Chapter 6

Managing fire and other potential problems

Summary: Managing fire and other potential problems

- Problems can occur at all stages of an FMNR project, from misconceptions during its introduction through to issues faced when practising FMNR for the first time or managing fire and other threats. Anticipating these problems can help an FMNR facilitator prevent them before they occur.
- Training, support, good bylaws and communication are the pillars of FMNR problem solving; strong leadership is the foundation.
- Social problems related to FMNR can generally be solved by following these steps:
  1. Engage with the community and stakeholders to jointly understand the problem.
  2. Identify everyone's best interests.
  3. Brainstorm possible solutions with the community and all stakeholders involved.
  4. Guide the process of evaluating possible solutions.
  5. Provide support and guidance as communities choose the best solution(s).
  6. Agree on the way forward.
  7. Create a written agreement.
- Technical problems can be solved through:
  - experimentation and learning from different methods available or those already used;
  - seeking external advice from local experts or other FMNR practitioners;
  - careful observation of outcomes that result from different practices;
  - mentoring;
  - exchange visits; and
  - research.
- Preventing and managing fire is critical in most FMNR projects. This generally involves:
  - understanding the cause of fire and the damage it does;
  - committing the community to fire prevention; and
  - creating a community fire plan.

Resources

- The **FMNR Troubleshooting Guide** is a shorter, printable version of the information available in this chapter.
- **Sample fire management plans** from existing FMNR projects are available on the FMNR Manual website.
- Video: **Preventing Fires**

Based on many years of experience, and many thousands of conversations with people practising FMNR, we have identified several regularly occurring problems.

These can include:

- misconceptions about FMNR, which may prevent people from adopting the practice;
- problems establishing an FMNR plot and pruning for the first time; and
- problems related to managing threats to FMNR, such as competition for tree resources.

In general, all problems can be easily solved with some combination of training, support, bylaws and communication. Fire is a particular problem for FMNR, which requires greater management. We have dedicated a little more time to discussing how this can be approached later in the chapter.

Solving problems

The two types of problems most commonly encountered in FMNR are:

1. Technical problems involving difficulties managing trees, such as selection, pruning and tree management.
2. Social problems involving confusion, misunderstanding or conflict.

The seven-step resolution process described in Figure 1 can help to solve problems related to people in particular, or at least start you on the path towards a solution.

More technical problems may be solved through:

- experimentation and learning from different methods available or those already used;
- seeking external advice from local experts or other FMNR practitioners;
- careful observation of outcomes that result from different practices;
- mentoring;
- exchange visits; and
- research.

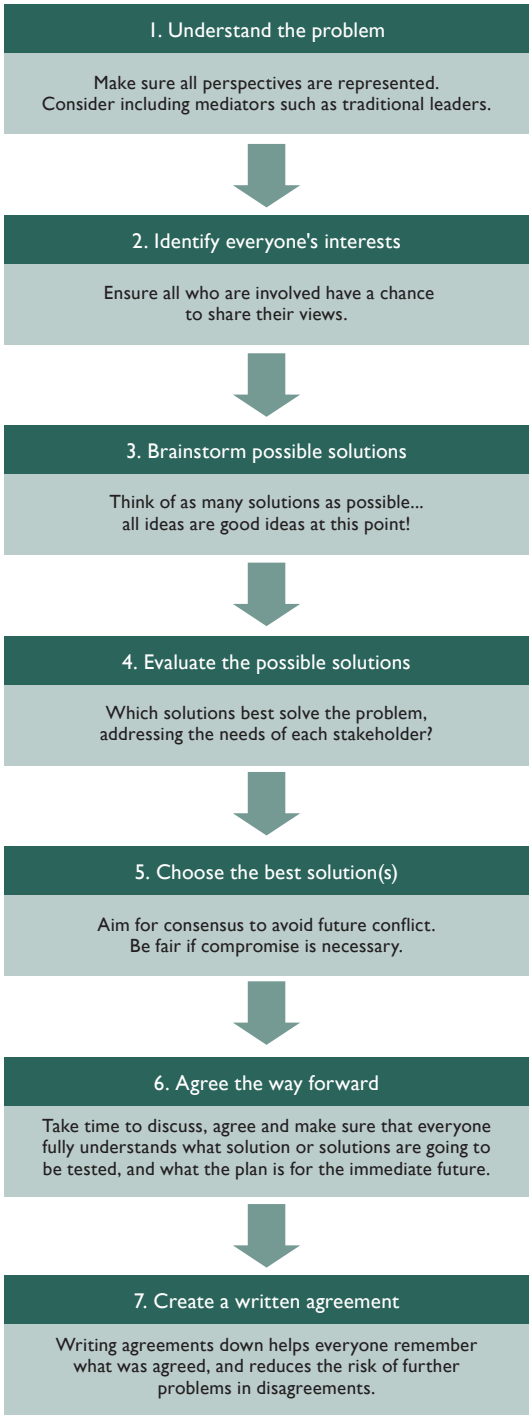

Figure 1 Seven steps for solving threats to FMNR adoption.

Problems and misconceptions when introducing FMNR

Anyone working hard for their living in degraded landscapes cannot afford to invest time, effort or land into any practice they are not confident will bring a good return on their investment.

Some of the most common concerns about FMNR are misconceptions. Before launching into the practice, land users must feel confident that it isn't going to make life harder, and that it is in their best interests to proceed. Ensuring people understand the reality of FMNR – and are empowered to make all decisions regarding what tree species to use, and how many to leave – helps to reduce concern and encourage experimentation.

In any context, but especially where there are fears about adopting FMNR, it is wise to encourage land users to start small and pilot the concept. This greatly reduces any perceived risks while providing first-hand learning experience in FMNR.

Other common misconceptions you might hear, and some suggested responses are outlined below:

"FMNR has a standard approach and technique"

Some people wrongly believe that FMNR is about following a set of rules – how to prune, what trees to keep, how to keep out livestock, etc. This is not the case.

FMNR practices vary greatly from region to region and even from land user to land user. It is this flexibility, and the freedom of land users to choose how they will implement FMNR, which allows them to take the risk of experimenting with FMNR for themselves. The emphasis of FMNR is on 'farmer managed' regeneration: the final form the practice takes is not determined by anyone except the land users themselves. While practitioners should follow the basic principles outlined in **Chapter 1**, no-one should be a slave to a particular way of doing FMNR.

Chapter 4 describes some of the wide variety of ways FMNR is practised in different contexts around the world.

"FMNR is so simple – it cannot be as good as tree planting"

FMNR almost sounds too good to be true: it's easy, low-cost and doesn't depend on external resources. This makes people wonder if FMNR can really be as effective as growing nursery-raised, exotic tree species and using expensive, high-tech solutions.

In fact, FMNR is generally much more effective, and requires fewer resources, than methods of reforestation based on nursery seedlings. This is especially the case in arid and semi-arid environments. This is because FMNR practised on native tree stumps takes advantage of a mature existing root system. When FMNR is practised on native seedlings, it has another advantage: the seedling is already adapted to the environment, and is strong and healthy enough to sprout with no help. Most of what the FMNR practitioner does is simply support nature to do what it does best. As with most things in FMNR, however, whether FMNR or tree planting is 'better' is not the right question. The right question is: What is appropriate and cost effective for the goals of the community managing the trees?

There are times when tree planting is required. If there are no tree stumps left in the landscape, tree planting may be the speediest and most appropriate way of re-establishing trees. Or, if the land user wants to grow a particular tree species that does not occur naturally in the area, or large numbers of a certain species need to be grown in rows, then tree planting may be the only option.

On the other hand, tree planting is usually very expensive compared to FMNR, and planted trees do not have as strong a chance of survival as regenerated trees. If restoration of the land as quickly and inexpensively as possible is the goal, then FMNR is the better path. When water is scarce, or resources are limited, FMNR is usually the best option, as long as living stumps or natural seedlings exist. FMNR also requires far less work than maintaining nurseries or nursery trees, so it is more practical for many communities.

In the 20-year period prior to the rediscovery of FMNR in Niger Republic, tens of millions of dollars were spent and some 60 million trees were planted. Officially, there was a 20 percent survival rate; after funding was withdrawn, there was no evidence of a tree-planting movement. In contrast, investment in FMNR in the 20-year

period following was very low (perhaps less than $10 million by all organisations), but it experienced a 100 percent survival rate. The movement continues to spread to this day.

There has been some resistance to FMNR from mainline disciplines of agriculture and forestry. In defence of FMNR, Dr Richard Stirzaker, Principal Research Scientist at CSIRO's Division of Land and Water, wrote:

> *FMNR is a counter-intuitive idea. Traditional agroforestry has always tried to specify the ultimate tree-crop combination and arrangement that maximises complementarity … I do not think that any research program, no matter how well funded, would have come up with the idea, because it expertly combines the subtleties of location specific tree selection with land user specific opportunities and constraints.*

A growing body of scientific evidence is validating the efficacy and benefits of FMNR. Our recommendation is to make FMNR the starting point of your work, then to remain open to other complementary technologies that meet additional needs.

"Local indigenous trees are not as valuable as exotic trees"

This misconception has various sources. In some cases, European perceptions and the introduction of so-called 'superior' exotic species have imbued communities with the perception that these trees are superior. In other cases, perhaps large-scale exotic tree planting programs have made an impression on mindsets. The characteristics of the exotic trees themselves, such as hardiness, suitability for coppicing, longevity (eg. eucalypts) and product value (eg. grafted mangoes), have in no small measure contributed to biased attitudes. Far too often, indigenous species are considered 'useless bush'. This completely ignores the fact that indigenous forests had long been the supermarket, pharmacy, hardware store, water and temperature regulator and soil builder of past generations, and many indigenous species possess outstanding properties of value to this day.

Some exotic trees might indeed be a great addition to the fields of communities you work with, but we encourage you to have a good look at what is available locally first. Remember to consider:

- what species are already regenerating?
- what characteristics of these indigenous trees might be valuable to the community?

Native trees tend to be adapted to the soil types and water availability of the area, and may be well adapted to resist local diseases and pests, so they usually require less care and fewer resources than exotics and thrive under local conditions.

If the community is considering planting introduced species instead, ensure it has very good reasons to do so. FMNR is far cheaper and more efficient than planting exotic trees.

"Trees grow slowly"

The belief that trees grow slowly tends to discourage people from starting FMNR, because they feel it's going to take many years to reap the benefits of their efforts. "Is it worth it?" they ask. For communities living on the edge of poverty, focused on where the next meal is coming from, it may seem a waste of time to invest in cultivating trees. In the early days of FMNR development, an incredulous land user asked, "Why should I do this? Perhaps my grandchildren will benefit, or perhaps my children, but I never will!"

While some species do grow slowly, others grow surprisingly quickly. Regenerated trees, in particular, benefit from mature root systems, which allow them to grow fast. Often there are tangible benefits even in the first year; one or two metres annual growth is very common.

"Trees will overshade crops and compete for water"

This is a deeply and widely held view, and one of the most common impediments to FMNR uptake on farmland. It is true that some trees compete with crops through heavy shading, or shallow roots that draw up moisture and nutrients normally available for crops. Other trees release chemicals into the ground that inhibits the growth of other species.

Generally, communities are well aware of any trees that compete heavily with crops, and will avoid regenerating them in their fields. This is why the people managing the trees should also be the ones who choose what species to leave on their land, how many trees to leave, and how often and how severely those trees are pruned. All these management factors have an impact on crop yields. For example, crops stop growing in the middle of the day because it is too hot, so a light shade can increase crop yields by about 50 to 70 percent. [1]

Some trees, such as *Faidherbia albida*, are extremely valuable on agricultural land. These trees fix nitrogen, and in the rainy season they shed their leaves, improving the soil and providing a light dappled shade, which protects crops from extreme temperatures without reducing harvests.

There are many other naturally occurring species with traits that benefit crop production. Often, but not always, the local community knows which are which. It's very important to encourage experimentation, as there is so much to be gained by trial and error. FMNR land users are great observers, who will modify their practices according to their experiences. Facilitating exchange visits where new FMNR practitioners can learn from others who are more experienced can be a very important way to increase tree knowledge and confidence. When discussing the known impacts of various local trees on crops, use photos and explain research findings in an understandable way.

Figure 2 The beneficial effect of this *Faidherbia albida* for crop growth can be clearly seen (2010). Photo: P. Weston

"Trees harbour birds that attack crops"

In the early days of FMNR promotion in Niger Republic, communities explained they had cut down the trees so grain-eating birds would have no place to nest and perch. They feared that by bringing trees back, bird damage to their crops would increase.

In the 30 years since then, average tree density in Niger has risen from four to 45 trees per hectare, with more than six million hectares of land regenerated. The authors are not aware of any reports of increased bird damage. This does not mean there has been no damage but, if significant damage had occurred, then almost certainly those land users would have cleared their trees again, especially if facing regular food shortages. Instead, in many situations, birds reported to reduce insect damage to crops have been seen in the regenerated trees.

The Niger case does not mean that bird damage can never happen, but it does demonstrate the importance of challenging assumptions which may not always be true. If a bird pest problem did arise as a result of FMNR, communities should analyse the situation, identify underlying causes and experiment to work out sustainable solutions at a level and in a way they feel comfortable with, until their concerns are resolved.

"More trees will bring more snakes to our area"

It may be true that increased tree cover will result in an increase in the snake population. Each community needs to weigh up the pros and cons of an increase in snakes, particularly if venomous snakes are endemic to the area. Will the benefits of FMNR outweigh the perceived and real disadvantages of an increased snake population?

The authors know of no examples where a community chose not to implement FMNR because of the possibility of an increased snake population. Incidentally, we do know of two cases where land users have happily accommodated snakes on their land. In Talensi, northern Ghana, community members were very proud of the fact they now had a resident python in their regenerating forest.

Figure 3 Boomslang snake found living in an FMNR tree in Chad. Photo: T. Rinaudo

[1] Bunch, R. 2012, "Oxfam's Savings for Change-Plus Agriculture Pilot Program in Mali: Final Report", Oxfam, Cowley, United Kingdom

The boomslang snake (pictured) is actually very venomous. Even so, the farmer whose land it resided on said, "We respect each other. I leave it alone and it leaves me alone!" The farmer valued the services rendered by the snake, such as control of pests including rodents, birds and insects.

Snakes play a very valuable ecological role in the environment, both providing pest control services and, in turn, becoming food for their own set of predators. This fact notwithstanding, we have also heard of at least one death from snake bite, so those promoting FMNR have a duty of care to warn of the dangers. To be forewarned means you can be forearmed. With knowledge in advance, land users can be prepared to take precautions such as avoiding thrusting their arm into bushes without a clear line of sight and, if possible, by wearing boots, long pants and gloves.

Tips for preventing problems

Remembering these points in any FMNR project may help to prevent problems before they begin.

- Include all stakeholders in the process of designing, implementing and monitoring FMNR work.
- Build on the wisdom and experience the community has with its land, and with any traditional practices related to FMNR.
- Build the capacity of women, youth, minority groups and others who have not traditionally held power in the community, so they can share equally in the decision-making processes and benefits of their work.
- Ensure the community retains the power to make and implement all decisions about where and how to practise FMNR.
- Encourage land users to experiment with FMNR and find what works best for their specific needs – don't prescribe 'one way' to practise it.
- Build the capacity of the community to manage both trees and problems that affect their work on FMNR.
- Support and work through farming committees, producer groups, women's groups, forestry, agricultural and environment departments, schools, churches and other faith communities, media, and other partners to share FMNR and help ensure the sustainability of your project.
- Build the capacity of the community to advocate for a policy environment that ensures they can profit from their tree management efforts.
- Build the capacity of the community to teach others how to practise and benefit from FMNR.
- Work with the community to link their FMNR practice to profitable markets for wood and non-wood products and services, to increase profitability and sustainability.
- FMNR projects in most cases should not provide tools or other inputs to communities. FMNR works best when successes depend on a community's own efforts and resources.[2]
- Follow up regularly to help solve problems until FMNR is working successfully and sustainably.

[2] One exception might be when FMNR is used as part of a food- or cash-for-work project during an emergency response. But here, too, making the project as locally sustainable as possible is the best option. The danger with providing tools is that they can encourage dependency and depress self-reliance and innovation. The spread of FMNR in Niger, one of the world's poorest countries, was not a result of providing tools.

Problems when practising FMNR

	Problem	Solution
When establishing FMNR	**Loss of access to resources (grass, land, firewood) in early stages of FMNR, when small trees are being protected before producing benefits.**	• Prepare ahead of time for this brief period of less productivity. Think through potential concerns and make plans for how to get through the early stages. • Consider using cut-and-carry to ensure animals have fodder, and perhaps practise FMNR on a smaller portion of land until the trees are mature enough to bring benefits, expanding FMNR practice as you go. In Senegal, alternative cooking fuels were provided to households in the short term, as the trees were growing. While this helped people accept FMNR, it is by no means necessary in all cases.
	The inherent dangers of working in the physical environment.	• Whenever working on trees and shrubs, clearing firebreaks or digging, be aware of poisonous scorpions, spiders and snakes, as well as potentially dangerous animals. • Always take care when using sharp tools, and watch children carefully around them. • Recognise that, while beneficial animals may return with the regenerated forest, less desirable animals may also return. Make a plan to ensure they do not become a problem, or that they are manageable.
While pruning	**Poor techniques, such as using dull tools or cutting downwards instead of upwards, damage tree bark or lead to disease or insect attack.**	• Always use sharp tools for pruning, and maintain their sharpness while in use. Less energy is expended when using sharp tools, and the practice of FMNR is easier. • Remember to cut with an upward instead of downward motion whenever possible to further reduce damage to tree bark.
	Regenerating stems are weak and prone to breakage due to overpruning, for example after leaving a single stem or limited side branches.	• Use FMNR champions to demonstrate and promote pruning practices that leave young trees strong enough to grow well. • Work with land users to clear up any concerns they have about trees overshading crops, or other concerns that lead them to overprune. • Demonstrate the differences in growth rate between severely and sustainably pruned trees.
	Pruning during times that are too wet or too dry causes excess stress for regenerating trees, exposing them to infection, while pruning during very busy seasons creates too much work for the land user.	• When possible, plan your pruning for a time of year when regenerating trees will have the best conditions. • On farmland, trees pruned just before the farming season will be protected from animals, as communities usually keep livestock away from their crops. This is also usually a slower season on the farm, allowing land users to avoid extra work during planting or harvest.

	Problem	Solution
While managing trees	**Livestock (or those caring for them) damage or destroy trees that are being regenerated.**	• Ensure that trees are pruned correctly to have the best chances of survival. • Restrict livestock access until trees are established through: - 'Social fencing' created by the community after developing and enforcing bylaws, which govern when and where livestock can graze. (Enforcement sometimes requires community scouts and fines per animal, but these are rarely needed.) - Temporarily ceasing all livestock access to regeneration areas, and using the cut-and-carry system of grass harvesting. - Grazing animals on a rotational basis, moving them from one designated area to another before damage occurs, while trees are regenerating on protected areas. This allows land users to benefit from having animals on the land while still protecting trees. - Allow young livestock (calves, lambs and kids) to graze in regenerating areas, as they are less likely to cause major damage. • If excluding animals is not practical, try other options, including tying thorny pruned branches around trees after pruning. The thorns make it harder for livestock to cause damage.
	External parties, and even community members, steal or destroy trees pruned by land users.	• Early in the process, ensure there is community-wide consultation and agreement on bylaws and consequences for infringements. • Consequences should be enforced fairly and consistently, but enforcement should also include additional education and discussion. It may be necessary for community members to act as scouts to make sure bylaws are respected. • Ensure neighbouring communities and nomadic groups are notified of any bylaws that have been set. Preferably include them in the process of bylaw development.
	Resistance or conflicting information from forestry staff or other government officials.	• Partner with forestry staff from the beginning of the project. Include them in trainings and visits to successful sites, where communities have managed forest resources sustainably and where the practice of FMNR has resulted in a net gain of forest resources. Sharing information can help to build positive relationships and secure powerful allies when working towards policy changes.

Case study

Conflict resolution through sustainable tree management in Ghana

Figure 4 A pastoralist tending his cattle. Ghana (2015). Photo: F. Gumah

In Ghana, nomadic herders and farmers are working together to reach common goals.

As part of a World Vision FMNR project in Bawku West District, over 300 traditional leaders, herders and farmers came together for training on conflict management and resolution strategies. Participants were equipped to deal with conflicts around natural resources management, and to promote peaceful co-existence between farmers and herders. Activities such as role playing helped illustrate the benefits of tolerance and working together for common goals.

Abu, a 57-year-old Fulani herdsman, describes how FMNR has *"promoted peaceful co-existence between we the Fulani herdsmen around Akara and the people of the Akara area in Garu".*

"Previously we had to travel long distances in search of fodder for our cattle. This caused daily disputes between us and farmers … as a result of our cattle destroying crops as we search for fodder. Humiliation was like our daily food, as insults kept pouring on us which sometimes led to a fight with the farmers.

"But now, we are glad to have abundance of fodder at [FMNR field] Akarateshie Natinga, where we can easily move our cattle to graze without destroying crops from people's farms and picking up quarrels with them."

Bringing people of various ethnic groups and interests together for dialogue has become a springboard for many other development outcomes. In exchange for grazing land, the Fulani are supporting other community members by taking care of their animals as well. This initiative from the Fulani has encouraged other community members to involve them fully in working in and using FMNR fields. As a result, their futures are looking brighter.

"Incomes from the sales of our cows have also increased tremendously, as the presence of the fodder has help[ed] to increase the sizes of the animals we now take to the market to sell," says Abu.

"All I can say to this person called World Vision is thank you and God bless you for touching the lives of my family and I indirectly with your project."

Fire management

It is very difficult to practise FMNR if your fields are regularly burnt. Fires can destroy trees, fodder, crops, property and lives, so any community practising FMNR needs to plan ahead to minimise fire damage.

There may be occasions for judicious use of fire, such as to create strategic firebreaks or to reduce hazardous fuel loads or biomass to protect lives and infrastructure from destructive fires. However, routine burning of fields is harmful to soils, trees and the uptake of FMNR. When taking stock of and engaging the community (**Chapter 3** and **Chapter 5**), it's important to understand attitudes towards fire and its uses in the environment. In many communities, annual burning is seen as a normal, acceptable occurrence – it has always been that way, and it is rare for anybody to question the validity of this practice. In many other cases, people recognise that burning is a serious issue, but they have resigned themselves to accepting it because it is an intractable problem and trying to stop it will likely lead to conflict and frustration.

For FMNR success, the community must:

1. Understand the cause of fire and the damage it does.
2. Commit to fire prevention.
3. Create a community fire plan.

Step 1. Understand the cause of fire and the damage it does

Unintentional fires may result from:

- accidents – such as overturned kitchen fires, engine sparks, children playing with fire, etc;
- carelessness – such as burning cigarettes tossed away, honey collectors not being careful with bee smokers, etc; and
- lightning strikes.

Fire may be used intentionally for a number of reasons:

- **To trap rodents and other wildlife for bush meat**
  Some communities use fire to lure out pests and wildlife for food. Alternatively, rats and other rodents can be managed using ecological approaches such as **trap barrier systems**.
- **To encourage grass growth**
  Many communities still believe that burning fields is an effective way to encourage new grass growth on grazing land, or to clear 'rubbish' from fields. Grass may quickly regrow after fire, but it is short-lived: the soil loses fertility and the ability to hold water, so future crops or grass will not grow as well. Also, only fire-tolerant species are likely to grow back if the field is burnt year after year, and these species of grass are harder for animals to digest. The best grass species might eventually be killed off completely, so that only inferior grass species remain. Burning also destroys trees and damages the habitat of useful plants, animals and insects, so these take longer to return to the area.
- **To cause harm to other people or their FMNR work**
  It's a sad fact that people sometimes use fire as a weapon or to purposely destroy others' crops or trees.

When illustrating the damage of fire to communities, it may be helpful to emphasise that regenerating trees can also increase the grass available for animals, and it does this without the destructive side effects of fire. It may be helpful to demonstrate the monetary and yield benefits of not burning fields through FMNR demonstrations and field trials, or to facilitate land user forums and exchange visits to promote the benefits of not burning. The following case study can be used for this purpose.

Case study

Farmers are putting an end to forced burnings in Uganda – and reaping the rewards

Dratele, a proud land user, leads his herd to graze in this carefully tended FMNR plot in Offaka, Uganda.

Now thick with trees, the land was cleared and burnt annually before FMNR was introduced in 2010. Back then, finding fodder was a struggle.

These days, the land user not only has an adequate fodder supply for his animals, but harvests his own firewood and doesn't worry about his livestock wandering into other people's fields – a regular problem in the past. In just four years, thanks to better pastures and fodder, his herd grew dramatically: from 15 goats and five cows in 2010 to 65 goats and 17 cows in 2014.

Proceeds from animal, wood and honey sales have enabled him to pay secondary school fees for his children and to build a new house.

Figure 5 Open woodland restored from wasteland, now managed through FMNR. Offaka, Uganda. Photo: T. Rinaudo

Step 2. Commit to fire prevention

Once fire is recognised as a problem, the next step is to convince the community that it's their problem – not the government's, not the neighbouring village's and not God's. Nothing will change unless communities accept responsibility for fire management themselves. If a community can believe that it is within their means and power to change something as damaging as fire, then more than likely they will succeed. But if they don't believe it, no amount of incentives, training or encouragement will change the situation.

Additional steps include:

- Stakeholder creation of bylaws addressing fire management issues (for example, with community, local government, traditional and religious leaders, and youth).
- Engagement with local fire authorities, if they exist. They can help reduce the risk of fire, stop fires burning and provide valuable experience and knowledge.
- Creation and execution of a community-owned fire plan (see Step 3 on page 99).

Case study

Tony Rinaudo on changing mindsets about fire

As people embrace FMNR on their own, they become passionate about stopping fires.

In Ghana's Tongo Beo community, Biliya-mnamaltenga told me about a recent fire in his community.

"I just came out from my bath wrapped in a towel and saw a fire on the hill. I ran out as I was and started fighting it. Seeing my concern, my people followed me and put the fire out."

This is from a community that witnessed the burning of the whole landscape every year, which they believed was beyond their control to stop, as fires were always lit by 'that neighbouring village'. In 2009, I was told *"it would be impossible to stop bushfires occurring, because they were such an entrenched part of the culture and there were no mechanisms to stop it, even if communities wanted to."*

The cornerstone question I asked of the community was, *"What future do you want for your children?"*

"You have a choice," I said. *"You can continue with things as they are (since no other entity is powerful enough or rich enough to intervene), or you can do something about it yourself."*

Fortunately, these Ghanaian communities rose to the challenge, and decided that they would do something about 'their' problem. Once they made this decision, others rallied to support them.

- World Vision provided awareness creation in schools and communities.
- The district commissioner offered any community that remained 'fire-free' for three years a prize: a development project of the community's choice, such as electricity, water, a school or clinic.
- The local fire brigade provided professional training.
- World Vision also helped train over 100 fire-fighting volunteers, providing t-shirts and equipment.

If there was any doubt on the part of the communities, it was dispelled within one season.

"Our cattle used to wander far in search of grass," they told me. *"They were always being stolen and they were so skinny the traders wouldn't even look at them. Now they only walk a few hundred metres from the village. They are fat and sleek and we get a good price."*

In 2012, an evaluation of FMNR activities in the area found:

- 2,760 farmers and fire stewards had adopted FMNR in 37 communities;
- about 1,000 hectares were under FMNR forest cover, with an average tree density of 2,334 trees per hectare;
- 600 hectares of farmland were under FMNR management, with an average tree density of 57 trees per hectare; and
- 90 percent of FMNR communities reported zero record of bushfires over five years.

In Senegal, farmers who had visited FMNR farmers in Niger and learnt from them were leading by example and had stopped burning.

"The Nigeriens told us that they stopped burning when they realised that this organic matter was fertiliser and burning it was a waste," they said.

In East Sumba, Indonesia, the whole island burns every year – partly because of negligence (throwing burning cigarette butts in the grass, etc), but mainly in order to stimulate 'green grass growth'. One chief created a law that anybody who lit a bushfire would be fined the equivalent of two years' wages. After setting aside a 'no burn' area, the community found there was more grass available than if it were burned.

Convincing and equipping land users and communities to take responsibility for fire management is difficult – but should not be impossible. Often, burning has become a social norm and nobody questions it; nobody thinks they have the power to stop it and nobody thinks that there is a better alternative.

It often takes an outsider, a change agent, to be a catalyst for positive change.

Step 3. Create a community fire plan

A community fire plan includes:

- an introduction to the dangers and negative impacts of fire, why it's important to take action to prevent fires in the first place, and how to control them quickly when they do occur;
- a vision of what fewer fires and an increased capability to stop fires means for the community;
- bylaws clearly outlining what is and isn't permissible, and a fines system for infringements;
- partnerships with organisations such as local fire services for community volunteer training;
- roles and responsibilities for preventing, spotting and fighting fires; and
- when, where, how and what action needs to be taken.

Agreed actions to be taken to reduce fire risks may include:

- replacing slash-and-burn practices with 'slash and mulch', and stopping all other unnecessary burning in fields or forests;
- identifying likely sources of sparks and flame that need to be monitored;
- clearing fire breaks – narrow strips of land without grass or trees – so, if there is a fire, it stops there;
- reducing fuel for wildfires through regular pruning of trees, heavy targeted grazing and/or harvesting and removing dry grass;
- enlisting the help of children and educating them and others about the dangers of starting even small fires, which can get out of control, and about the causes of accidental fires;
- creating, equipping and empowering community-level fire volunteers; and
- establishing any necessary early warning systems. For example, a warning bell might be installed and rung by the first person who sees a fire. On high fire-danger days, scouts can be appointed to keep watch over an area.

Implementing the fire plan requires ensuring that each of the actions are taken, and that all agreements are respected and enforced, to reduce the risk of fire destroying the work of those practising FMNR. As with other FMNR activities, this is best done in collaboration with FMNR and other community groups and committees, as well as forestry, agriculture and environment departments where possible. The fire plan should also involve all stakeholders in raising awareness, decision-making and follow-up.

An example community fire plan can be seen in the **assisted regeneration project of Humbo, Ethiopia**.