Littuko seedlings planted in rows for transplanting (Engr. Evangeline F. Dacumos (Bureau of Soils and Water Management))

Littuko Growing for Forest Enhancement (Philippines)

DESCRIPTION

Growing of rattan is done by upland farmers as part of the Community-Based Forest Management (CBFM).

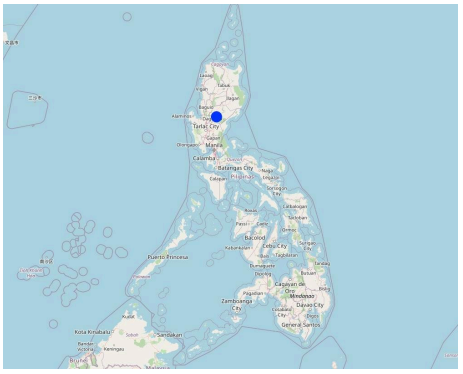
Littuko (Calamus manilensis) is a large rattan variety belonging to the climbing-palm family Arecaceae which is commonly found in the Cordillera, Caraballo, and Sierra Madre mountain ranges. It matures in seven years and bears 50 to 70 kilos of fruits each year. Its fruits are sweetish sour when ripe and are gathered around April to September.

Purpose of the Technology: The littuko provides green cover to the trees even in the dry months and in case of wildfire,they reinforce the forest's capacity to serve as firebreaks or greenbreaks. It also attract a lot of wildlife ranging from insects (bees, fire flies, and beetles) to birds, bats, and cloud rats. Forests with littuko become equipped with natural guards since the littuko's spines with sturdy thorns discourage people and stray animals to freely enter the forest area and disturb the ecosystem.Conservation of trees is also promoted on this technology.

Establishment / maintenance activities and inputs: For the cultivation of littuko, the following procedures are done: (1) Before planting into a seedbed or polyethylene bags (plastic planting bag), the hilar cover of the littuko seed is gently scraped with the use of a sharp knife. Removing the hilar cover enables the tiny plant to easily break out of the seed. (2) The sprout is transplanted to the designated area under the host tree when it reaches six inches in height and with at least three leaves. The chosen host tree is where the littuko can cling on for support to prevent lodging or breakage of stems. (3) Within one to three years, ring weeding is done around the littuko plant. (4) Maintenance and inputs are needed after three years to ensure its growth.

Natural / human environment: Littuko grows underneath of growing trees in the natural forest. They grow best in rainforests and no cultivation is needed.The area is under a humid agro climate with an average annual rainfall of 2000-3000 mm per year. Land users have an average holding of 0.5-1 hectare for the forestlands or woodlands.Most of them are stewards of the forest through the Community Based Forest Management Agreement (CBFMA) for 25 years and renewable for another 25 years.

LOCATION



Location: Nueva Vizcaya, Bayombong, Philippines

No. of Technology sites analysed:

Geo-reference of selected sites
- 121.0833, 16.145

Spread of the Technology: evenly spread over an area (approx. 0.1-1 km2)

In a permanently protected area?:

Date of implementation: 10-50 years ago

Type of introduction
- [x] through land users' innovation
- [ ] as part of a traditional system (> 50 years)
- [ ] during experiments/ research
- [ ] through projects/ external interventions

Littuko fruits (Engr. Evangeline F. Dacumos (Bureau of Soils and Water Management))

CLASSIFICATION OF THE TECHNOLOGY

Main purpose

- improve production
- reduce, prevent, restore land degradation
- conserve ecosystem
- protect a watershed/ downstream areas – in combination with other Technologies
- preserve/ improve biodiversity
- reduce risk of disasters
- adapt to climate change/ extremes and its impacts
- mitigate climate change and its impacts
- create beneficial economic impact
- create beneficial social impact

Land use

Forest/ woodlands

- (Semi-)natural forests/ woodlands. Management: Selective felling, Non-wood forest use
- Tree plantation, afforestation. Varieties: Mixed varieties

Products and services: Timber, Other forest products, Nature conservation/ protection

Water supply

- rainfed
- mixed rainfed-irrigated
- full irrigation

Purpose related to land degradation

- prevent land degradation
- reduce land degradation
- ☑ restore/ rehabilitate severely degraded land
- adapt to land degradation
- not applicable

Degradation addressed

soil erosion by water - Wt: loss of topsoil/ surface erosion

chemical soil deterioration - Cn: fertility decline and reduced organic matter content (not caused by erosion)

physical soil deterioration - Pc: compaction

biological degradation - Bc: reduction of vegetation cover, Bh: loss of habitats, Bq: quantity/ biomass decline

SLM group

- natural and semi-natural forest management

SLM measures

vegetative measures - V5: Others

TECHNICAL DRAWING

Technical specifications

Rattan vine planted in the forest with rattan made basket used in transporting littuko seeds in the market.On top is the scarification of the littuko seed to induce seed growth.

Location: Brgy. Buenavista. Bayombong, Nueva Vizcaya

Date: June 25,2015

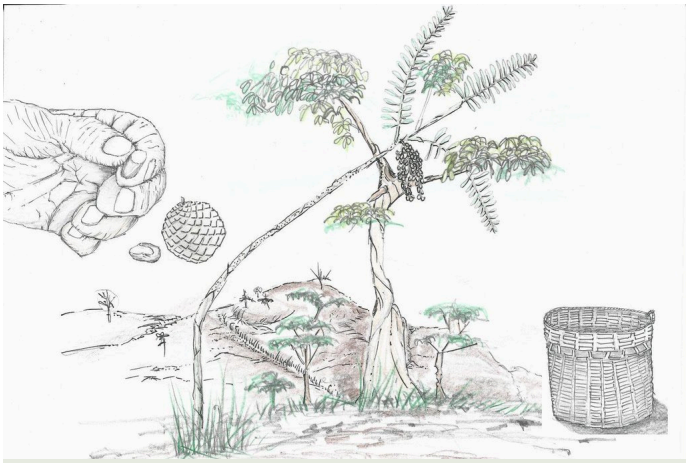
Technical knowledge required for land users: high (Need skills in seed propagation and use of scarification of seeds.)

Main technical functions: promotion of vegetation species and varieties (quality, eg palatable fodder), Conservation of trees which serve as host or anchor trees

Secondary technical functions: control of raindrop splash, increase in organic matter, increase of biomass (quantity), Control weeds

Scattered / dispersed
Vegetative material: O : other
Number of plants per (ha): 1000

Other species: Vine (rattan)



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ESTABLISHMENT AND MAINTENANCE: ACTIVITIES, INPUTS AND COSTS

Calculation of inputs and costs

- Costs are calculated:
- Currency used for cost calculation: **Pesos**
- Exchange rate (to USD): 1 USD = 45.0 Pesos
- Average wage cost of hired labour per day: 3.33

Most important factors affecting the costs

n.a.

Establishment activities

1. Nursery establishment through seed bed (Timing/ frequency: Before the onset of rainy seasons)
2. Transplanting (Timing/ frequency: After 8-12 months of seeding)

Establishment inputs and costs

Specify input	Unit	Quantity	Costs per Unit (Pesos)	Total costs per input (Pesos)	% of costs borne by land users
Labour					
Labour for nursery	Person/day	1.0	3.3333	3.33	100.0
Transplanting	Person/day	1.0	3.3333	3.33	100.0
Plant material					
Seedling	Seeds	1000.0	0.22222	222.22	100.0
Total costs for establishment of the Technology				**228.88**	
Total costs for establishment of the Technology in USD				*5.09*	

Maintenance activities

1. Weeding (Timing/ frequency: Once a week for 2 years (maybe done once a month))
2. Harvesting (Timing/ frequency: After 5-8 years of planting)

Maintenance inputs and costs

Specify input	Unit	Quantity	Costs per Unit (Pesos)	Total costs per input (Pesos)	% of costs borne by land users
Labour					
Weeding	Person/day	2.0	3.333	6.67	100.0
Harvesting	Person/day	4.0	3.333	13.33	100.0
Total costs for maintenance of the Technology				**20.0**	
Total costs for maintenance of the Technology in USD				*0.44*	

NATURAL ENVIRONMENT

Average annual rainfall

- ☐ < 250 mm
- ☐ 251-500 mm
- ☐ 501-750 mm
- ☐ 751-1,000 mm
- ☐ 1,001-1,500 mm
- ☐ 1,501-2,000 mm
- ☑ 2,001-3,000 mm
- ☐ 3,001-4,000 mm
- ☐ > 4,000 mm

Agro-climatic zone

- ☑ humid
- ☐ sub-humid
- ☐ semi-arid
- ☐ arid

Specifications on climate

Thermal climate class: tropics

Slope
- [ ] flat (0-2%)
- [ ] gentle (3-5%)
- [ ] moderate (6-10%)
- [ ] rolling (11-15%)
- [x] hilly (16-30%)
- [x] steep (31-60%)
- [ ] very steep (>60%)

Landforms
- [ ] plateau/plains
- [ ] ridges
- [x] mountain slopes
- [x] hill slopes
- [ ] footslopes
- [ ] valley floors

Altitude
- [ ] 0-100 m a.s.l.
- [ ] 101-500 m a.s.l.
- [x] 501-1,000 m a.s.l.
- [ ] 1,001-1,500 m a.s.l.
- [ ] 1,501-2,000 m a.s.l.
- [ ] 2,001-2,500 m a.s.l.
- [ ] 2,501-3,000 m a.s.l.
- [ ] 3,001-4,000 m a.s.l.
- [ ] > 4,000 m a.s.l.

Technology is applied in
- [ ] convex situations
- [ ] concave situations
- [x] not relevant

Soil depth
- [x] very shallow (0-20 cm)
- [x] shallow (21-50 cm)
- [ ] moderately deep (51-80 cm)
- [ ] deep (81-120 cm)
- [ ] very deep (> 120 cm)

Soil texture (topsoil)
- [ ] coarse/ light (sandy)
- [x] medium (loamy, silty)
- [ ] fine/ heavy (clay)

Soil texture (> 20 cm below surface)
- [ ] coarse/ light (sandy)
- [ ] medium (loamy, silty)
- [ ] fine/ heavy (clay)

Topsoil organic matter content
- [ ] high (>3%)
- [x] medium (1-3%)
- [ ] low (<1%)

Groundwater table
- [x] on surface
- [ ] < 5 m
- [ ] 5-50 m
- [ ] > 50 m

Availability of surface water
- [ ] excess
- [x] good
- [ ] medium
- [ ] poor/ none

Water quality (untreated)
- [x] good drinking water
- [ ] poor drinking water (treatment required)
- [ ] for agricultural use only (irrigation)
- [ ] unusable

Water quality refers to:

Is salinity a problem?
- [ ] Ja
- [ ] Nee

Occurrence of flooding
- [ ] Ja
- [ ] Nee

Species diversity
- [ ] high
- [x] medium
- [ ] low

Habitat diversity
- [ ] high
- [ ] medium
- [ ] low

CHARACTERISTICS OF LAND USERS APPLYING THE TECHNOLOGY

Market orientation
- [ ] subsistence (self-supply)
- [x] mixed (subsistence/ commercial)
- [ ] commercial/ market

Off-farm income
- [x] less than 10% of all income
- [ ] 10-50% of all income
- [ ] > 50% of all income

Relative level of wealth
- [ ] very poor
- [x] poor
- [x] average
- [ ] rich
- [ ] very rich

Level of mechanization
- [ ] manual work
- [ ] animal traction
- [ ] mechanized/ motorized

Sedentary or nomadic
- [ ] Sedentary
- [ ] Semi-nomadic
- [ ] Nomadic

Individuals or groups
- [x] individual/ household
- [ ] groups/ community
- [ ] cooperative
- [ ] employee (company, government)

Gender
- [x] women
- [x] men

Age
- [ ] children
- [ ] youth
- [ ] middle-aged
- [ ] elderly

Area used per household
- [x] < 0.5 ha
- [x] 0.5-1 ha
- [ ] 1-2 ha
- [ ] 2-5 ha
- [ ] 5-15 ha
- [ ] 15-50 ha
- [ ] 50-100 ha
- [ ] 100-500 ha
- [ ] 500-1,000 ha
- [ ] 1,000-10,000 ha
- [ ] > 10,000 ha

Scale
- [x] small-scale
- [ ] medium-scale
- [ ] large-scale

Land ownership
- [x] state
- [ ] company
- [ ] communal/ village
- [ ] group
- [ ] individual, not titled
- [ ] individual, titled

Land use rights
- [ ] open access (unorganized)
- [x] communal (organized)
- [ ] leased
- [ ] individual

Water use rights
- [ ] open access (unorganized)
- [x] communal (organized)
- [ ] leased
- [ ] individual

Access to services and infrastructure

health	poor ✓	good
education	poor ✓	good
technical assistance	poor ✓	good
employment (e.g. off-farm)	poor ✓	good
markets	poor ✓	good
energy	poor ✓	good
roads and transport	poor ✓	good
drinking water and sanitation	poor ✓	good
financial services	poor ✓	good

IMPACTS

Socio-economic impacts

Crop production	decreased ✓	increased
wood production	decreased ✓	increased
risk of production failure	increased ✓	decreased

drinking water availability	decreased ✓ increased	
water availability for livestock	decreased ✓ increased	
water quality for livestock	decreased ✓ increased	
farm income	decreased ✓ increased	
diversity of income sources	decreased ✓ increased	
Difficulty to harvest	increased ✓ decreased	Difficult to harvest since host tree is tall

Socio-cultural impacts

food security/ self-sufficiency	reduced ✓ improved	
cultural opportunities (eg spiritual, aesthetic, others)	reduced ✓ improved	
community institutions	weakened ✓ strengthened	
conflict mitigation	worsened ✓ improved	
Improved livelihood and human well-being	rdeuced ✓ improved	The littuko fruits provide additional income to community based forest management implementer/participants.

Ecological impacts

soil organic matter/ below ground C	decreased ✓ increased	
plant diversity	decreased ✓ increased	
beneficial species (predators, earthworms, pollinators)	decreased ✓ increased	
habitat diversity	decreased ✓ increased	
emission of carbon and greenhouse gases	increased ✓ decreased	
Conservation of trees	decreased ✓ increased	Conservation of trees is promoted because trees serve as hosts for the growing of rattan

Off-site impacts

COST-BENEFIT ANALYSIS

Benefits compared with establishment costs

Short-term returns	very negative ✓ very positive	
Long-term returns	very negative ✓ very positive	

Benefits compared with maintenance costs

Short-term returns	very negative ✓ very positive	
Long-term returns	very negative ✓ very positive	

CLIMATE CHANGE

Gradual climate change

annual temperature increase	not well at all ✓ very well	

Climate-related extremes (disasters)

local rainstorm	not well at all ✓ very well	
drought	not well at all ✓ very well	
general (river) flood	not well at all ✓ very well	Answer: not known

ADOPTION AND ADAPTATION

Percentage of land users in the area who have adopted the Technology

- ☐ single cases/ experimental
- ☐ 1-10%
- ☐ 11-50%
- ☑ > 50%

Number of households and/ or area covered

200 households and 70 percent of land

Of all those who have adopted the Technology, how many have done so without receiving material incentives?

- ☑ 0-10%
- ☐ 11-50%
- ☐ 51-90%
- ☐ 91-100%

Has the Technology been modified recently to adapt to changing conditions?

- ☐ Ja
- ☐ Nee

To which changing conditions?

- ☐ climatic change/ extremes
- ☐ changing markets
- ☐ labour availability (e.g. due to migration)

CONCLUSIONS AND LESSONS LEARNT

Strengths: land user's view

- Littuko vine is multi-purpose. Its fruits are used for food consumption while its poles are used as handicrafts/furniture.

  How can they be sustained / enhanced? Provision of technical assistance in the development of product using rattan as the raw material.

Strengths: compiler's or other key resource person's view

- Littuko fruit is not perishable. It could be stored for a period of time under normal conditions. This could be used as condiments and ornaments.

  How can they be sustained / enhanced? Providing assistance in processing the littuko fruits such as creating jams, candies and others using the fruit. In this way, the marketability and market value of the product will be increased.
- Low maintenance as a crop. Contributory to trees and it helps in the reduction of soil erosion.

Weaknesses/ disadvantages/ risks: land user's viewhow to overcome

Weaknesses/ disadvantages/ risks: compiler's or other key resource person's viewhow to overcome

- Difficult to harvest since the host tree is tall.It does not grow in open areas and does not stand alone. Development of a tool that could be used in harvesting the fruit and planting of trees as pole stand to avoid lodging or breakage of littuko vine.

REFERENCES

Compiler

Philippine Overview of Conservation Approaches and Technologies

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Full description in the WOCAT database

https://qcat.wocat.net/af/wocat/technologies/view/technologies_1708/

Linked SLM data

Approaches: Community-Based Forest Management https://qcat.wocat.net/af/wocat/approaches/view/approaches_1956/

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