CHILLI FENCES KEEP ELEPHANTS OUT OF CROPS!

HOW TO MAKE & SUPPORT CHILLI FENCES TANZANIA

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Conflict between people and elephants in Tanzania is a national issue, affecting both elephants and community's livelihood, thus impacting conservation efforts and Tanzania's National Strategy for Growth and Reduction of Poverty (NSGRP).

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WHY USE CHILLI FENCES?

Elephants like to eat crops. They can damage large areas of farms and cause losses of food and income that are difficult for farmers. Elephants can also be dangerous and elephants attracted to crops at night can kill or injure people.

Farmers have tried many things to keep elephants out of farms and scare them away from villages, including fires, loud noises, traps that can injure them, planting buffer crops for them, and fences made of spiny plants. But elephants are smart and tough and get used to most things that are tried, ignoring them and entering the crops anyway. Some have tried lines of beehives strung together and they do deter elephants, but beehive fences are a lot of work and expensive to set up and maintain around larger fields, they require heavy poles, and hives are difficult to fill with wild bees, at times. Sometimes elephants are speared, snared, shot with arrows, and poisoned, which is illegal and will contribute to making elephants disappear as part of Tanzania's heritage. Wounded elephants are also very dangerous to people.

Sisal rope fences covered in chilli oil have proven to work well in keeping elephants out of crops. They do not work all the time as some elephants have figured out how to walk into farms backwards or knock them down with branches, but over the last 6 years we have not had a single fence broken down. They work well enough and often enough to make them worth the cost of setting them up and maintaining them during the harvest season. And chilli fences can be paid for and managed by farmers themselves without the need to get support from the government or other groups. The fences are relatively inexpensive to build and maintain compared to many other tactics to reduce crop-raiding. Chilli-fences work day and night, so that farmers do not have to be up all night.

Here we show how farmers can set up chilli fences and maintain them during the harvest season. We also suggest ways that groups of farmers can establish community-based organizations that promote block farming and run a village savings and loan that can be used to buy needed materials and compensate members of the group if their crops are damaged. Chilli fence farmer groups have

been working well around Mikumi and Tarangire National Parks over the last few years. We believe the same or a similar approach can work well for other farmers.

Elephants have very sensitive noses and they do not like the smell of chilli powder. They cannot get used to it like other things that have been tried to keep them out of crops. For a chilli fence to work, however, it has to be set up properly and maintained during the right time of year when the crops are ripening and elephants are most likely to raid crops.

WHAT MATERIALS DO YOU NEED TO MAKE A FENCE?

Chilli fences are made of two to three strands of sisal string strung along poles surrounding a crop. The ropes have cloths (mutton cloths work well) or rags soaked in chilli oil hung between the two strands of rope in between the two nearest poles. Both the rags and the sisal rope are first soaked in spent engine oil that has had crushed dried chilli powder mixed into it.

The poles have to be thick enough to be able to hold the fences up and stay standing if they get bumped. They also need to be of good enough wood so that they do not rot in the rains. The poles can be reused each year if they are kept stored in a dry place.

Sisal rope, mutton cloths or rags, spent engine oil, and crushed chilli powder are the other things needed to make a chilli fence.

WHICH FIELDS SHOULD BE FENCED?

What fields do you want to protect? Some types of crops are more attractive to elephants than others and some are raided over a longer period of time than other varieties. Local farmers know best how vulnerable their crops are to elephant raiding. Farmers should work closely with their District Game Officers, Village Game Scouts, National Park Outreach Officers, and District Agricultural Extension Officers to determine the best plan for using chilli fences to protect crops.

Groups of farmers can work together and put their farms together in blocks so that amount of fence needed to protect them is much shorter around the border. Sometimes the fields bordering parks where elephants live or ones along paths where they travel are the fields that may benefit greatly from having chilli fences. If a chilli fence is around a field, an elephant will likely go to where it is more comfortable to find food, either back to the bush or to nearby fields that are not protected.

The type of crop that should be fenced depends upon what local elephants are commonly raiding and what the farmer's value most. Sometimes farmers grow chilli around the borders of their crops and the chilli fences to help further deter the elephants with chilli plant smell, as well as have a supply of chilli for fences or sale.

HOW MUCH FENCE MATERIAL DO YOU NEED?

Estimate how many poles and how much other materials you will need to properly fence the fields that you want to protect. Then you need to gather the materials and get a team of friends or group members to help you set up the fences. To fence one acre crop field, we require about 10 litres of used engine oil, 2.5 kg of ground chilli, 32 pieces of mutton clothes (2 x 1.5 ft), a bundle of sisal rope (5 kg), and 36 pieces of wooden poles about 3 m long and preferably at least 2 to 3 inches thick.

We estimate that is costs about $40 USD (86,000 Tanzania Shillings) in materials to fence about 7 acres of blocked fields, that is, fields that are planted adjacent to one another to make them as

rounded as possible, such as in a square, to make the border that needs to be fenced shorter.

WHEN SHOULD THE FENCES BE BUILT AROUND CROPS?

Determine when the fences should be built and taken down. Fences are best built around fields as the crops are ripening and getting near ready to harvest. This timing helps keep elephants from getting used to the fences. Of course, different farmers can put up fences at times that work best for them and their particular crops and the pattern of elephant crop raiding in their area. The fences should be taken down right after harvest.

SETTING UP THE CHILLI FENCES

Caution!!! Chilli powder can greatly irritate a person's eyes, nose, and throat so everyone needs to be very careful to wash their hands and equipment thoroughly during and afterwards building the fences. Many people cover their faces with cloths while working with the chilli powder.

STEP 1: PLACING AND SETTING THE POLES IN THE GROUND

How big should the poles be? **The poles should be between 5 and 10 cm (3 to 4 in) in diameter and at least 2.5 m tall (above the ground, remember some of the pole will be buried in the soil so best to get poles at least 3 m in length). The poles should be made of sufficiently strong wood (not rotten or brittle) to hold up the sisal ropes heavy with chilli oil and to not be easily broken if knocked. Living fence posts can also be used, that is, live poles that will root and resprout after being placed in the ground.**

How far apart should the poles be?
The poles should be placed about 7 to 10 m apart. Two poles around a field can be placed close to one another like a gate to allow easy entry for people.

<u>How deep should the poles be in the ground?</u> The poles need to be buried deep enough so that they sit firmly in the ground, after pressing soil around them (one can add a few rocks to the hole too to help secure the pole or peg the with stakes), and cannot be knocked over if cattle knock them (elephants can easily push over any pole if they choose to).

<u>How far from the crops should the fence be?</u>
The further the chilli fences are from the crops the more fence material will be required. Many farmers plant a buffer of chilli plants 5 to 10 m wide around their crops and then put the fence around that. A distance of at least 4 m from the actual crop will help to reduce the attraction of the crop to elephants.

STEP 2: CRUSHING THE CHILI POWDER AND MIXING IT WITH OIL

About 2.5 kg of chilli powder (dried chillis must be pounded into a coarse powder), roughly 12 to 15 handfuls, is mixed with 10 litres of spent engine oil. The mixture is thoroughly stirred with a stick.

STEP 3: THOROUGHLY SOAK THE SISAL STRING AND CLOTH IN THE CHILLI POWDER OIL

STEP 4: STRINGING THE OILED SISAL STRING ALONG POLES AT THE RIGHT HEIGHTS

The height of lower sisal is about 1.5 to 2 m above the ground and height of the upper sisal string is about 2.5 m above the ground. The fence must circle crop field completely leaving no entrance. If Elephants are believed to have calves, it is advised that additional third sisal string be tied 1 m above the ground to prevent young elephants from entering. We have heard of one fence knocked down by a concerned mother elephant retrieving her calf that went under a chilli fence. Some farmers place thorny acacia branches on the ground along the bottom of the fence to keep calves and other smaller animals out of the fields.

STEP 5: TYING THE OILED CLOTH BETWEEN THE SISAL STRINGS

Pieces of mutton cloths soaked with chilli oil are tied between the upper two sisal strings so that they are spread open between them. The cloths should be placed equal distance between two poles.

MAINTAINING THE CHILLI FENCES

STEP 6: DETERMINING A MAINTENANCE PLAN AND HOW LONG THE FENCES SHOULD REMAIN AND WHO WILL STORE THE POLES, SISAL STRINGS, AND CLOTHS AFTER THE HARVEST SEASON IS OVER

Over time, the chili fence smell that keeps the elephants out of fields will fade and not work as well as when you first set them up. It is important to refresh the chilli oil (use the same chilli-oil mixture as when the fences were set up) on the sisal strings and cloths, using a bucket of oil and a brush or cloth, on a regular schedule, usually around every 20 days if the weather has been dry and around every 7 days if it has been raining heavily. Of course, if heavy rains occur around harvest time then a reapplication of fresh oil is a good idea. This is bit of work to refresh a long line of fences, but it is very important. Some farmer CBOs hire or find a volunteer to be the main person that refreshes the chilli fences that are owned by the group.

The fences also need to be walked every day while they are up to make sure that no strings are broken or poles fallen over or knocked down by branches, cattle, or elephants!

After the harvest, the fences should be broken down right away and the poles stored in a dry place for the next season and the string and cloth also stored if it is decided it can be used again next year.

Photo by Randy J Braun

CHILLI BRICKS

Chilli powder can also be used to produce smoke at night to help keep elephants away from crops. Chilli bricks are made from adding water to a mixture of half cow dung and half ground chilli powder. The mixture is moulded to form bricks around 16 cm height and 20 cm diameter. The bricks are then in the sun to dry for 2 to 3 days. During the evening, the bricks can be set on fire to produce chili smoke around the chilli fences or along the routes the elephants use to raid crops.

COMMUNITY-BASED ORGANIZATIONS (CBOS) TO SUPPORT THE CHILLI FENCES & LIVELIHOODS

For farmers and farming communities to be able to use and pay for chilli fences each year, without having to rely on the assistance of government or other groups, they can establish a Community-Based Organization (CBO) that enables groups of farmers to more effectively access and manage resources. CBOs can set up Village Savings and Loans (VSL) that help farmers manage their financial resources, get loans, and have some insurance in case of hardships. The VSLs can be used to provide credit to members that will enable them to buy chilli fence materials and other agricultural products they require at times when cash availability is most difficult. Once a CBO is legally established with the government, the group can also access a range of other government services.

The government of Tanzania works with farmers through legally established Community Based Organization (CBO) that are registered with their District Council. To establish a CBO, at least ten members of the community should convene an official meeting, take meeting minutes with their signatures, and together develop a CBO Constitution stating clearly the location, objective, financial management, and other organization aspects to the District Council. In some cases, groups have requested support from District Community Development Officers or NGOs to help them develop constitutions and work through the process of CBO establishment.

One benefit of forming a CBO is that it can bring more members of a village community in contact with potentially useful organizations and government institutions. Many organization, such as local government, central government, NGOs, business people, banks, and other micro-finance organizations find it easier to work with registered CBOs. One Tanzanian NGO working with small- hold farmers is Mtandao wa Vikundi vya Wakulima Tanzania (MVIWATA), a farmer's organization that works with registered CBOs.

HOW A VILLAGE SAVING & LOAN (VSL) WORKS

Here we describe one model of a VSL approach that has been working well around Mikumi, Tanzania. Other than the requirements of CBO registration from the government and associated financial institutions, the CBOs can develop VSL approaches that work best for their communities and economics.

The basic principle of the Village Savings and Loan (VSL) system is that members of a self-selected group voluntarily form a Village Savings and Loan Association (VSLA) and save money, through purchasing shares. The savings are invested in a loan fund from which members can borrow, repaying with a service charge added. VSLAs are a form of SACCO (Accumulating Savings & Credit Association), a term for a small-scale, community-managed financial institution.

Purpose – The primary purpose of a VSLA is to provide simple savings and loan facilities, in a community that does not have access to formal financial services. Loans can also provide a form of self-insurance to members, supplemented by a social fund that provides small, but important, grants to members in distress. Associations are autonomous and self-managing.

Transparency – All transactions are carried out at meetings in front of all the members of the Association, to ensure transparency and accountability. To ensure that transactions do not take place outside the regular meetings, a lockable cash box is used, with three locks whose keys are held by three different and elected members, to prevent unauthorised cash movement and the risk that records might be tampered with.

Cycle – The cycle of savings and lending is time bound. At the end of agreed period (the cycle), the accumulated savings and services charge earnings are shared out amongst the members in the proportion to the amount that each has saved throughout the cycle. This is critical for resolving outstanding issues, transparency, and maintaining confidence of members. The cycle must not last for more than one year.

Passbooks – All members have an individual passbook. This is necessary to permit varying rates of savings and to track member loan liabilities, but there is no Association record-keeping ledger. Only the starting and closing balances of the Association social fund and the loan fund are recorded, mainly through memorisation, at each meeting.

Membership – VSLAs are made up of 10 to 30 members. This strikes a balance between being big enough to create a useful pool of capital and small enough to keep meetings manageable. The members are self-selected, usually from among the adult population. Membership is open to women and men, but at least three of the five Committee members elected are normally female in the case of mixed Associations. Members who hold public office should not be eligible for Committee positions.

Meetings – Associations meet at regular intervals, weekly, fortnightly or every four weeks during the first cycle, as the members agree. In future cycles, once VSLAs are independent, meetings may be reduced in the frequency

Structure & Positions – Associations are comprised of a General Assembly and a Management Committee. Members of the Management Committee are elected by the General Assembly. Each member of the General Assembly has one vote.

The Management Committee consists of five people: a Chairperson, Record-keeper, Box-keeper and two Money-counters. The Management Committee must be re-elected at the start of each cycle.

Constitution – Each Association develops a written constitution that is signed by every member. A Constitution performs two functions: first to provide a framework for governance, dispute resolution and disciplinary action and, secondly, to specify the conditions for share-purchase/savings, access to benefits payable from the social fund. Each member of the General Assembly may be assigned one or more rules to remember, on which they are likely to be questioned at meetings. This has the effect that after some months everyone knows the regulations by heart.

Associations agree on the length of the operating cycle and this is recorded in the constitution. A cycle should not be less than six months, or longer than a year.

Savings & Loans – All members of the Association save through Share-purchase. This is the core activity of the VSLA and regularity in saving is the key to mutual confidence and success. Shares are in between 1 to 5 shares can be purchased at each meeting.

The value of a share is set by the Association. It is set at a level that allows the poorest members reliably and regularly to buy at least one share per meeting. However, it should not be set so low than five shares will not satisfy the savings objectives of the majority. At the start of a new cycle, and with the agreement of all members of the Association, the value of a share can be increased or decreased.

An Association may allow a member who is experiencing financial difficulties to stop saving (buying shares), but only for a limited period. At certain times of the year it may be hard to save, or there may be no time to attend meetings. While it is important to ensure financial discipline and regular share-purchase, it is a reality that

rural incomes are unstable and variable. Even if an Association has suspended share-purchase/savings, loans must continue to be repaid and can continue to be disbursed.

Associations may provide a daily savings service to members through use of a slot-savings system. This system is optional. It makes savings easier because it allows the regular deposit of small amounts. This enables members to meet the minimum share-purchase/savings requirements.

Loans are made every four weeks. All members of the Association have the same right to borrow from the loan fund, which is comprised of the members' share purchase money, loan service charges and fines. The Association sets the length of the loan repayment term, which should never be more than six months and, during the first cycle, no longer than 12 weeks.

The size of a loan available to a member may not be more than three times the total value of all the shares they have bought. This ensures a fair distribution of capital and prevents the risk that any one member will be overwhelmed by too much credit.

The Association decides the percentage rate of the service charge for loans, and notes it in the CBO Constitution.

Service charges on loans are due at four-week intervals. The service charge is applied to the balance of the loan every four weeks until fully repaid. It must be paid when due, regardless of whether or not the member repays loan principal.

Loan principal repayments are made at four-week intervals. The period of loan repayment is agreed when the loan is taken, but the borrower may repay early, to avoid further service charges if (s)he wishes. When a borrower pays part of the balance due, the remaining balance is treated as a new loan, with the service charge percentage applied to the new amount and due at the end of the next four-week period.

<u>Social Fund</u> – Associations may wish to create a social fund. Associations agree on a regular, equal contribution by all the members to this fund. This provides small grants for specific purposes such as emergency assistance, funeral expenses and educational costs for orphans. The fund is not intended to grow,

but is set at a level that covers the minimum insurance needs of the Association's members.

Anyone needing a grant from the social fund makes the request publicly to the General Assembly. Approval rests with the General Assembly and may be immediately disbursed. The social fund is kept separate from the loan fund, and is not included in the end of cycle share-out.

<u>Share-out</u> – When the operating cycle comes to an end, the Association shares out the total value of its financial assets amongst the members (except for the social fund). As the end of the cycle approaches, no new loans are issued and all outstanding loans are repaid. This is mingled with any money remaining on hand and is shared out amongst the members in proportion to the number of each person's shares. After the share-out, members who do not want to stay in the Association may leave and new members may be invited to join.

At the end of the share-out meeting, members who plan to continue to the next cycle may consider making a lump-sum starting contribution to the loan fund in order to initiate lending activities with a useful amount of money on hand. If they decide to do this, all members should agree to contribute the same amount at the first meeting of the next cycle, which should take place immediately. The amount of the contribution on this one occasion is not limited to the normal five-share ceiling. Once the start-up shares are stamped into all passbooks, deposit shares will be bought as normal, subject to the normal five-share ceiling.

When a new cycle begins, members can agree to change the value of the standard share. The price of a share cannot be changed during the cycle.

CONSTITUTION DEVELOPMENT

A Constitution sets out rules to guide daily operation of a VSL and associated CBO. The CBO and VSL Constitution is a tool that assists members to resolve internal and external conflicts. All members must participate in developing an agreed upon constitution. A useful constitution may include the following information:

1: ASSOCIATION DETAILS

I. BASIC INFORMATION ON THE ASSOCIATION

- Name of the Association _____
- Address: _____
- The Association was formed on: _____
- Date of official registration: _____

II. OBJECTIVE OF THE ASSOCIATION

- The purpose of the Association, for example, an independent, profitable provider of financial services to the members
- The services the Association provides to its members in order to achieve this objective are:

  _____

  _____

III. RELATIONSHIP TO EXTERNAL SOURCES OF FINANCIAL SERVICES

- The Association may receive a grant or borrow money from financial institutions after implementing a successful one-year cycle. The following principles will be applied for grant or loan from financial institutions:
  - The Association must be the borrower and not individual members
  - The Association will not allow the lender access to information on individual loans
  - Members' savings cannot be used as collateral for an external loan
  - Any borrowing by the Association must not exceed the total value of all members' paid up shares
  - At the end of the cycle (share-out) grant or loan will be taken off from savings, following by sharing out the savings

IV. WHO MAY BE A MEMBER OF THE ASSOCIATION?

- Lower age limit _____
- Residence _____
- Other common circumstances _____

V. COMPOSITION OF THE MANAGEMENT COMMITTEE

- Chairperson
- Record-keeper
- Box-keeper
- 2 Money-counters

I. ELECTION PROCEDURES

- The maximum number of consecutive terms any one person may serve on the Management Committee is: _____
- Elections must be held at the beginning of each new cycle.
- The minimum number of members who must be present to hold an election is: _
- The election procedure will use a system that allows everyone's vote to be secret.
- The minimum number of people that must stand for each position is 2.

- A candidate for election to a post must be proposed for office by another member.

VII. REMOVAL OF OFFICERS FROM THEIR POSITION BETWEEN ELECTIONS

- Any member of the General Assembly can call for a vote of no confidence to a member of the Management Committee. If a majority of the members decide that the person should be removed from the Management Committee, the member must step down and another member be elected to the same position.

VIII. MEETINGS

- To mobilise savings the Association will meet every _____
- To disburse loans the Association will meet every four weeks.
- The cycle of meetings will continue for a maximum of 52 weeks before the Association shares out its assets.

IX. MEMBERS LEAVING THE ASSOCIATION

- If a member leaves the Association because they have no alternative, the Association will calculate how much they must be paid using the following principle:

  _____
  _____

- If a person leaves the Association before the end of the cycle for no reason, except their wish to leave, the Association will calculate how much they are paid using the following principle:

  _____
  _____

- If a person is expelled for failing to make regular share-purchase/savings deposits, the Association will calculate how much they are paid using the following principle:

  _____
  _____

- If a person is expelled for failing to repay a loan, the Association will calculate how much they are paid using the following principle:

  _____
  _____

X. EXPULSION FROM THE ASSOCIATION

- The reasons for which a person should be expelled from the Association are:

  _____
  _____

XI. DEATH OF A MEMBER

- If a member dies the Association will calculate how much money should be given to their heirs using the following principle:

  _____
  _____

XII. FINES

The following table lists the fines that can be charged for offences committed by members.

Offence	Amount
Non-attendance at a meeting for personal reasons not sanctioned by the Association	
Late to meetings	
Not remembering Association rules	
Loss of member number card	
Forgetting key	
Disruption of the proceedings	
Showing disrespect to a fellow member	
Not remembering decisions and activities of the preceding meeting	
Failure of a member of the Management Committee to perform their duties	

XIII. AMENDMENTS TO THE CONSTITUTION

- 2/3 of the members must agree before the constitution can be changed
- Anyone can propose an amendment to the Constitution

2: SERVICES OFFERED BY THE ASSOCIATION

I. SAVINGS

- Members may buy 1–5 shares in each meeting
- Members may contribute an equal agreed-upon amount at the start of every future cycle to speed up the growth of the loan portfolio. This can be more than 5 shares if all members agree

II. LENDING

- Those eligible to borrow are: _____ _____
- The maximum amount that anyone can borrow is three times the value of their shares
- The maximum length of loan term is 24 weeks, but only 12 weeks during the first cycle
- A member must repay a loan before (s)he can take another
- The service charge rate to be charged every four weeks (month) is: _____ %
- When a member does not repay a loan the following principle will apply: _____ _____
- A loan that is not repaid will be considered uncollectible after: _____
- If a member dies his/her loan need not be repaid.
- The highest priority for loans will be given for: _____
- The second highest priority for loans will be given for: _____
- The third highest priority for loans will be given for: _____

III. SOCIAL FUND

- The contribution to the social fund will be: _____
- The social fund contribution will be paid: _____
- The benefits for the death of a spouse will be: _____
- The benefits for the death of a child will be: _____
- The benefits for the death of a parent will be: _____
- The benefit to a member whose house or workplace is accidentally destroyed will be: _____
- The benefit to a member whose crops are destroyed by elephants, despite chilli fencing, will be: _____
- The benefit for sickness of a family member will be: _____

Note: Each Programme will develop a list of benefits from the social fund that most participants think are the most important. What is shown here is a suggested list that can be modified.

Name: _____ Signature: _____

INTRODUCING CHILLI FENCES TO FARMERS

Farmer to farmer exchanges have proven to be particularly effective for sharing knowledge about the use of chilli fences as a method to reduce crop raiding by elephants and setting up the CBOs and VSLs used to support them. Over the past two years a Mikumi Tembo-Pilipili team and a Tarangire team (5 women and 5 men on each team, all local farmers) have been making presentations on both to new farming communities in their area that experience conflicts with wildlife. Farmers are shown how to set up the fences and a demonstration fence is established to be monitored by local farmers. Follow-up visits can occur if desired with the communities that help with fence maintenance and the establishment of CBOs and VSLs.

In advance of the farmer to farmer exchanges, it is important to inform the national wildlife authorities (Wildlife Division, TANAPA, TAWIRI) and agricultural divisions, as well as the relevant District Councils, District Executive Directors (DED), District Game Offices, and Agricultural Extension Offices. Having their support and participation in the presentations is very important.