Parc à Faidherbia albida (CSE-LADA (Dakar, Sénégal))

Parc à kadd (Faidherbia albida) avec rotation culturale (Senegal)

Khokhine (parc à kadd) ; Diabata rakhandal (rotation des cultures)

DESCRIPTION

La technologie consiste à maintenir Faidherbia albida dans les parcelles où se pratique la rotation des cultures et l'apport de fumure organique afin d'améliorer la fertilité des sols et d'accroître la production agricole

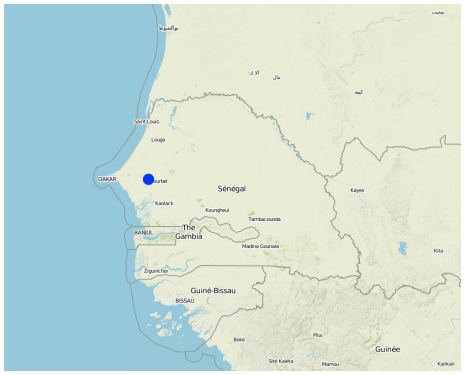
Dans cette partie du Sénégal, les mauvaises pratiques culturales combinées aux effets de la sécheresse et à l'explosion démographique ont conduit à l'épuisement des terres.

But de la technologie: Pour maintenir la fertilité dans leurs champs, les populations de Doutki perpétuent une pratique traditionnelle, la culture sous parc arborée. L'espèce la plus utilisée est le Faidherbia albida (kadd en langue locale) qui contribue fortement à reconstituer la fertilité du sol. Par ailleurs, sa présence dans les champs réduit la vitesse du vent et par conséquent, permet de stabiliser le sol. Pour accroître l'efficacité de cette pratique, les populations y associent la rotation culturale et l'apport de fumure organique.

Activités d'établissement / maintenance et intrants: Cette combinaison de technologies a permis d'améliorer sensiblement la production agricole et la sécurité alimentaire. Elle est facile à mettre en place, consistant à la protection des jeunes pousses et à leur suivi pour faciliter leur croissance en veillant à ce que le port de l'arbre soit droit et que le houppier ne déborde pas. Elle nécessite un investissement humain (régénération naturelle assistée, épandage du fumier) et l'acquisition d'un matériel simple et à faible prix (corde, coupe-coupe, pelle). Seul le coût de location de la charrette pour le transport du fumier collecté peut être considéré comme relativement onéreux.

Environnement naturel / humain: Le village de Doutki est situé dans le département de Bambey, au coeur du bassin arachidier, zone agricole par excellence du Sénégal. La principale source d'eau pour les activités agricoles est constituée par les eaux de pluie et les sols, très profonds, y sont de textures argileuse et sableuse. Les principales cultures pratiquées sont donc le mil, l'arachide, le niébé, le sorgho et l'oseille. Dans cette région située en zone tropicale semi-aride (468 mm de pluie en moyenne par an), les autres ressources en eau, constituées de puits à exhaure

LOCATION



Location: Village de Doutki, Département de Bambey, Senegal

No. of Technology sites analysed:

Geo-reference of selected sites
- -16.458, 14.687

Spread of the Technology:

In a permanently protected area?:

Date of implementation: more than 50 years ago (traditional)

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

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

Land use

Land use mixed within the same land unit: Yes - Agro-silvopastoralism

Cropland
- Annual cropping: flower crops, oilseed crops - groundnuts, cereals - millet, cereals - sorghum, legumes and pulses - peas

Number of growing seasons per year: 1

- adapt to climate change/ extremes and its impacts
- mitigate climate change and its impacts
- create beneficial economic impact
- create beneficial social impact

Grazing land
Animal type: cattle - non-dairy beef, goats, horses, mules and asses, sheep

Forest/ woodlands

Water supply
- [x] rainfed
- [ ] mixed rainfed-irrigated
- [ ] full irrigation

Purpose related to land degradation
- [x] prevent land degradation
- [ ] reduce land degradation
- [x] restore/ rehabilitate severely degraded land
- [ ] adapt to land degradation
- [ ] not applicable

Degradation addressed

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

soil erosion by wind - Et: loss of topsoil

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

biological degradation - Bc: reduction of vegetation cover, Bh: loss of habitats, Bq: quantity/ biomass decline, Bs: quality and species composition/ diversity decline

SLM group
- rotational systems (crop rotation, fallows, shifting cultivation)
- integrated soil fertility management

SLM measures

agronomic measures - A2: Organic matter/ soil fertility

vegetative measures - V1: Tree and shrub cover

TECHNICAL DRAWING

Technical specifications

ESTABLISHMENT AND MAINTENANCE: ACTIVITIES, INPUTS AND COSTS

Calculation of inputs and costs
- Costs are calculated:
- Currency used for cost calculation: **CFA**
- Exchange rate (to USD): 1 USD = 500.0 CFA
- Average wage cost of hired labour per day: n.a

Most important factors affecting the costs
Le facteur le plus déterminant pour les coûts est l'achat d'engrais chimique. Pour les travaux, on utilise gratuitement le personnel local.

Establishment activities
n.a.

Maintenance activities
1. Fumure organique (Timing/ frequency: annuel (hivernage))
2. Rotation des cultures (Timing/ frequency: annuel (hivernage))
3. Engrais minéral (Timing/ frequency: annuel (hivernage))
4. Installation de tuteurs pour favoriser la croissance des jeunes pousses (Timing/ frequency: None)
5. Elagage du houppier des sujets adultes (Timing/ frequency: None)

Maintenance inputs and costs

Specify input	Unit	Quantity	Costs per Unit (CFA)	Total costs per input (CFA)	% of costs borne by land users
Labour					
Elagage du houppier des sujets adultes		1.0	6.0	6.0	100.0
Fertilizers and biocides					
Engrais		1.0	39.0	39.0	100.0
Total costs for maintenance of the Technology				**45.0**	
Total costs for maintenance of the Technology in USD				*0.09*	

NATURAL ENVIRONMENT

Average annual rainfall
- [ ] < 250 mm
- [x] 251-500 mm
- [ ] 501-750 mm
- [ ] 751-1,000 mm

Agro-climatic zone
- [ ] humid
- [ ] sub-humid
- [x] semi-arid
- [ ] arid

Specifications on climate
Average annual rainfall in mm: 468.0
8 mois (novembre-juin)
Thermal climate class: tropics

- [ ] 1,001-1,500 mm
- [ ] 1,501-2,000 mm
- [ ] 2,001-3,000 mm
- [ ] 3,001-4,000 mm
- [ ] > 4,000 mm

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

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

Altitude
- [x] 0-100 m a.s.l.
- [ ] 101-500 m a.s.l.
- [ ] 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
- [ ] not relevant

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

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

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

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

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

Availability of surface water
- [ ] excess
- [ ] 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?
- [ ] Yes
- [ ] No

Occurrence of flooding
- [ ] Yes
- [ ] No

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

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

CHARACTERISTICS OF LAND USERS APPLYING THE TECHNOLOGY

Market orientation
- [x] subsistence (self-supply)
- [ ] 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
- [ ] poor
- [x] average
- [ ] rich
- [ ] very rich

Level of mechanization
- [x] manual work
- [x] 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
- [ ] < 0.5 ha
- [ ] 0.5-1 ha
- [ ] 1-2 ha
- [x] 2-5 ha
- [x] 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
- [ ] small-scale
- [x] 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)
- [ ] 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
fodder production	decreased	increased
wood production	decreased	increased
risk of production failure	increased	decreased
expenses on agricultural inputs	increased	decreased
farm income	decreased	increased

Socio-cultural impacts

food security/ self-sufficiency	reduced	improved	
health situation	worsened	improved	Usage médicinal du Kadd
Amélioration des moyens de subsistance et du bien-être humain	en baisse	augmenté	

Ecological impacts

surface runoff	increased	decreased
groundwater table/ aquifer	lowered	recharge
evaporation	increased	decreased
soil moisture	decreased	increased
soil cover	reduced	improved
soil loss	increased	decreased
soil crusting/ sealing	increased	reduced
nutrient cycling/ recharge	decreased	increased
soil organic matter/ below ground C	decreased	increased
biomass/ above ground C	decreased	increased
plant diversity	decreased	increased
emission of carbon and greenhouse gases	increased	decreased
wind velocity	increased	decreased

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

Le kadd est une espèce à croissance rapide

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	
local windstorm	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

Other climate-related consequences

reduced growing period	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%

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%

Number of households and/ or area covered

100

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

- [ ] Yes
- [ ] No

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

- Augmentation de la production agricole

  How can they be sustained / enhanced? Poursuivre la protection des jeunes pousses

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

- Très grande capacité de fertiser le sol

  How can they be sustained / enhanced? En plus de la RNA, merner des activités de reboisement pour remplacer en cas de besoin les peuplements veillissants
- Faible coût de la technologie et facilité de vulgarisation

  How can they be sustained / enhanced? Assistance technique et appui des eaux et forêts

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

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

REFERENCES

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Full description in the WOCAT database
https://qcat.wocat.net/en/wocat/technologies/view/technologies_1026/

Linked SLM data
n.a.

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Key references

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