Resilience in Traditional Food Systems.

Conference presentation

Agrobiodiversity to manage risks and empower the poor.
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The challenge: and use biodiversity to feed a healthier world

Solving the problem with the same mentality that created them .
Intensification through simplification and increased inputs .

Further simplification of production systems, crops and varieties, landscapes and food systems. No longer a viable option.

Instability in food prices, periodic health and food safety problems, growing demand for more diverse healthier locally sourced foods.

Channel a vast body of research in a coherent context and at a scale where they present a global alternative to future extrapolations based on existing systems

Changes in Biological and Cultural Diversity over Time

In **regions** across the world dramatic and rapid changes occur:

- new species domesticated, introduced, and used
- cultural practices change rapidly to incorporate new practices and demographic changes, migrations
- societies innovate adopt and endogenise new biological and cultural introductions in a brief historical period

Globally, cultures are threatened by

- language loss,
- demographic changes, poverty, and marginalisation
- loss of access to and knowledge of traditional resources, territories, and landscapes
- biodiversity in food systems, agricultural systems and landscapes is diminishing, (conversion of land use, intensification, homogenisation)

Human potential to maintain and innovate through bio-cultural diversity

- Occurs in places where communities have resided and managed resources for livelihood security for generations
- Where mosaic landscapes result from application of the unique cosmovison of the community to the land and its products
- Where communities access and use wild and cultivated biodiversity to maintain their systems and increase flow between the cultivated and the wild.
- Where food cultures and local food systems provide the potential for food sovereignty
- Where local institutions and knowledge systems exist to embed, govern, and transmit the value and potential of their agricultural biodiversity and biocultural landscapes to young people and allies in conservation and development.

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Social Ecological Systems and Bio-cultural Landscapes Apt for Crop Domestication and Evolution.

- Association with protected areas/ ecotones
- Traditional ecological and biodiversity knowledge embedded and transmitted through cultural values, beliefs, and practices
- Maintenance and distribution of local seeds and germplasm
- Geneflow from wild to cultivated patches-home gardens, swiddens, abandoned or resting fields and orchards (Loroco, Eggplant, Manioc, Yams, Taros, Pepper, Fruit trees) and back
- Distinctive food cultures, dietary diversity, local notions of health & nutrition
- Local management of mosaic landscapes for resilience and ecosystem services in soils, water, niche differentiation pollinators, pest and disease management..

Farmers Managing Risks: Scope and Scale of Adaptation and Innovation

Landscape scale

- Defend or reclaim mosaic landscapes that span a range of ecosystems and resources: crop fields, forests, pastures, wetlands and inland waters. E.g. Nepal, Kenya, Central Asia

- Intensify use of niches to produce foods of high nutritional or market value. Home gardens, experimental gardens, E.g. Mali, Burkina Faso, .

- Diversify food sources from different ecosystems and niches. Shorter food chains & redefine scope of food systems .

Broaden the scope of crop and tree diversity

Introduce new crops: chayote, butter bean, quinoa, cowpea

Revitalise traditional crops: voandzu, millets and sorghum

Consume more food from trees and perennials

Access and use broader scope of genepool: perennial forms of pigeon pea

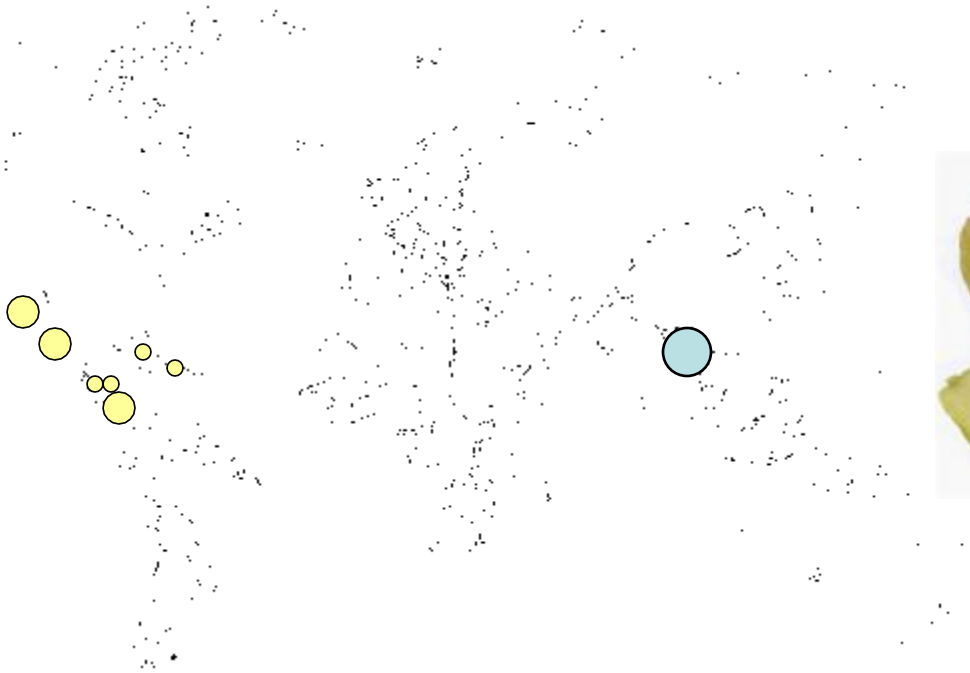
Move crops and crop varieties to new niches, ecosystems,

Assist migration of food species and varieties, conserve those with nowhere to go.

Chayote (*Sechium edule*)

Chayote is native to Mesoamerica. Cultures in Asia have been successful in cultivating it as well. The main growing regions are Costa Rica and Veracruz, Mexico. Costa Rican chayotes are predominantly exported to the European Union whereas Veracruz is the main exporter of chayote to the United States.

The chayote fruit is used in both raw and cooked forms. When cooked, chayote is usually handled like summer squash, it is generally lightly cooked to retain the crisp flavor. Raw chayote may be added to salads or salsas, and it is often marinated with lemon or lime juice. Whether raw or cooked, chayote is a good source of amino acids and vitamin C. The tubers of the plant are eaten as root vegetables., particularly in Southwest China. In addition, the shoots and leaves can be consumed, and they are often used in salads and stir fries, especially in Southeast Asia.



Main distribution of Chayote

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Harvesting a field of high value Taro flowers in Yunnan

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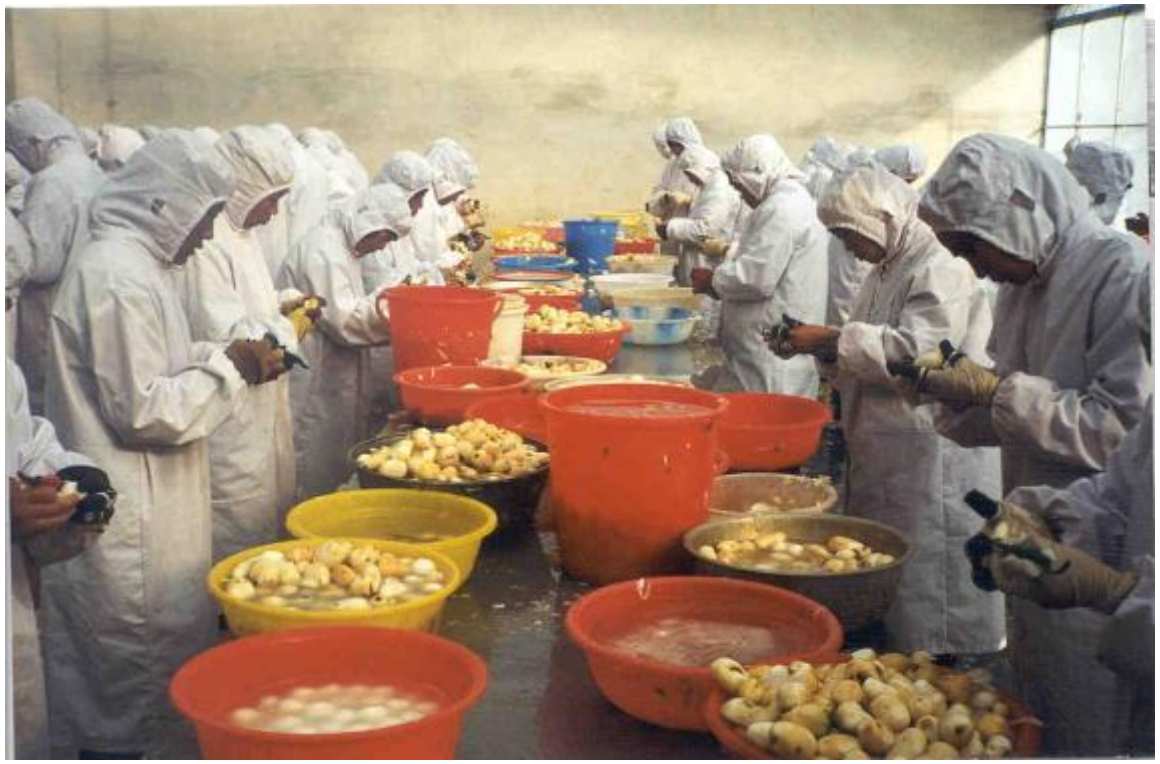
Taro flowers travelling to urban market on a bicycle to be sold and then stir fried

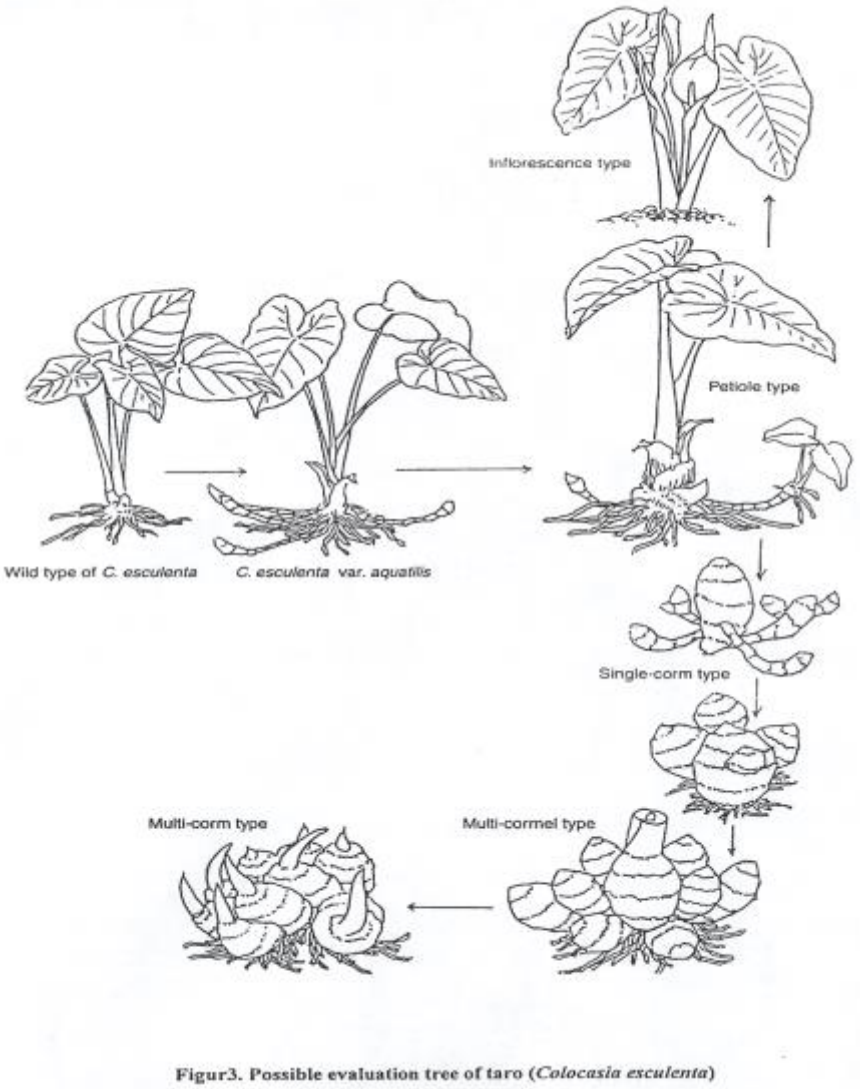
Whose food culture? Taking taro out of its bio-cultural landscape

Taro in Laiyang China, intensive cultivation of single cultivar for export as high-value product.

Not much diversity for taro or people



Conservation and Use of Taro



Figur3. Possible evaluation tree of taro (*Colocasia esculenta*)

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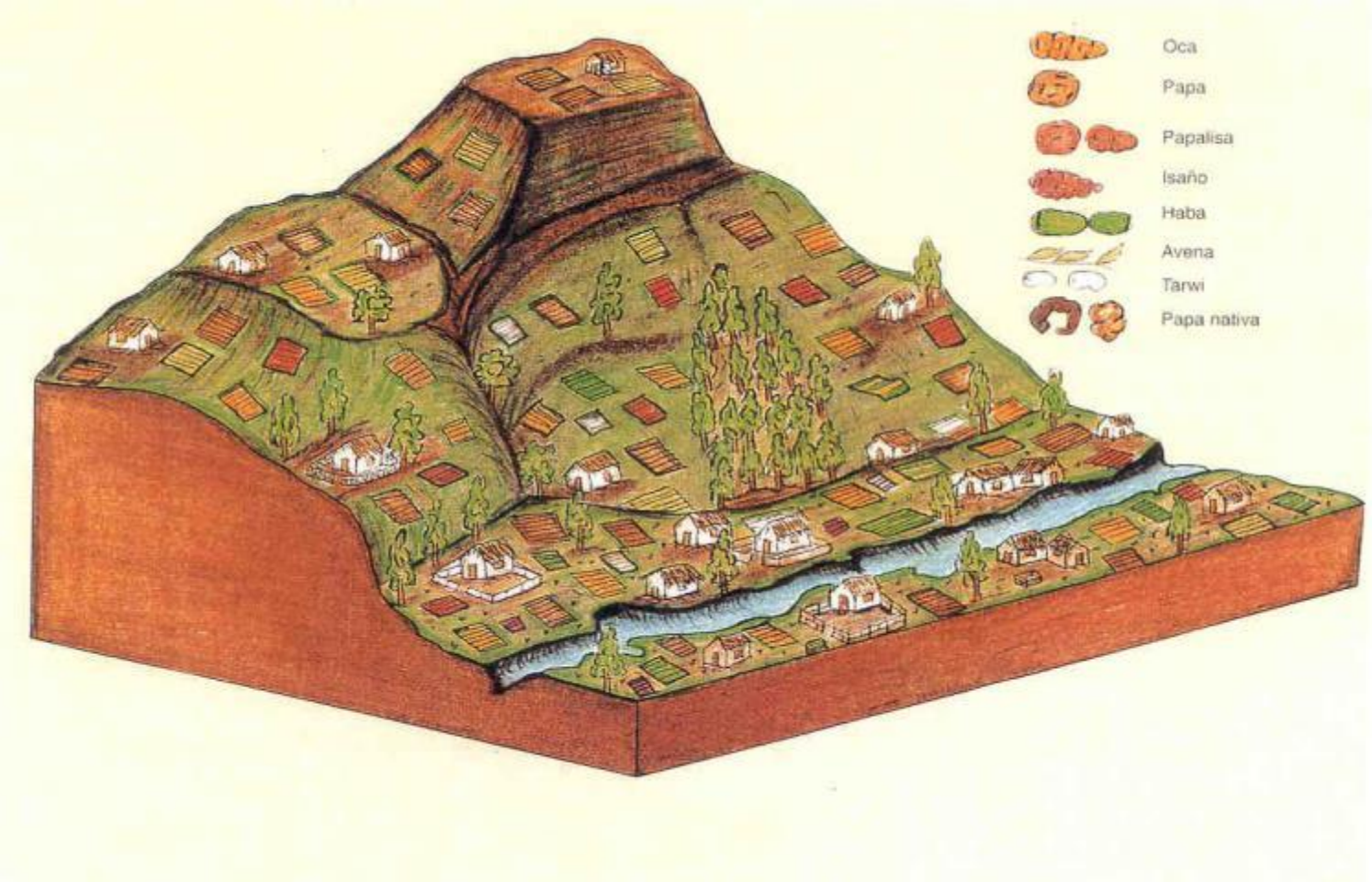
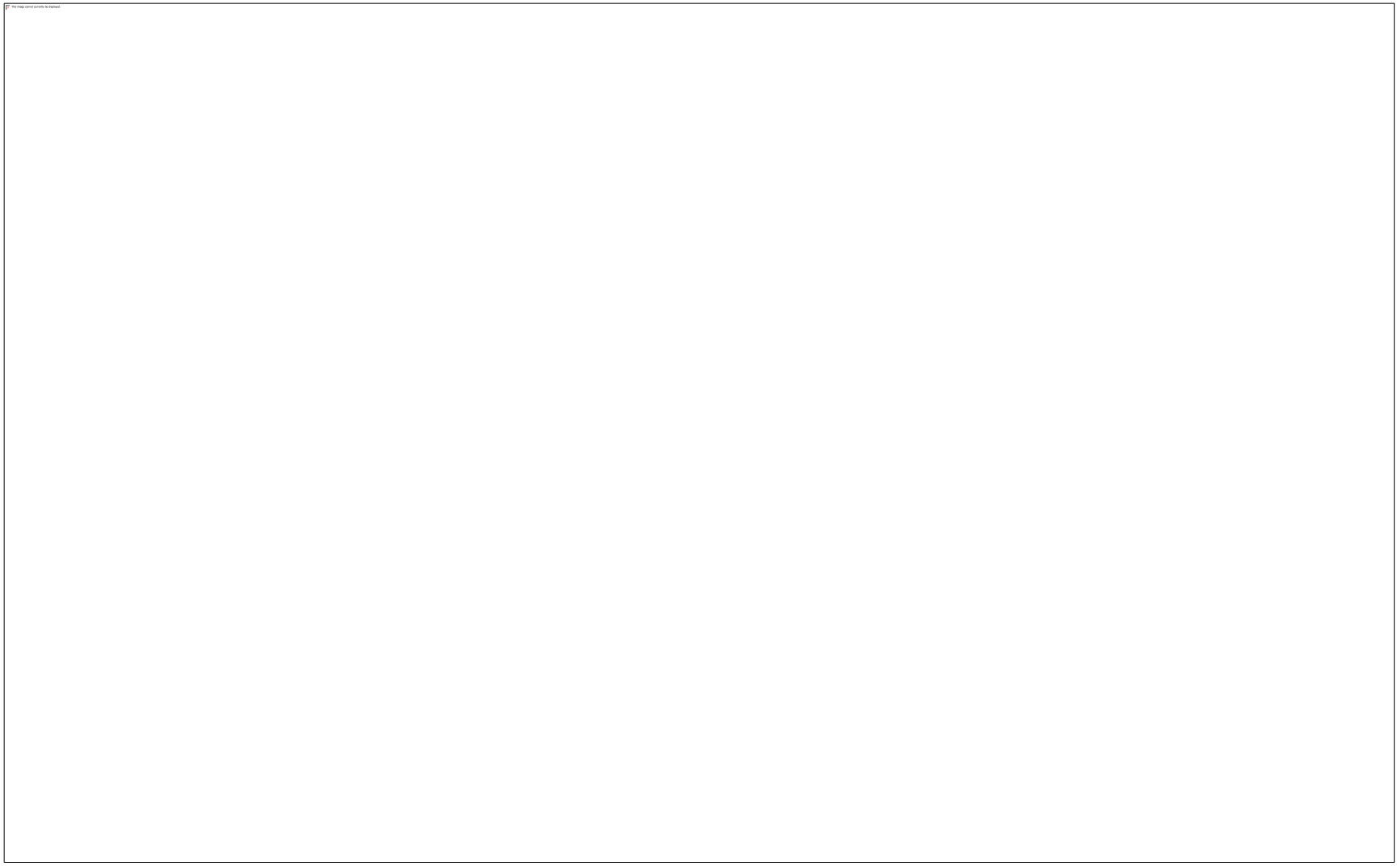
Local cosmologies and perceptions of landscapes enable farmers to develop and adapt crops to niches in their ecosystems



PROINPA & BIOVERSITY: Cochabamba, Bolivia

Karen rotational farming system (northern Thailand)



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Cultural Adaptation to Difficult Environments Increases Biodiversity: Arab and Berber peoples in desert oases maintain drought resistant plant varieties and plant communities around a key species, the date palm (Phoenix dactilefera)

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- Cosmology and Rules
- Transmission
- Conservation
- Innovation

Farming in the Guantanamo Man and Biosphere

Adaptation and Innovation, Kitui , Kenya

Increasing importance of

- traditional drought-resistant crops (e.g. sorghum, millets),
- wild plants (e.g. wild fruit trees)
- and the maintenance of landscape diversity (e.g. use of fields and gardens in different micro agro-ecological zones (landscape scale diversity).

Lessons gained by using indicators:

- reach a common understanding of threats and solutions,
- define resilience-strengthening strategies (improving access to seeds, planting trees, protecting sacred sites, reducing deforestation.)
-access new knowledge and practices from other communities, NGOs, research organisations.

Photographs Yasu Morimoto

70 years of Bio-cultural research on crop domestication, evolution and agricultural innovation

- **Audrey Richards**: rapid changes and adoption in food systems (Land Labour and Diet in Northern Rhodesia 1939)
- **Max Gluckman:** the culturally engineered landscape and social ecological systems (Economy of the Central Barotse Plain 1941)
- **Harold Conklin** Research on the unique agroecological knowledge of indigenous cultures (ethnoscience) places placed agriculture within a traditional society's cosmovision of the natural world. *Hanunoo Agriculture* (1957) and the *Ethnographic Atlas of Ifugao* (1980)
- **Roy Ellen** "concepts of nature depends on how peoples use it, how they transform it, and how in doing so they invest knowledge in a different part of it" " (Modern crises and traditional strategies: local ecological knowledge in island Southeast Asia.)a.
- **Sadao Sakamoto,** geneticist at Kyoto U. linked culture to the evolution crop genepools in rice and tropical root crops. The glutinous starch trait in domestication and evolution of starchy staples. g
- **Elinor Orstrom**; Nobel Prize, Political economy of institutions that underpin productive landscapes and resilience
- **Doyle McKey**: domestication of clonal crops (Ecological Approaches to Crop Domestication 2012)
- **Carl Folke** Integrated Social-Ecological Systems and Adaptive Governance of Ecosystem Services 2007..