

### Principle

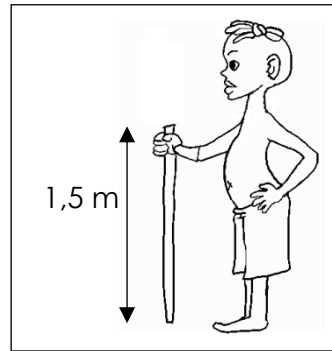
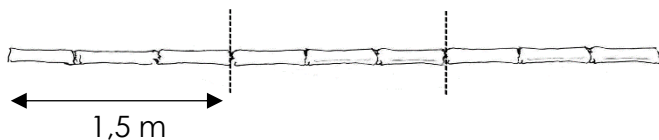
Tree protection is a key element for the success of afforestation projects. In the rural context of Malawi, the free grazing of animals is one of the main challenges to the survival of seedlings. Young trees located within villages are particularly exposed to goats and should be systematically protected. There are several simple techniques to set up in order to ensure a proper growth of seedlings. The following techniques are already used by some farmers and have proved their efficiency in the Malawian context.

### Materials

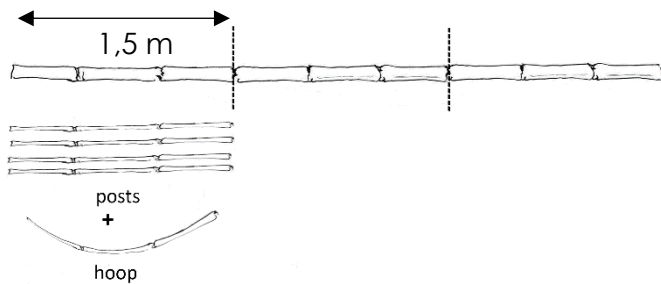
- ✓ Bamboo stems.
- ✓ Inner tubes or dry sisal twines.

### Procedure

After cutting bamboo stems, let them dry for one week. Then, divide each stem in pieces (approximately 1.5 meters long) (drawing).



Then, divide each 1.5m long piece in strips : some will be used for posts and others for hoops.



To save workforce and time, it is best to fix the fence when the tree is being planted. Otherwise, it must be done before the goats are released.

- Dig a round trench 50cm away from the young tree (drawing opposite).
- Push in the bamboo posts in the trench and add soil to strengthen the structure.
- Then, fix the posts together with the hoops and tie them with inner tubes or sisal twines.

### Remarks

Building a fence like this one requires less than 2h (materials' collection included).

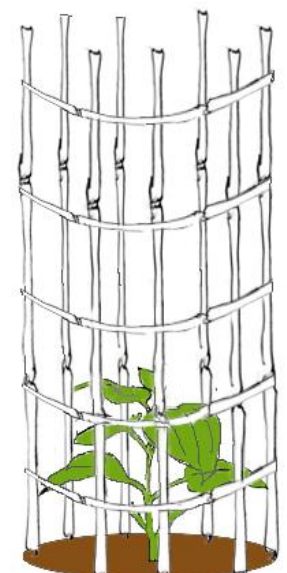
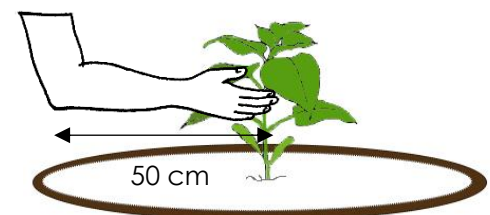
Do not remove the fence during the rainy season. It must be kept until the tree is tall enough for the leaves to be unreachable by goats.

### Species which need this type of protection

- Moringa oleifera* (moringa)
- Melia azaderach* (Indya)
- Fruit trees (papaya, mango...)
- Leucaena leucocephala* (lukina)



Avocado tree fenced with bamboo. Abadia (2016)



Posts are tied with inner tubes. Abadia (2016)

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Tree protection is a key element for the success of afforestation projects. In the rural context of Malawi, the free grazing of animals is one of the main issues for the survival of seedlings. Young trees located within villages are particularly exposed to goats and should be systematically protected.

There are several simple techniques to set up in order to ensure a proper growth of seedlings. The following techniques are already used by some farmers and have proved their efficiency in the Malawian context.

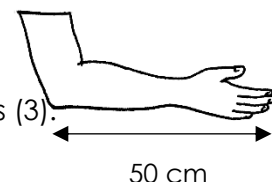
### Materials (for one fence)

- ✓ Dry sisal (twines) or inner tubes
- ✓ Napier grass
- ✓ 6 wooden sticks
- ✓ Bamboo stems

### Procedure

To save workforce and time, the best way is to fix the fence at the same time as you plant the tree. Otherwise, it must be done before the goats are released :

- Dig 6 holes (50cm deep) 50cm far from the tree (1).
- Plant a wooden stick in each hole (2).
- Fix bamboo hoops around the wooden sticks by tying them with sisal twines or inner tubes (3).
- Add napier grass between the wooden sticks and plant them in the ground (4).



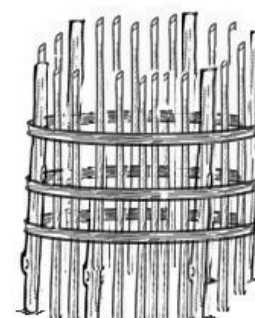
(1)



(2)



(3)



(4)

Abadia (2016)

### Model Farmer (picture)

To build his fence, Mr. Greshan Kawale from Zembani VH (Mnongwa GVH) needed 2 hours (collection time + digging the hole + fixation). He will leave the fence during the rainy season and will build a new one in April 2017.

He did not apply goat dung on the fence.





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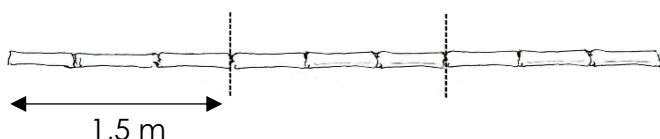
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### Materials (for one fence)

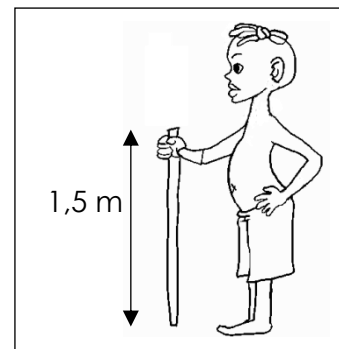
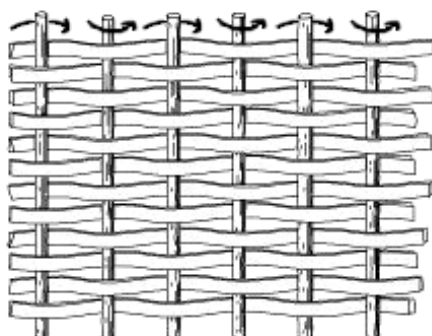
Bamboo stems

### Procedure

After cutting bamboo stems, let them dry for one week. Then, cut 10 – 15 posts (approximately 1.5 meters long) and plant them in the ground (50cm deep).



Use the remaining stems to make hoops by weaving bamboo around the posts. Pass alternatively inside and outside to make an impassable fence.



*Senna spectabilis* fenced with bamboo. Abadia (2016)



Fence only made with bamboo. Abadia (2016)



Bamboo strips weaved around bamboo posts. Abadia (2016)

The three kinds of fences presented above are relevant to promote because they are strong, made with local materials and easy to replicate.

Nevertheless, farmers are innovative and there are many possibilities in order to protect trees with local materials. Here are some examples for farmers who are not able to find or buy bamboo.

They can use :

- Kankhande (*Ziziphus abyssinica*) : its thorns repel livestock.
- Dry leaves of banana : they are an alternative to Sisal and inner tubes to tie the structure.
- Chikombilo (*Tithonia diversifolia*) : this light wood can be weaved like bamboo.
- Bricks : they can be put around the tree to strengthen the structure.
- Goat dung : it can be applied on the fence to repel goats.

