



Natural forest conservation using apiaries Tanzania, United Republic of - Utunzaji misitu kwa kufuga nyuki (swahili),

Establishment of apiaries in natural forests to retard forest mismanagement and improve honey production

This technology has been practiced in Ngara region for the last 50 year and involves construction and upkeep of apiaries for honey and related goods production. The apiaries are constructed by farmers (traditional) or purchased (modern box hives) and then positioned in a designated forest area that is away from settlements and public places. The apiaries should be hanged on a strong branches of trees with good shade and the honey production process takes from 9 to 12 months.

It is recommended to apply this technology in the forest that is exposed to deforestation as apiaries help to enhance forest protection. The establishment of apiaries help to improve management of the natural forest while increasing production of honey. This will contribute to the better livelihood of the community and environmental wellbeing.

The described technology covers area of enclosed 4 hectares of natural forest and establishment of 365 apiaries (338 traditional, 27 box hives); the group of practitioners consist of 10 members (7 male and 3 female). The establishment procedures require: a) identification of forest at risk of degradation, b) earmarcation of the apiary forest, c) creefing of fire breaks d) reparations for and hanging the beehives (traditional and box hives). Maintanance activities include a) regular slashing of grasses and bushes around the trees with hives b)grading with hand hoes the fire breaks/ roads around the entire forest for fire protection before each dry season c) cleaning of hives,repairs and harvest honey with bee protectives (bee smoker,bee veils,gloves) to eliminate the risks of fire in the forest.Patrol and guard tresspassers d) monitoring pests and diseases
Natural occuring tree species include: Combretus spp., Albizia spp., Parinari spp., Pericopsis spp. and Eucalyptus woodlots. Grazing areas are nearby but restricted by village by laws to tress pass in the forest apiary The apiaries should be located near permanent water sources because bees use water for honey production and cooling in the hives. Farmers with bee hives become more committed to protect their forest when they hang beehives in the area. Honey is harvested for consumption, trade and medicinal mixtures The land users are small scale subsistance farmers with poor to average income/wealth,organised as a group of 10 farmers. the population density is between 200-500 people per square km and anual population growth at 2-3% Land ownership is both individual and communal but there are natural forestl areas owned communally through village governments where groups may access temporarily by request to establish environmental friendly activities such as forest apiaries.

left: Inspection of apiaries hanged on the tree (Photo: Ileta Philip)

right: Traditional apiaries ready to be used (Photo: Ileta Philip)

Location: Tanzania

Region: Ngara District

Technology area: <0.1 km²

Conservation measure: management

Stage of intervention: prevention of land degradation

Origin: Developed through land user`s initiative, traditional (>50 years ago)

Land use type:

Forests / woodlands: Natural

Climate: subhumid, tropics

WOCAT database reference:

T_TAN016en

Related approach: n/a ()

Compiled by: Philip Ileta, Ngara District Council

Date: 2012-03-02




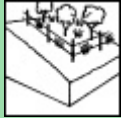
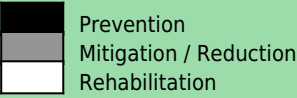
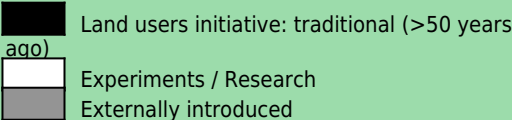
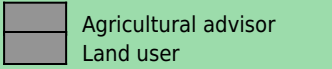
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Classification

Land use problems:

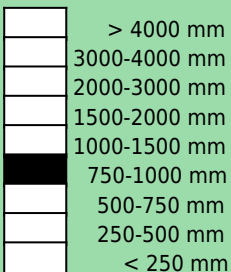
- Deforestation and fire burning during dry season Reduction of biodiversity (expert's point of view)
- Droughts and vegetation burning during dry seasons (land user's point of view)

Land use  Natural	Climate  subhumid	Degradation  Biological degradation: reduction of vegetation cover, Biological degradation: loss of habitats, quantity / biomass decline, detrimental effects of fires, quality and species composition /diversity decline	Conservation measure  management: Layout according to natural and human environment
Stage of intervention 	Origin 	Level of technical knowledge 	
Main causes of land degradation: Direct causes - Human induced: deforestation / removal of natural vegetation (incl. forest fires), over-exploitation of vegetation for domestic use, industrial activities and mining Direct causes - Natural: droughts Indirect causes: land tenure, governance / institutional			
Main technical functions: <ul style="list-style-type: none"> - indirectly minimize deforestation - indirectly increase of biomass 		Secondary technical functions: <ul style="list-style-type: none"> - control of fires - reduction of dry material (fuel for wildfires) - spatial arrangement and diversification of land use 	

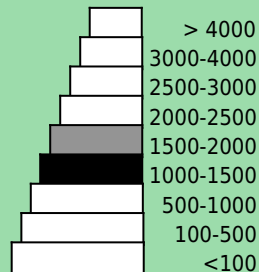
Environment

Natural Environment

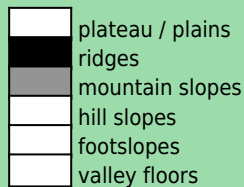
Average annual rainfall (mm)



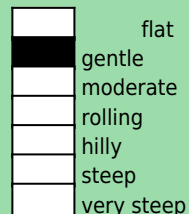
Altitude (m a.s.l.)



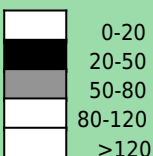
Landform



Slope (%)



Soil depth (cm)



Growing season(s): 120 days (Sept-December), 90 days (March to May)

Soil texture: medium (loam)

Soil fertility: medium

Topsoil organic matter: medium (1-3%)

Soil drainage/infiltration: medium

Soil water storage capacity: medium

Ground water table: > 50 m

Biodiversity: medium

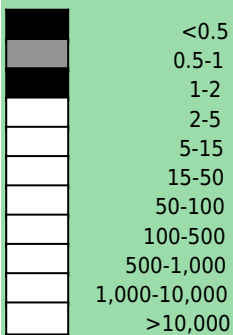
Tolerant of climatic extremes: seasonal rainfall increase

Sensitive to climatic extremes: temperature increase, droughts / dry spells

If sensitive, what modifications were made / are possible: By planting fire tolerant plant species around boundaries of the forest, beehives will be more secure from fire damage and the forest apiary remain with vegetative soil cover -such species includes agaves sisalana, euphobia tirucali etc

Human Environment

Forests / woodlands per household (ha)



Land user: groups / community, Small scale land users, common / average land users, mainly men

Population density: 100-200 persons/km²

Annual population growth: 2% - 3%

Land ownership: communal / village
(The group was allocated the forest area of approximately 4 ha by village govt to establish the forest apiary.)

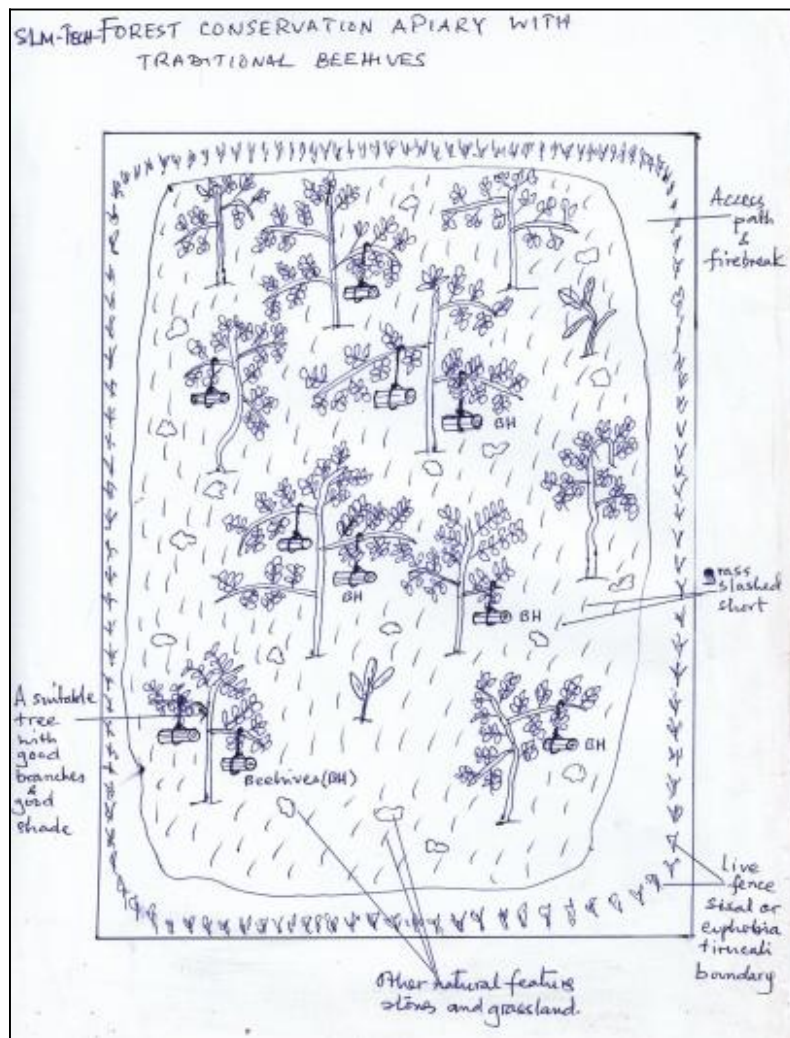
Relative level of wealth: poor, which represents 80% of the land users; 50% of the total area is owned by poor land users

Importance of off-farm income: less than 10% of all income: A small number of people practice off farm activities in burnt bricks making and petty trade

Access to service and infrastructure: low: employment (eg off-farm), market, energy, financial services; moderate: health, education, technical assistance, roads & transport, drinking water and sanitation

Market orientation: mixed (subsistence and commercial)

Purpose of forest / woodland use: nature conservation / protection



Technical drawing

Layout of natural apiaries (beehives BH) placed on the trees (good branches with shade), access path and firebreak and live fence. (Ileta Philip)

Implementation activities, inputs and costs

Establishment activities

- Purchase of hives and binding wires
- Purchase of beekeeping protectives
- Slashing, screefing bushes and tall grasses; planting hedge around forest boundary
- Baiting and hanging apiaries
- Purchase of cuttings (euphorbia spp)

Establishment inputs and costs per ha

Inputs	Costs (US\$)	% met by land user
Labour	62.50	100%
Equipment		
- tools	1704.90	100%
Agricultural		
- seeds	15.00	100%
TOTAL	1782.40	100.00%

Maintenance/recurrent activities

- Slashing grasss,bushes and firebreaks
- Apiaries repair
- Monitoring of bee pests and diseases

Maintenance/recurrent inputs and costs per ha per year

Inputs	Costs (US\$)	% met by land user
Labour	250.00	100%
TOTAL	250.00	100.00%

Remarks:

High prices of equipment an (especially box hives) and labour labour per hectare year 2011 tools per piece/each year 2011

Assessment

Impacts of the Technology

Production and socio-economic benefits

- ++ diversification of income sources
- + increased crop yield
- + increased wood production
- + reduced risk of production failure
- + increased farm income
- + decreased workload
- + increased product diversification

Production and socio-economic disadvantages

- ++ dangers of bee attack

Socio-cultural benefits

- +++ community institution strengthening
- +++ improved conservation / erosion knowledge
- ++ improved health
- + improved cultural opportunities
- + increased recreational opportunities
- + conflict mitigation

Socio-cultural disadvantages

Ecological benefits

- +++ increased beneficial species
- +++ increased / maintained habitat diversity
- +++ Pollination of forest abd crops
- ++ increased biomass above ground C
- ++ reduced fire risk
- + increased water quantity
- + reduced surface runoff
- + increased plant diversity

Ecological disadvantages

Off-site benefits

Off-site disadvantages

Contribution to human well-being / livelihoods

- ++ increased income for the group members through sale of bee products honey as food and for diseases treatments members have attended various training for forest management and modern beekeeping members have increased access to loans and credit organisations

Benefits /costs according to land user

Benefits compared with costs

Establishment

Maintenance / recurrent

short-term:

slightly negative

positive

long-term:

positive

positive

After initial high establishment costs,maintanance costs are minimal and the box hives are durable for at least 10 years when made from durable well seasoned timber

Acceptance / adoption:

50% of land user families have implemented the technology with external material support. The box hives and beekeeping protectives were subsidies from projects/programmes under NGOs and government support
 50% of land user families have implemented the technology voluntarily. Traditional beekeeping with indigenous knowledge used traditional hives only. Government and some NGOs support improved by availing box hives and modern beekeeping knowledge more 4 groups emerging who request for support in the area

Concluding statements

Strengths and → how to sustain/improve	Weaknesses and → how to overcome
Enhanced forest conservation → Improve management/tending activities in the forest and administration of bylaws	High costs for box hives and bee protective gears → Integrate modern box hives with durable traditional hives
Improved vegetation cover → Enrichment planting with suitable bee forage plant species	Require large/extensive areas/Competing demands especially firewood for energy domestic use/trade and grazing land areas → By laws administration, Planting trees/woodlots have participatory and operational village land use plans
Increased income and diversification of income sources → Integrate modern beekeeping and improved processing of bee products. Construct beehives shelter house in the forest to accommodate more hives	Bee stings for people and livestock → establish forest apiaries away (>400m) from human settlements and public places
Decrease bush/grassfire incidences → Screening firebreaks using hand hoes, conduct regular fire patrols during dry season, use proper honey harvesting equipments especially beesmokers. Environmental education and campaigns	Danger of falling from trees during hanging of hives and harvesting → Use ropes, ladder and tree climbing devices, Bee stings for people and livestock → Use of bee protective gears during honey harvesting
Continuous production of honey for consumption, sale and medicine → Reservation of more forests for practicing commercial beekeeping	Regular conflicts with grazing of livestock in the forest during dry season when grass in other areas are already burned-Damaging of beehives by pastoralists → By laws administration and operational
Increased income and income sources for farmers → Integrate modern box hives, processing gears and improve markets for bee products.	
Decreased bushfire incidences → Strengthen bylaws administration procedures to punish persons causing bushfires, harvest honey in late evening and during the nights. Use beesmokers during harvesting	



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