The photo shows barley fodder being grown on the trays in a shelter. (Babirye Sarah)

Barley fodder management for livestock production among smallholder farmers ( )

Balle

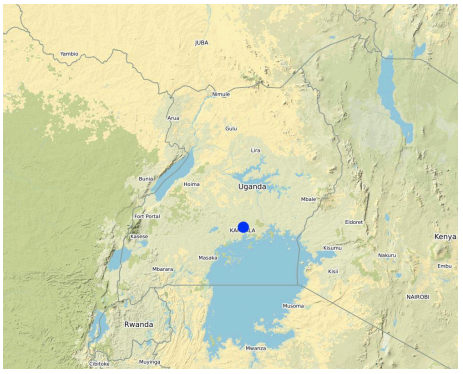
Barley fodder technology is a livestock feed that grows under a hydroponic system. This green feed is highly palatable, rich in protein and energy yet cost-effective. It takes few days to maturity (5-6 days) and can be grown in a smaller area. One kilogram of barley seeds can yield up to 6 to 6.5 kg of green feed.

Barley is a cereal grain that grows with hydroponic system to supplement on the feeds for livestock. This system enables crops to grow without soil so easily yet they mature within the shortest time in a smaller area. It is commonly used in finishing rations for livestock. Barley sprouts the best, grows the fastest and is cost-effective. This green feed is less expensive yet highly palatable and nutritious for animals.

To work well for sprouted fodder, the barley seed needs a high germination rate. Sprouting barley consistently and economically needs a climate-controlled space, light (18 hours of light and 6 hours of darkness) and a watering system. The ideal temperature being 75 degrees F and 70% humidity. Air movement is necessary to control mold.
The technology ensures a reduction of pesticides and herbicides because the plants are in a protected environment . The sprouts are high in protein and fiber, and are naturally balanced in protein, fat and energy. Barley fodder has 95% of the energy and higher digestibility hence reducing the occurrence of digestive diseases, such as bloat. It is one of the most nutritious sprouts and is full of essential nutrients, vitamins and minerals. These are absorbed more efficiently due to the lack of enzyme inhibitors in sprouted grain. Dry barley seeds yields between 6-6.5kg of green feed. Feeding barley fodder will improve the overall health and wellbeing of animals. With this technology, farmers can easily anticipate the expected amount of feeds. Despite the benefits, growing barley requires skills, knowledge and constant supervision especially maintaining the conditions required. Barley seeds are at times hard to get. In case of commercial/large livestock farming, the technology is not economically feasible. Bacterial and fungal growth is also another challenge like the common bread mould therefore seeds must be sterilized. The steps taken to grow barley seeds are as follows:

•On day 1, the barley seeds are laid on plastic trays after being soaked in water for 8-12 hours or an overnight. These seeds must be moist and kept clean. In case of any moulds, hydrogen peroxide may be used in the soaking water to kill mould.
•On day 2, the trays are placed on shelves where they are stacked. On this day, initial sprouting begins. Seeds must be kept moist, but not water-logged. Manually, water should be spread every after 4-5 hours. The seeds will usually sprout within 24 hours.
•On the third day, initial shooting begins. Watering still proceeds.
•From the 4-5th day, the root mat or the mat stem begin to grow.
•On the 6-7 the day, the farmers begins to harvest the barley grass and gives to the livestock. The grass has produced a 6-8 inch high grass mat with a 2 inch mat of interwoven roots.

The sprouted grain is harvested by removing the tray or sliding the mat off the tray in one long sheet. The mats can be cut to the appropriate size and fed to animals. Livestock will eat the whole thing like seeds, roots, and grass therefore, there is minimal waste. Barley is a major feeding option when pastureland and/or hay are in short supply, or adds a highly nutritious and relished supplement to traditional grazing.
Initial costs involved to a small scale farmer are minimal. This includes buying clean seeds, 5 kg costing 15,000/=, 10 plastic trays (50000), 2 watering cans (20000), 1 bucket for soaking seeds (10000), watering seeds 6 times (18000), soaking seeds (3000), labour for making shelves (30000), papyrus mat (20000) ,2 kg of nails (10000), timber for making shelves (50000), chopping ready folder (3000) totalling to 232,000/= for a start. However, this depends on the amount of fodder a farmer wants to produce.



: Kyanja, Gayaza, KAMPALA,

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(> 50)

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A kg of barley seeds yields to 7-10 kg of green fodder. Each kg of fodder is sold at 1500 hence in a kg planted (i.e. 3000 invested), a farmer is likely to earn 15000/=
The technology is advantageous in that there is little or insignificant costs involved on maintenance of the technology. Maintenance only involves daily watering of seeds (18000 for 6 days), cleaning the treys after use (3000) and supervision on barley during growing for 6 days (18000) totaling to 39000/=.

The photo above explains the stages involved while growing barley grass.Source:(Growing Sprouted Fodder For Livestock by Jason Wiskerchen Monday, March 19, 2012 (Babirye Sarah)

- : Laboratory
: The demonstration was done at Kyanja National Research Organization in a laboratory.

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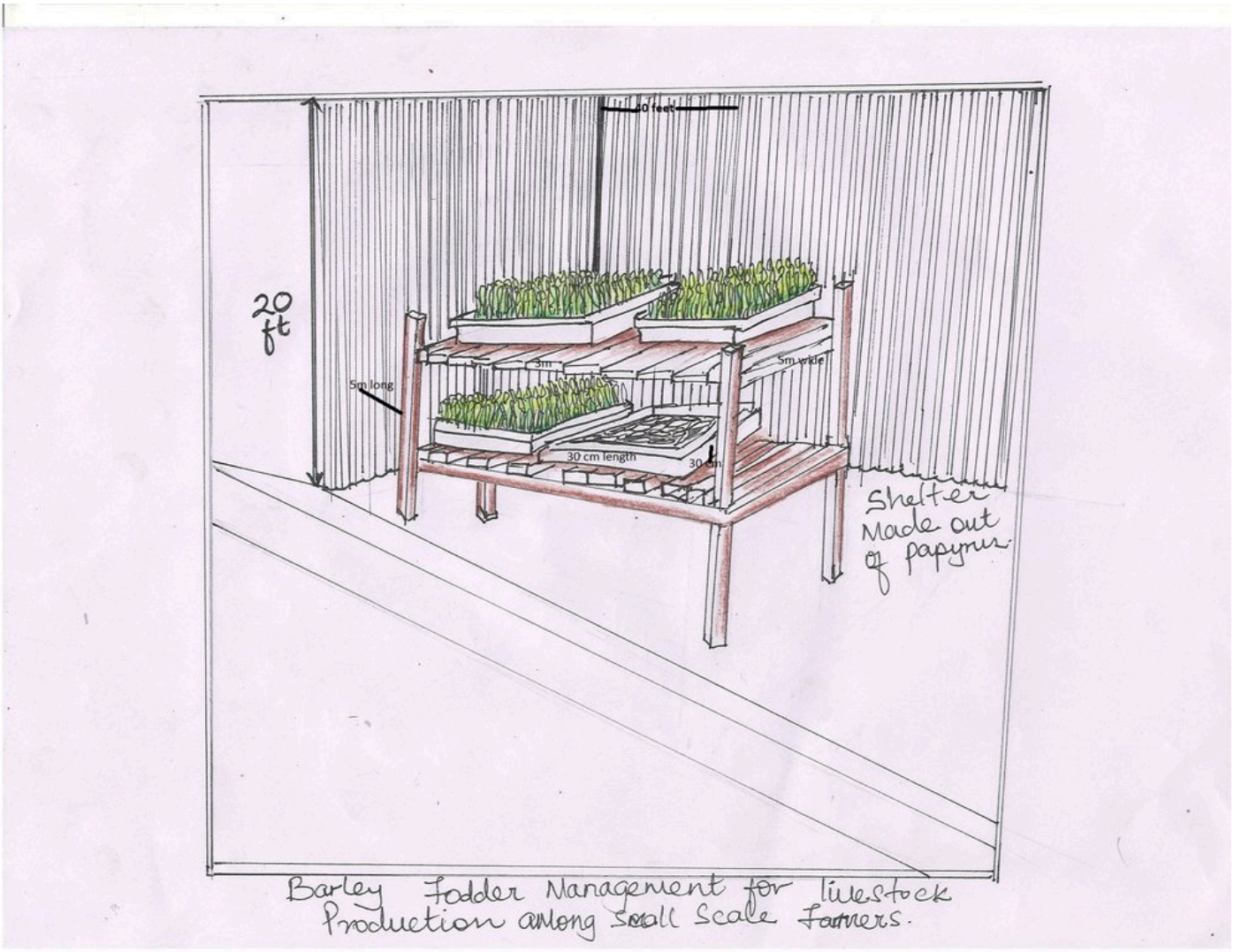
- M2: /



: Prossy Kaheru
The shelter is constructed at 20 feet long and 20 feet wide
Trays(10) of 30cm wide and 30 cm length
Barley seeds (5kg)
Shelves (20) of 3m wide and 3m long
Papyrus mats (2) of 20 feet wide and 40 feet long
Shelves stand of 5m long

- Labour costs represent the largest cost element.
- **UGX**
- ( ) 1 USD = 3600.0 UGX
- 3000/= per day

1. Buying seeds (/ : Every planting time)
2. Clean the seeds if dirty to avoid molds (/ : Before planting if they are dirty)
3. Soak the seeds for 8-12 hours (/ : 8-12 hours)
4. Place the trays on the shelves (/ : Once from 1-5 day)
5. Water the seeds planted on the tray every 4-8 hours (/ : 4-8 hours for 5 days after planting)
6. Harvest and chop the leaves,stems and roots,then give to the livestock (/ : After harvesting)

			(UGX)	(UGX)	%
Making shelves	Man day	1,0	30000,0	30000,0	
Clean the seeds if they are dirty	Man day	1,0	3000,0	3000,0	
Soaking the seeds into water	Man day	1,0	3000,0	3000,0	
Chop the fodder ready for feeding	Man day	1,0	3000,0	3000,0	

Water the seeds planted on the trey in every 4-8 hours	Man day	6,0	3000,0	18000,0	
Buying trays	piece	10,0	5000,0	50000,0	
Buying seeds	Kg	5,0	3000,0	15000,0	
Buying a watering can	piece	2,0	10000,0	20000,0	
Buying a bucket	piece	1,0	10000,0	10000,0	
Timber making shelves	piece	5,0	10000,0	50000,0	
Nails	Kg	2,0	5000,0	10000,0	
Papyrus mats	piece	2,0	10000,0	20000,0	
				232'000.0	

1. Watering the seeds (/ : Every day after planting to harvest)
2. Maintaining the room temperature (/ : Every day after planting to harvest)
3. Replacing poles (/ : Once a year)
4. Cleaning the equipments like treys (/ : After harvesting)
5. Replacement of shelves (/ : Once a year)

			(UGX)	(UGX)	%
Watering seeds	Man day	6,0	3000,0	18000,0	
Cleaning the equipments(trays)	Man day	1,0	3000,0	3000,0	
Spervision of the growing barley	Man day	6,0	3000,0	18000,0	
				39'000.0	

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

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

0-100
101-500
✓ 501-1,000
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)
✓ (51-80)
(81-120)
(> 120)

(
)
/ ( )
✓ (,)
/ ( )

(> 20
)
/ ( )
✓ (,)
/ ( )

(>3%)
✓ (1-3%)
(<1%)

- ✓ < 5
- 5-50
- > 50

SLM

- 10%
- ✓ 10-50%
- 50%

- < 0.5
- ✓ 0.5-1
- 1-2
- 2-5
- 5-15
- 15-50
- 50-100
- 100-500
- 500-1,000
- 1,000-10,000
- > 10,000

Improves on fodder for animals. That is 1 kg of barley yields 7-10 kg of green fodder

The animals that feed on barley supplements reduced suffering from bloating because of high digestibility

Barley grass is highly nutritious with a lot of protein content. Coupled with being a very palatable fodder, the growth rate of animals increases.

The health situations of animals is improved. Barley fodder

has 95% of the energy and higher digestibility hence reducing the occurrence of digestive diseases, such as bloat. It is one of the most nutritious sprouts and is full of essential nutrients, vitamins and minerals.

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Too high temperature

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1-10%

10-50%

50%

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0-10%

10-50%

50-90%

90-100%

?

It is operated in a moist, cool environment

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- It is less cost effective yet highly nutritious. A kg of barley is nutritionally equivalent to 3Kg of other grass like the lucerne.
- Barley grows in a very short period of time
- It requires a small piece of area to grow barley

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- Barley improves the overall health and well-being of animals
- It has higher digestibility hence reduces on some diseases like bloat
- Barley growing does not involve the use of soil hence cost effective

/ / :

- The technology requires skills and knowledge especially to manage the conditions for growth Encouraging farmers to train from model farmers
- Barley seeds are at times hard to get. Promoting the barley seed multiplication in large quantities
- The technology requires maximum supervision Always endeavor to do maximum supervision

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- Bacterial and fungal growth is also another challenge e.g the common bread mould. Seeds must be sterilized
- Barley is not economically feasible for large scale farmers on pasture production To grow more pastures in addition to barley as feed supplements
- It cannot be stored for a long period of time Serve it in the first days after harvest.

Editors

Sarah Babirye | Kamugisha Rick Nelson | Nicole Harari, Udo Höggel, Donia Mühlematter

: 22 2018 : 4 2019

Fred Kabanda - SLM

https://qcat.wocat.net/km/wocat/technologies/view/technologies_3453/
: https://player.vimeo.com/video/261459678

SLM

- National Agricultural Research Organisation (NARO) -
- Scaling-up SLM practices by smallholder farmers (IFAD)

- Growing Sprouted Fodder For Livestock by Jason Wiskerchen Monday, March 19, 2012,: https://www.peakprosperity.com/growing-sprouted-fodder-for-livestock-2/
- https://www.hydroponics-simplified.com/hydroponic-fodder-advantages.html: http://www.fodderconsultants.com/advantages.html