

# Significance of Agroforestry and its Relationship with *Satoyama* landscape

アグロフォレストリーの意義と里山ランドスケープ

**Kazuhiko TAKEUCHI 武内和彦**

Vice-Rector, United Nations University

国連大学 副学長

Director, United Nations Institute for Sustainability and Peace

国連大学 サステイナビリティと平和研究所



UNITED NATIONS  
UNIVERSITY

December 16, 2009

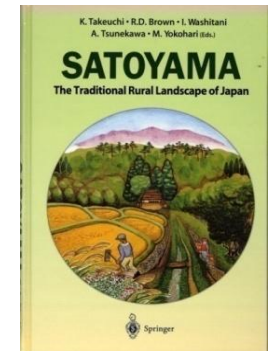
# CBD and *Satoyama* Landscapes

- ❖ The 10<sup>th</sup> Conference of the Parties (COP 10) to the Convention on Biological Diversity (CBD) will be held in October 2010 in Aichi/Nagoya, Japan.
- ❖ Expect significant increase of interest in biodiversity and ecosystem conservation both in Japan and internationally.
- ❖ Focus on the traditional human-nature relationship in *Satoyama* landscapes as a nature-harmonious society model.
- ❖ Japan proposes SATOYAMA Initiative to disseminate the *Satoyama* concept to the global community, particularly to Asia and the Pacific.
- ❖ Japan is expected to contribute to international work in this field.



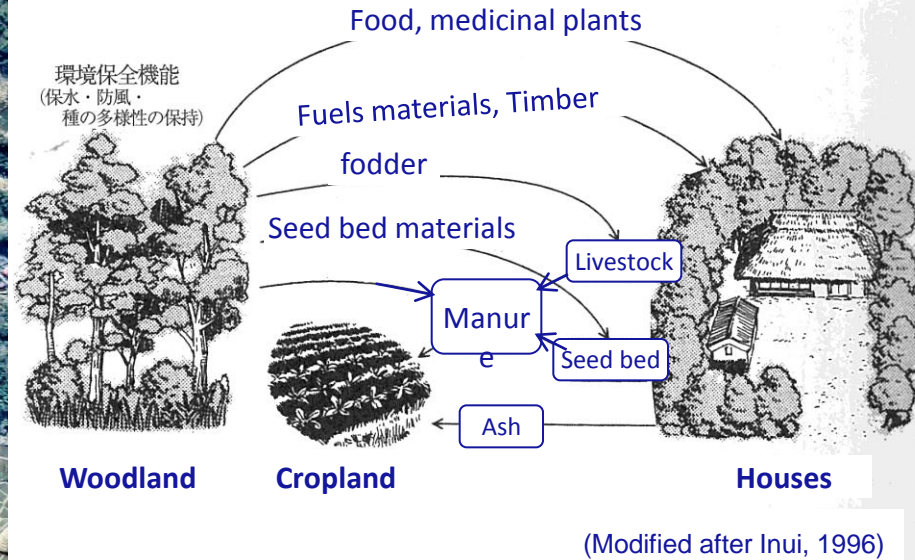
環境省資料 From MOE

- ❖ 生物多様性条約第10回締約国会議が2010年に愛知県名古屋市で開催される
- ❖ 生物多様性・生態系保全についての国民的・国際的関心の高まりを期待
- ❖ 自然共生社会のモデルとして里地里山の伝統的な人間・自然関係を取り上げる
- ❖ アジア・太平洋を中心とする世界に発信するSATOYAMAイニシアティブを提唱
- ❖ 生物多様性・生態系分野での日本の国際貢献に大きく寄与するものと期待される





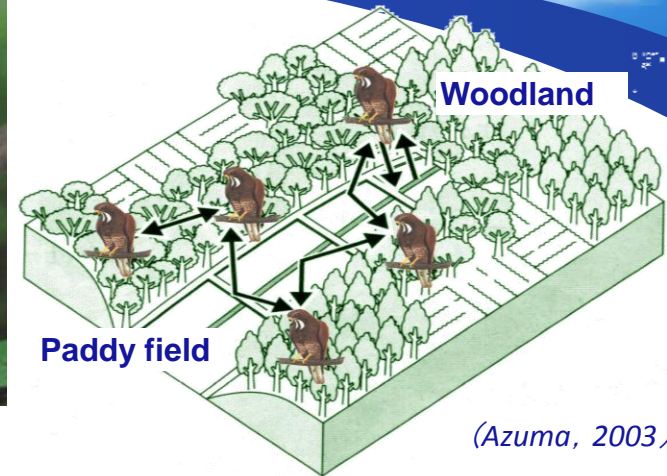
# Satoyama Landscape in Japan



- ❖ Mosaic pattern of woodlands, grasslands, crop lands, paddy fields, settlements, irrigated ponds, etc.
- ❖ Nature maintained by human activities such as periodically tree cutting in coppice woodland and agricultural activities.
- ❖ Relationships exist between each of the different types of land use, such as the plowing of fallen leaves gathered from a woodland back into the soil as fertilizer, or the use of firewood as fuel in homes.

- ❖ 林地、草地、畑、水田、集落、ため池などからなるモザイク状の土地利用パターン
- ❖ 林地における定期的な伐採や農業活動など、人間活動により維持されてきた自然
- ❖ 落ち葉の堆肥利用、家で使用する薪炭材の林地からの採取など、個々の土地利用間に関係性

# Biodiversity of Satoyama Landscape



- ❖ Periodically tree cutting kept woodland with broad leaved deciduous trees which formulate habitat for plants “spring ephemeral”.
- ❖ Abandonment of woodland management causes degradation of habitats for these species living in so-called secondary nature.
- ❖ Provides a combination of habitats for certain species such as Gray-faced Buzzard.
- ❖ 定期的な森林伐採により、落葉広葉樹林が維持され、春植物の生育環境が形成
- ❖ 林地の管理放棄は、林床の環境変化をもたらし、これらの二次自然に生育する植物の生育地を脅かす
- ❖ サシバのような複数の異なる環境が必要な種の生息地を提供





# Satoyama in Japan and Agroforestry in India

- ❖ There are landscapes in Western Ghats region of India which are similar to *Satoyama* landscapes in Japan. Traditional land use and resource management practices in these rural communities of valley and plateaus.
- ❖ Forests, agricultural lands, garden vegetable plots and rice paddies are found in the small-scale river basin valleys and exhibit characteristics of *Satoyama* landscapes.
- ❖ These landscapes in Western Ghats are sustainable social-economic production systems and biodiversity is conserved and the forests function as sinks.
- ❖ However, the communities in Western Ghats are not yet valued as potential models for sustainable as the *Satoyama* landscapes in Japan are and conservation plans to ensure the longevity of these communities is needed.
- ❖ インドの西ガーツ(Ghats)には、丘陵地・台地とそれを開析する谷底平野が発達し、伝統的土地利用(管理された樹林や水田)が里山ランドスケープと類似した景観がある
- ❖ 小流域に、樹林、畑地、ホームガーデン、水田が連なる点も里地の特徴と類似
- ❖ 西ガーツと日本の里山ランドスケープは、いずれも持続可能な生産システムであり、生物多様性保全や森林吸収源としての機能をもつ
- ❖ しかし、西ガーツでは、日本の里山ランドスケープほど評価が進んでおらず、その保全のあり方について検討していく必要がある



# Ecosystem Services in *Satoyama* and Agroforestry Systems

## Woodlands (*satoyama*) and Agroforestry in the Western Ghats 二次林(里山)とガーツ山脈西部におけるアグロフォレストリー

Croplands (terraced uplands and lowlands)

畑地(台地と低地)

### Products and services

- Hydrological benefits (higher interception, infiltration rate, and reduced overland flows)

- Nutrient cycling (litterfall/decay, greenleaf manure)

生産物とサービス

- 水文学的な利益(高度な遮断機能、浸透率、表面流出の減少)

- 栄養分の循環(落枝落葉/腐食、緑肥)

- Fuelwood, fodder, small timber, poles -薪炭材、飼料、小角材、竿

- Agrobiodiversity conservation (Moderate disturbances, e.g., Periodical cutting and burning for the maintenance of agricultural lands, open forestlands and secondary coppice forests, promote species richness and diversity).

- 農業生物多様性の保全(適度なかく乱 例;定期的な伐採と農地管理のための火入れ、疎開林と二次萌芽林、種の豊かさと多様性の促進)

- Carbon sequestration in vegetations and soils; phytoremediation; alleviating agricultural non-point source pollution

- 植生と土壌による炭素吸収;植物による環境浄化;農業における特定できない汚染の緩和

- Microclimatic modification, recreation, aesthetics

- 微気象の調整、レクリエーション、美的価値



# Key Differences between Traditional Agroforestry and Satoyama

Parameter 比較要素	Agroforestry アグロフォレストリー	Satoyama 里山
<b>Geographical focus</b> 対象とする地域	Predominantly tropical 主に熱帯地域	Temperate East Asia 東アジアの温帯
<b>land management</b> 土地の管理	Individualistic 個人主義的	Collective, community, or private 共同、コミュニティ、または個人
<b>Objectives</b> 目的	A tool for landscape restoration, improve human welfare ランドスケープ再生、人間の福利向上のツール	Co-existence of nature and humans with high natural and social quality on national lands 自然的社会的に質の高い国土における自然と人間との共生
<b>Intrinsic features</b> 本質的特徴	Intentional, Intensive, Interactive, and integrated 意図的、集約型、相互作用型、統合型	Integrated, dynamic, mosaic landscapes with traditional land use and management 伝統的土地利用・管理による統合的・動的なモザイク
<b>Structural aspects</b> 構造的特徴	Mimics the natural forests, possesses multi-tiered canopy architecture, and provides niches for different species groups 自然林を模倣し多層の林冠で構成。異なる種グループのニッチを提供	Various stages of arrested succession, less complex, potential to create habitat mosaics 様々な遷移段階。アグロフォレストリーより単純。多様なハビタットを提供しうる
<b>Functional aspects</b> 機能的特徴	Multiplicity of products as well as ecosystem services 多様な生産物とエコシステムサービス	Ecosystem services and conservation of natural resources (production focus lacking) エコシステムサービスと自然資源 (生産面に対する関心は欠く)
<b>Land tenure</b> 土地の所有	Predominantly private ownership 主に私有	Mostly common pool resources; conservation entails social engineering and participatory management 主に共有資源。保全に対する取り組みには、社会に向けた発信、利害関係者の参加型管理が必要

# Traditional Landscapes/Land Use Systems in the World

Country 国	Local terms ローカル名	Characteristics 特徴
Korea 韓国	<i>Maeul</i> (village) <i>Maeulsoop</i> (village forest)	Maeul: landscape composed of mountain in the back, residential area, streets, croplands, streams, and ponds. マウル: 背後の山、集落、道、農地、小川と池からなる空間
China 中国	稲魚農業 Rice-Fish Agriculture	Fish farming in rice paddies 水田における稲作と漁業の両立
Indonesia インドネシア	<i>Kebun-Talun</i>	Shifting cultivation system 移動耕作システム
	<i>Pekarangan</i> (Homegarden)	A mixture of agricultural crops, tree crops, and animals on the land surrounding a house 家屋の周囲に農作物、果樹や有用樹木を栽培し家畜を飼育する土地利用システム
Spain スペイン	<i>Dehesa</i>	Agrosilvopastoral system (Sparse wood pasture grazed by livestock) まばらな樹木のある草地における放牧システム
Zambia, Malawi, Mozambique ザンビア、 マラウイ、モザンビーク	<i>Chitemene</i>	Slash and burn system (Branches of trees on an area several times the size of the cultivated field are cut and piled on the central field where they are burnt to fertilize the acid, nutrient poor soils.) 焼畑システム。広い範囲から枝のみ伐採し、狭い範囲に集めて焼き耕作を行う。



# Pekarangan (Homegarden)

- ❖ A mixture of agricultural crops, tree crops, and animals on the land surrounding a house.
- ❖ Combination of trees with different height and herbs
- ❖ Farmers try to optimize the use of space in in their homegardens, locating each crop according to its light, water, and fertility requirements.

- ❖ 住居の周りにおいて、農作物や樹木作物(果実等)の栽培や家畜の飼育を行う、複合的な土地利用の空間
- ❖ 異なる高さと用途の樹木や草本の組み合わせ
- ❖ 農民が日照・水分・土壌条件などを考慮して、空間の最大利用と最適配置





# Dynamic Land Use in West Java, Indonesia



Talun  
タルン

Trees for fruits, timber, fuels, etc.

果樹、木材、燃料等用の樹木



Kebun-Talun system (Figure by S. Okubo)

クブン-タルン システム

Shifting cycle of 6 years: two years for growing of annual crops and four years for fallow (bamboos in this picture).

6年サイクル: 耕作2年、休閑4年





# Traditional Rural Landscape in Northern Luzon, Philippines



The Kalahan Forest Reserve landscape is dynamic mosaic of fields, fallows, and forests at different stages of succession.

カラハン森林保護地区は、畑、休閒地、異なる遷移段階の森林からなる動的でモザイク状のランドスケープである

(Photo and caption by R.N. Banaticla)



# Promotion of the Use of Indigenous Knowledge



Staggered planting scheme assures regular supply of crops and minimizes exposure of bare ground during cropping.

斜面地での耕作では、裸地の状態にある面積を最小にするため、栽培時期をずらした作付けをする



Riprap: mechanical barrier (made of stones) built around the field to control soil erosion

畑地の土壌侵食防止用の石積



(Photos and caption by R.N. Banaticla)

“Punawel” (Compositae) fallow species that is used by farmers as an indicator that soil is fertile

土壌が回復していることを知らせる植物



# Satoyama Landscapes as New Commons

- ❖ The essence of *satoyama* landscapes is that coexistence of human society and the natural environment is achieved through sustainable management of local natural resources and energy needs.
- ❖ This essence has the quality of contributing to the maintenance of biodiversity cultivated by human intervention and management of secondary nature.
- ❖ When considering this essence of the traditional human and nature relationships of *satoyama* landscapes, Japan should focus on establishing a green infrastructure founded on a contemporary model of a biomass-circulating society.
- ❖ This approach is to some extent similar to the concepts of agroforestry and proposing combined strategies that include such concepts is now a major challenge not only for Japan, but globally.



- ❖ 里地ランドスケープの本質は、コモンズとしての地域資源・エネルギーの共同管理を通じた人間と自然の共存である
- ❖ それが、少なくとも日本では、二次的自然が育む生物多様性の維持に貢献するという特質をもつ
- ❖ こうした里山ランドスケープの本質から見て、我々が日本で推進すべきは、新たな地域管理主体の形成と、新たなバイオマス循環社会の構築を通じた自然共生社会の実現
- ❖ こうした考え方は、アグロフォレストリーの概念とある程度類似しており、それらを包含する共通戦略の提示が大きな課題

# Creating Sustainable Societies in Humid Tropics

- ❖ Harmonious coexistence between human and nature is traditionally recognized across humid tropics.
- ❖ Climate in humid tropics supports an environmentally sound circulating society.
- ❖ Traditional land use systems are more sustainable than modern industrial agriculture and forestry.
- ❖ Traditional human activities are at risk due to the acceleration and progression trends of globalization.
- ❖ Working together to achieve a sustainable society by combining traditional and modern ways of life.
  - ❖ 湿潤熱帯に息づく伝統的な人間と自然のかかわり
  - ❖ 湿潤熱帯の気候風土が循環を支える
  - ❖ 近代的な農林業よりもむしろ持続可能性が高い
  - ❖ 伝統的な人々の営みが グローバル化で危機に
  - ❖ 伝統と近代が調和した持続型社会をつくるには



Tall trees planted to provide shades to the coffee trees  
 コーヒーの木に適切な日陰を作る多種の高木

Coffee trees  
 コーヒーの木

[http://eco.nikkeibp.co.jp/style/eco/column/shimamura/080213\\_fairtrade/index6.html](http://eco.nikkeibp.co.jp/style/eco/column/shimamura/080213_fairtrade/index6.html)

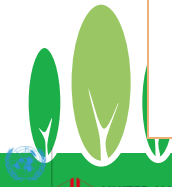
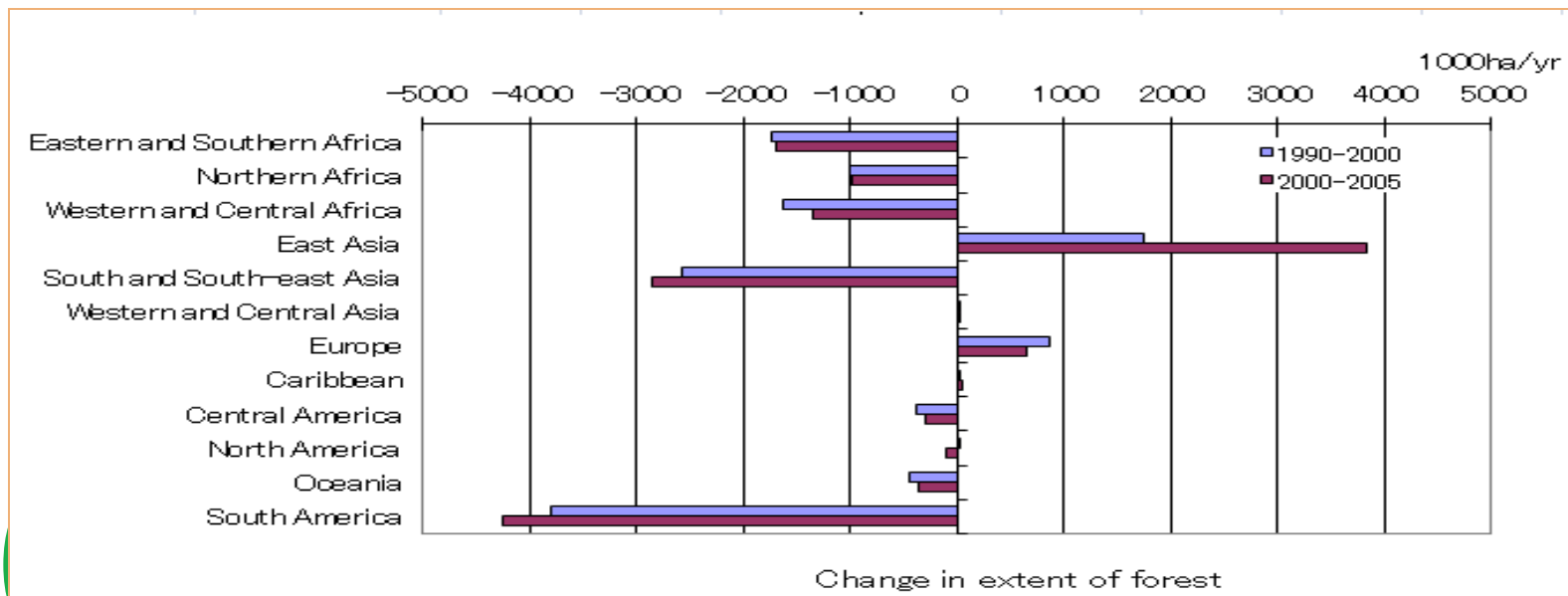






# Proposing Global No Net Loss

- ❖ Setting a long-term goal to stop the loss of forest cover of the earth's terrestrial surface.
- ❖ Particularly aiming to mitigate deforestation in such developing countries as Latin America & Africa.
- ❖ Aiming at remarkable improvement of the self-sufficiency in food and timber in each region.
- ❖ Imposing obligations on development aid programmes to be in sets with ecosystem rehabilitation.
  - ❖ 地球の陸域全体の森林面積の減少をストップさせるという長期目標
  - ❖ とりわけ、中南米、アフリカ等途上国の森林減少の緩和を目指す
  - ❖ それぞれの地域で食料・木材自給率の顕著な向上を目指す
  - ❖ 開発援助では、生態系の回復とセットのプログラムを義務づけ







***Thank You !***

