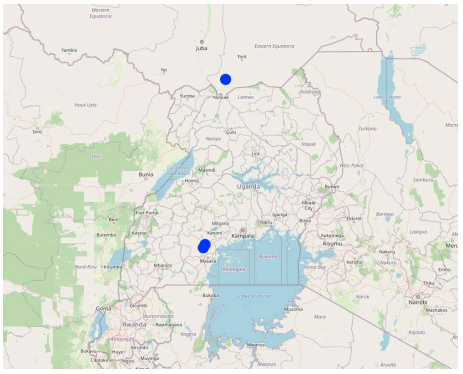
Members of Mbirizi farmer group in coffee harvest season (Tonny Kyambadde)

Piggery-Banana-Coffee technology ( )

Obusa bwe mbizzi kumwanyi ne bitooke

The "Piggery-Banana-Coffee" sustainable land management technology is a proven practice that significantly improves soil fertility and productivity in an integrated farming system for smallholder farmers in Uganda.

The “piggery-banana-coffee” SLM technology has been widely practiced by smallholders in Bukumansimbi District, Central Uganda for many years. The technology is proven due to its manifold functions and benefits, including increased productivity and improved soil biodiversity leading to better food security with organic, healthy produce. It simultaneously contributes to environmental protection. The technology has been applied for many years in Bukumansimbi but it needed a promotion by the implementer Caritas MADDO for wider adaption by the community.
The technology can be applied in a natural environmental setting with no controlled conditions. Taking a case of one acre (0.4 ha) of land the farmer will need 450 coffee seedlings and 150 banana suckers to establish an integrated banana-coffee plantation. Then there is a requirement for 10 pigs to supply enough manure (urine and dung) to maintain the fertility of the soil in the plantation. Bananas provide shade to the coffee and reduce the impact of wind and soil erosion. Manure from the piggery is applied to the mixed plantation. Manure application increases soil biodiversity and improves both the physical and chemical properties of the soil, including soil structure, aeration, and moisture retention. Integrating piggery components into the system requires shed construction, purchase of piglets, feeding costs, treatment, and vaccinations. The pigsty occupies a space of 50 ft by 25 ft (approx. 15 m x 7.5 m). Each enterprise is complementary to the other: manure from pigs goes to the coffee and banana plantation and in return the banana peelings as well as the household food leftovers are served as important food resources for the pigs.
The land users under the pilot project acknowledge the significance of the technology because of its ability to sustain production and the other benefits listen above. However, swine fever disease is one of the limiting factors to the technology, as the pigs are prone to its outbreak. Moreover, some farmers report the high feeding costs for the pigs’ maintenance - particularly in the dry season (when there are few weeds that can be supplemented to the diet of the pigs).



: Bigasa Sub County in Bukomansimbi District, Central region,

: 10-100

- 32.16797, 3.94827
- 31.62506, -0.09484
- 31.66738, -0.02196

: (approx. 0.1-1 2)

?:

: 2017; 10 ( )

(> 50)

/

Participants in the banana plantation (Nabukenya, Beatrice)

Piglets in a newly established piggery (Nabukenya, Beatrice)

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- ✓ , ,
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- ✓ /
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/ -

- ( ): /plantain/abaca, Coffee : 2 ? / ?

- / .

Tree types ( ): : , , , , / , / , , Backcloth

- / : Swamp is nearby for water supply

- ✓
-
-

- ✓
- ✓
- /
-
-

- Wt: , Wo:

- Cp:

- Bq: / , Bs: / , Bl: , Bp:

- Hq:

SLM

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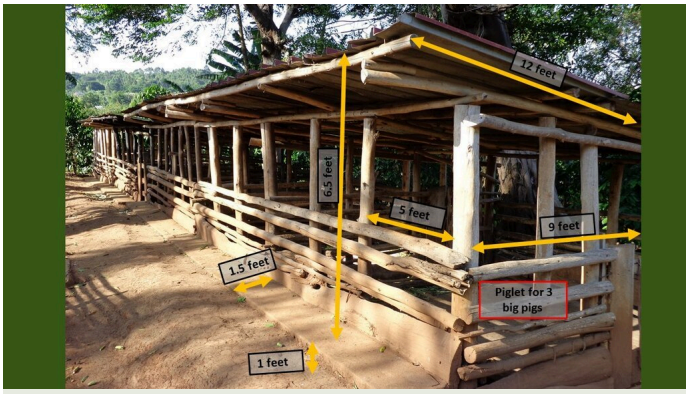
-
-

SLM

- A1: / , A2: / , A3: (A 3.2: Reduced tillage (> 30% soil cover)), A7:

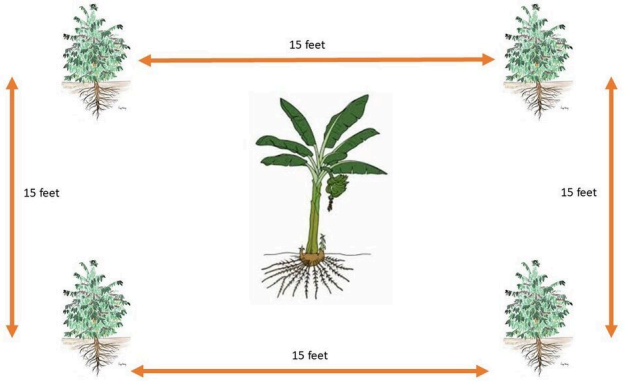
- V1: , V2: 2 , V3:

Technical specifications of the pig sty construction



Author: Kyambadde, Tonny

Technical specifications of the coffee and banana integration



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- (**one hectare**)
- **Uganda Shilling**
- ( ) 1 USD = 3750.0 Uganda Shilling
- no labour was hired

Most costs are connected to the piggery in particular the maintenance of the pigs. Animal diseases and the resulting costs for the treatments are unplanned expenses.

1. Land clearing and preparation (/ : once a year)
2. Hole digging (/ : once)
3. Coffee and banana planting (/ : once)
4. Pig sty (house) construction (/ : once)
5. Purchase of pigs (/ : once)

( )

5300000,0

1. Weeding and garden clearing (/ : Twice a seaon)
2. Manure application (/ : At the onset of rain season)
3. Feeding and watering of pigs (/ : On daily basis)
4. Treatment and deworming of pigs (/ : On monthly basis)
5. Mulching of the garden (/ : Once a year or more)
6. Contour digging (/ : once a year)
7. Pruning of coffee and banana plantation (/ : For banana its done twice a season and for coffee its done every after harvesting season.)
8. Maintenance of piggery sty (/ : once a year)

( )

500000,0

- [ ] < 250
- [ ] 251-500
- [ ] 501-750
- [ ] 751-1,000
- [x] 1,001-1,500
- [ ] 1,501-2,000
- [ ] 2,001-3,000
- [ ] 3,001-4,000
- [ ] > 4,000

- [x]

1200.0

The rainfall pattern is bimodal, having two seasons. The two dry spell seasons are between January - March and between June to August, with the winter seasons between March to May and September to December.

Uganda metrological authority

The average maximum temperature doesn't exceed 30 degrees Celcius and the minimum temperature is not below 10 degrees Celcius with almost equal length of the day and night through out the year.

The humidity level is relatively low through out the area.

- [ ] (0-2%)
- [x] (3-5%)
- [x] (6-10%)
- [ ] (11-15%)
- [ ] (16-30%)
- [ ] (31-60%)
- [ ] (>60%)

- [ ]
- [ ]
- [ ]
- [ ]
- [x]
- [ ]
- [ ]
- [ ]

- [ ] 0-100
- [ ] 101-500
- [ ] 501-1,000
- [x] 1,001-1,500
- [ ] 1,501-2,000
- [ ] 2,001-2,500
- [ ] 2,501-3,000
- [ ] 3,001-4,000
- [ ] > 4,000

- [ ]
- [ ]
- [ ]

( )

- [ ] (0-20)
- [ ] (21-50)
- [x] (51-80)
- [ ] (81-120)
- [ ] (> 120)

( )

- [ ] / ( )
- [x] (,)
- [ ] / ( )

(> 20)

- [ ] / ( )
- [x] (,)
- [ ] / ( )

- [ ] (>3%)
- [x] (1-3%)
- [ ] (<1%)

- [ ]
- [ ]
- [ ] < 5
- [x] 5-50
- [ ] > 50

- [ ]
- [x]
- [ ] /

( )

- [ ]
- [x]
- [ ] ( )

?

- [ ] /
- [x]
- [ ]
- [ ] /
- [x]

- [x]
- [ ]
- [ ]
- [ ]
- [x]
- [ ]

SLM

- [ ] ( )
- [x]
- [ ] (/)
- [x] /

- [x] 10%
- [ ] 10-50%
- [ ] 50%

- [ ]
- [x]
- [ ]
- [ ]
- [ ]

- [x]
- [ ]
- [ ] /

- [x]
- [ ]
- [ ]
- [ ]
- [ ]

- [ ] /
- [x] /
- [ ] (,)

- [x]
- [x]

- [x]
- [x]
- [x]
- [x]

- [ ] < 0.5
- [ ] 0.5-1
- [x] 1-2
- [ ] 2-5
- [ ] 5-15
- [ ] 15-50
- [ ] 50-100
- [ ] 100-500
- [ ] 500-1,000
- [ ] 1,000-10,000

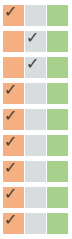
- [x]
- [ ]
- [ ]

- [ ]
- [ ]
- [ ]
- [x]
- [x]

- [ ] ( )
- [ ] ( )
- [x]
- [x]
- [ ] ( )
- [ ] ( )

> 10,000

(.)



SLM: 1
SLM: 3

Significant improvement in coffee production was noticed jumping from an average yield increase of 300kg to 700kg of coffee harvest in one acre per season. Size of banana bunches with an average increase in weight from from 12kg to 30kg.

SLM: 0
SLM: 2

Coffee beans improved a lot in terms of size and quality, with over 70% coffee beans harvested in the category of screen 18 (super beans). The banana size and its fingers improved in size, and the taste of banana food greatly improve with a pleasant aroma, softer on eating and cooks faster compared to previously produced bananas.

The production of pigs increased substantially in a time period of a year. The participating farmers started with 3 pigs at the beginning and reached an increase of pigs to an average 15 pigs after a year (2 breeding cycles per pig per year).

SLM: -2
SLM: 3

The farming system employed by the farmers previously before introduction of the technology was not sustainable. Resources were being continuously depleted by crop practices employed without replacement of what is lost from the soil during harvest. integration of piggery into the system improved soil fertility with manure composted from piggery wastes. Besides boosting soil fertility, biodiversity on the farm improved as well (the soil organisms, new plant species emerged, insect species among others) the green biomass and overall soil health improved.

The average farm income before the technology was very little and did not support the family's basic home needs. With the introduction of the technology, the household income improved from an average of monthly 45.000 UGX to 150.000 UGX. However, it is important to note that this is not a fixed monthly income and is depending on the harvest season. Thus, there are peak income phases followed by low seasons.

More income sources were established through the three enterprises (coffee, banana and piggery).

/

SLM: 0
SLM: 2

With improved soil fertility resulting in bigger sizes of banana bunches, improved food security was achieved. The increased income from coffee and piggery ensured availability of alternative food supply though their sale.

SLM /

Through the technology farmers were able to learn how important it is to use organic sources of fertilizer and its

benefits to the environment and soil health. MADDO facilitated roughly 15 different training sessions for the participating farmer group targeting the soil and water conservation practices.

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The situation of women (average between 40-55 years old) was improved through the technology by giving them access and knowledge to this pilot project. The mobilization and right selection of participants were crucial for the improvement.

/

Higher retention of soil moisture

Better composition of soil nutrients with increased population of soil organisms (micro and macro)

/

Organic manure provided a conducive environment for multiplication and survival of living organisms

Pollution of water

Increased Decreased

The usage of organic manure instead of chemical fertilizers reduced the pollution of downstream water from fields

After the establishment of the technology, the returns from coffee are attained in period of two years, for banana returns observed in less than one year and for piggery profits attained in period of less than two years.

-

/

1-10%
11-50%
> 50%

?

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

/

Mainstreaming of the technology was promoted through copying from the participants and also due to the promotion by the district field staff. The technology has been in existence for years and that is why a high adoption can be observed.

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- Contributes positively to the soil fertility.
- Improves the food security and household income

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- Farmers were able to local available resources for this technology.
- It improved the soil health and contributed to environmental conservation.

- Diseases that affect the piggery (swine fewer). No mitigation (vaccination) available.
- The vet officers are not always available for vaccinations or treatments for the pigs. Moreover, there are quite expensive. Farmers group together to lobby for the service.

/ / :

- Follow up on the management practices for the piggery were time consuming. Establishment of community-based trainers (CBT) that take over

Tonny Kyambadde

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: 18 2021 : 16 2023

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Michael Mulindwa - co-compiler

https://qcat.wocat.net/km/wocat/technologies/view/technologies_5914/

SLM

Approaches: MADDO SLM approach https://qcat.wocat.net/km/wocat/approaches/view/approaches_6370/

- Caritas Masaka Diocesan Development Organisation (Caritas MADDO) -
- Euregio-East Africa Livelihood Improvement Programme (EEALIP)

- Benefits of sustainable land management, UNCCD: https://catalogue.unccd.int/838_Benefits_of_SLM_eng.pdf
- Sustainable Agriculture in Africa,: https://wedocs.unep.org/bitstream/handle/20.500.11822/34621/RSRSA.pdf?sequence=3&isAllowed=y