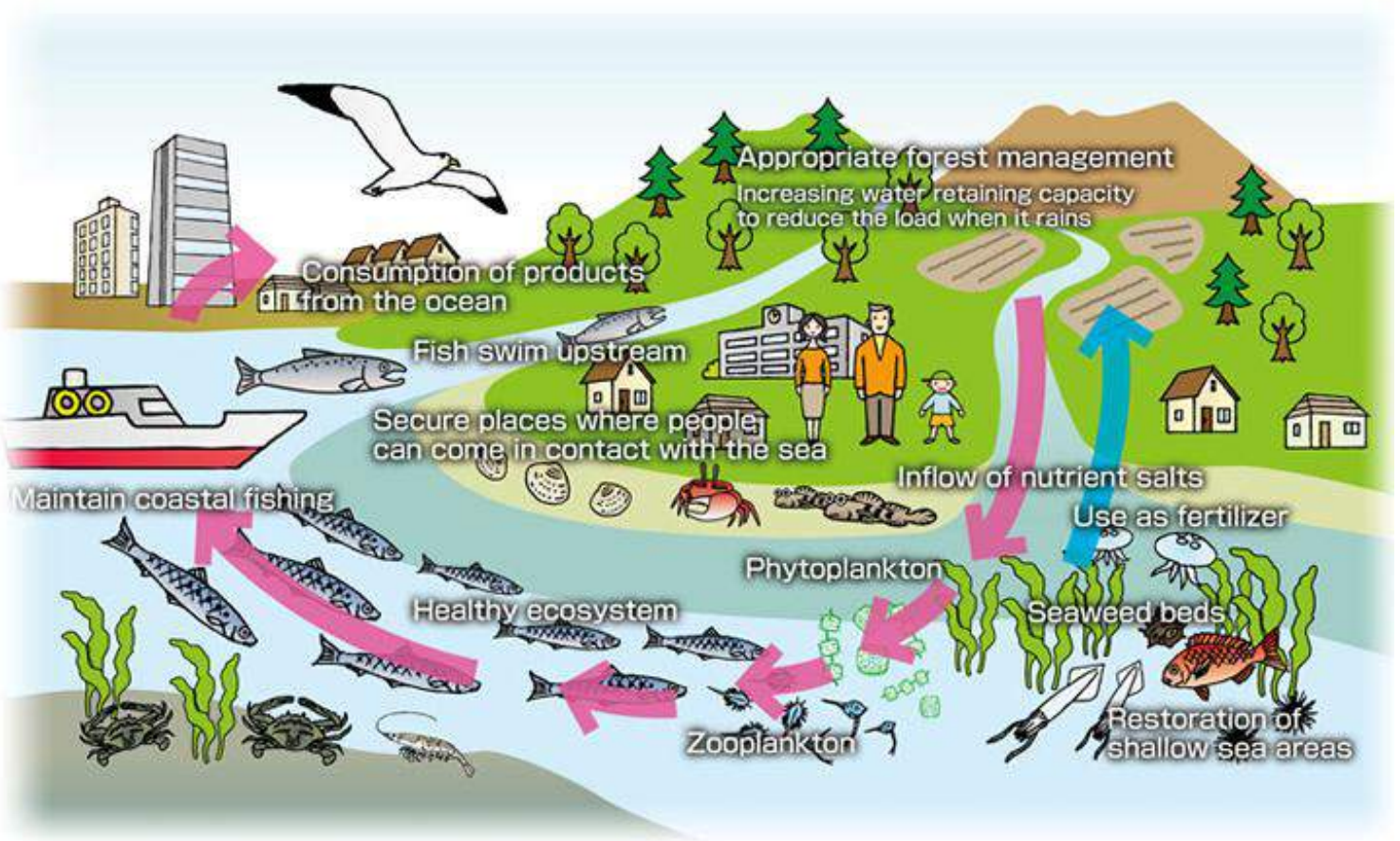
Japan Satoyama-Satoumi Assessment (JSSA) Socio-ecological Production Landscapes – Japan's most important ecosystem assessment – Example of the marriage of ILK and MS for BES Assessment







Satoyama-Satoumi




Palau Women’s agroforest

Sugarcane Farms and Agroforests, Fiji Islands



Pulaka – Insurance, knowledge and taste to address salinity, flooding, drought, economic and social crises!











THREATENED ECOSYSTEMS



Cloud Forest, Mt. Tomaniivi
Viti Levu, Fiji Islands

8 Breakdown in Biogenic Calcification and the Biogenic Sand and Sediment Budget

-On atolls and smaller islands where the sand is largely biogenic, there is increasing evidence that the loss of beaches is due to the loss of diversity and abundance of organisms that are the sources of biogenic sand.

-Studies on the atolls of the Pacific, such as Tuvalu, indicate that the loss of forams, calcareous algae (e.g., *Halemeda* spp.) that contribute to most of the beach sand and lagoon sediment are decreasing in abundance and diversity due to pollution (eutrophication), improper coastal engineering (e.g., causeway/bridge development)which interrupts along shore and ocean-lagoon circulation.

Te Puka Islet, Funafuti, Tuvalu



9 Coral Disease and Death of Coral Reefs

-Coral diseases have devastated coral reefs throughout the Caribbean since the 1980s and over 90% of the main reef forming corals in the Caribbean have died due to coral disease with the severity of disease outbreaks commonly correlated with corals stressed by bleaching.

-

-Outbreaks seem to be related to bacterial infections and other introduced disease organisms, increasing pollution, human disturbance and INCREASING SEA TEMPERATURE, all of which have put reef-forming corals at serious risk

5 Need to Protect Biodiversity Cool Spots

-Most global conservation efforts have focused on the Earth's "biodiversity hotspots.

-Critical need to address the very serious biodiversity crisis in the Earth's "biodiversity cool spots" – atolls, small islands and humanized areas that have very limited species diversity and little or no endemism .

- But where a very high proportion of their very limited biodiversity, the only biodiversity thesy have as a basis for sustainable development, is highly threatened!!

AREAS OF OPPORTUNITY FOR THE MARRIAGE OF LINKS AND MODERN KNOWLEDGE SYSTEMS

1. FORESTS: Conservation, enrichment and sustainable use of forest resources
2. MARINE RESOURCES: Conservation and sustainable use of marine resources
3. ENVIRONMENTAL CHANGE AND EXTREME EVENTS: Adaptation to climate and environmental change and extreme events
4. WATER: Watershed, water and catchment management
5. SOIL AND FIRE:Soil conservation, fertility maintenance, fallow systems and fire management
6. AGRICULTURAL AND FOOD SYSTEMS: Conservation and enrichment of traditional polycultural semi-subsistence food and agricultural systems

*Cross-cutting themes, cultural and environmental conservation, restoration and enrichment!

AREAS OF OPPORTUNITY FOR THE MARRIAGE OF LINKS AND MODERN KNOWLEDGE SYSTEMS

7. MEDICINE AND HEALTH: Medicinal plants and medicinal and health practices
8. HANDICRAFTS AND CONSTUCTION: Traditional handicraft, arts, and construction (e.g., house and boat building, fencing) systems
9. INVASIVE SPECIES AND DISEASES: Invasive alien organism (IAS) and disease management
10. ENERGY AND WASTE: Energy and waste management and environmental restoration
11. TOURISM, RECREATION, AND SPORTS.
12. SOCIAL AND CULTURAL SUSTAINABILITY: Cultural sustainability, Spirituality, Social cohesion, Education and Governance.

*Cross-cutting themes, cultural and environmental conservation, restoration and enrichment!

Conclusion

Emerging and intensifying “new winds and waves” clearly threaten the lands, forests, gardens, shores and waters of PSIDS.

To build resilience and adapt to such challenges in a holistic manner will require building synergies between time-tested indigenous and local knowledge, technologies and adaptive strategies and the best modern science and technology.

Conclusion

We must “put ancient fair winds into new sails” as we chart our course through increasingly degraded islands and turbulent waters and against the rising tide of rapid monocultural globalization and the accelerating loss of the fragile island and ocean biodiversity and ecosystem services that underpin sustainable island life!!!

Examples – of such marriages

Ouvea, Loyalty Islands, New Caledonia
World Heritage Site Study (IRD, UNC, USP)











Yadua Taba Island Crested Iguana Reserve Off Vanua Levu, Fiji (National Trust of Fiji)









Tetepare Island, W. Solomon Islands
(The World's Largest Uninhabited Is. - Tetepare Descendents Association TDA-WWF Conservation Initiative

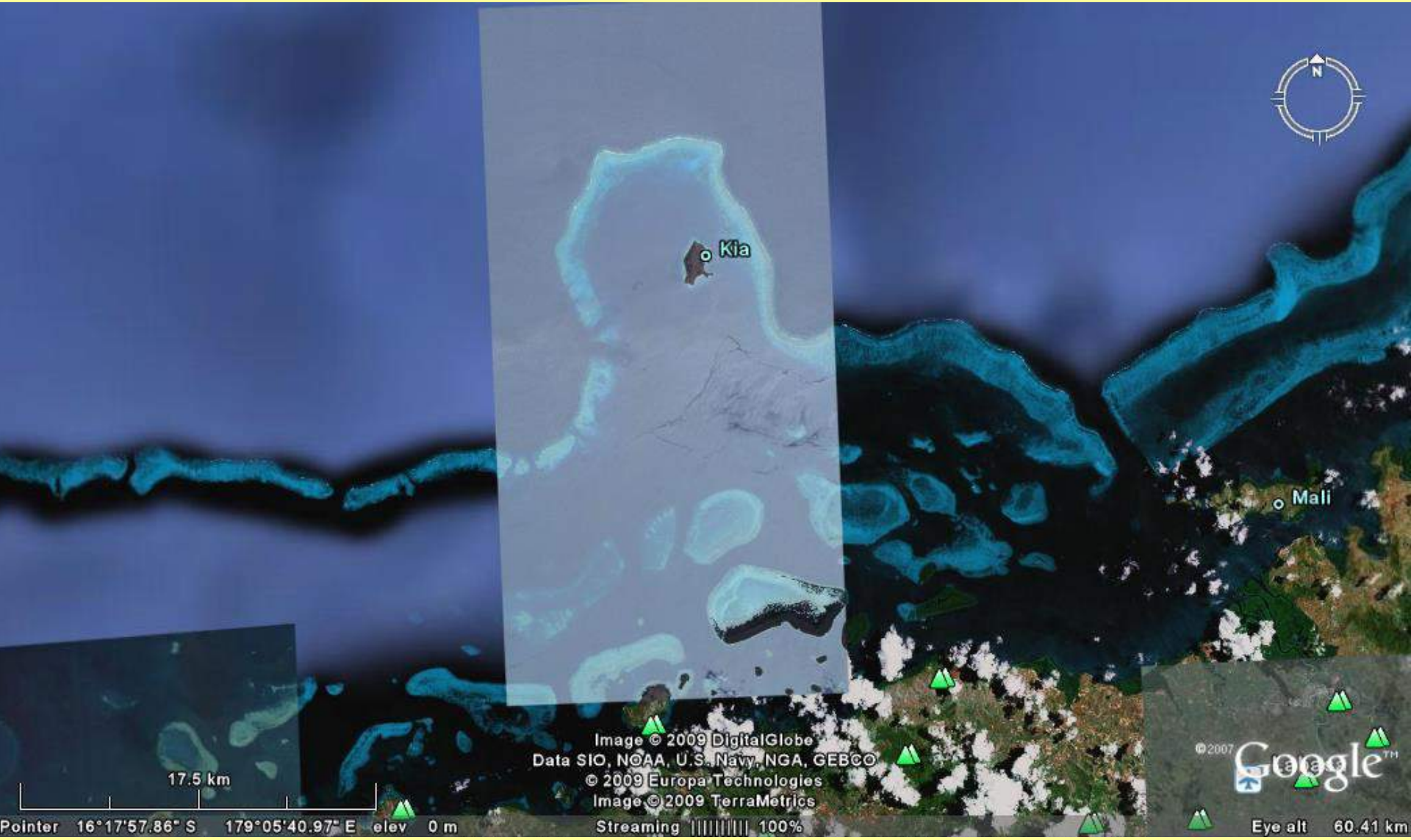








Kia Island, Great Sea Reef, Macuata, Fiji (4th Longest Barrier Reef in the World)



Cakau Levu (The Great Sea Reef) off Kia Is.)









Fiji 7’s – Marriage of ILK and talent and modern sports, rugby, conditioning and food science)!!!



USP Graduation – Capacity Building for Sustainable Island Development













OUR PI GRADUATES – FOUNDATION FOR CONSERVATION AND BUILDING RESILIENCE TO SUSTAINABLE USE OF OUR ISLAND BIODIVERSITY



VINAKA, TAGGIO TUMAS, THANKYOU!!!

(Tagimaucia – Taveuni's Endemic and Student!!)





VINAKA VAKALEVU

