A 'Mildly Interdependent Relationship' between Local People and a Protected Wild Parrot Species through Indigenous Arboriculture

13th Congress of the International Society of Ethnobiology,
Montpellier (France), 20-25 May 2012

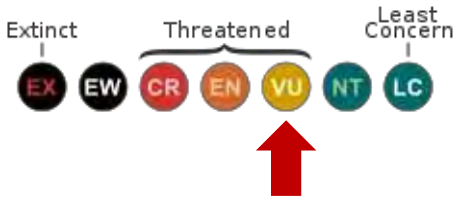
Masatoshi Sasaoka(CIFOR), Yves Laumonier (CIRAD), and Ken Sugimura (FFPRI)

CIFOR

Manusela NP, Parrots and People

- Established in 1997 to conserve biodiversity and maintain ecosystem services in the region
- One of its expected functions: to help conserve a flagship species, the Moluccan cockatoo

CITES1-listed, protected parrot, Moluccan cockatoo (*Cacatua moluccensis*)



- Many Human-Modified Forests (HMFs) are created and maintained through arboriculture

Arboriculture

- **Arboriculture**: Utilization, cultivation, and protection of **useful arboreal plants**

Useful arboreal plants:

- Plants used for food, medicine, construction, handicrafts, etc.
- Plants used for shade, windbreaks, and attracting animals (for trapping), etc.

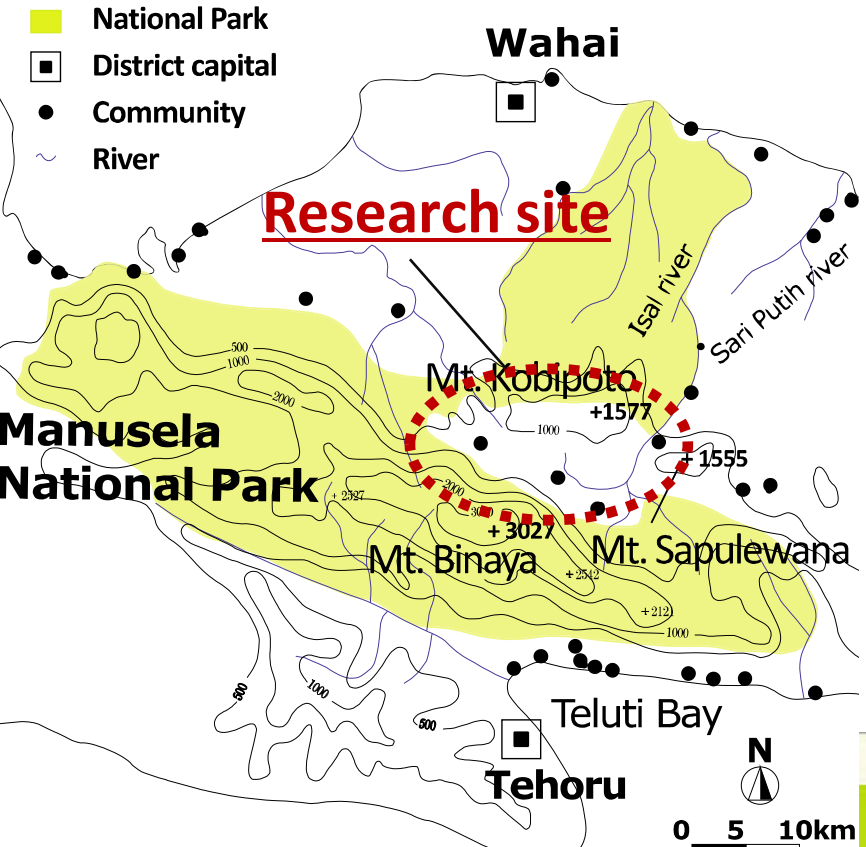
- Subsistence systems in Wallacea and Near Oceania: "**Arboreal-based Economy**"

Arboreal-based economy:

Subsistence economy whose practitioners meet the majority of their dietary, nutritional and economic needs through the utilization of arboreal resources [Latinis 2000:43]

Objectives and Methods

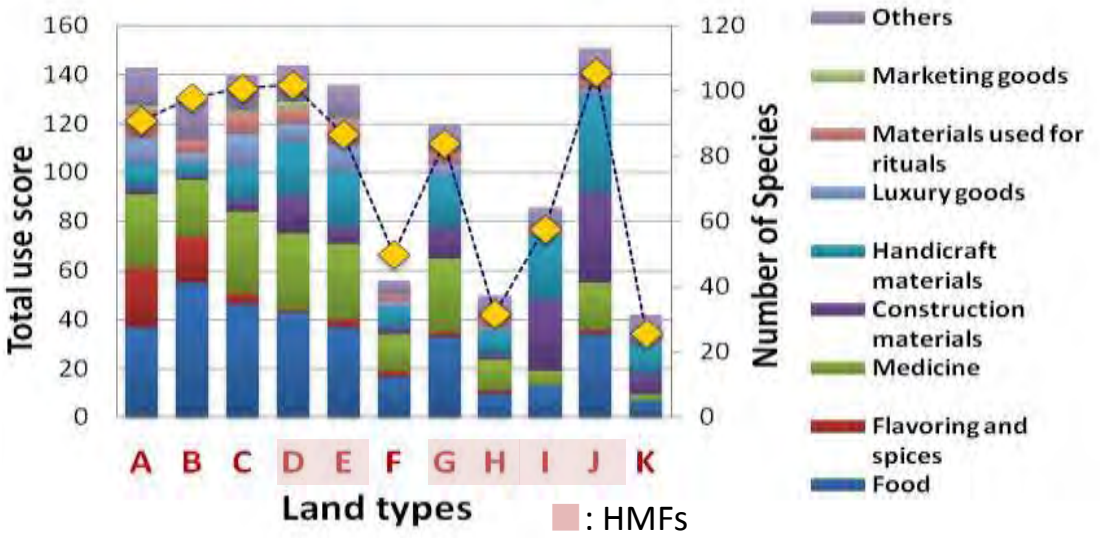
- **Objectives**
  - to clarify
    - how local people create, maintain and use HMFs through arboriculture
    - the relationship between local people and the Moluccan cockatoo
  - to discuss future research



- **Research site: *Amani oho*** (fictitious name)
  - Population : ±320 (±60 households) in 2012
  - Subsistence activities: sago-starch extraction, hunting/trapping, NTFP collection
- **Data collection methods:**
  - 2003-2012 (intermittently)
  - Interviews (key informant , one-on-one , and group), resource inventory surveys, participatory mapping and participatory observations

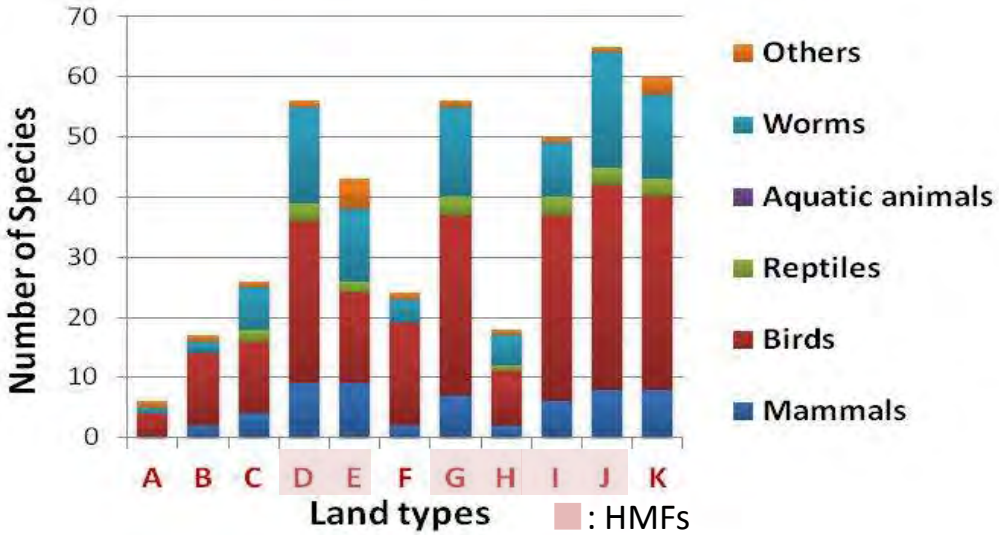
Various HMFs and their forest provisioning services

Folk Land categories	HMFs
A. Residential land and home garden (*Amania*)	
B. Intensive root crop - vegetable garden (*Lela*)	
C. Extensive banana - taro garden (*Lawa*)	
D. Forest garden (*Lawa aihua*)	X
E. Sago grove (*Soma*)	X
F. Young fallow forest (*Lukapi holu*)	
G. Old fallow forest (*Lukapi mutuani*)	X
H. Bamboo grove (*Awa harie* etc.)	X
I. Damar forest for resin collection (*Kahupe harie*)	X
J. Forest for NTFP collection (*Airima harie*)	X
K. Primary/old secondary forest for hunting/ trapping (*Kaitahu*)	



Plant resources

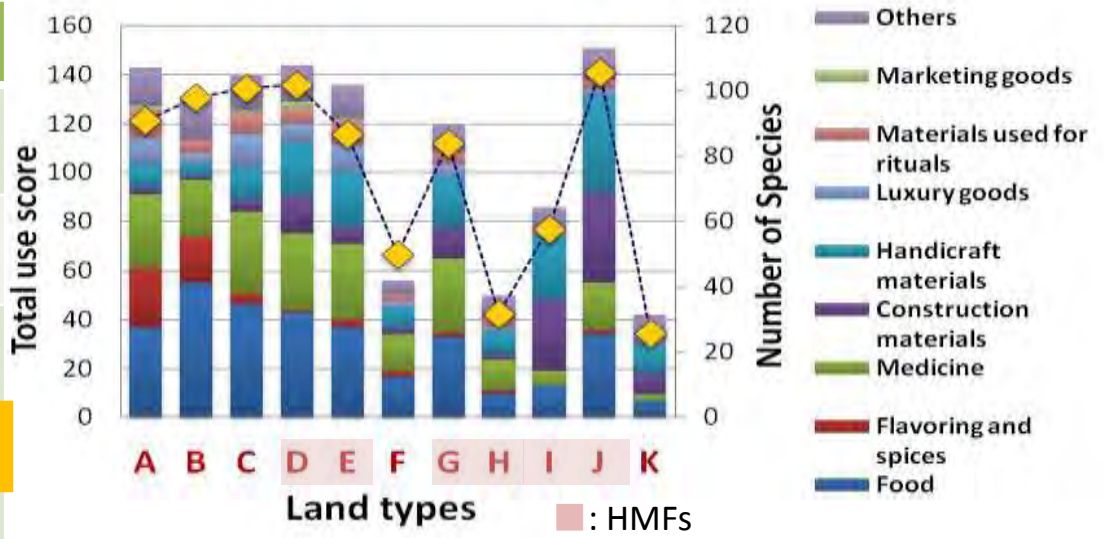
* "Total use scores" were counted in the following way: For example, cassava has 2 use scores for food since the roots as well as the leaves of cassava can be eaten.



Animal resources

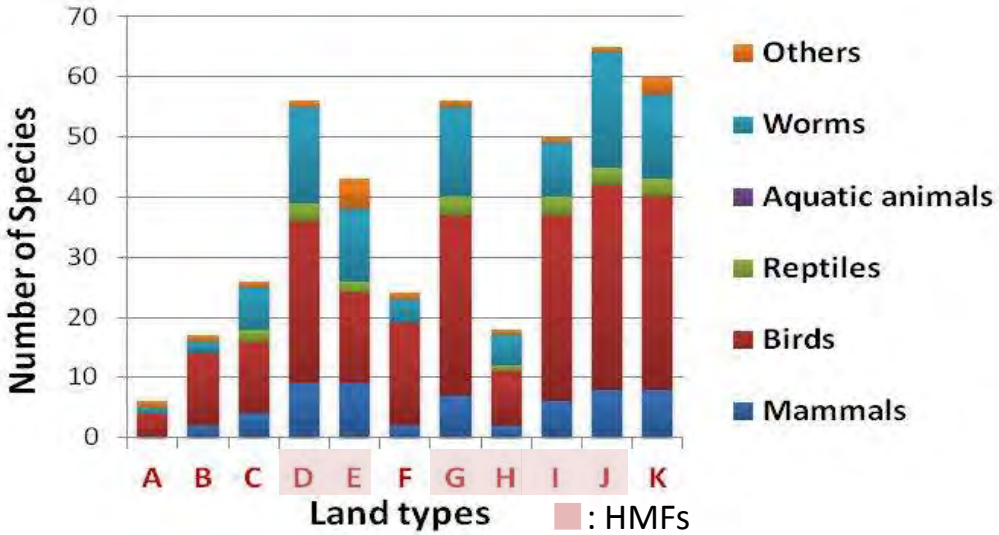
Various HMFs and their forest provisioning services

Folk Land categories	HMFs
A. Residential land and home garden (*Amania*)	
B. Intensive root crop - vegetable garden (*Lela*)	
C. Extensive banana - taro garden (*Lawa*)	
D. Forest garden (*Lawa aihua*)	X
E. Sago grove (*Soma*)	X
F. Young fallow forest (*Lukapi holu*)	
G. Old fallow forest (*Lukapi mutuani*)	X
H. Bamboo grove (*Awa harie* etc.)	X
I. Damar forest for resin collection (*Kahupe harie*)	X
J. Forest for NTFP collection (*Airima harie*)	X
K. Primary/old secondary forest for hunting/ trapping (*Kaitahu*)	



Plant resources

* "Total use scores" were counted in the following way: For example, cassava has 2 use scores for food since the roots as well as the leaves of cassava can be eaten.



Animal resources

Forest garden

- Mixed fruits tree garden with durian, langsat, jackfruit, water rose apple, etc.
- Formed by planting seedlings or protecting wild seedlings and young trees – mainly dispersed by wild bats (*Pteropus* sp.)
- Mainly distributed in old secondary forest, with a few in 'primary' forest
- Extensively managed: underbrush and vines cut only when harvesting → unclear boundaries mixed with many wild plants

Forest garden mixed with many wild plants

Villagers harvesting durian

Damar Forest

- *Agathis damara* - dominated forest used for resin (damar) collection
- Formed by selective protection of wild seedlings and young trees
- Patchily distributed in ‘primary’ and old secondary forest
- Damar is used as a fuel for lamps and kindling; was an important income source up to the mid 1960s
- Felling and de-barking are strictly forbidden

Damar /copal

Agathis damara-dominated forest

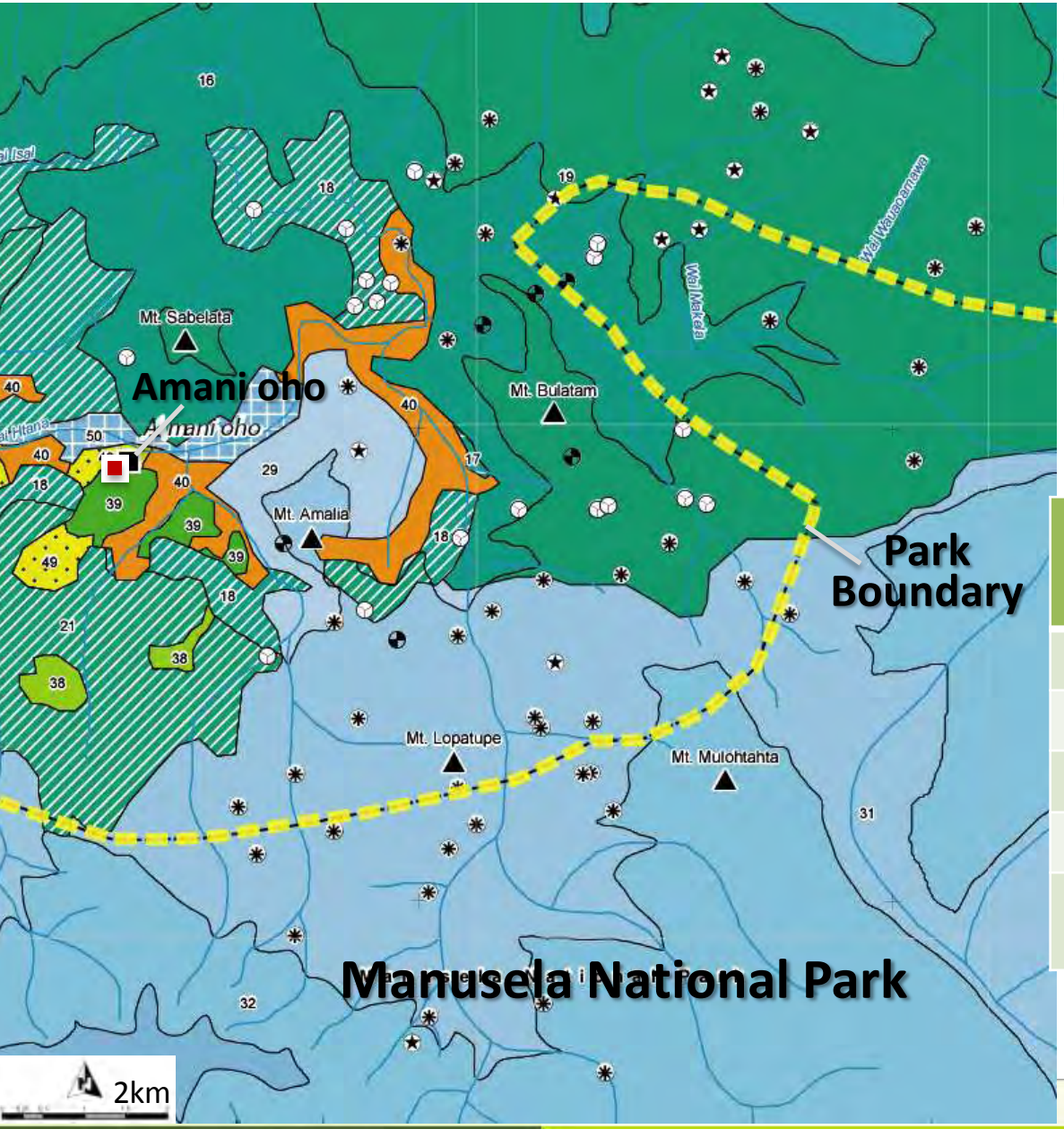
Utilization of human-modified forests by Moluccan cockatoo

Forest types	Utilization	Season
Forest garden	● Eats fruits of durian, langsat, jackfruit	Jan.-May.
Damar forest	● Eats fruits of *Agathis damara* ● Nests in tree hollows of large dead *Agathis damara*	All year around

Feeding scars of Moluccan cockatoo on the fruit of durian (left) and *Agathis damara* (right)

Agathis damara

Sites where Moluccan cockatoos frequently seen or heard



: Primary/old secondary forest (**NF**)

: Damar forest (**DF**)

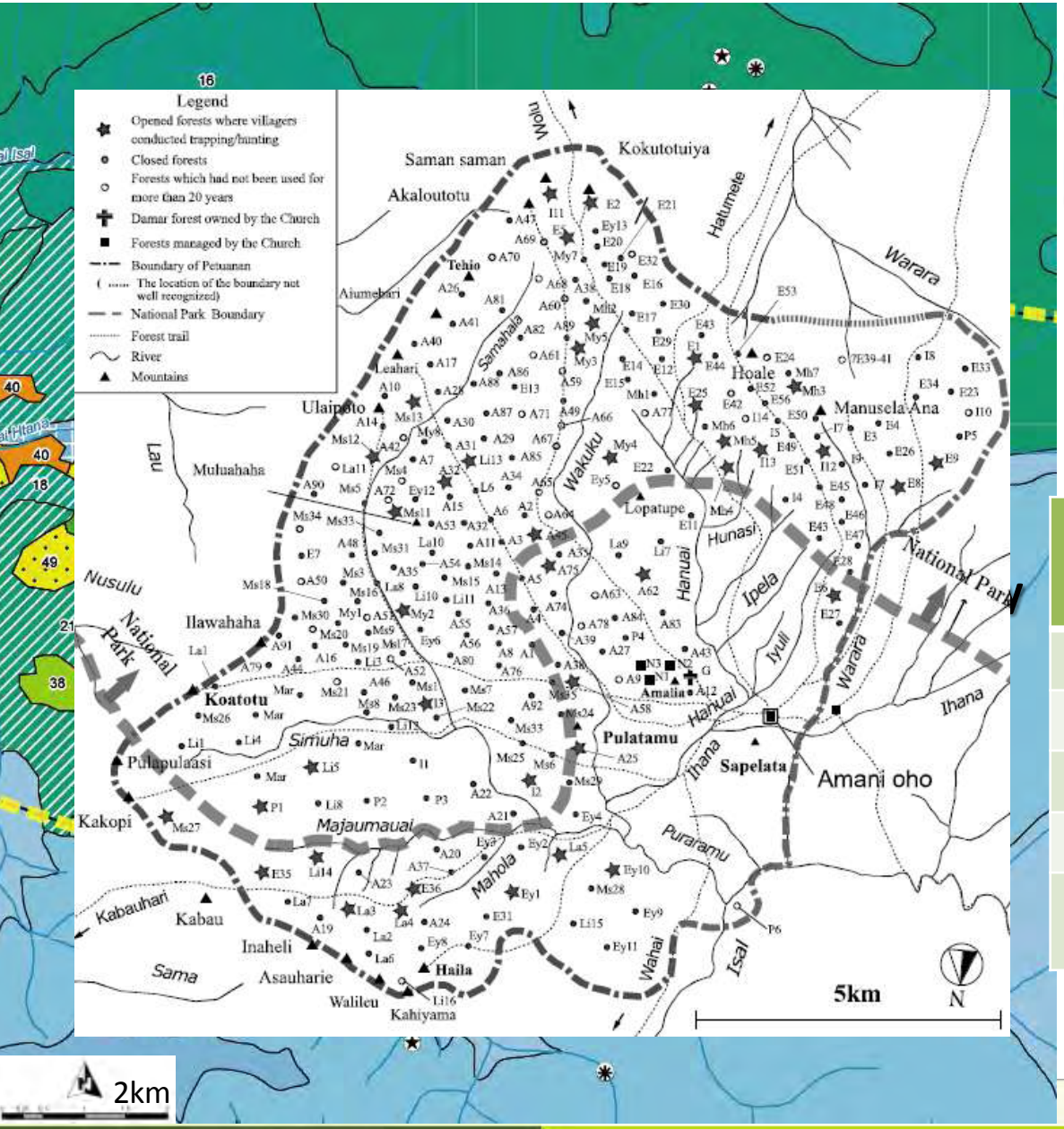
: Forest garden (**FG**)

: Forest garden with damar trees (**FG&DF**)

Forest types	Number of the site	Number of the site inside the NP
NF	11	3
DF	42	16
FG	19	2
FG&DF	6	1

*** 78 cockatoo sites were identified by the interviews with 26 villagers (2012).**

Sites where Moluccan cockatoos frequently seen or heard



: Primary/old secondary forest (**NF**)

: Damar forest (**DF**)

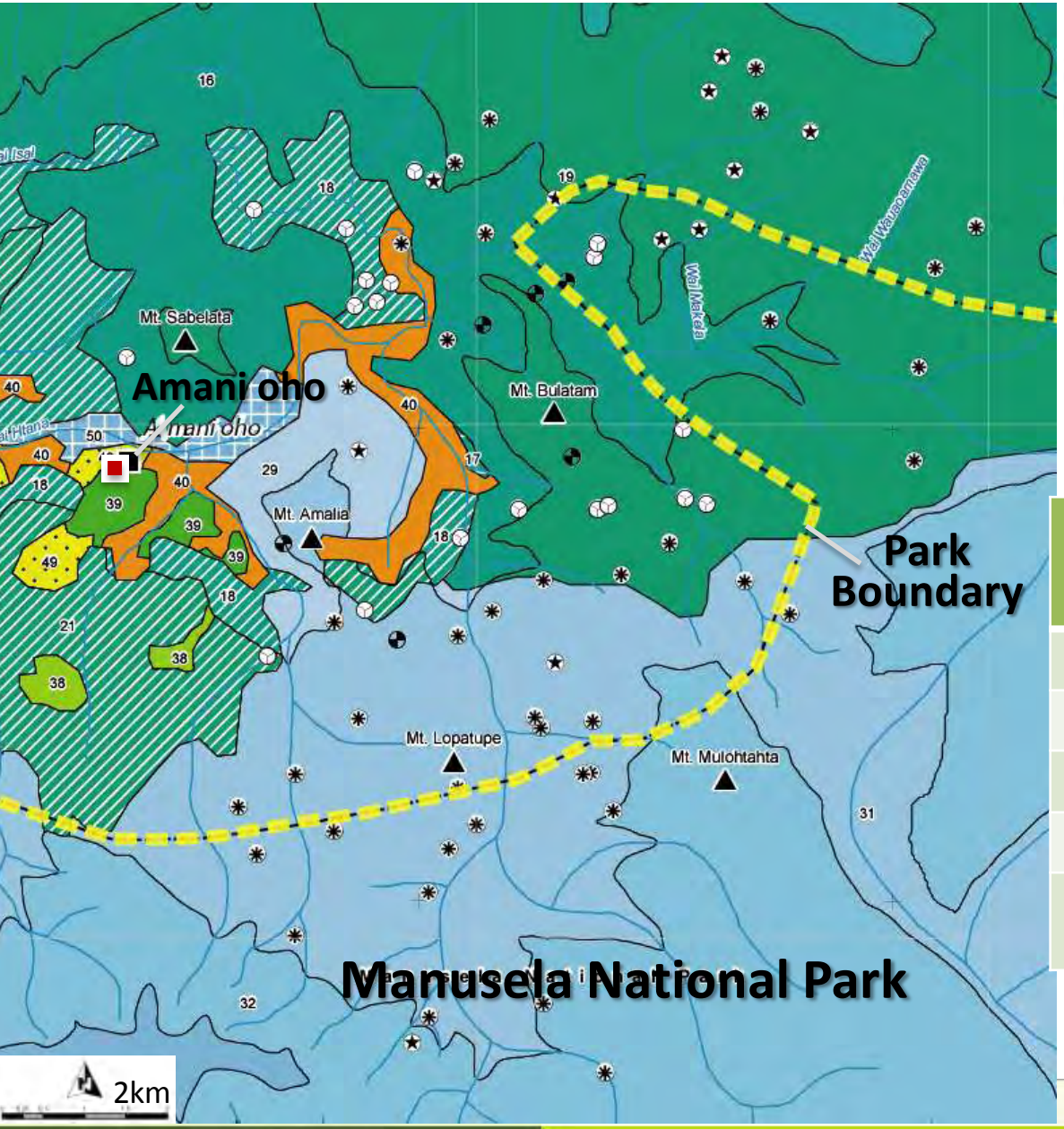
: Forest garden (**FG**)

: Forest garden with damar trees (**FG&DF**)

Forest types	Number of the site	Number of the site inside the NP
NF	11	3
DF	42	16
FG	19	2
FG&DF	6	1

*** 78 cockatoo sites were identified by the interviews with 26 villagers (2012).**

Sites where Moluccan cockatoos frequently seen or heard



: Primary/old secondary forest (**NF**)

: Damar forest (**DF**)

: Forest garden (**FG**)

: Forest garden with damar trees (**FG&DF**)

Forest types	Number of the site	Number of the site inside the NP
NF	11	3
DF	42	16
FG	19	2
FG&DF	6	1

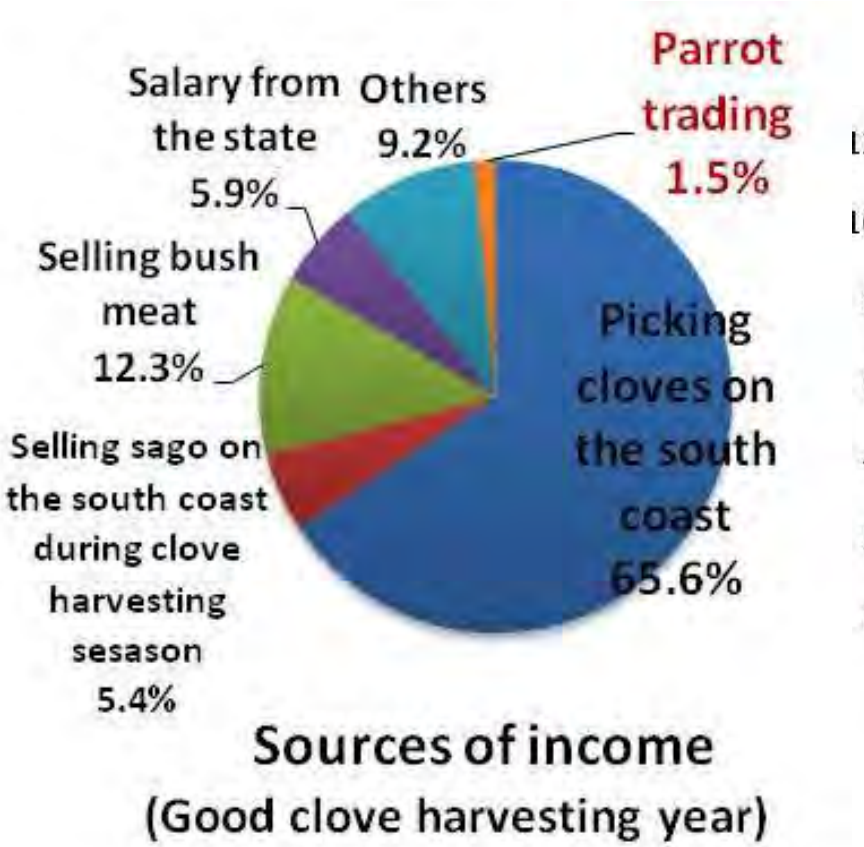
*** 78 cockatoo sites were identified by the interviews with 26 villagers (2012).**

A cockatoo caught by a trap set on a durian tree

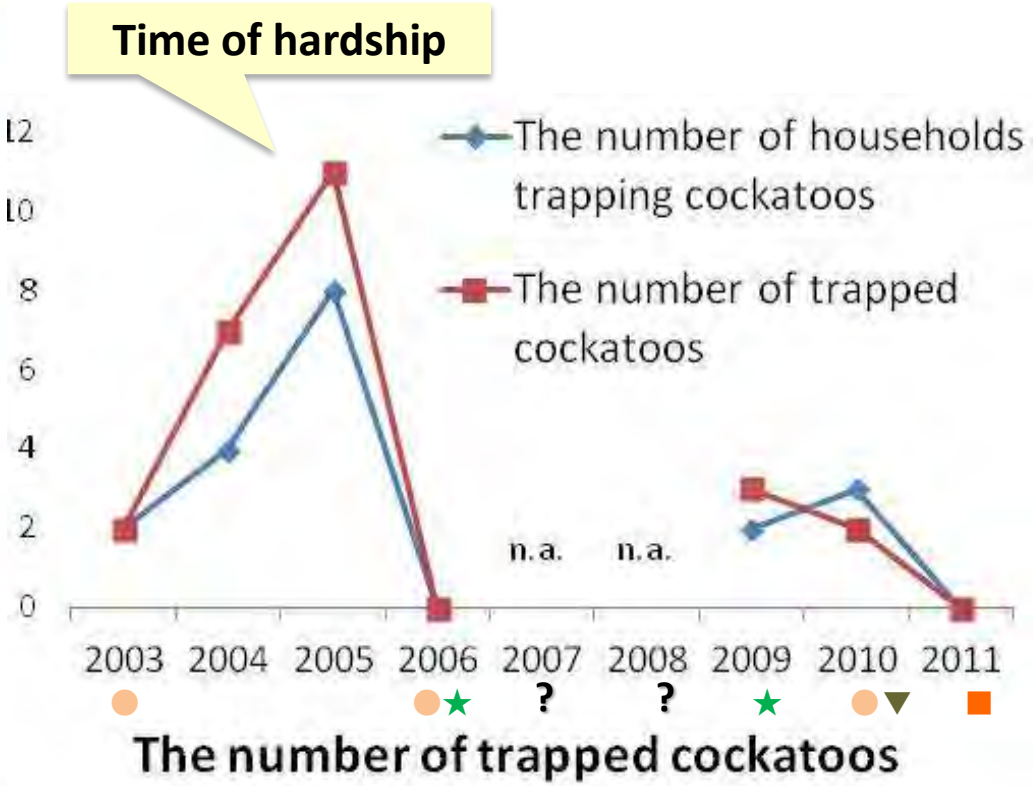
A Moluccan cockatoo trap

A trapped cockatoo for sale at the coast

Moluccan cockatoo:
Supplemental remedial source of income



Sources of income
(Good clove harvesting year)



The number of trapped cockatoos

●: high clove income, ★: government/NGO–sponsored project, ■: working on oil palm plantations, ▼: selling butterflies

* Proportion was estimated based on data collected by using self-administered sheets during 4 data collection periods (total 89 days) in 2003. Informants were 14 heads of households.

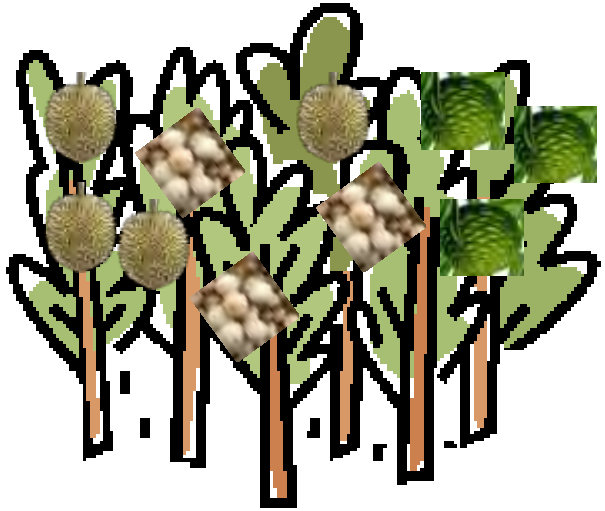
* Data was collected by one-on-one interviews with all heads of households in 2004, 2005, 2007, 2010 and 2012.

Mildly interdependent relationship (?) between Moluccan cockatoo and humans

Trap the parrots in times of hardship

Provide various forest provisioning services

Use HMFs as foraging and nesting sites



HMFs

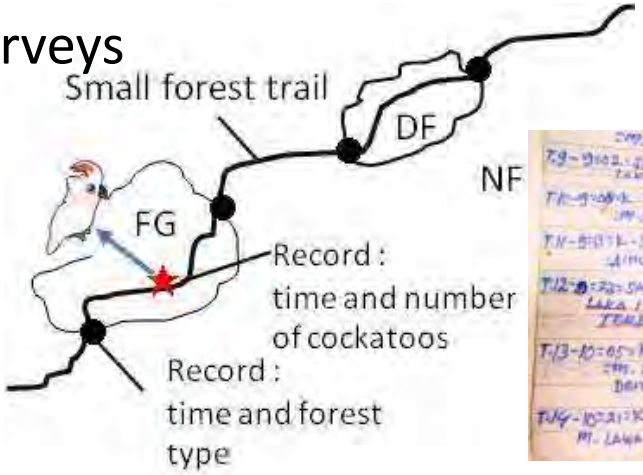
Arboriculture

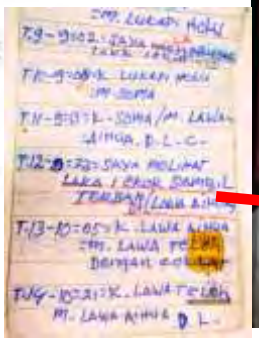
Future research

- Needs to evaluate the importance of HMFs as parrot habitats more objectively on the basis of quantitative data
  - Participatory parrot transect surveys

    ➔ Comparison of relative abundances (N/D) between HMFs and NF

    N: Number of cockatoos observed
    D: Distance observers walked in certain forest type





- Needs to evaluate the importance of HMFs as habitats for other species (e.g. Columbidae birds, hornbill, cuscus, timor deer etc.)
- Assumed directions of discussion in future research:
  - Appropriateness to apply conventional “zone-based conservation models”, which separate human resource use areas and wildlife habitats
  - Desirability of more flexible conservation models to allow local arboricultural practices with certain conditions inside protected areas

Thank you

This study was made possible by the grant assistance provided for CIFOR by the Ministry of Foreign Affairs, Japan and Forestry and Forest Products Research Institute, Japan (FFPRI), and also by the facilitation and support of the Collaborative Land Use Planning and Sustainable Institutional Arrangement (CoLUPSIA) Project funded by the EU. We thank these institutions for their assistance and support.

Thinking beyond the canopy

Center for International Forestry Research

CIFOR

CIFOR advances human wellbeing, environmental conservation and equity by conducting research to inform policies and practices that affect forests in developing countries. CIFOR is one of 15 centres within the Consultative Group on International Agricultural Research (CGIAR). CIFOR's headquarters are in Bogor, Indonesia. It also has offices in Asia, Africa and South America.

CGIAR

Appendixes

Use of Human modified natural environment by wild animals

Species	Type of land	Utilization
Celebes Wild Boar (Sus celebensis)	*Lukapi* (cultivatable land and fallow forest), sago groves, bamboo grove	Eating fruits of durian and jackfruits (fruits fallen on the ground), bamboo shoots, etc.
Grey Cuscus (Phalanger orientalis)	*Lukapi* , sago groves, forest garden, *kaitahu*	Eating leaf stalk of sago palm, fruits of *atau*, *masapa* etc.
Bat (*Pteropus sp*)	Forest garden, bamboo grove, sago grove, *lukapi*	Eating fruits of sugar palm, langsat, jackfruits, oma, guava, water rose apple etc.
Malayan Civet (*Viverra tangalunga)*	Forest garden, *lukapi*	Eating bananas, fruits of durian, jackfruits, papaya, pineapple, itawa etc.
Lories (*Eos bornea, Alisterus amboinensis etc)*	Forest garden	Eating Banana and durian
Papuan Hornbill (*Aceros plicatus)*	*Itawa* forest	Eating fruits of Itawa
Wild birds (*Gymnophaps mada, Ptilinopus superbus etc.)*	*Itawa* forest, edges of garden	Eating fruits of Itawa, leha (*Symplocos cochinchinensis*), awou (*Prunus grisea*), ketapi (*Geniostoma* sp.) etc.

Source: Field research.

Trap for wild bats set on *oma* (Artocarpus tree)

Malayan civet (*Viverra tangalunga*)

Trees used for catching wild birds and bats

Local name	Scientific name	Fruiting season	Wild birds and bats
Trees which are not felled when clearing land for agriculture			
Oma	*Artocarpus* sp.	Feb-Apr	*solo musunu (Pteropus sp), solo puti (Pteropus sp)*
Leha	*Symplocos cochinchinensis* (Lour.) Moore	Dec-Jan	*fufualo(?), makatola (Basilornis corythax), mavene (Gymnophaps mada), ovota (Ptilinopus superbus), uniuni (Zesteropus Kuehni)*
Awou Tuni	*Prunus arboreus* (Blume) Kalkman	Jan-Feb	*fufualo, mavene, ovota*
Awou Lasa	*Prunus grisea* Kalkman	Jan-Feb	*fufualo, mavene, ovota*
Ketapi	*Geniostoma* sp.	May-Jul	*mavene, ovota*
Trees, the growth of which is encouraged through seedling and protection			
Itawa Kopi	*Litsea mappacea*	Jan-Feb	*fufualo, ka (Aceros plicatus), lesoa (Ivos affinis), loe, (Phiemon subcorniculatus), manu putia (Ducula bicolor), makatola, mavene, nieli (Columba vitiensis), ovota, sisai (Alisterus Amboinensis), totoro, ovota, sisai (Alisterus Amboinensis)*
Itawa Tuni	*Litsea mappacea*	Mar-Apr	*fufualo, ka, lesoa, loe, manu putia, makatola, fufualo, ka, lesoa, loe, manu putia, makatola*

Source: Field research

Arboricultural activities to form *Itawa*-dominated forest

Human interventions:

- Weeding, clearing underbrush, and cutting vines (Jan.-Apr.)
- Cutting and barking trees covering *Itawa*
- Collecting seeds of Itawa and seeding land

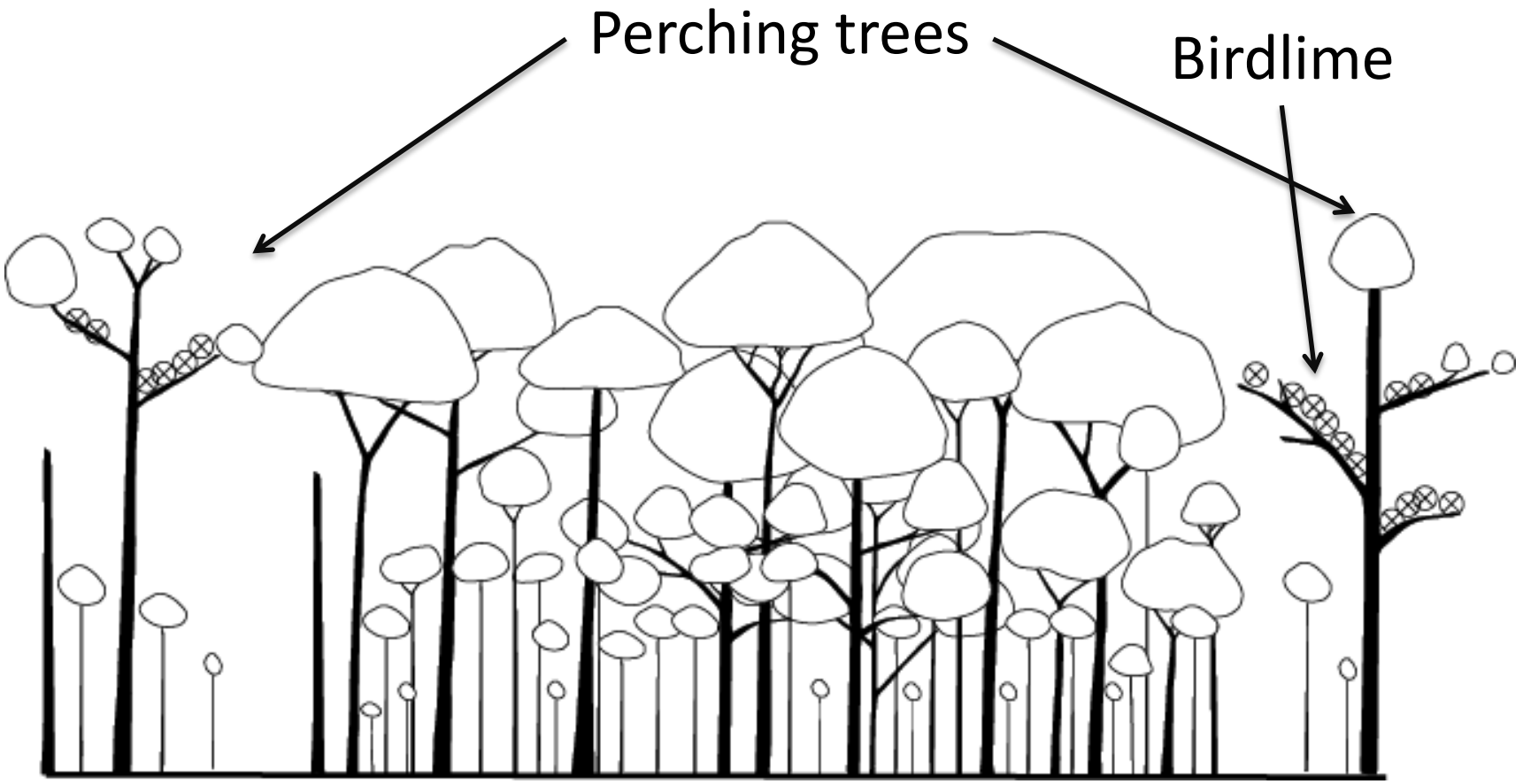
Itawa tuni (*Litsea mappacea*)

Itawa forest

- *Itawa* forest patchily distributed in fallow forest
- The largest one: around 1 ha

This slide indicates Arboricultural activities to form Itawa- dominated forest. Some villagers encourage the growth of itawa through weeding, clearing underbrush, and cutting vines , and felling and barking trees covering Itawa and hindering its growth, as well as collecting seeds of Itawa and seeding. Itawa forests are patchily distributed in fallow forests. I haven't yet conducted a sufficient survey to measure the sizes of itawa forests, but based on measurements by pacing it off, the size of largest one seemed to be around one ha.

Use of Itawa forest as a trapping ground



Itawa - dominated forest

According to villagers accounts, most wild birds attracted by the Itawa do not directly come to the Itawa tree. Before coming to the itawa, they usually perch on trees with a few branches and leaves where the view is not obstructed in order to make sure that there are no predators such as snakes. Therefore villagers set birdlime on the branches of these perching trees. Itawa- dominated forest can also be regarded as human-modified forest formed through arboriculture.

Wild bird trapping

Birdlime made from sap of *oma* (*Artocarpus* sp)

Villager setting birdlimes on a tree

Wild birds are trapped using birdlime made from sap of an Artocarpus tree. Photo at right shows a villager setting birdlime on a tree. Birdlime is inside this bamboo cylinder.

Frequently trapped wild birds

Gymnophaps mada

Ptilinopus superbus

Aceros plicatus

- Around 50 species trapped for subsistence purposes (food)
- Most of them are Columbidae birds
  - *Gymnophaps mada* (local name: mavene)
  - *Ptilinopus superbus* (ovota)
  - *Columba vitiensis* (nieli)
  - *Macropygia amboinensis* (pilaka)
  - *Aceros plicatus* (ka) etc.

In Amani oho I registered around 50 species of birds trapped for eating. Most of them were Columbidae birds.