

FMNR

Farmer Managed Natural Regeneration



World Vision



UP FROM THE ASHES TIMOR-LESTE TECHNICAL NOTES

Tony Rinaudo



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Introduction

In Greek mythology, a phoenix is a long-lived bird that is cyclically regenerated or reborn. Associated with the sun, a phoenix obtains new life by arising from the ashes of its predecessor.



Like the phoenix, Aileu is literally being re-born from the ashes of continuous slash and burn agriculture and indiscriminate burning and wood harvesting from the forest. After only one year, the World Vision Building Resilience to a Changing Climate and Environment (BRACCE) project is already having a significant positive impact on

forest and soil restoration, and through these actions, will ultimately positively impact livelihoods and wellbeing of whole communities.

Before the inception of the project, land was subject to continuous grazing and tree cutting and regular burning leaving only stunted, re-sprouting Eucalyptus tree stumps. Under this (mis-)management regime, soils were left bare for much of the year and rapidly lost their fertility, becoming susceptible to erosion and landslides. After just one year, farmers groups practicing FMNR are seeing dramatic increases in forest cover, biodiversity and soil fertility and reduced soil erosion.

Further, World Vision Timor Leste has set a goal of becoming the regional centre of FMNR excellence. This is a great encouragement in that FMNR was only introduced in 2011 and World Vision Timor Leste has been convinced by the encouraging results to date to develop FMNR expertise and to see it implemented in all their operational areas.

During my most recent visit to E. Timor (November, 2013), I spoke with the World Vision National Director, Samaresh Nayak and had the privilege of revisiting community members in Aileu district. Mr. Nayak spoke of the Aileu re-greening phenomenon in terms of the restoration of hope. In other words, along with the very dramatic positive changes occurring in the environment, he is witnessing a parallel positive change in the spirit and outlook of the affected communities.

Indiscriminate bush burning has become a thing of the past, barren slopes are sprouting a thick covering of grass and regenerating trees and along with that, people's hopes and dreams for a better future are being revived. Encouraged by the undeniable transformation they see all about them, they now feel that there is hope for the future and that the work they do today does make a difference for a better tomorrow.

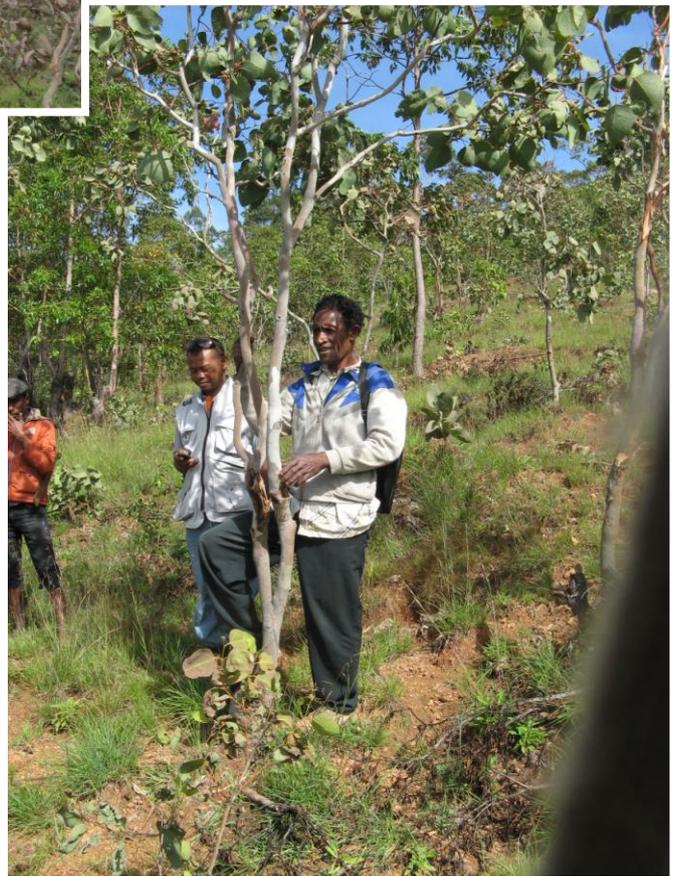
Encouraged by the positive impact of FMNR, World Vision E. Timor hosted an FMNR workshop for two additional districts in order to further spread the work through regular programming. In addition, WV E. Timor is preparing to host a major national FMNR conference in April, 2014. Government and NGO delegates will be invited to attend and speakers from Sri Lanka, Australia and the World Agroforestry Centre will be amongst the presenters. It is hoped that this event will kick start a greening movement that will transform the environment on a national scale.

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Above Typical barren hillside in Aileu, May 2011.

Right Vigorous re-growth is already evident in April 2013.



Bobonaro

Observations, learnings and recommendations

Climate change and environmental degradation

Farmers have observed that rains are coming later and are more intense when they do come; there are higher temperatures and winds are stronger. These changes have had negative impacts on crop yields and even contributed to livestock deaths.

These climate change trends are predicted to continue into the future. Climate change will increase the negative impact of normal fluctuations caused by the El Niño Southern Oscillation Index (ENSO) effect. ENSO can result in up to a 20% higher than average precipitation during La Niña years and 20% lower than average precipitation during El Niño years.

Having a healthy and functioning environment is a critical element in building resilience to climate change. Healthy, functioning environments will not stop climate change (though they will help mitigate against it) but they will reduce its negative impact and thereby increase peoples' resilience. Yet, at the very time when maximum adaptive capacity is needed, the environment has been drastically compromised. Forests have been cleared and in many subdistricts, natural forests no longer exist at all; annual burning destroys vegetation, organic matter and soil structure and in the long term, results in infertile soils and land degradation; Annual burning and continuous grazing prevents natural regeneration of trees and opens the door for invasive weeds to dominate large areas of grazing, forest and farmland. This effectively reduces the resource base from which people can gain their livelihoods as otherwise productive land produces nothing but weeds. Weed infestation competes with grasses and crops, reducing fodder availability and crop yields, and weeds retard forest regeneration.

Environmental degradation fuels erosion and landslides, contributes to flooding in the wet season and rapid drying out of the soil in the dry season along with reduced ground water recharge and spring and stream flow. Biodiversity is lost, productivity declines and ultimately income generating opportunities diminish.

Environmental degradation is a significant contributor to poverty in Bobonaro and exacerbates the negative impact of climate change.

It is critically important that farmers adapt their agricultural systems and landscape management methods to cope with these changes. (See [Annex I: Slash and Mulch Agriculture](#))

Coping mechanisms may include:

- Growing mulch crops such as Tithonia (Mexican sunflower) and using organic matter from weeds such as Chromolaena (Siam Weed) and tree leaves. ([See Annex II: Weeds: nuisance or valuable resource?](#))
- Building small dams, check dams and terracing on slopes to capture and store water. ([See Annex III: Case Study Abrha Weastsbha](#))
- Composting and mulching to increase soil organic matter and hence capacity of soils to absorb and retain moisture.
- Irrigation
- Raised bed farming to minimize water logging of crops. (See [Annex IV: Raised Bed Farming](#))

- Reforest hills and grazing lands through FMNR and by planting a diverse mix of species including indigenous, high value timber trees (teak, mahogany, candlenut, sandalwood, acacia mangium..), fruit and spice trees (mango, jack fruit, cinnamon...) and fodder trees (leucaena, sesbania, glyricidia, gamal, calliandra and Tephrosia candida).
- Increase biodiversity by growing a range of annual and perennial crops, tree crops, root and grain crops and by raising several species of livestock.
- Adopt agro forestry to provide multiple goods (wood, fodder, fruit) and services (shade to reduce soil temperatures and protect crops and livestock from extreme temperatures, wind protection, reduced evaporation, increase soil fertility, reduce erosion and run off..).

Poor market access

The areas visited (Bour sub village, Lolotoi Deudet, Balibo) are extremely remote with very poor road access and very high transport costs. Additionally, in Lolotoi, those with vehicles charge such exorbitant prices (\$300 each way for the truck) that farmers have no choice but to sell their produce – whether coffee, maize or timber - at rock bottom prices directly to the transporters. Farmers have the capacity to grow much more than they currently do, and there is certainly the potential to grow a diverse range of crops and trees, but there is no incentive when the bulk of the profits go to transporters.

Fair marketing arrangements could greatly improve living standards in Bobonaro district and by linking marketing/transport services to adoption of sustainable production methods such as agroforestry, replacing burning with mulching etc, adoption of climate change resilience building activities would increase. Examples of successful market linkage projects include vegetable growers contracts with Kmanek in Alieu district and Mango growers contracts with fruit and processing companies in Ethiopia.

Market Chain Development in Alieu, Timor Leste and Homosha, Ethiopia

A long running initiative of USAID links with World Vision initiated farmer extension groups which grow vegetables for marketing through the Kmanek supermarket in Dili. The scheme involves the Kmanek supermarket making weekly visits to pre-identified farmer groups to provide vegetable seeds for propagation, and for collection of the crop for transport to their supermarket in Dili. World Vision extensionists provide technical support and small material inputs, such as shade cloth for vegetable propagation houses and train the groups in good nursery¹.

The article "[More Bang for Your Buck](#)" is about how middlemen in Homosha, Ethiopia were bypassed by training farmers, forming cooperatives and partnering with external businesses to transport and process produce. Farmers realized a 300% price increase for their produce!

There are three relatively new World Vision Local Value Chain Development (LVCD) projects in Timor Leste - one in Aillieu, one in Baucau and one in Bobanaro. All of the LVCD materials, including Handbook etc, are available here: <http://lvcd.wordpress.com> and the contact person in the Timor Leste office is Lerina Sinaga.

¹<http://timor-leste.usembassy.gov/news-events/embassy-news/farm-families-take-control-of-horticulture-assets-may-29-2012.html>



Left: Truck bogged on unsealed road. Right: Agapito Martins, Bour sub-village with planks worth \$5.00 each in Maliana. He pays \$1.00 per plank to have them hand carried to Maliana.

Deforestation, Tree planting and Farmer Managed Natural Regeneration.

Agriculture is practiced on very steep slopes with no terracing and annual burning and slash and burn agriculture contribute to declining soil organic matter and fertility, landslides and erosion. Given the rapidly rising population and the lack of virgin forests for creating new farms from, these practices are not sustainable, and if continued, in the long term will result in such severe degradation that the land will become unusable and will be abandoned. Climate change will accelerate the degradation which is already in train.



Above Left: Very steep hillsides are burnt and cultivated every year and there is no terracing.

Above Right: continuous burning and cultivation destroys soil organic matter and structure. These farming methods in combination with deforestation and high rainfall intensity result in severe erosion and landslides.



The owner of this forest plantation plot has cleared existing indigenous 'low value trees' to plant higher value teak, mahogany and candlenut.

Rather than clearing existing trees in order to plant high value ones, it would be better to intensively manage existing trees through pruning and thinning (FMNR), and to plant trees on already deforested land.

Unlike Alieu where Eucalyptus tree stumps are found on most sites, in Bobonaro district there are very few sites with no living tree stumps at all, many sites seemed to have no, or very few tree stumps or, remnant forest is restricted to deep gullies. It is possible that if land management practices change (i.e. annual burning or grass ceases, and livestock are prevented from entering a reforestation area), natural regeneration will occur through tree seed germination – seeds are carried in the dung and fir of wild animals and in bird droppings. However, this natural process can be speeded up by supplementary tree planting on land that has no tree live stumps. Methods of supplementary planting can include – tree planting from nursery stock, direct sowing tree seeds, planting large cuttings (e.g. glyricidia or gamal), transplanting germinated tree seedlings from forest remnant areas).

The most important determinant of successful reforestation is the individual's and communities commitment to reforestation. This in turn can be strengthened through awareness creation, formation of farmer groups, legal user rights to the land and trees, and access to *markets*.



In Bobonaro, it is quite common to have large areas of grass land with no living tree stumps remaining. In time, with no burning and with control of livestock, such areas will regain tree cover naturally, though it may take some years. Sites like this are good candidates for tree planting.



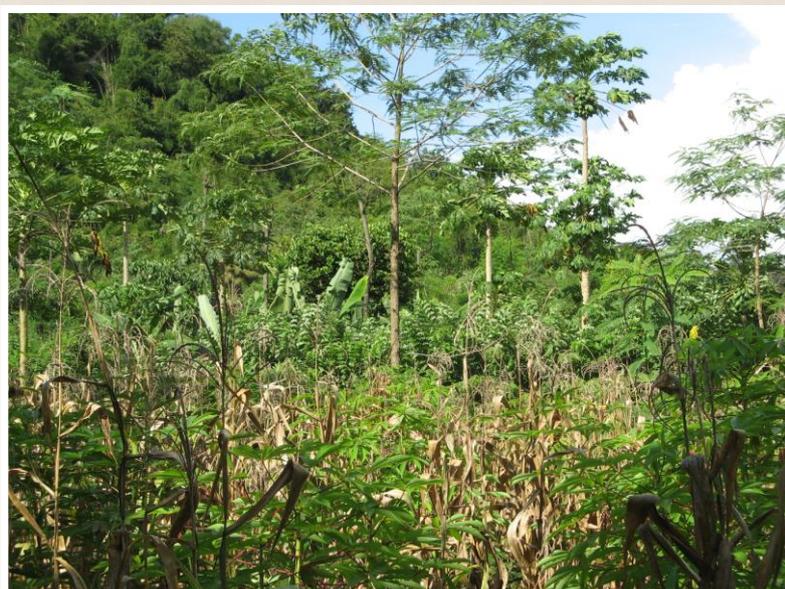
However, even on seemingly tree-less sites, trees can be found in gullies and isolated individual trees can be found on the hill sides.

Forest remnants can be found in gullies. From such points, forests can spread naturally to colonize the remaining, bare land if burning and overgrazing stop. By practicing FMNR with supplementary tree planting and through community forest management, such hillsides could be rapidly reforested.

Soil erosion, depletion of fertility

For centuries, farmers have used slash and burn agriculture as a means of maintaining soil fertility for agriculture. This system worked well while populations were low and large areas of forest existed. However, today many districts have no remaining forests, and large and growing populations results in there being no time for forests to recover. As well as benefiting from the fertilizing effects of ash, farmers use fire as a labour saving device to eliminate weeds. Unfortunately, while there are short term gains, in the long run, burning year after year results in loss of soil organic matter and structure and this in turn leads to loss of soil fertility, soil structure and moisture holding capacity. Eventually, degraded soils are much more easily eroded, and on sloping land, are more prone to landslides.

Fortunately, there are appropriate alternatives and a number of farmers in Bobonaro have already adopted agroforestry as an alternative to slash and burn agriculture. In addition to agroforestry, slash and mulch methods of land preparation can greatly contribute to soil fertility, moisture retention and suppression of weeds.



Example of agroforestry in Bour Sub Village, Bobonaro. The plot is surrounded by glyricidia (gamal) which serves as a living fence, source of fodder and nitrogen rich organic matter. The field is planted to maize and sweet potato under a canopy of nitrogen fixing Sesbania trees.

Water shortage

It is ironical that Bobonaro district receives between 1500 - 2,000 mm of rainfall per year and yet, during the dry season there is a water shortage in some sucos. This district should be water secure year round. Activities which will enhance water supply include:

- Increase soil organic matter by stopping burning and practicing slash and mulch agriculture and agroforestry.
- Reforest bare hillsides will assist with water recharge.
- Build small dams
- Build contour ditches and check dams.

Behaviour change strategies

It can be very difficult to change long standing practices such as slash and burn agriculture. The steps facilitating the adoption of FMNR that have been identified during a project evaluation in Senegal² may be a useful reference when planning behaviour change activities.

Aileu

Observations, learnings and recommendations

Observed progress

It is only one year since the BRACCE project commencement and I was extremely happy with the rapid progress that has been made:

1. Staff conducted awareness exercises on the consequences of forest destruction and annual burning in target communities and this seems to have had a significant impact in reducing burning and illegal tree cutting.
2. In each project village, farmers groups had been formed with a good balance of women and men members. Farmers groups have been well trained in FMNR and in addition, some groups were terracing land within the demonstration area in order to plant fruit trees and vegetables. At each site visited, group members had a very good understanding of why they were doing this work. Typical responses included "for my children and grandchildren; to reduce soil erosion; to protect our water sources; for biodiversity; and for income generation".



Fata Marine sub village, Farmer group leader proudly shows off their demonstration plot.

² <http://fmnrhub.com.au/wp-content/uploads/2014/01/Senegal-FMNR-Case-Study.pdf>

3. Each participating village had its own FMNR demonstration plot of 1 – 2 hectares. The work has been done to a high standard with well pruned and thinned trees in each plot and as a result trees are growing very fast and are producing valuable poles.
4. Incidence of bush burning has greatly reduced. This in turn is resulting in improved soil fertility and a reduction in the area of bare soil and increased biodiversity. Soils are visibly turning darker and a black mulch layer of rotting leaves and grasses has formed. Pruned branches and slashed weed stems are placed on bare soil enabling colonizing species to take root. Whereas, in 2011, only Eucalyptus species were evident, new tree species were found germinating in the leaf litter (*Image on the right*).
5. Illegal cutting of trees and burning has ceased in the demonstration plots.



Recommendations

The Alieu BRACCE team should be proud of themselves. The achievements listed above have occurred in just one year. Given that long standing practices and cultural beliefs about land and tree management have been challenged, and often changed, this project is having significant early impact.

It will be beneficial to now consolidate the results:

1. **Commendation and recognition.** Communities should be congratulated and encouraged for the good job they are doing. The project could facilitate visits from Ministry of Agriculture Staff (district and national levels) in recognition of their efforts. Such an event would reward good work while sending a strong message to the rest of the community who have not yet been involved.
2. **Exchange visits.** Strengthen mutual learning by facilitating exchange visits for example to Manual De Silva's farm where FMNR has been practiced for at least three years. Village representatives could be taken to such sites for encouragement, to be inspired by what an older managed forest looks like and to learn. In addition, farmers groups could be facilitated to visit each other – a little bit of friendly rivalry between neighbouring villages can act as a strong incentive to improve and expand reforestation efforts.
3. **Outreach to whole community and Tara Bandu.** Greater effort can now be made to reach the rest of the community not yet practicing FMNR. Campaigning will be even more effective once existing farmer groups begin sustainably harvesting and selling wood from their demonstration plots within the next year or so. Some farmers groups were complaining that village livestock were destroying some of their planted trees. It is critical to have the whole community agreeing to a common set of rules. If Tara Bandu (traditional land and tree use regulation system) is not already in force in a village, meetings should be held in order to re-instate it.
4. **Private forest plots.** In addition to the group demonstration plots, there are enough visible results to start encouraging individuals to create their own FMNR and tree planting forest plots.

5. **Market facilitation.** Even though farmers groups have only been practicing FMNR for up to one year, growth rates of the Eucalyptus trees has been extremely rapid. In one extreme case, one tree stump has produced over \$40 worth of poles (Photo: Left). However, even on the drier slopes, regrowth has been very rapid and farmers will have marketable wood within another year or so. The project can greatly facilitate interest in and uptake of FMNR and forestry in general by facilitating marketing of wood and non forest timber products.



Markets can be facilitated through such measures as:

- simplify the time consuming process of obtaining wood cutting licences from Aileu. Perhaps Farmers' Group licences or annual licences could be granted or the Ministry of Agriculture and Forestry (MAF) could be asked to consider giving a discount licence price to Group members who are sustainably managing forests.
- formally registering Farmers Groups and individuals who practice sustainable forestry with MAF;
- establishing a **Central Wood Market** in Aileu;
- introducing **quality control** measures as has been done for vegetables e.g. certifying that the wood is sustainably harvested; ensuring wood meets quality and size standards etc.
- linking timber growers with wholesalers and negotiating better prices;
- exploring opportunities to add value to timber and non timber forest products through milling, craft items, small furniture and tool handle manufacture and packaging of products such as honey, traditional medicines and wild harvest fruits.



Community based forest management in various African countries has resulted in tourism opportunities, value adding and packaging of cosmetics and wild foods and fair trade sale of craft items.

Organized wood markets in Africa have made it possible for farmers to have better market access and to receive better prices.



6. Given the strong progress made and the fact that there is excellent work to showcase, BRACCE should consider hosting a E. Timor national level FMNR conference in 2014 to stimulate the uptake of FMNR by MAF and by communities in other districts and by other NGOs.

Additional considerations

1. Avoid planting nursery raised trees too close to regenerating Eucalyptus trees. Eucalyptus trees are very competitive and will suppress growth of transplants. Also, trees should not be planted in places where they will be washed out by flowing water.
2. Pruned branches and slashed stems of weeds and grass should be placed on bare ground so as to encourage establishment of grass.
3. Re-instating Tara bandu should be a priority activity in each participating village.
4. In some demonstration plots farmers were planting crops in very poor soil. Consider building soil fertility in the first year or two through planting soil building plants such as tephrosia, calliandra, leucaena, sesbania etc., then, once soils are more fertile, begin planting food and cash crops.

5. Consider where to place terrace and garden plots in relation to the water supply. Ideally, gardens should be at a lower altitude than the water source so that water can be directed to the garden simply by using gravity. This will save much labour and eliminate the need to purchase a water pump.



Excellent example of pruning and thinning of re-growth from Eucalyptus tree stumps. Pruned branches have been left on the ground so that leaf litter will protect and restore soil fertility. Pruned shoots will straighten out within their second year of growth producing a more valuable and faster growing pole. Notice also that the grass is green – the Farmer Group has prevented fires from occurring in their demonstration plot.

Annexes

Annex I: Slash and Mulch Agriculture

It is very difficult for farmers who have been burning grasslands and crop residues all their lives to suddenly stop burning. There are a number of practical reasons why farmers do burn – on agricultural land burning removes weeds, clearing the way for ploughing and it destroys pathogens and pests. On grassland, burning gives a transitory burst of green growth. Burning is also a tool to flush out wildlife during hunting expeditions. However, the long term consequences of regular burning include biodiversity loss, reduced soil fertility, increased erosion and water run off and eventual abandonment of the land. This attachment provides a robust alternative to slash and burn called the 'Slash and Mulch agroforestry' system.

A short youtube video clip, Up in Smoke talks about the destructive impact of slash and burn agriculture and a positive alternative³ – slash and mulch⁴:

Annex II: Weeds: Nuisance or valuable resource?



Large swathes of land are covered in invasive weeds, particularly *Chromolaena odorata* (Siam Weed) and *Tithonia diversifolia* (Mexican sunflower). *Chromolaena* and *Tithonia* are considered to present significant weed problems in E. Timor as they occupy large areas of land, reducing grass growth on grazing land and competing with crops on agricultural land. Since they form thick stands preventing sunlight from reaching the ground, they also suppress forest regeneration.

However, these weed species can also be viewed as an asset. They colonize disturbed sites, reducing erosion and generating massive volumes of organic matter and recycle nutrients back into the soil. If managed through a slash and mulch regime, they can become strong allies in soil and forest restoration. Mulching with plant organic matter has been shown to reduce nematode population densities in various cropping systems. The level of nematode control is increased when such mulches are incorporated into the soil as organic amendments. Currently, farmers deal with weeds by burning them. But burning destroys much of the potential benefits. Weeds can be turned into an asset. By slashing them before seed set, and using them as a mulch, the soil will be covered and protected from sun and rain, organic matter and vital nutrients will be returned to the soil, soil temperatures will be reduced, rainfall infiltration and retention into the soil will be increased and emerging weeds will be shaded out.

Tithonia diversifolia has been used for a wide variety of purposes around the world, including fuel, compost, land demarcation, soil erosion control, building materials and shelter for poultry. *Tithonia diversifolia* is commonly used as a fodder for ruminants and rabbits who can eat the leaves, soft branches and even the flowers and its potential has been tested in pigs and poultry.

³ <http://www.ingafoundation.org/>

⁴ <http://ciat.cgiar.org/wp-content/uploads/2012/12/qsmas1.pdf>

Tithonia diversifolia produces a nutrient-rich biomass and its use as an effective source of biomass for annual crops has been reported for rice and maize in Africa. Its abundance and adaptability coupled with its rapid growth rate and very high vegetative matter turnover makes it a candidate species for soil rejuvenation and improvement, as a green manure or as a major component of compost manure. Dried *Tithonia* plants should be preferably left to decompose on the field rather than burned.



Yields of kale, French beans, tomatoes and Napier grass (*Pennisetum purpureum*) all increased when these crops were planted with *Tithonia diversifolia*. It has also a positive effect on crop yields when used in intercropping.

Annex III : Case Study: Abrha Weatsbha – a community restores a landscape⁵

The destruction of Ethiopia's forests escalated after the [Sahel](#)-wide famines of 1974 and 1984. Total crop failures meant that vast numbers of people were faced with the choice of migrating to major cities/other countries; or to sell the wood of their forests to feed their families. This accelerated a vicious cycle where denuded hills were unprotected from tropical rainfall and became less able to absorb rain, ground water reserves failed to refill and flash floods washed away valuable farmland and caused gullies through farm and town alike. Each year the land became less able to feed those who depended upon it.



Abrha Weatsbha before restoration

⁵ <http://fmnrhub.com.au/abreha-atsbeha-a-community-restores-a-landscape/>



Above Right: A flash flood damages farm land as rainwater runs unchecked from denuded hills.

The community of Abrha Weatsbha, in Northern Ethiopia, had experienced recurrent crop failure and had received relief assistance for many years. In the 90s, they faced a terrible choice. The government asked them to relocate rather than depend on aid year after year. How could they leave the land they loved, the land of their forefathers?

There was another alternative, and that was to restore their land to its former productivity. Aba Hawi, the community leader, challenged his community to work to restore their hills and farmland. They worked on three interconnected interventions: soil erosion control, water harvesting and closing the hills to livestock and to wood harvesting.

The effort that this community has expended on erosion control measures is absolutely astounding. They initially built hundreds of kilometres of soil and stone bunds to slow the flow of water down hills.



Left: community working bee, building contour banks reinforced with stones.



Left: trench bunds 'bank'(store) water in the soil in the rainy season, raising the water table so that irrigation is possible in the dry season.

Each family dug a 4m X 4m pond to conserve water. In small gullies, the community constructed stone and trench bunds to slow the flow of water and chains of ponds to trap water. In the river, they constructed nine check dams. The first three catch silt and the last six hold water that allows 80% of the community to irrigate crops in the dry season from 650 hand dug wells. Everyone understands that they are banking water in the dry season – in the soil, the ponds, the check dams and the water table.



Left: This check dam prevents erosion and enables farmers to irrigate in the dry season.

It took about 10 years to convince the whole community of the value of closing their hills to livestock and to wood harvesting but they are now united in their resolve to conserve their natural resources in order to have healthy and productive farmland.

The community has amazing commitment and understanding but they have not turned their situation around without outside assistance. The Ethiopian Government has enabling policies such as the one that requires every able-bodied, adult rural Ethiopian to give 40 days/year to development of community assets such as the soil and stone bunds, the chains of ponds and the check dams. Abrha Weatsbha families contribute at least another 40 days/year voluntarily.

Families whose income is less than US\$1000 above subsistence level participate in the [Productive Safety Net Programme](#) under which they receive food or cash for work performed on community assets. District meetings determine the priorities periodically. The aim is for those receiving the assistance to graduate from poverty. The managing committees of the Abrha Weatsbha community have utilised these programs to organise themselves, under the dynamic leadership of Aba Hawi, to restore their land.

Assistance has come from the [World Food Programme](#), the [Relief Society of Tigray](#), the [University of Mekelle](#), the [Tigray Agricultural Research Institute](#), [AusAID](#), [World Vision](#) and other organisations.

To complement the above changes, households planted woodlots of eucalyptus and grevillea (Silky Oak) to provide firewood and building materials; adopted the use of fuel-saving cookstoves to reduce the consumption of firewood; and participated in the government scheme to improve dairy cattle by artificial insemination so that only one dairy cow is needed, instead of ten, to provide the same amount of milk.

Introduction of modern beehives enables households to earn additional income from the unique white, organic honey produced from the local shrubs. A market chain has been established so that the honey can be sold to Europe at premium prices.

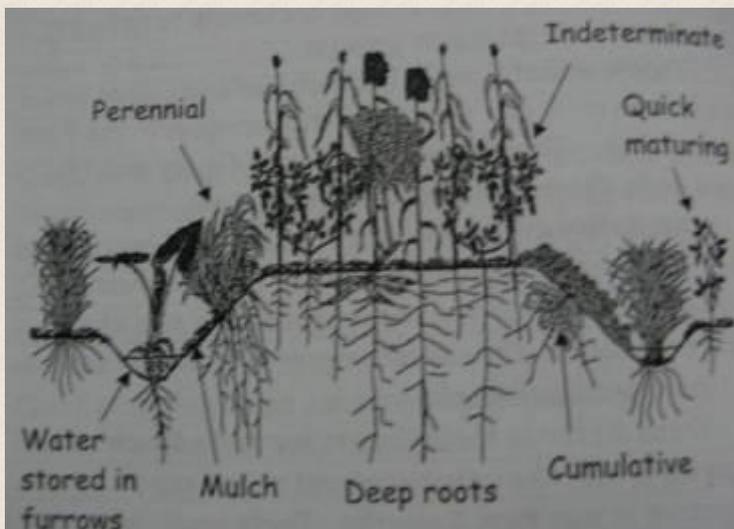
Government, community, UN Agencies, NGOS, universities and research stations have all contributed to the successes seen in Abrha Weatsbha. However the mobilisation of the community under dynamic and committed leadership has been a key contributor to the extent and sustainability of the change.

“We go to sleep dreaming of how to make our landscape and our life better”

Aba Howi, (Mr. Gebre Michael Gidey) community leader.



Annex IV : Raised Bed Farming



Diagrammatic representation of raised bed farming. Crops such as maize, cassava, sorghum, peanuts and beans are grown on the raised bed where they are safe from flooding and yet, during dry spells water from troughs can soak into the raised bed. Water loving plants such as rice and taro are grown in the troughs where even in drier years, moisture will be more available than on the raised bed.

Raised bed farming is a cultivation method which has been developed to cope with the unpredictable and wildly fluctuating weather conditions which are normal in East Sumba, and which could become even more variable with climate change. If applied, raised bed farming could enhance both rice and maize yields in Aileu while increasing resilience to climate change.

Benefits of raised beds include:

- Reduces the susceptibility of farmers to adverse financial and climatic events
- Reduces the risk of total crop failure
- Reduces the amount of water needed to grow rice
- Enables crops that use water more efficiently than rice to be incorporated into a rice-based cropping system
- Enables crops to be rotated to limit the build up of weeds, pests, and diseases
- Enables the inclusion of legumes to increase the availability of nitrogen to crops

- Enables the inclusion of fodder plants so that livestock can be included into the system
- Enables the inclusion of multi-purpose perennials that provide farmers with a arrange of useful products
- Improves the quantity and nutritional value of the food produced.
- Reduces the necessity to practice destructive slash and burn (shifting) agriculture

About the author



Tony, or 'chief' as he is known in the Program Research & Advisory team, is involved in the development and promotion of agricultural-forestry-pastoral systems across a range of environments. Tony previously spent 18 years in Niger managing a long-term agricultural development program. The natural-regeneration reforestation methods Tony developed were adopted by farmers and contributed to over five million hectares of land being revegetated in Niger alone. Tony was also instrumental in introducing edible seeded Australian acacias into Nigerien farming systems and in their promotion as a human food.

Tony's specialist areas are de/reforestation, desertification, sustainable farming and food production. Tony is currently engaged primarily in promoting reforestation internationally and facilitating ongoing research and development of edible seeded Australian Acacias.

For more information:
www.fmnrhub.com.au

