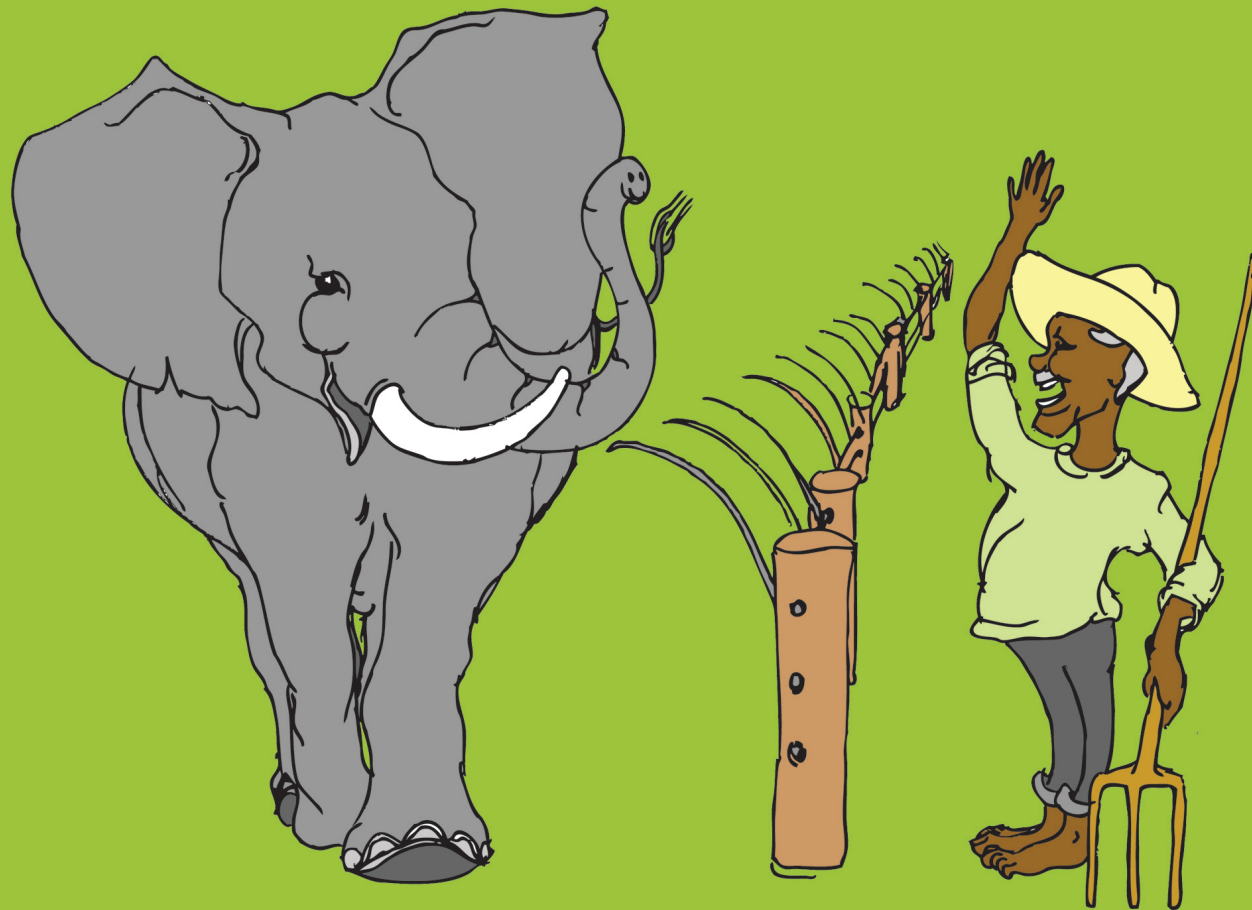


# GOOD FENCES MAKE GOOD NEIGHBOURS



By Max Graham  
Illustration and design by Anikia Henley

## LAIKIPIA ELEPHANT PROJECT

A Comic Book for managers and community groups interested in the use of electrified fences to alleviate human-elephant conflict

# ELEPHANTS ARE IMPORTANT AND VALUABLE TO PEOPLE

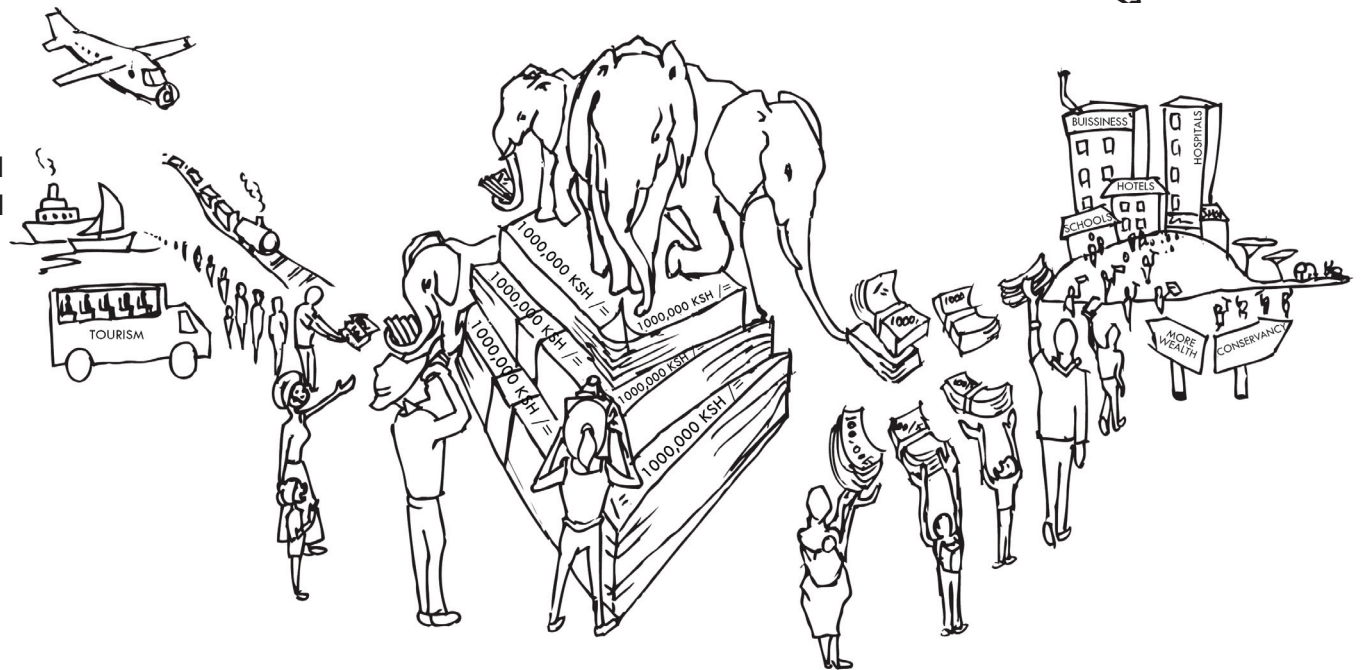
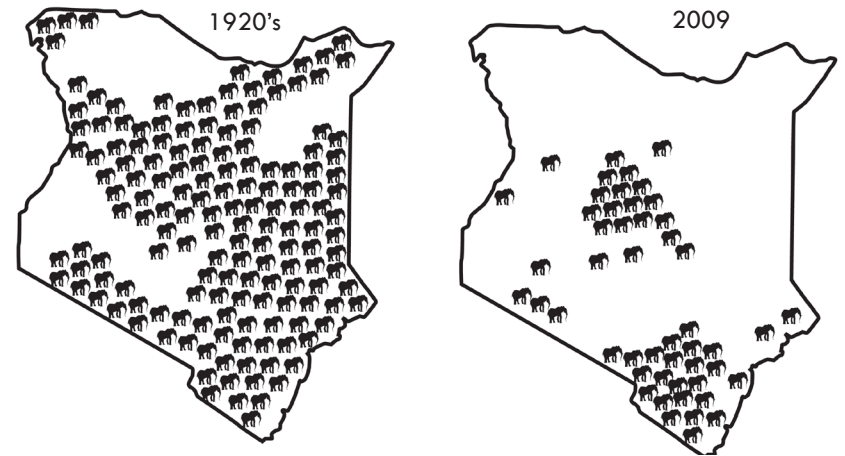
Elephants used to occur throughout Africa but hunting by people means that today elephants only occur in a small fraction of their former range. Poaching elephants for ivory was a particular problem in Eastern Africa during the 1970s and 1980s. During this time Kenya's elephant population fell from 167,000 in 1973 to just 19,000 in 1989. The ban in the ivory trade helped to stop this illegal killing of elephants so that numbers have begun to recover in recent years.

Because they require such large areas to live in and because they play such a big role in shaping the landscapes in which they occur, if we protect elephants we are also protecting many other species of wild plants and animals. People depend on these plants and animals for their survival.

Elephants play a key role in their environments, clearing thick woodland and bush to create pasture, helping with the germination of certain species of trees and digging shallow wells for water

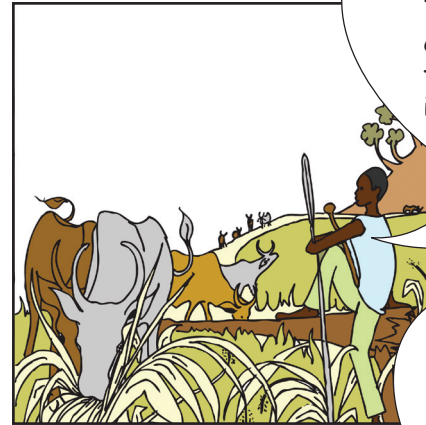
Which is then available to other wildlife during dry times.

People from all over the world come to Africa to see elephants in the wild. This generates money for government services such as education, health and infrastructure development, pays for the conservation of protected areas, pays for community projects and employs tens of thousands of people. Because elephants are important to the world community they are protected under international and national laws.

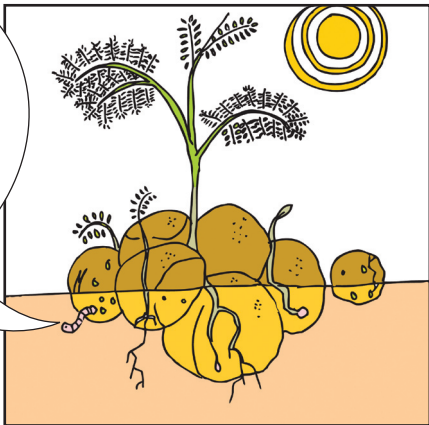




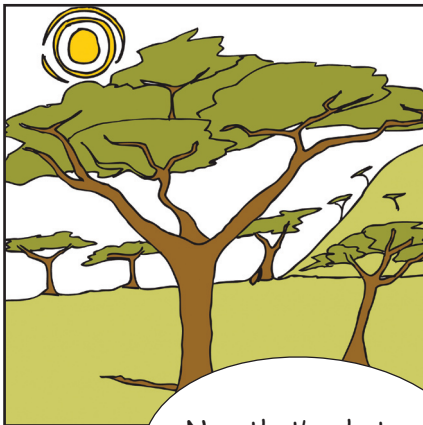
Lets move on there is no more food left for us now. We will return.



The elephants have cleared the bush to create good grazing for my livestock.



These elephants' are so helpful they have fertilised the soil and planted trees!

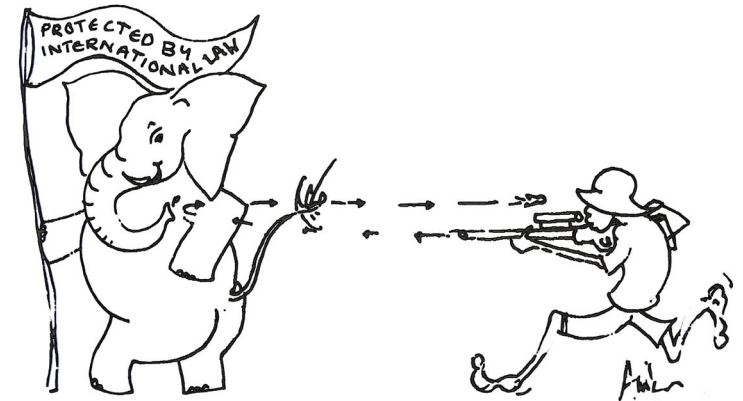
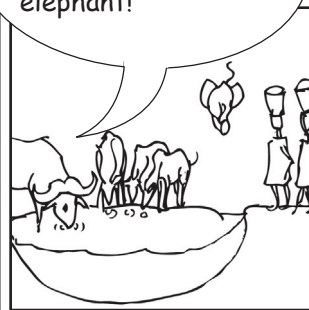


Thanks to the elephants' we can collect good firewood.

Come on, hurry up! We are all thirsty!



Now that's what we call a useful elephant!



# WE NEED TO FIGURE OUT WAYS OF KEEPING ELEPHANTS OUT OF CULTIVATED LANDS

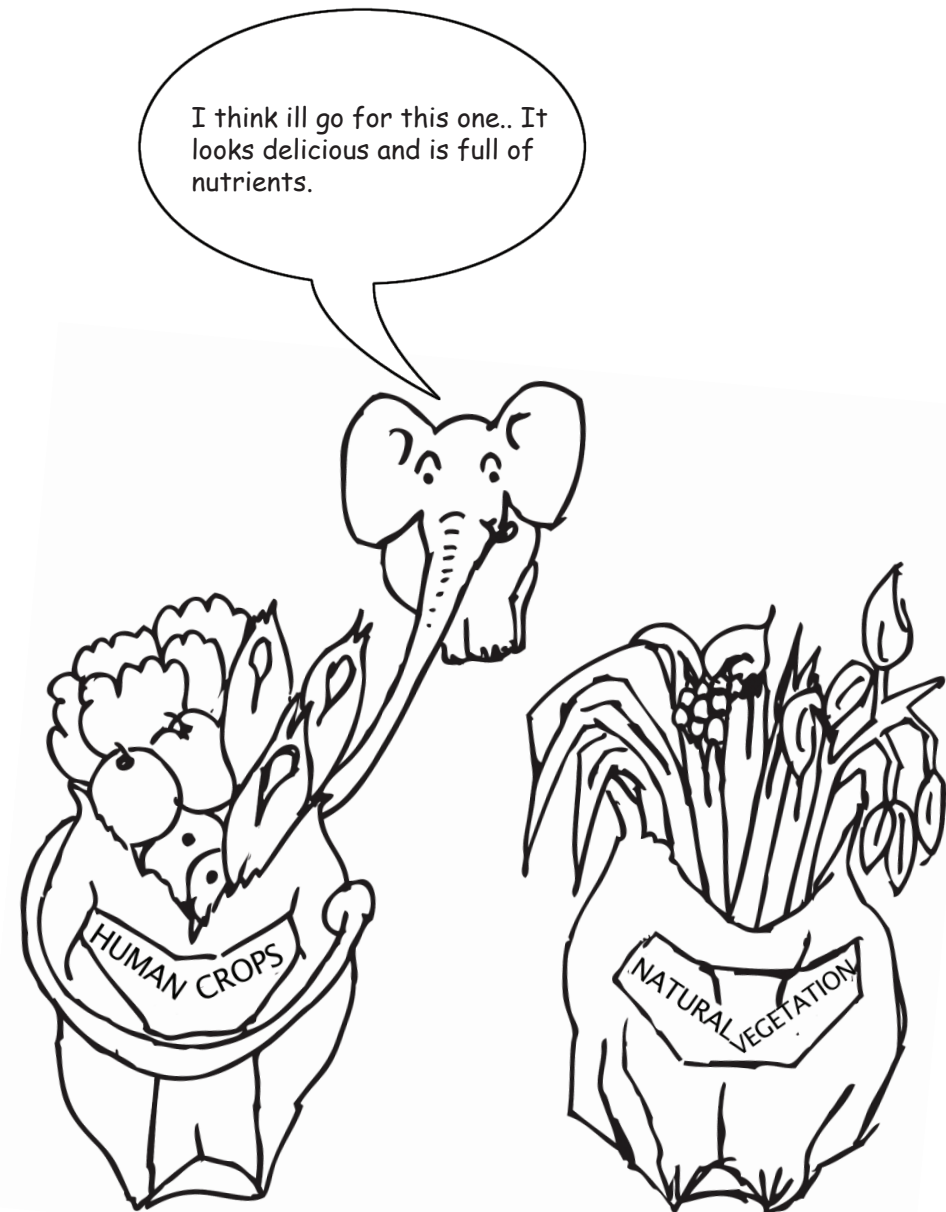
The human population in Africa has increased dramatically in the last hundred years. For example there were less than one million people in Kenya one hundred years ago but today there are probably over 35 million. This human population explosion is pushing people into the bush to find new areas to cultivate and feed livestock. However these remote places are home to elephants and other species of wildlife.

Where people and elephants share space they can come into conflict. This is a particular problem where farmers grow crops in or near places where elephants occur. Elephants are hugely attracted to crops, especially maize, as these are more nutritious than elephants' natural food sources. This can make farmers extremely angry resulting in elephants being injured or killed. Elephants that are harassed can also become dangerous, injuring and even killing people. This conflict is a huge problem. While we all know that elephants are valuable and bring in benefits but at the same time we

cannot afford the damage they cause to people's farms, lives and livelihoods. So it is really important to figure out how to keep elephants out of people's farms.

Farmers try and keep elephants out of their crops using traditional deterrents such as fire, beating tins and drums, throwing stones and putting up simple brush fences. These are not very effective. There are new simple methods that are being trialled such as burning hot chillies, making chilli grease fences, watchtowers, bright torches and the use of loud noise makers. These are showing more promise but the most important ingredient for all of these simple farm-based elephant deterrents to be effective is that there are enough people to help with farm guarding. This may mean that farmers have to work together to keep elephants out of their farms.

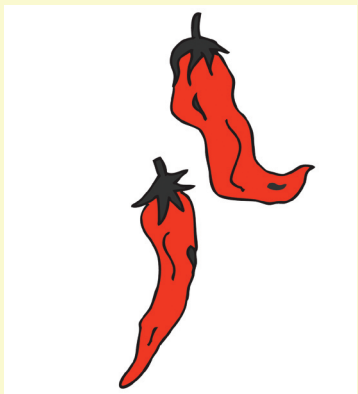
The other method for keeping elephants out of crops is through the construction of an electrified fence.





### Chilli Paste

Crushed chillies are mixed in grease and smeared onto ropes and fences. Elephant don't like chillies!



### Guards

If enough people work together to guard their crops, elephant will keep away.



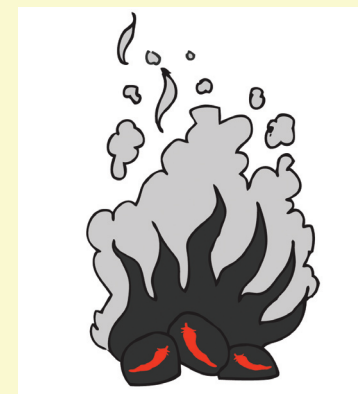
### Noise Makers

Loud noise makers are needed to scare elephants away from crops.



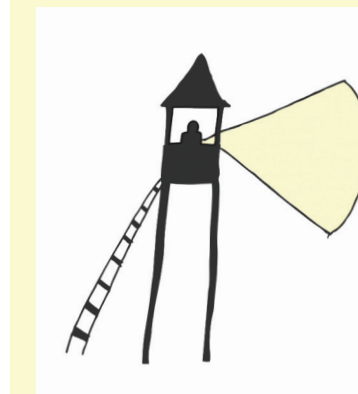
### Chilli smoke

Burnt chillies mixed with dung puts the smell out to elephant to keep away.



### Watch Towers and Spot lights

These can work well as elephants can be scared away before they enter the crop field.



# BEFORE YOU BUILD A FENCE YOU NEED TO BE SURE WHO IS GOING TO BE RESPONSIBLE FOR IT

Before an electrified fence is constructed it is often seen as the final solution by farmers. However there are many electrified fencing projects that have failed to resolve the problem of human-elephant conflict. This is because constructing the fence is the easy part. It is what happens to the fence after it is constructed that is key. Who will look after it? Who will pay for the cost of maintenance? Many fencing projects have failed because the answer to these questions has been unclear.

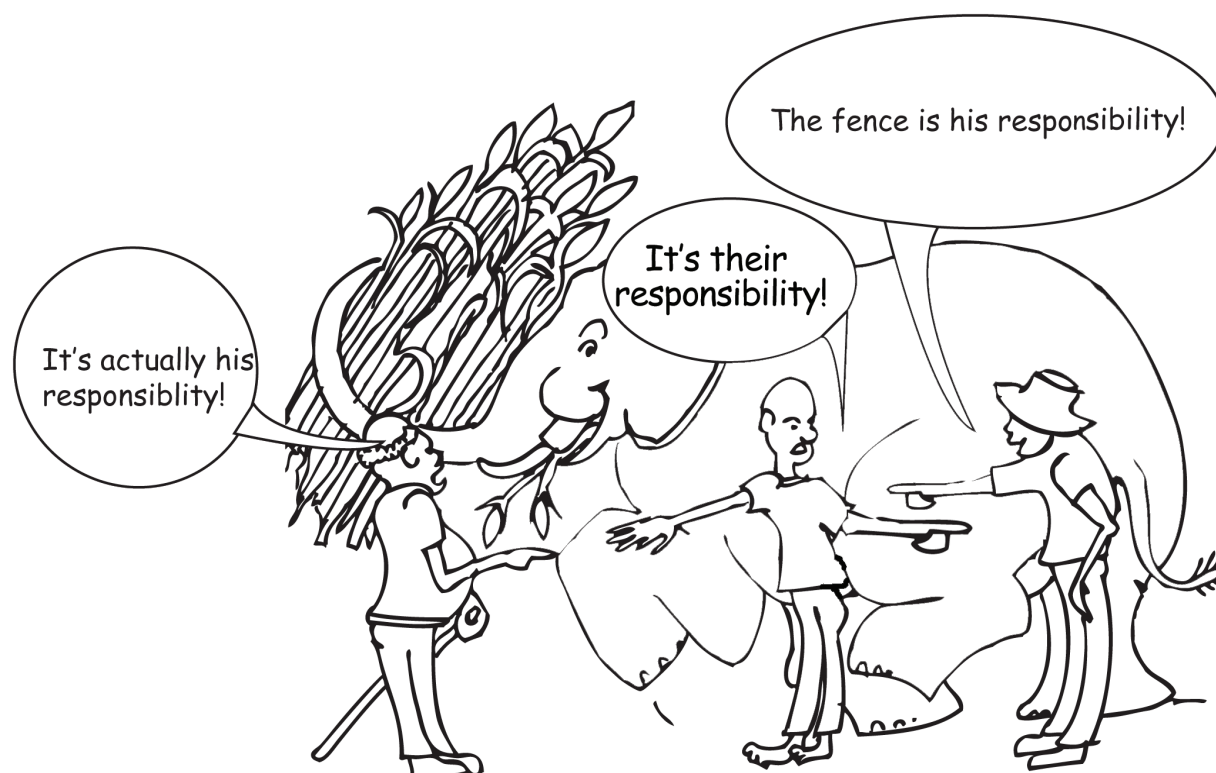
Therefore before a fence is constructed it needs to be very clear who is going to pay for its maintenance and who is going to put in the labour required. This is simple in situations where it is the government wildlife authority who is constructing the fence around, for example, a national park. Similarly where a private ranch or wildlife sanctuary constructs an electrified fence then ownership of the fence is also quite clear. However when it is a community that is requesting a fence to

be constructed, ownership becomes much more complicated.

In situations where it is the community that own an electrified fence then it is important that they create a community-based organisation, elect a committee that includes a treasurer, secretary and chairman, and open a bank account.

It must be clear what the cost of maintenance will be in terms of labour but more importantly, in terms of direct cash for fence components that will need to be replaced over time such as batteries, solar panels, wire, posts and insulators. Members of the community who want an electrified fence must be willing to

contribute to covering the full cost of its maintenance. If these costs cannot be met by the community members then the electrified fence should not be constructed.





We all need a fence to protect our crops.



I cant pay Alone.

Who will pay for it?  
We must hold a meeting and discuss this....

I cant Afford it.

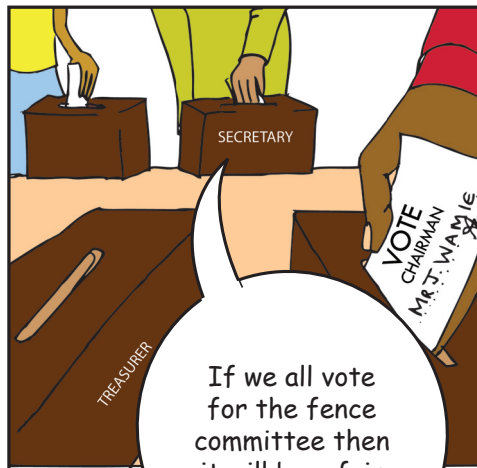


We are meeting today as a community as we all want an electric fence. Let us come together and form a fence committee and pool our resources to cover costs.

I am happy to donate some money toward the building of the fence.



We are signing an agreement to contribute to the maintenance and building of the fence.



If we all vote for the fence committee then it will be a fair vote.



As a Conservationist I am pleased to see people working together and protecting wild life I will contribute to the project where I can.



I am the treasurer of the fence committee and am at the bank to open an account for the fence project.

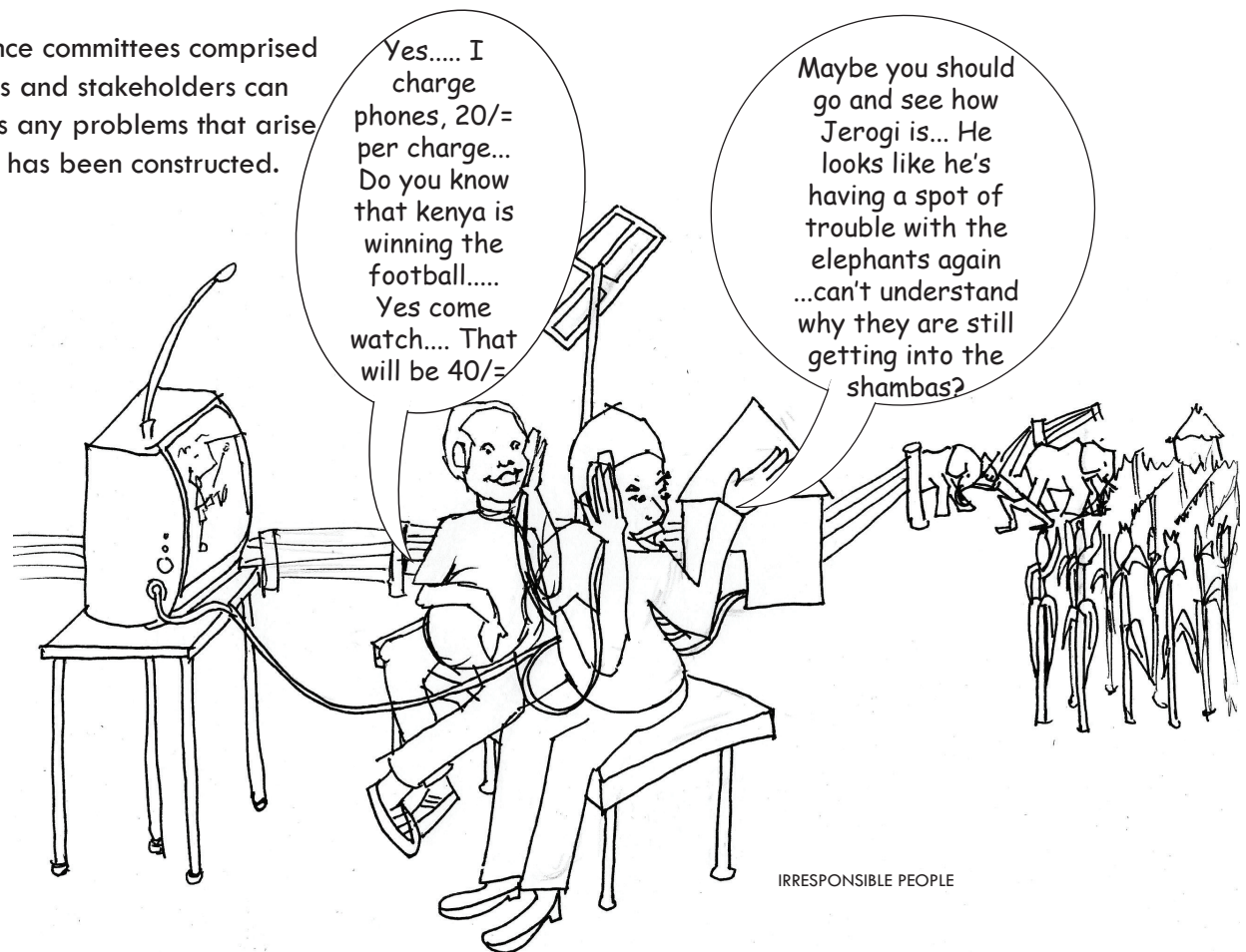
# BEFORE CONSTRUCTING THE ELECTRIFIED FENCE ENSURE THAT ALL THE PEOPLE WHO LIVE NEARBY SUPPORT THE CONSTRUCTION OF THE FENCE AND WILL NOT TAMPER WITH IT

Before building a fence it is important to ensure that all the people that live near to where it will be constructed understand and are fully supportive for the reason behind its construction. In some situations the electrified fence may stop people from accessing resources with or without permission such as firewood, grazing for livestock, timber, water and medicinal plants. These people may resent the presence of the electrified fence and will damage it if they do not agree it should be there. In some situations where these people have legitimate rights or needs for access to resources, then it may be sensible to work out a way in which they can continue to access such resources. For example gates or ladders can be put in place to allow access by people if this is necessary. One way of ensuring all the appropriate stakeholders support the fence is to get them all to sign a letter of commitment before the fence is constructed

Children and young adults often short fences for fun. This is dangerous and

destructive and it is really important that communities neighboring the fence discourage such behavior.

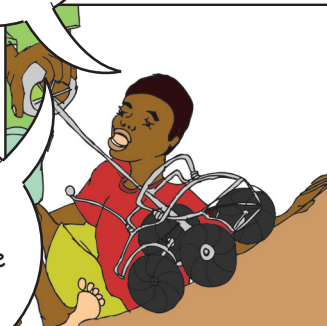
Establishing fence committees comprised of local leaders and stakeholders can help to address any problems that arise after the fence has been constructed.



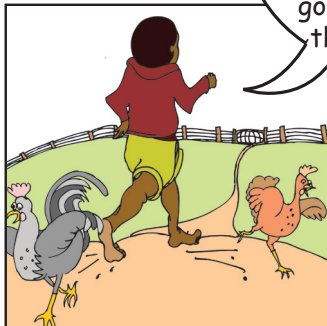




That's a cool car...can I have a go?



No!... But i'll make you one if you find the wire.



I know where to find wire. My car is going to be the best!



My poor baba! I should have warned you!



WA AA AA!!!



We should have had this sign up before any accident happened.



My cows are thirsty today!

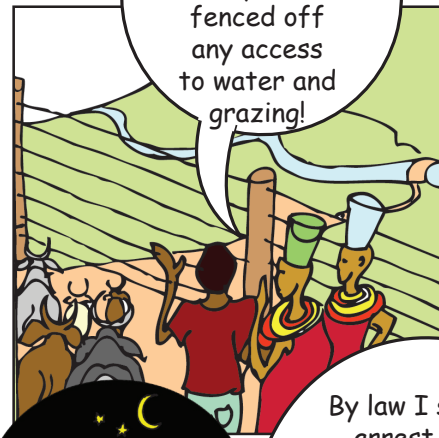
Morning!

My cows are going to die of thirst... I'm taking matters onto my own hands!

That isn't very clever.



We need water! Can't we come to an agreement?



I don't believe it...! They have fenced off any access to water and grazing!



By law I should arrest you! Look! Now the elephants are coming into your shambas. We must have a meeting and discuss this.



Morning! The gate is the answer. You should have discussed the water problem before taking matter into your own hands.



# HOW DOES AN ELECTRIC FENCE WORK?

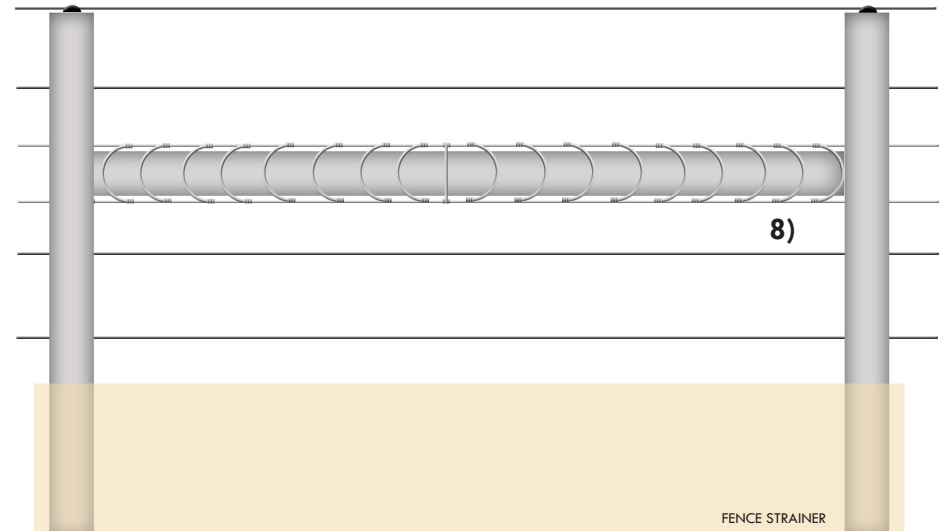
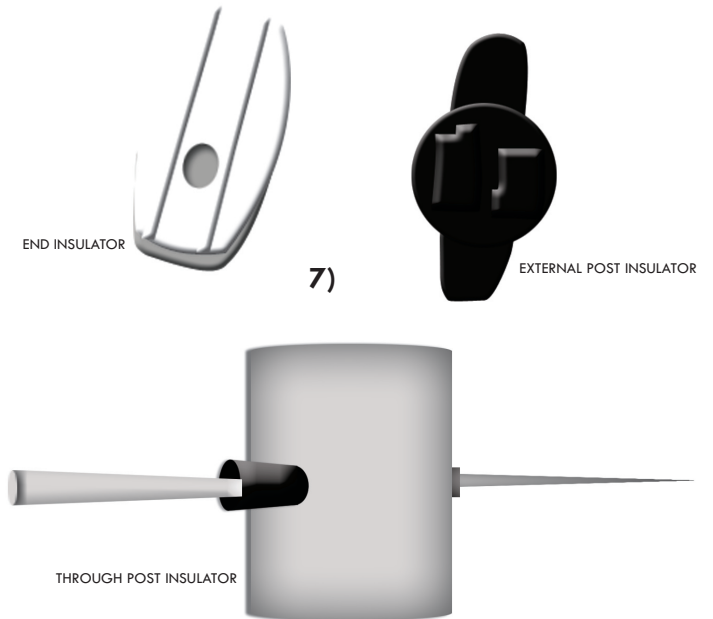
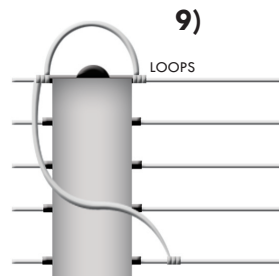
An electric fence is comprised of the following components:

- 1) A solar panel which converts sunshine into electricity;
- 2) A charge control which regulates the flow of power into a battery;
- 3) A battery which stores the electricity generated by the solar panel;
- 4) An energiser which converts the power stored in the battery into a pulse of electricity down the live wires of a fence
- ; 5) Wooden fence posts. These have to be treated so that they are not eaten by termites;
- 6) High tensile wires that are either live (connected to the energiser) or earthed;
- 7) Plastic or porcelain insulators on the wooden fence posts for the live wires to pass through, ensuring the electric current is not interfered with. It is preferable if

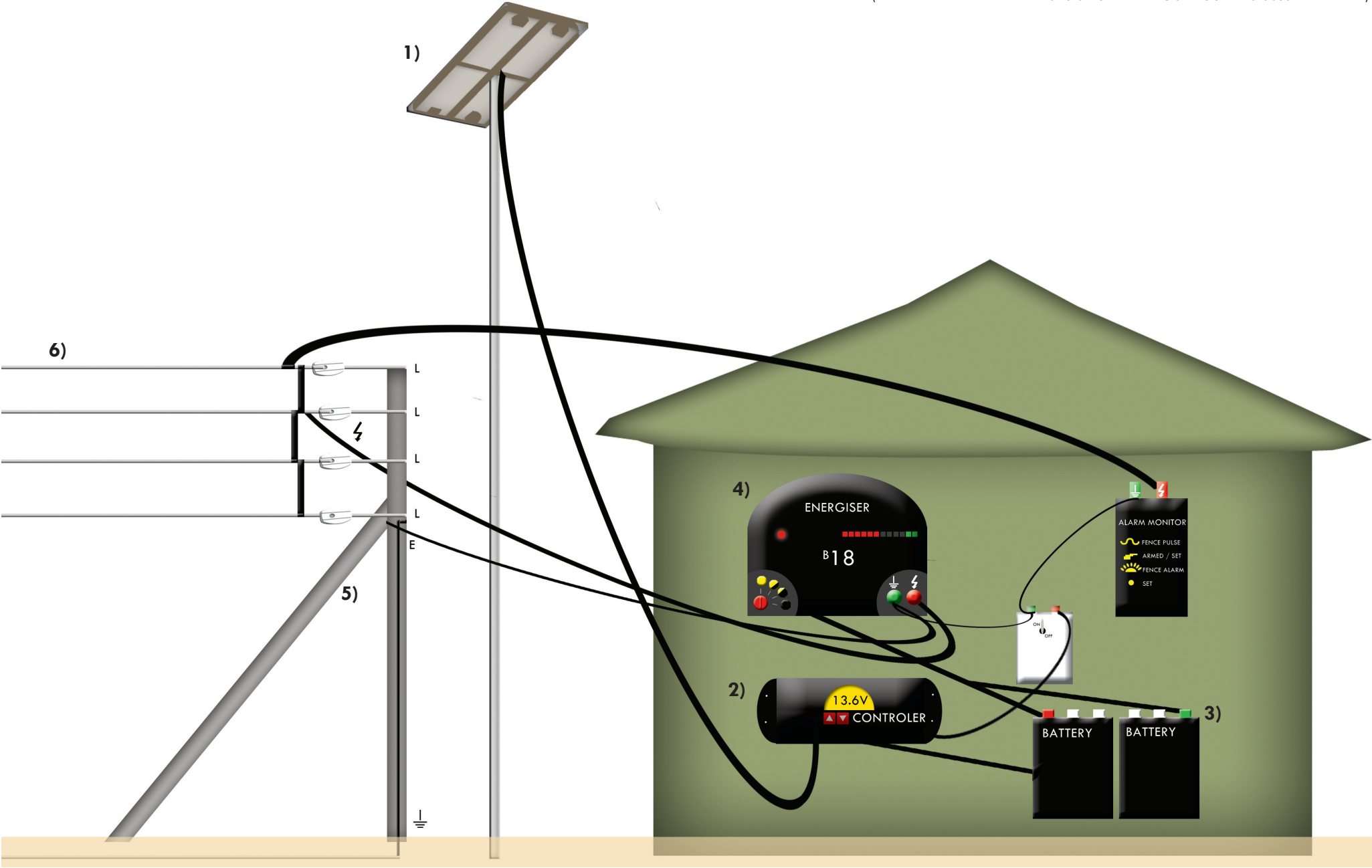
If the wires run through the posts, rather than along the face of the post;

8) A strainer post to ensure the fence wires are well supported and are pulled tight.

9) Loops are a security mechanism securing the Electric pulse to flow over the top of the post elephants cannot get their trunks around to pull them down. Also it protects from monkeys and humans jumping the fence ( this is just a minor preventative, It doesn't prevent fully)



(THERE ARE MANY DIFFERENT WAYS TO SET UP THE ENERGISER ROOM THIS IS JUST AN EXAMPLE)



# KEY POINTS TO CONSIDER WHEN DESIGNING AN ELECTRIC FENCE



It is important to consider that an electric fence can do more than control elephant movement. Electric fences can help with security, in particular the theft of livestock. This is because cattle thieves will have to break the electrified fence to get passage for the livestock they have stolen. When the fence is broken, fencers are alerted and can report the location to the authorities. This has had a big impact on reducing the theft of livestock among farmers around some private wildlife conservancies in north Kenya.

Electric fences can also protect farmers' property from other wildlife pests. For example with the right kind of fence around a conservation area, livestock on the settlement side can be protected from large predators such as lions and hyenas. Some designs of fences can also keep out other crop-raiding pests such as for example Bush pigs, monkeys and various antelopes.

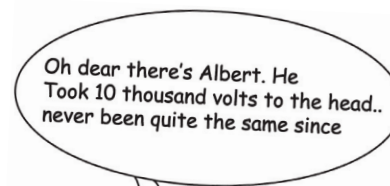
Lastly electrified fences can help to manage the use of pasture and water

by livestock, ensuring there is decent dry season grazing available.

While electrified fences can deter people from entering an area, it is important to consider that there is no such thing as a people-proof fence. If deterring people from entering an area is one of the goals of constructing a fence, for example to prevent rhinos from being poached, then it is important to recognise that this can only be successfully achieved in combination with a good relationship with neighbouring communities and agreed rules that local community and government institutions support and are willing to enforce.

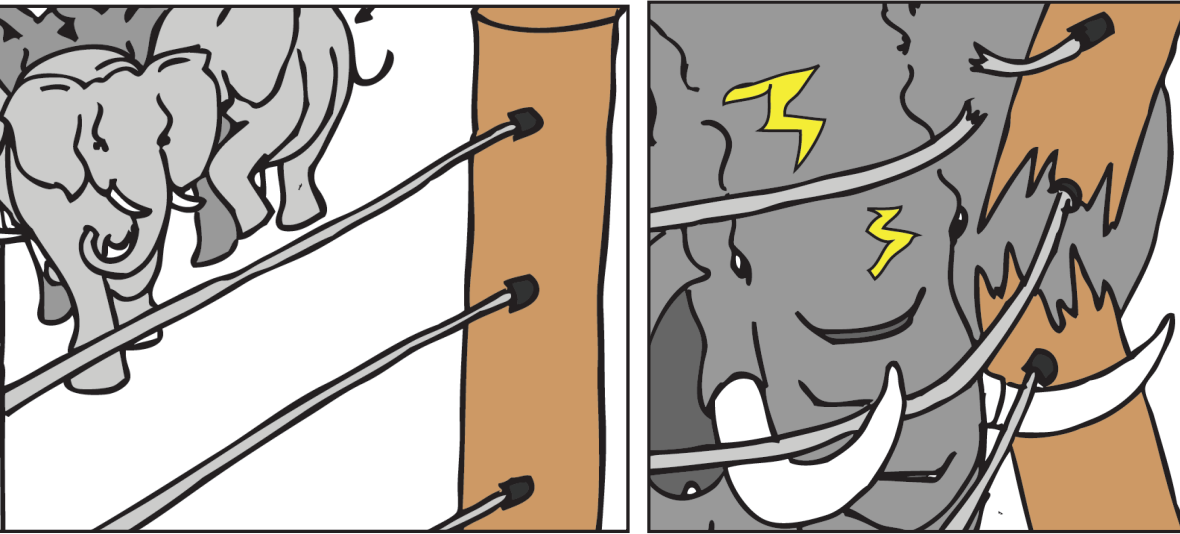
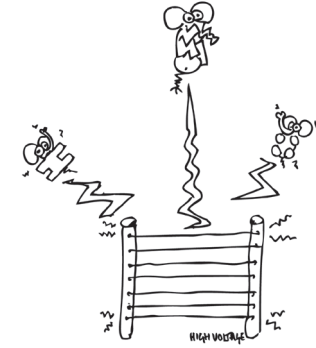
Elephants are extremely intelligent and resourceful which means they can quickly learn to break an electrified fence if they want to. Elephant tusks do not conduct electricity so

they sometimes use their tusks to break electrified wires. They can do this by hooking their tusks under the wires and pulling backwards until the wires snap. Fence posts are extremely vulnerable to being broken by elephants. Elephants will use their trunks and feet to put pressure on parts of the fence post that are unprotected by an electrified wire until the posts break. Sometimes elephants will simply charge at an electrified fence to break it and accept a large electric shock.



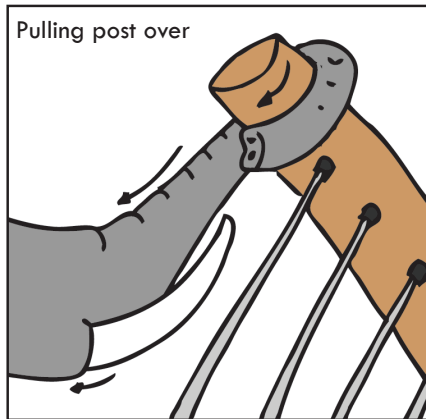
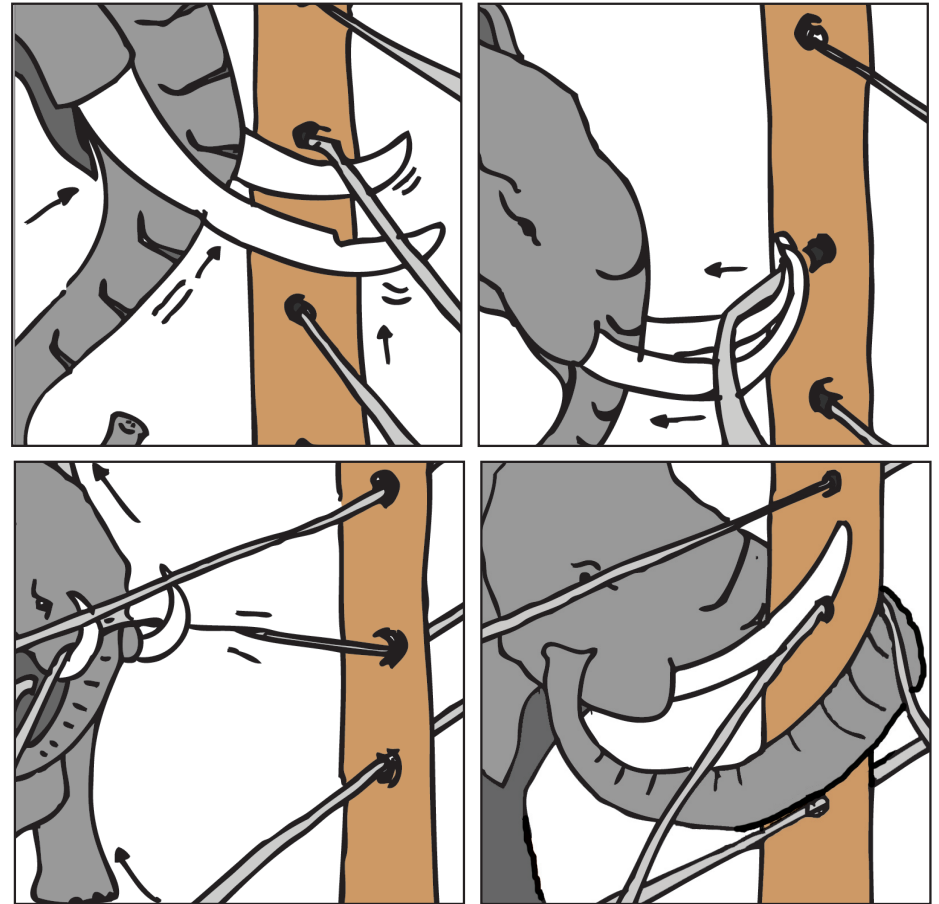


Fences also help protect people from illegal grazing, stock theft and dangerous predators

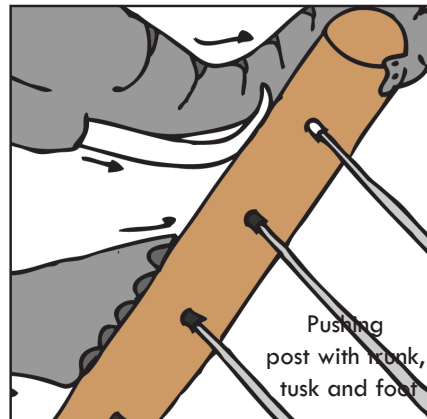


Bull elephants will sometimes push a young bull into the fence  
 Elephants don't mind a shock on their forehead as much as a shock on their Belly and chest area

The most common way that an elephant can brake a fence is by pulling the wire with its tusks (they do not conduct electricity) they pull the wire until it snaps or stretches falling onto another wire causing the fence to short



Pulling post over

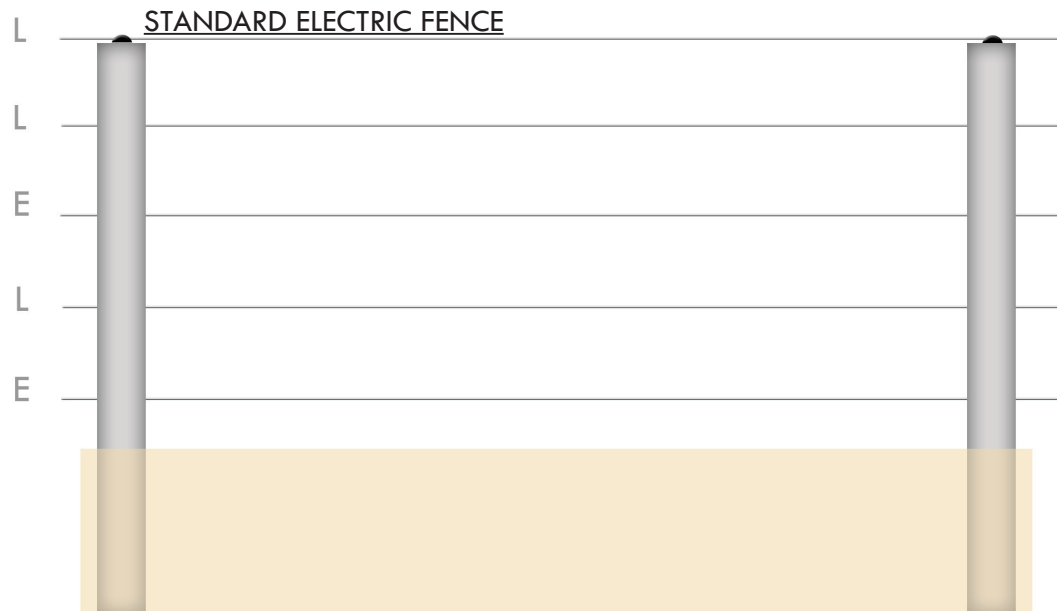


Pushing post with trunk, tusk and foot

# CONSTRUCTING THE RIGHT KIND OF FENCE

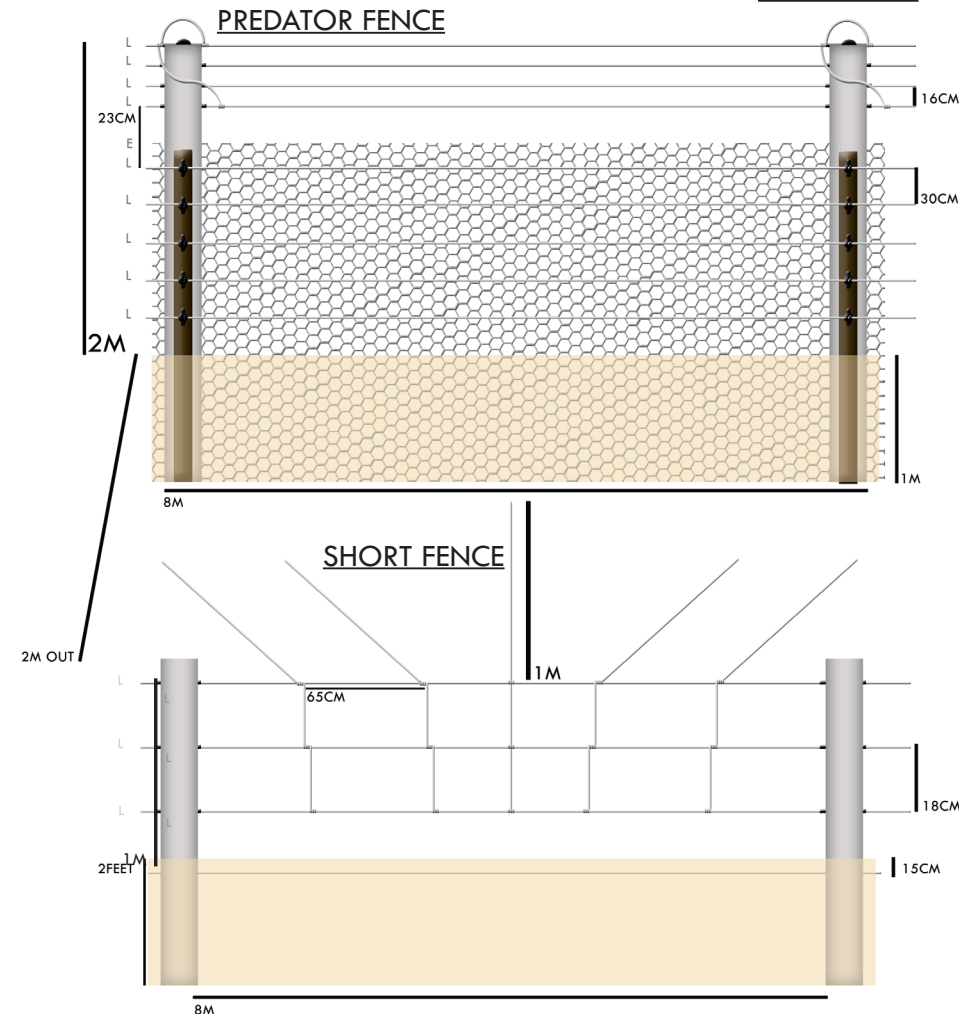
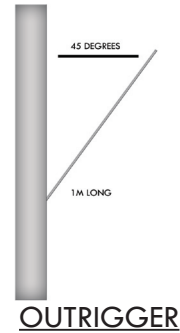
There are some designs of fence that are more effective at deterring fence breaking elephants than others. In Laikipia District in north-central Kenya, a voltage of not less than 7kv (7,000 volts) has shown to be important. This is achieved by ensuring that an energiser does not service more than 7km of fence line.

There are several designs of electrified fence that occur in Laikipia. The standard electric fence has a post of 6 feet in height, placed at x intervals, with 3 live wires and 2 earth wires. The insulators are placed on the outside face of the fence. Unfortunately this fence has regularly been broken by elephants. This may be because of low voltage as the fence is often damaged by pastoralists who want to get access to pasture for their livestock but inadequate post protection has also been a major problem.

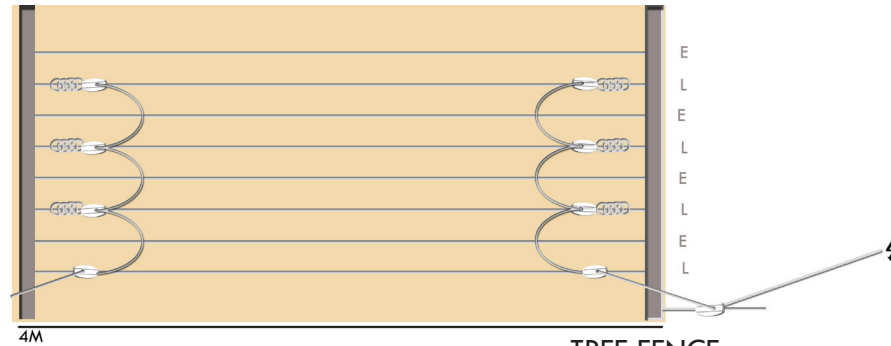


Another fence that has been far more effective is a short fence, with posts that are just three feet off the ground, with three live wires. The earth wire is buried just in front of the fence. This fence has outriggers attached to it.

outriggers are one of the most effective elephant deterrents with outriggers the elephant cannot reach the post and if it tries it will get shocked on its belly and chest.



### GRID (ROAD CROSSING) FENCE

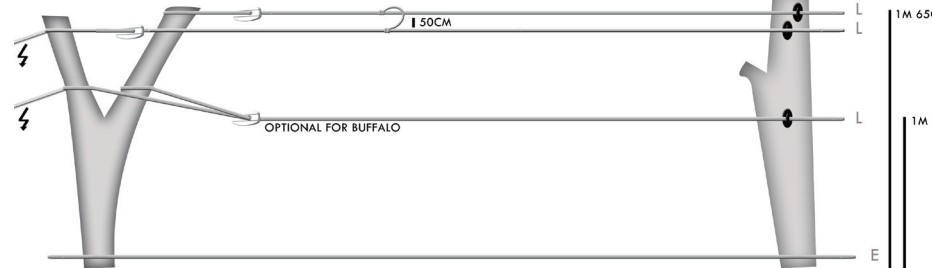


Outriggers are pieces of high tensile fencing wire, measuring 3 feet in length which are attached to a live wire on the fence about one foot from the ground, that then project outwards into the direction of elephant pressure. The outriggers are designed so that if an elephant tries to get close to the fence to challenge it, he will get an electric shot in the tender area around the chest or feet. That way the elephant is not able to get close enough to try and use his tusks to snap the wires or challenge the posts.

Obviously the short fence is for elephants only and it may be that the fence that you want to build will have purposes other than just reducing human-elephant conflict. Another fence worth considering is a predator proof fence. This is six feet tall, has 9 live wires, outriggers and a strong mesh designed to keep in predators as well as elephants and has proved very effective for the Ol Pejeta Conservancy in Laikipia

As posts are the most vulnerable component of an electrified fence to elephant damage, a fence that uses large trees as posts can be very effective. Obviously this fence can only occur where such large trees exist, such as along a river. The tree fence has three live wires and an earth running along the ground in front of the fence.

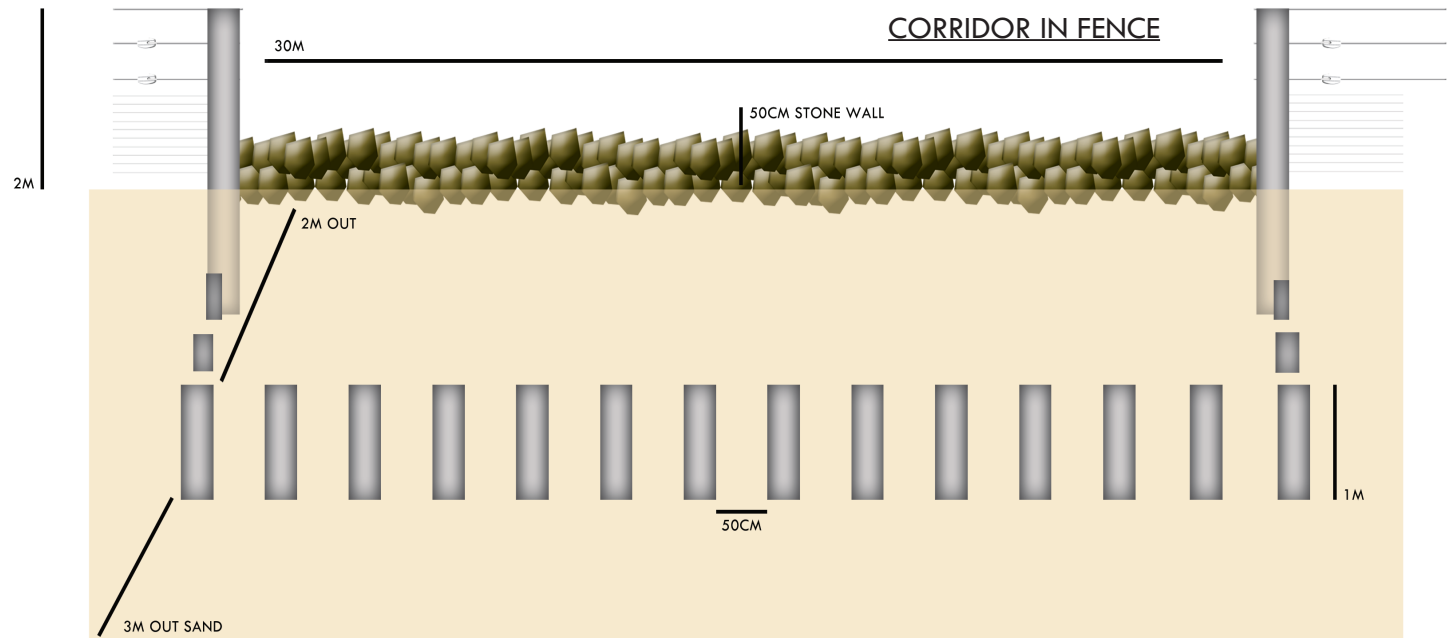
### TREE FENCE



There are other modifications worth considering under particular circumstances. One such modification is a grid along roads which allows access for vehicles and people on foot but deters wildlife.

Another modification is to create a gap in the fence that will actually allow the movement of elephants and other wildlife. These are created in places where such movement is desired, such as at the beginning of a corridor. A short brick wall can be built in these gaps to prevent the movement of rhino while still allowing the movement of migratory species such as elephants and predators.

### CORRIDOR IN FENCE



# FENCE ALIGNMENT

Where the fence is constructed determines the level of pressure it will experience in terms of how often it will be challenged by elephants. Obviously fences separating elephant habitat from elephant habitat will be under a great deal less pressure than fences constructed along hard boundaries separating elephant habitat from intense maize cultivation. It is also important to establish the movement of elephants in the area so as to avoid putting a fence up where there is an elephant corridor if possible as this will just result in the fence being placed under a great deal more pressure.

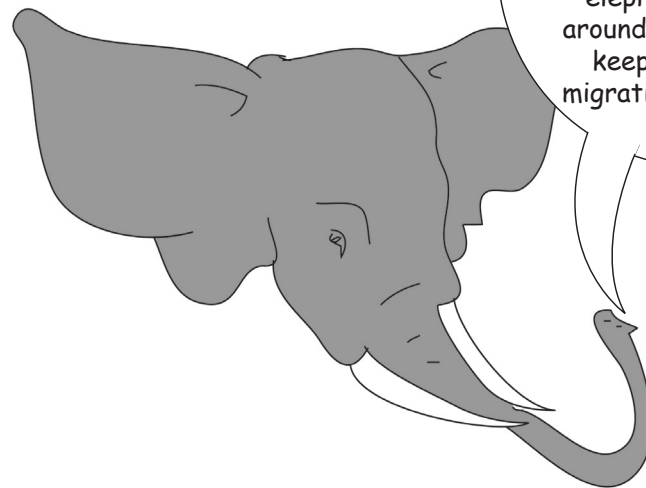
There are three sorts of fence alignment:

1) The first is a simple straight line with a start and a finish. So this type of alignment might occur where a fence is constructed along part of the perimeter of a national park. However elephants can simply walk to where the fence ends and then walk around it.

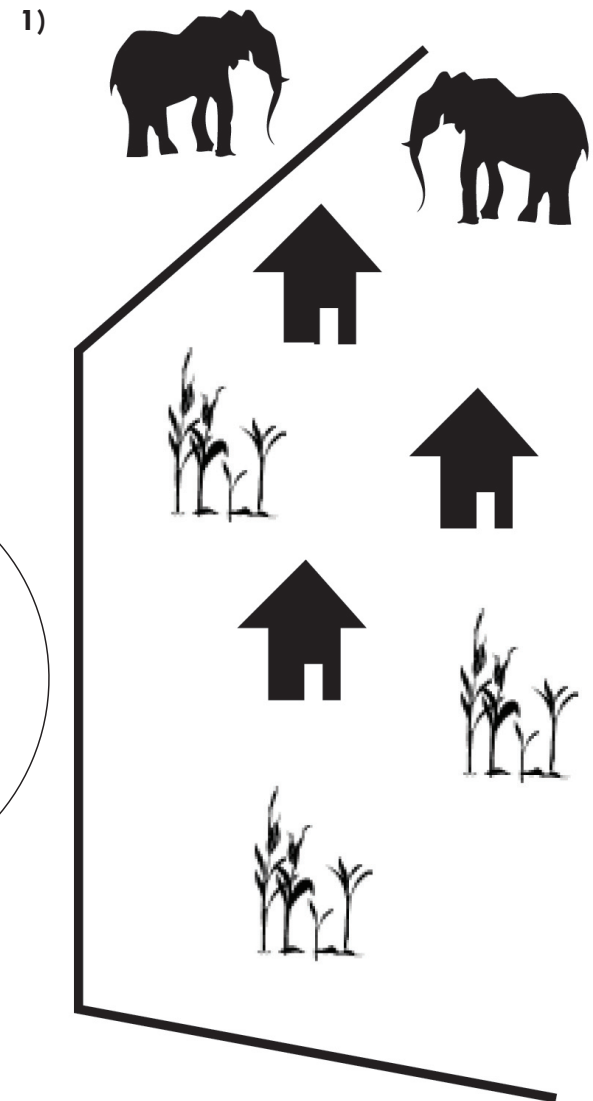
2) The second is a fence created to contain elephants. This inevitably will be extremely large

and is perhaps best represented by the fences we have in this country around the Aberdares National Park and Shimba Hills National Park. These are very expensive to construct and maintain.

3) The third type of alignment is that which surrounds cultivation. These fences have the potential for being the smallest and most cost-effective but are probably the least used among fencing projects. It is perhaps these fences which we should be using more in future to reduce human-elephant conflict.



It is important not to put a fence up where there is an Elephant corridor. With this straight line alignment elephants can walk around the fence thus keeping their old, migration routes open.



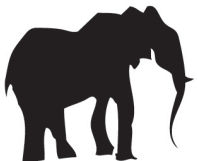
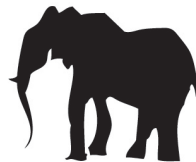
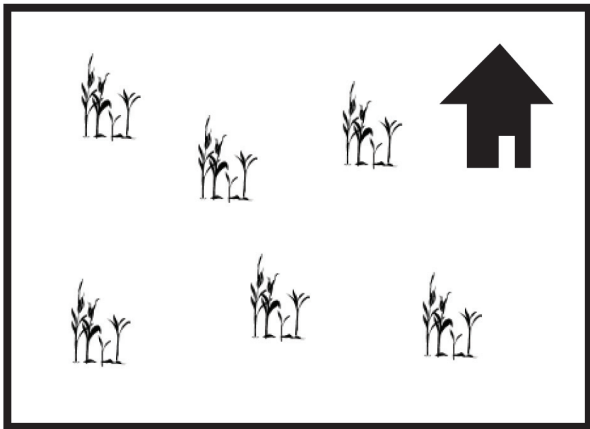
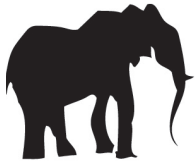




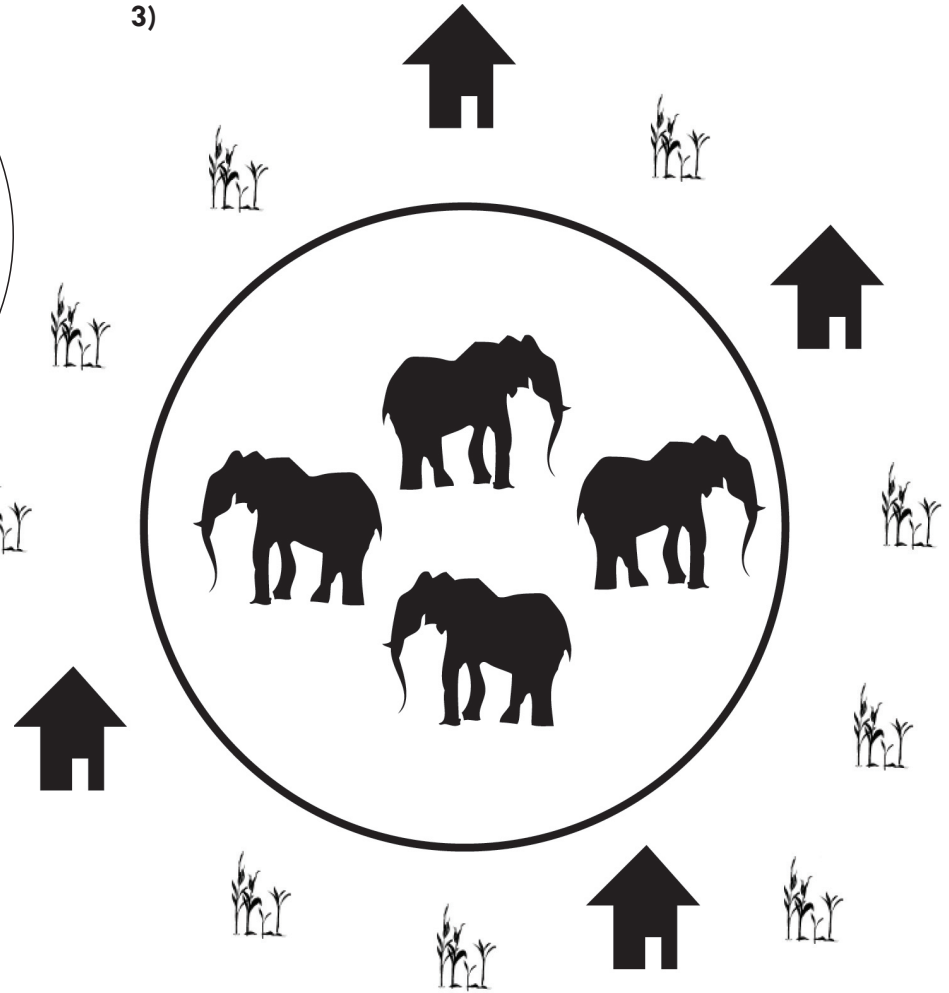
If the fence is built to contain the elephants then it has to be an extremely large area as elephants like to migrate.

A fence built around the farmstead is the most cost effective and the most ideal alignment to have.

2)



3)



# AN ELECTRIFIED FENCE WILL ONLY WORK IF IT IS WELL MAINTAINED

Fences need to be well looked after if they are to be effective. Many electrified fences simply fail because they are not maintained. If you think you will not have the resources to carry out routine maintenance then you should not construct an electric fence as it will simply be a waste of money.

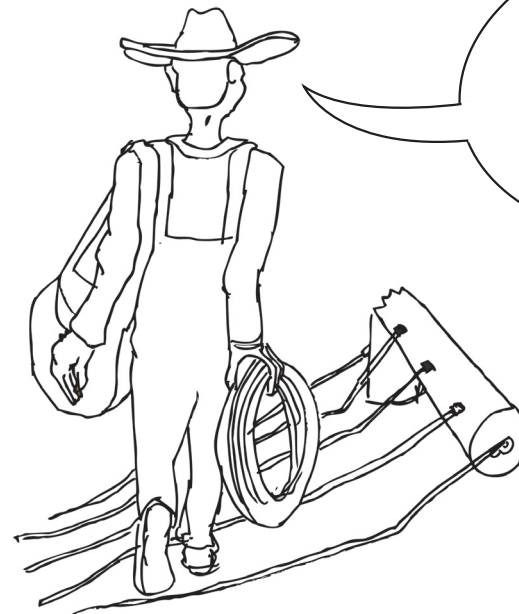
The maintenance of a fence can be thought of as comprising three components:

1) Clearing of vegetation along a narrow strip, under and adjacent to the fence to prevent any growth that will short the fence. It is important that such vegetation clearing occurs along as narrow a strip as possible to prevent soil erosion;

2) Routine maintenance carried out by dedicated fencers. This involves daily patrols and monitoring of the fence using a voltmeter, rapid repair of any wires as soon as they are broken and repair or replacement of minor

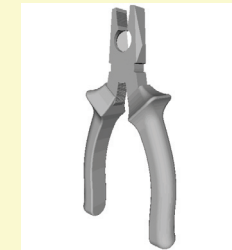
components such as insulations. A fencer should be equipped with a slasher, voltmeter, pliers and a chain wire tightener. As a rule of thumb there should be at least one fencer for every 7 km of fence; and

3) Replacement of major fence components such as batteries, energisers, fence posts etc. These larger components are clearly quite expensive and their regular replacement needs to be planned and budgeted for.



VOLTMETER

CHECKS THE PULSE ANT ANY POINT ALONG THE FENCE LINE



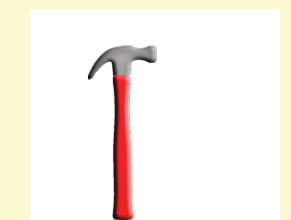
PLIERS



FENCE WIRE CUTTERS



FENCE WIRE TIGHTENER



NAILS AND HAMMER



FENCING WIRE



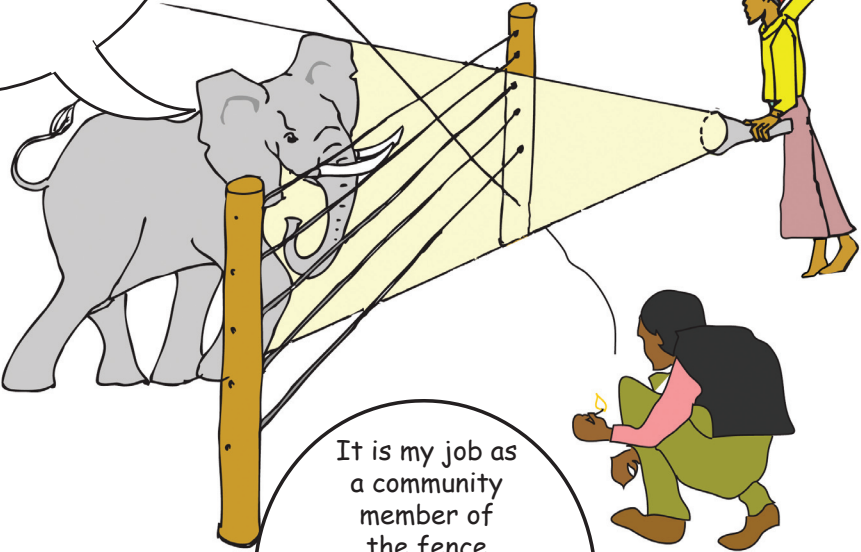
SLASHER

My job as a community member is to check the fence for any damage. These are some of the tools and things I carry with me.

Ah! No! The Rapid Response Team always catch me out just before I can break the fence.



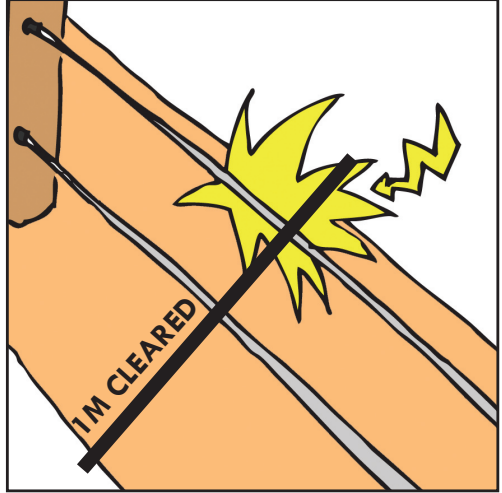
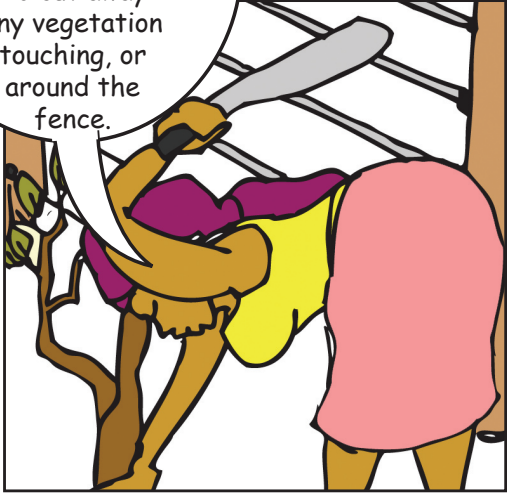
By throwing Thunder flashes and using bright spotlights, the elephants are scared away before they can break the fence.



It is my job as a community member of the fence committee. To cut away any vegetation touching, or around the fence.

When approximately one meter is cleared under the fence it has its full power and works effectively

Fence loses power (shorts) if vegetation touches the live wire



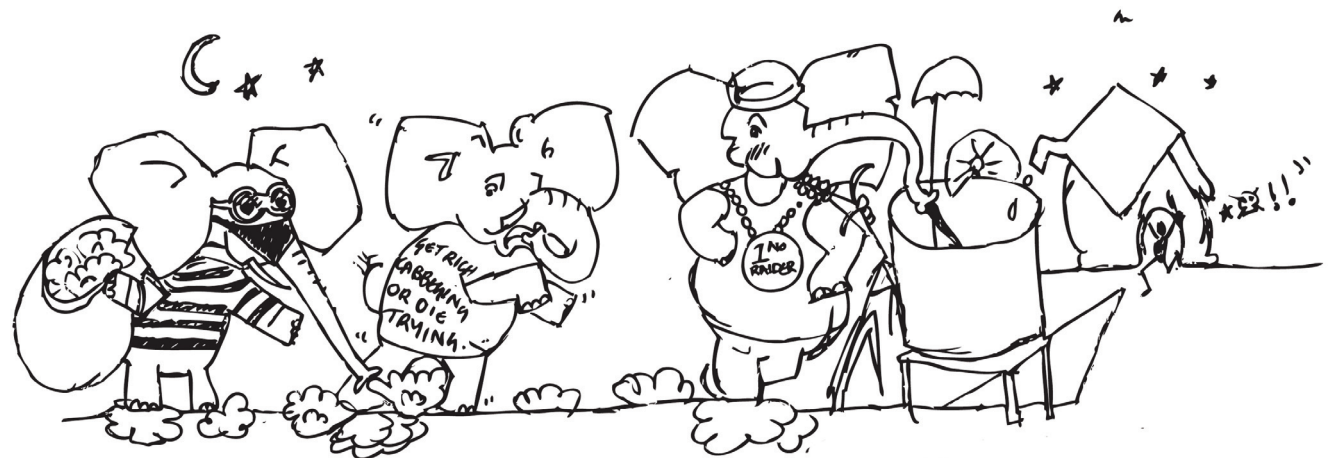
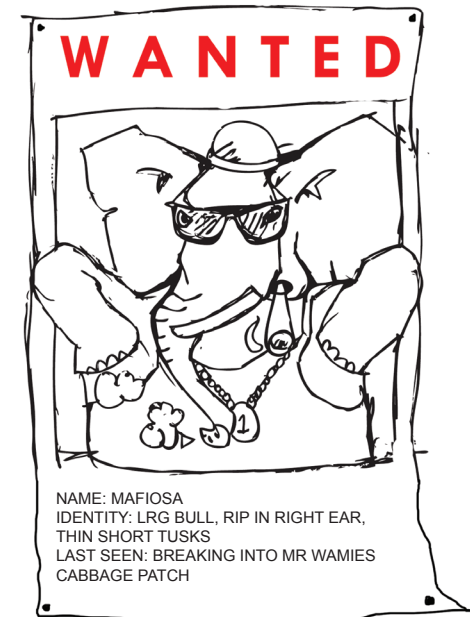
# FENCES ARE EFFECTIVE IF THEY ARE PROACTIVELY DEFENDED AGAINST FENCE BREAKING ELEPHANTS

Not all elephants break fences. Fence breaking by elephant depends on the risks involved. The higher the danger, the lower the number of elephants involved in fence breaking. Females with young will rarely take risks so in almost all circumstances it is only male elephants involved in breaking electrified fences. As the risks to elephants involved in breaking electrified fences increase, then the number of elephants willing to challenge the fence will decrease until it is just a few male elephants that are still willing to accept the risks. The risks to elephants that attempt to break electrified fences increase with higher voltage and enforcement. Enforcement is where the boundary represented by a fence is actively defended by people so that elephants associate breaking a fence with the risk of being injured or killed. This can be achieved by scaring elephants away before they even reach a fence using loud noise makers and bright spotlights. If this isn't effective then the wildlife authorities may need to attempt more drastic intervention such

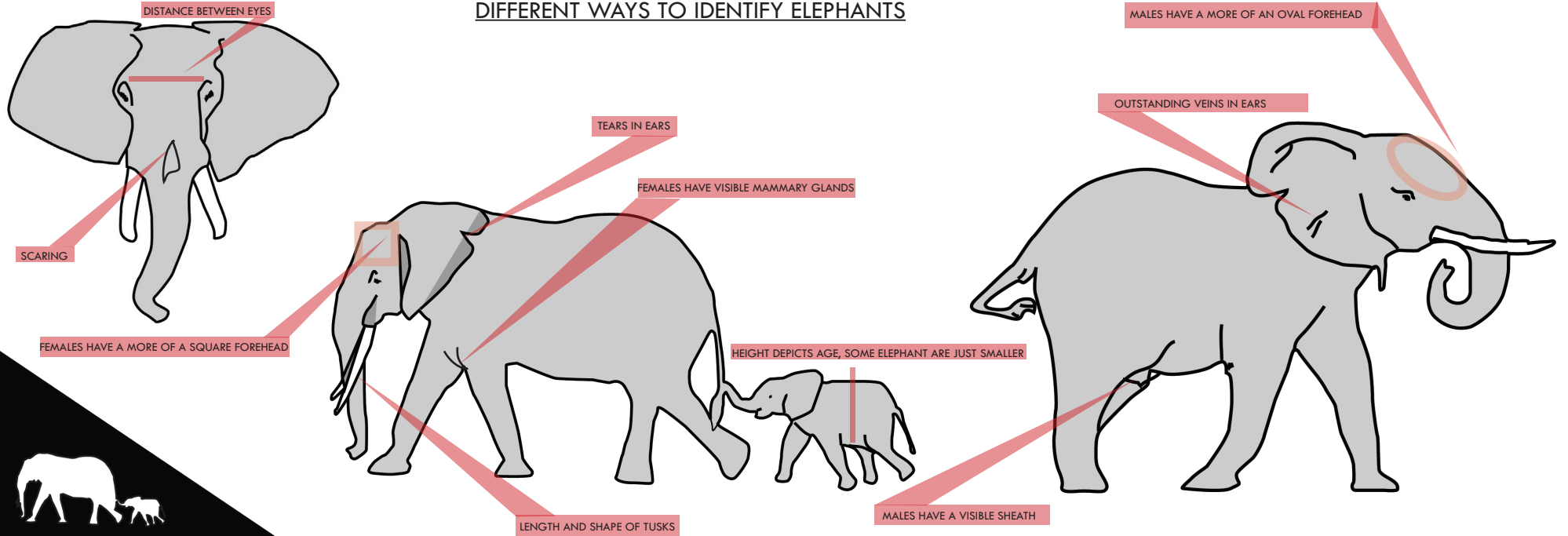
as removing a consistently problematic individual.

Some male elephants are willing to take higher risks and are better at breaking electrified fences than others. It is important to identify and monitor these individual elephants as if they are managed then this can help the overall performance of the fence. No two elephants look exactly the same and they can be distinguished by a number of unique features. The best of these unique features is the pattern of veins, holes, tears and notches in the ears of an elephant. The shape and size of tusks can also be helpful in identifying individuals as well as any marks, lumps or

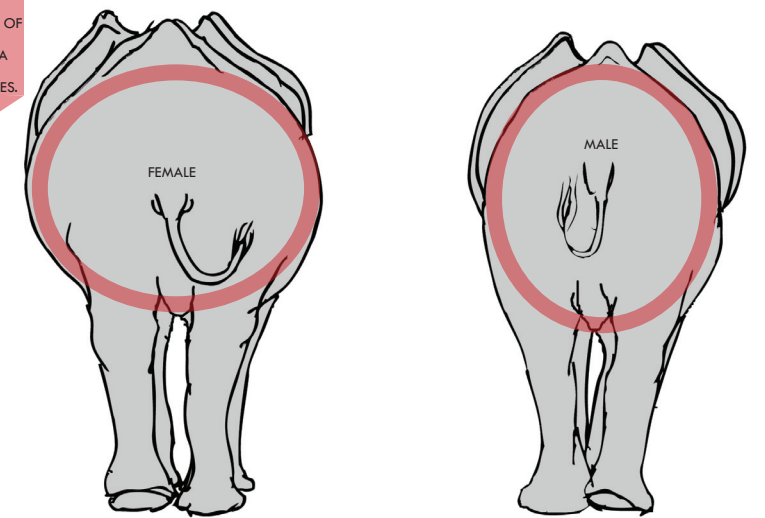
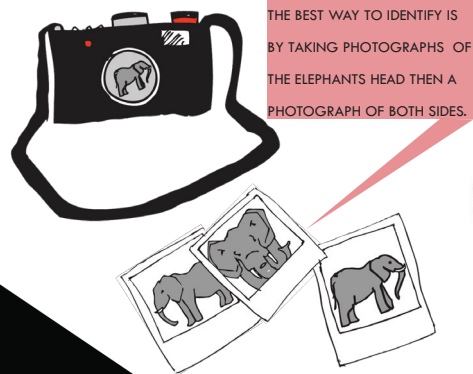
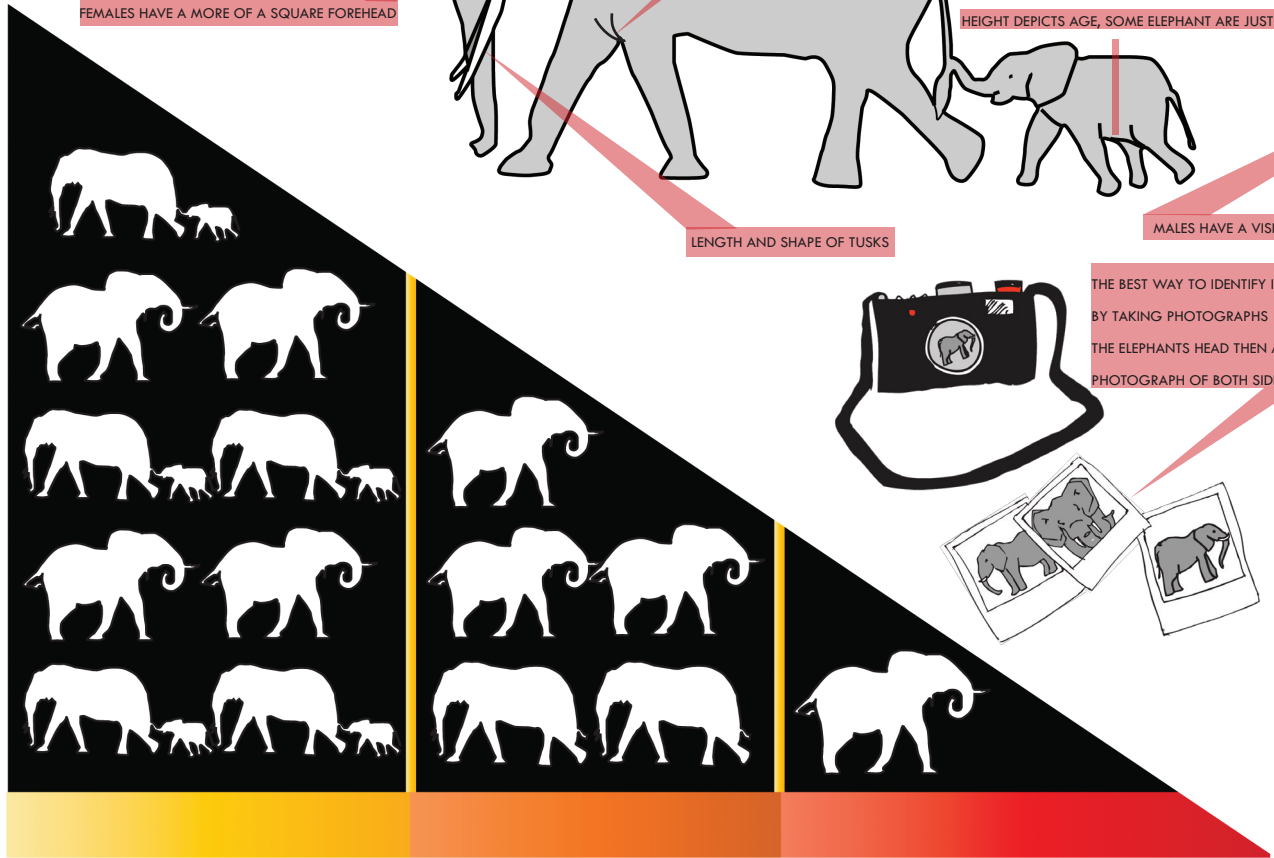
Abnormalities on the body. If possible a sketch of these unique features should be recorded in a note book with accompanying notes or better yet a photograph taken. The most useful photographs for the purpose of individual recognition are from either side, with each ear and tusk clear captured in the picture, and possibly one from the front. This information can be shared with the wildlife authorities to help them to make management decisions.



# DIFFERENT WAYS TO IDENTIFY ELEPHANTS



NUMBER OF ELEPHANT CHALLENGING FENCE



RISK LOW MEDIUM HIGH

NUMBER OF ELEPHANTS INVOLVED IN BREAKING ALACTRIFIED FENCES DECREASES WITH INCREASING LEVELS OF RISK

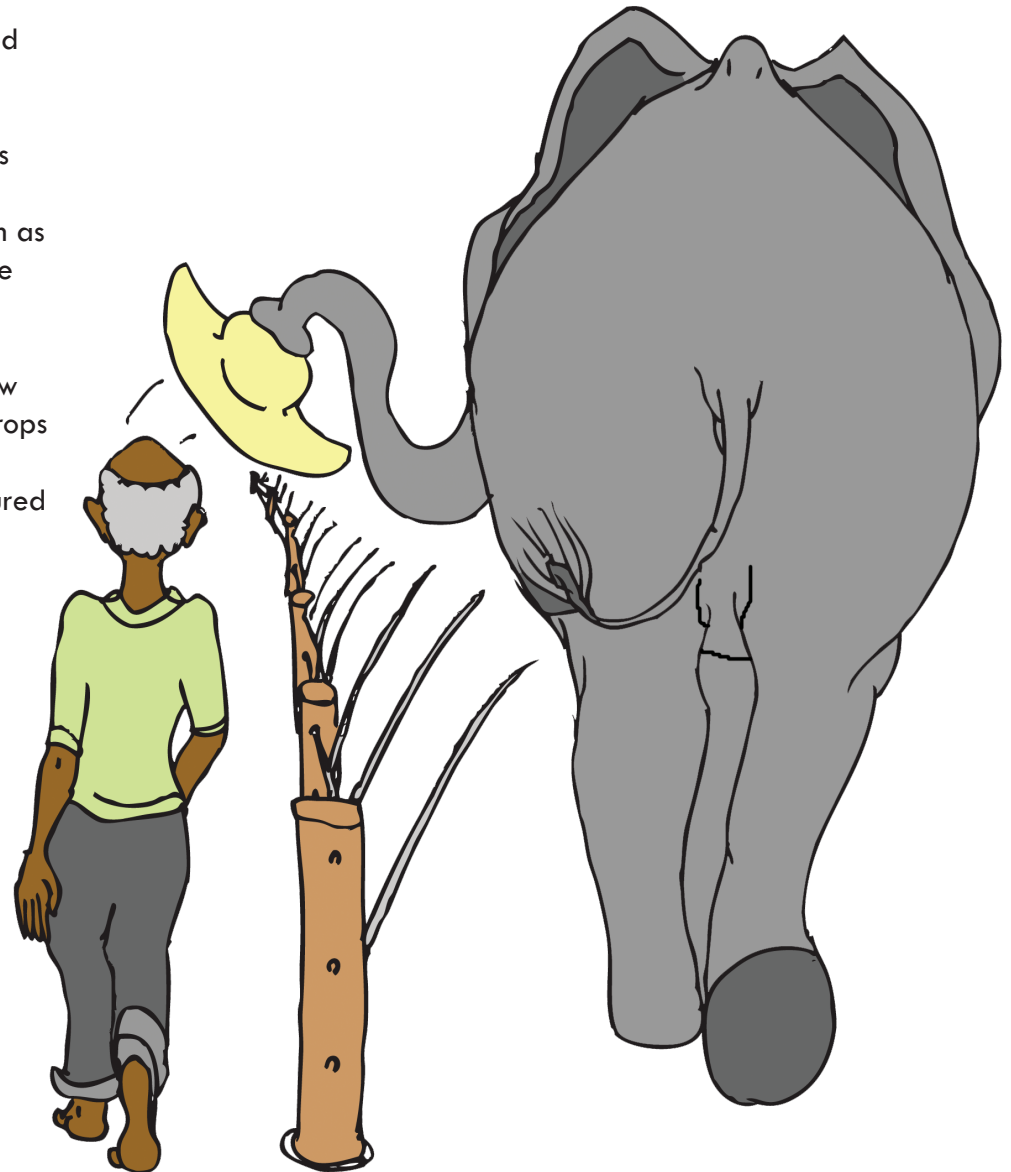
# GOOD FENCES MAKE GOOD NEIGHBOURS

Human-elephant conflict is an enormous challenge for farmers, conservationists and political leaders to deal with. Tools to mitigate human-elephant conflict are expensive and will always need to be maintained requiring enormous resources from a range of different stakeholders. In some cases it may be difficult to sustain the cost of tools to mitigate human-elephant conflict. Therefore wherever possible it is really important to try and prevent human-elephant conflict from occurring in the first place through proper land-use planning to reduce cultivation and prevent the fragmentation of the natural habitats where elephants live. Prevention is safer, simpler and probably cheaper in the long term than trying to cure the problem of human-elephant conflict.

Electrified fences are a potentially effective measure for reducing human-elephant conflict where it already occurs. However as we have described in this booklet electrified fences are only effective if they are properly supported

by the local community and all other stakeholders, are of the right design, have high voltage, are well maintained and there are systems in place for the management of persistent fence breaking elephants. If these conditions can't be met, then other methods for reducing human-elephant conflict, such as simple farm-based deterrents, may be more appropriate.

Where fences are effective, they allow farmers to grow and harvest their crops and ensure that elephants can live in peace without the threat of being injured or killed. Good fences make good neighbours.

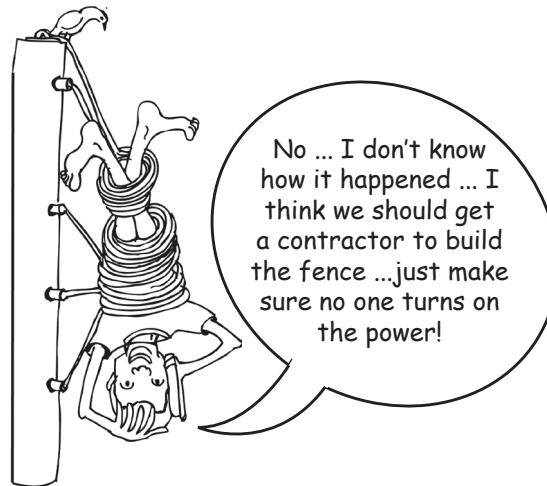


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## Building Capacity to Alleviate Human-Elephant Conflict in Northern Kenya DEFRA Darwin Initiative Grant 741

This project aims to enhance the conservation and management of Kenya's second largest elephant population (over 5,000 animals) and the ecosystem they inhabit through the implementation of an integrated and sustainable community based approach for alleviating human-elephant conflict (HEC).

The purpose of this project is to alleviate human-elephant conflict and promote tolerance of elephants in Laikipia District, Kenya.

### The project works to support local partners in the following activities:

- Research on the development of systems to provide early warning of human-elephant conflict using local knowledge, mobile phone ('push to-talk') technologies and GPS/GSM collars;
- Dissemination of information on elephant conservation and human-elephant conflict management in vulnerable communities and local conservation organisations and land managers;
- Assess the feasibility of establishing economic activities that promote sustainable livelihoods and reduce negative human-elephant conflict;
- Promote the establishment of strategy and revenue streams to support for long term human-elephant conflict management in Laikipia;
- Support local organisations in the development of the institutional capacity to manage the West Laikipia Elephant Fence.

The project's partners are:

**CETRAD**  
**Elephant Pepper Development Trust**  
**Kenya Wildlife Service**  
**Mpala Research Centre**  
**OI Pejeta Conservancy**  
**Rivercross Technologies**  
**Save the Elephants**  
**Symbiosis Trust**  
**The Laikipia Wildlife Forum**

[www.laikipiaelephantproject.org](http://www.laikipiaelephantproject.org)  
[www.geog.cam.ac.uk/research/projects/heccapacity](http://www.geog.cam.ac.uk/research/projects/heccapacity)



*The Symbiosis Trust*



THE LAIKIPIA WILDLIFE FORUM