Photo showing pigs tethered for animal manure. (Issa Aiga)

Intensive Pig farming for soil fertility improvement and household income (Uganda)

Gwoko Opego Kidyang Pi Yubu Moc can

DESCRIPTION

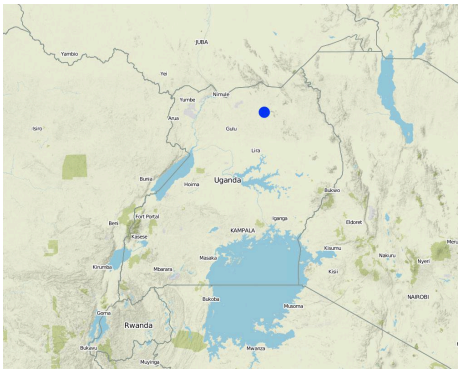
Pigs are kept to produce manure used for soil fertility improvement and household income.

Pig farming has become a popular and lucrative business among farmers in Northern Uganda. It is considered to be a quick means of improving soil fertility and household incomes, thus improving land productivity and reducing poverty.

Pigs are normally fed reguraly on maize bran purchased or maize grain produced as the most common food ration but could also benefit from having a ratio with protein from soybeans produced on farm, and home-made feeds mainly in the form of cassava, brew waste and potatoes as well as adequate supply of drinking water for purposes of fattening, animal manure and income provision.

10-12 pigs are kept in a pen measuring 6 to 8 m wide, 8 m long and 3.5 m high with a space for feeding and bedding. The materials needed for constructing the pen are iron sheets, wood, and nails. Sanitation in pig farming is important in order to keep the pigs disease-free. Therefore, a mechanism for easy cleaning and removal of waste is necessary for any type of pig housing using sawdust. The farmer uses simple local brooms, basins, and buckets to clean and remove manure on a daily basis and applied in nearby gardens
After five to seven months, pigs are likely to have attained an ideal market weight of more than 70 – 100kg. The farmer may decide to sell or slaughter for meat. Compared to most livestock species, pigs have a higher turnover rate due to a shorter gestation period in addition to providing manure which the farmer applies on the gardens to increase soil fertility for increased food production. Pigs also have higher returns on investment due to a larger litter size and higher feed conversion ratio. These factors make pig farming a more profitable livestock enterprise, since more meat is produced and sold in a shorter period, relative to other domestic animals.
However, the farmer needs to be aware that pigs are easily attacked by bacteria and virus related diseases, which result into diarrhoea, leading to death. Treatment requires high-level skills, which may need the attention of an extension worker to provide advisory services and treatment in case they fall sick.

LOCATION



Location: Northern Region,Uganda, Uganda

No. of Technology sites analysed: single site

Geo-reference of selected sites
- 33.10022, 3.16303

Spread of the Technology: applied at specific points/ concentrated on a small area

In a permanently protected area?:

Date of implementation: 2015; less than 10 years ago (recently)

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

Photo showing pigs kept to produce manure used for soil fertility improvement and household income. (Issa Aiga)

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CLASSIFICATION OF THE TECHNOLOGY

Main purpose

- [x] improve production
- [x] reduce, prevent, restore land degradation
- [ ] conserve ecosystem
- [ ] protect a watershed/ downstream areas – in combination with other Technologies
- [ ] preserve/ improve biodiversity
- [ ] reduce risk of disasters
- [x] adapt to climate change/ extremes and its impacts
- [ ] mitigate climate change and its impacts
- [x] create beneficial economic impact
- [ ] create beneficial social impact
- [x] Improve learning with the community on tithered livestock mangement for manure

Land use

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

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

biological degradation - Bc: reduction of vegetation cover

SLM group

- integrated crop-livestock management
- integrated soil fertility management
- Piggery

SLM measures

agronomic measures - A2: Organic matter/ soil fertility

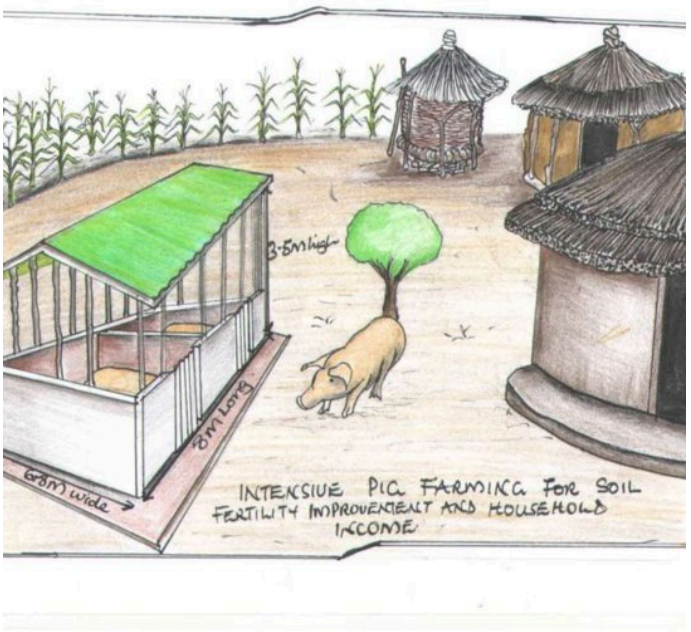
structural measures - S9: Shelters for plants and animals

management measures - M6: Waste management (recycling, re-use or reduce)

TECHNICAL DRAWING

Technical specifications

None



Author: Pito Alex

ESTABLISHMENT AND MAINTENANCE: ACTIVITIES, INPUTS AND COSTS

Calculation of inputs and costs

- Costs are calculated: per Technology area (size and area unit: **less than 0.05 acre, 6 to 8 m wide, 8 m long and 3.5 m high**)
- Currency used for cost calculation: **UGX**
- Exchange rate (to USD): 1 USD = 3400.0 UGX
- Average wage cost of hired labour per day: 7000

Most important factors affecting the costs

Labour takes most of the costs because its required regularly during establishment and maintenance.

Establishment activities

1. Select site where to put pigs (Timing/ frequency: Once before establishment)
2. Build a pen for pigs (Timing/ frequency: Once before establishment)
3. Look for inputs (Timing/ frequency: Once during estabslsihment/ routine)
4. Purchase pigs (Timing/ frequency: Once during establsihment)
5. Put pigs in the pen (Timing/ frequency: Once during establlsihment)
6. Feedding pigs (Timing/ frequency: Daily)
7. Watering pigs (Timing/ frequency: Daily)
8. Spraying pigs (Timing/ frequency: Weekly)

Establishment inputs and costs (per less than 0.05 acre, 6 to 8 m wide, 8 m long and 3.5 m high)

Specify input	Unit	Quantity	Costs per Unit (UGX)	Total costs per input (UGX)	% of costs borne by land users
Labour					
Persons days on monthly basis	persons	4.0	210000.0	840000.0	100.0
Equipment					
Nails	kgs	10.0	2500.0	25000.0	100.0
Hoes	Pieces	1.0	10000.0	10000.0	100.0
Spade	Pieces	1.0	10000.0	10000.0	100.0
Wheel barrow	Pieces	1.0	75000.0	75000.0	100.0
Iron sheets	pieces	6.0	20000.0	120000.0	100.0
Fertilizers and biocides					
Pestcide	litres	5.0	15000.0	75000.0	
Construction material					
Poles	Pieces	20.0	5000.0	100000.0	100.0
wood	pieces	15.0	5000.0	75000.0	100.0

Other					
Feeds on weekly basis	kgs	100.0	3000.0	300000.0	100.0
Total costs for establishment of the Technology				**1'630'000.0**	

Maintenance activities

1. Cleaning and removing manure (Timing/ frequency: Daily)
2. Giving drinking water to pigs (Timing/ frequency: Daily)
3. Spraying the pigs (Timing/ frequency: Weekly)
4. Feeding the pigs (Timing/ frequency: Daily)
5. Manure application in the field to improve soil fertility (Timing/ frequency: Weekly)

Maintenance inputs and costs (per less than 0.05 acre, 6 to 8 m wide, 8 m long and 3.5 m high)

Specify input	Unit	Quantity	Costs per Unit (UGX)	Total costs per input (UGX)	% of costs borne by land users
Labour					
persons days on monthly basis	persons	4.0	210000.0	840000.0	100.0
					100.0
Total costs for maintenance of the Technology				**840'000.0**	

NATURAL ENVIRONMENT

Average annual rainfall

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

- [x] humid
- [ ] sub-humid
- [ ] semi-arid
- [ ] arid

Specifications on climate

Average annual rainfall in mm: 1200.0
Two rainy seasons.

Slope

- [ ] flat (0-2%)
- [x] 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

- [ ] 0-100 m a.s.l.
- [ ] 101-500 m a.s.l.
- [ ] 501-1,000 m a.s.l.
- [x] 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
- [x] concave situations
- [ ] not relevant

Soil depth

- [ ] very shallow (0-20 cm)
- [x] shallow (21-50 cm)
- [x] 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)
- [x] medium (loamy, silty)
- [ ] fine/ heavy (clay)

Topsoil organic matter content

- [ ] high (>3%)
- [x] medium (1-3%)
- [ ] low (<1%)

Groundwater table

- [ ] on surface
- [x] < 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?

- [ ] Yes
- [x] No

Occurrence of flooding

- [ ] Yes
- [x] No

Species diversity

- [ ] high
- [ ] medium
- [x] low

Habitat diversity

- [ ] high
- [x] 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
- [ ] poor
- [x] average
- [ ] rich
- [ ] very rich

Level of mechanization

- [x] manual work
- [ ] animal traction
- [ ] mechanized/ motorized

Sedentary or nomadic

- [x] Sedentary

Individuals or groups

- [x] individual/ household

Gender

- [ ] women

Age

- [ ] children

- [ ] Semi-nomadic
- [ ] Nomadic

- [ ] groups/ community
- [ ] cooperative
- [ ] employee (company, government)

- [x] men

- [x] youth
- [x] middle-aged
- [ ] elderly

Area used per household

- [x] < 0.5 ha
- [ ] 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

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

Land ownership

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

Land use rights

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

Water use rights

- [x] 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

Quantity before SLM: 0
Quantity after SLM: 250kgs
Manure application on the maize field to improve soil fertility.

crop quality

decreased ✓ increased

Especially maize.

fodder production

decreased ✓ increased

For feeding the pigs.

animal production

decreased ✓ increased

Good feeding/purchase after sell of maize.

land management

hindered ✓ simplified

manure application.

drinking water quality

decreased ✓ increased

water quality for livestock

decreased ✓ increased

Quantity before SLM: 0
Quantity after SLM: 1 water harvesting tank to be used for drinking by the pigs.

expenses on agricultural inputs

increased ✓ decreased

Spend on pesticides.

farm income

decreased ✓ increased

Quantity before SLM: 0
Quantity after SLM: 800000 sale of maize and 2 pigs.

workload

increased ✓ decreased

Looking after pigs and maize on farm.

Socio-cultural impacts

food security/ self-sufficiency

reduced ✓ improved

Especially with the harvest of maize.

SLM/ land degradation knowledge

reduced ✓ improved

Training on planting maize, feeding the pigs and manure application in the maize field.

Ecological impacts

soil cover

reduced ✓ improved

Animal manure application in the maize field.

soil loss

increased ✓ decreased

Zero grazing avoiding overgrazing.

soil organic matter/ below ground C

decreased ✓ increased

Due to application of manure.

vegetation cover — decreased ✓ increased — Zero grazing.

beneficial species (predators, earthworms, pollinators) — decreased ✓ increased — Pigs.

pest/ disease control — decreased ✓ increased — Support from extension workers.

Off-site impacts

damage on neighbours' fields — increased ✓ reduced — Zero grazing as pigs are destructive.

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

Short term- High costs on labour and inputs. Long term - Low costs required only for labour to maintain the technology.

CLIMATE CHANGE

Gradual climate change

annual temperature increase — not well at all ✓ very well

seasonal temperature increase — not well at all ✓ very well — Season: wet/ rainy season

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

5

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?

- ☑ Yes
- ☐ No

Planted Agroforestry trees (avocado and calliandra) as feed supplement.

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

- Can easily be replicated in some other areas.
- Cheap to maintain once established: require low costs for maintenance.
- Provide manure which is applied on farm for increased maize production.

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

- Rewarding to both small and scale land users in terms of Income from the sale of pigs.
- Provide manure for maize production.

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

- Expensive to feed during the dry season: costly due to shortage of feeds. Promote alternative farm feeds on farm e.g avocado and calliandra trees.

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

- Easily attacked by bacteria and virus related diseases which result into constant Diarrhoea. Improve hygiene.
- Intensive Labour. Use both family labour.
- Requires some capital which may not be available with the land user who may want to start. Form saving and loans group/ association.
  Access agricultural loans for farmers and pay after sale of pigs.

REFERENCES

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Date of documentation: June 10, 2017

Last update: March 22, 2019

Resource persons
Alex Pito - land user

Full description in the WOCAT database
https://qcat.wocat.net/en/wocat/technologies/view/technologies_2812/
Video: https://player.vimeo.com/video/325842937

Linked SLM data
n.a.

Documentation was faciliated by

Institution
- CDE Centre for Development and Environment (CDE Centre for Development and Environment) - Switzerland

Project
- Scaling-up SLM practices by smallholder farmers (IFAD)