Domestication of Indigenous Tropical Fruits and Nuts

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All around the tropics and sub-tropics wild species have traditionally been used to meet peoples’ everyday needs. Their fruits, nuts, gums, bark, leaves, etc. have been gathered from the forest. These species have been overlooked by science, yet many have potential to be domesticated as new highly nutritious crops.

An initiative to domesticate these species was initiated in 1993. Now it is a worldwide programme led by ICRAF.
Creating New Cash Crops to Generate Income

A ‘Grassroots’ Self-help Process for Self Sufficiency

Through selection of ‘elite’ trees with the best quality products and their mass propagation by grafting and cuttings new tree crops can be rapidly created.

The provision of skills and knowledge allows farmers to be empowered to make the decisions that suit them and allows them to become self-sufficient.
Decentralized Participatory Domestication
Activities of a Rural Resource Centre

12 RRC’s
Some of the 50 Species Being Domesticated Across Many Environments

Socially-Modified Organisms/Crops producing Agroforestry Tree Products
Cultivated Varieties can be Rapidly Developed by Appropriate Methods of Asexual Propagation

Creation of a cultivar with early fruiting, reduced size and uniform products
Domestication of Agroforestry Trees

Quantitative characterization of tree-to-tree variation in fruit / nut traits

- Fruit length and width
- Fruit weight
- Flesh depth
- Flesh weight
- Nut weight
- Kernel weight
- Shell weight
- Skin and pulp colour
- Fibrosity and taste
- Drawability of extract
- Price
Quantification of Tree-to-Tree Variation in Fruit Characteristics

*Irvingia gabonensis* in Cameroon and Nigeria
Quantification of Important Traits with Continuous Intraspecific Variation

Fruit morphology

- Kernel mass
- Shell mass
- Flesh mass

Medicinal properties

Elite trees for selection

Essential oils

Edible oils and fatty acids

Techniques allow multiple trait selection for different markets
About 80% of the variation is found at a single site, so Decentralized Domestication is a good strategy, especially as the elite trees in a population have low levels of relatedness. This means that the risks of seriously losing genetic diversity is minimal.
Use of Appropriate Technology for Asexual Propagation

Non-mist propagation:
No need for piped water or electricity
Multifunctional agriculture is transforming people’s lives. Integrated rural development = efficient use of development $
Tropical/Sub-tropical Land Use Scenarios

‘Land Sparing’
- Nature reserve: Maximum biodiversity (seldom secure)

‘Land Sharing’
- Agroforestry: Food security and agroecological functions, with limited economic benefits

‘Land Maxing’
- Multifunctional agriculture: Maximum food security, agroecological functions and social/economic benefits from associated value-adding (+ cash and orphan crops)

Best practice intensive conventional agriculture: Maximum food security (seldom achieved)
Rebooting Tropical Agriculture

Degenerative:

Low yields + environmental degradation + poverty + Greenhouse gas emissions + loss of biodiversity

Regenerative:

High yields + environmental rehabilitation + income and well-being + Greenhouse gas storage + wildlife habitat/biodiversity conservation, on less farm land

With a greener economy
Roger RB Leakey

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http://scitechconnect.elsevier.com/multifunctional-agriculture-solution-planb-africa/
http://mongabay.com/trees-are-much-more-than-the-lungs-of-the-world/

Multifunctional Agriculture
Achieving Sustainable Development in Africa

Roger RB Leakey

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