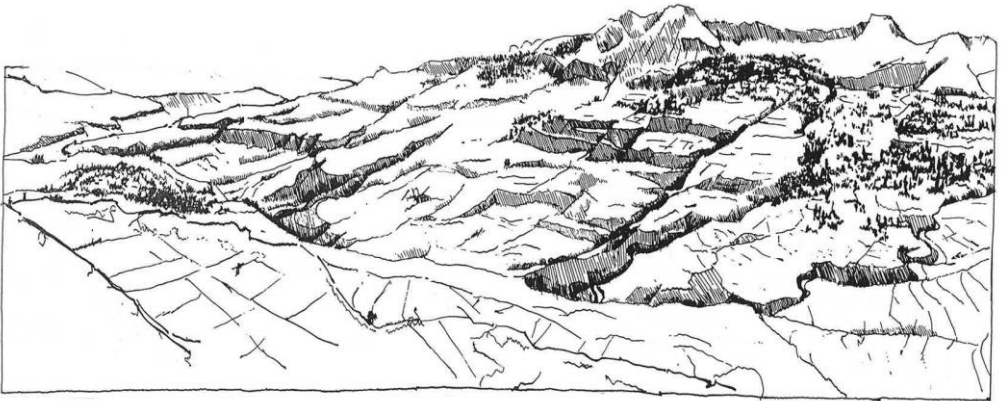


What do we hear from the farmers in Dogu'a Tembien?



by

Jan Nyssen

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This is the English version of a book that was published in Tigrigna language

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Foreword to the English translation

Extension, or distribution of scientific knowledge to the end users in Africa and Ethiopia in particular, goes through a long formal extension system. As we have carried out research in the Tigray region of Ethiopia since more than 20 years and published >100 articles in SCI journals, we may state that we did a significant contribution to scientific knowledge regarding a wide range of scientific disciplines that are relevant for rural development and sustainable livelihood. From all this research, three extension manuals came out, two in English and in the local Tigrigna language, and one in English only. We recently also started preparing research briefs that are aimed at policy makers at different levels. Direct knowledge sharing with farmers was done through (i) the implementation of five development projects, and (ii) the organisation of so-called Farmers' Days (a dozen in total) in which farmers from various districts were brought to a particular area, where research findings are demonstrated in the field. It is not clear how much of this information finally trickled down from the privileged model farmers who generally assist in such Farmers' Days, to the rest of the community. In a bid to reach the rural community, to hand the knowledge directly to the farmers, and hence to empower them, we took inspiration from 'almanacs' as they had been used in northwest Europe since many centuries. One of the traditional functions of such almanacs is, in view of the close links between a calendar and farmworks, to attempt to make such booklets most useful to the peasant majority of the population. Hence, our objectives were to develop a

booklet that holds basic research findings, expressed in simple words, and combined with other useful and sometimes lighter information; distribute it among farmers with the aim that it is not only read but also passed on and discussed within the communities (farmer-to-farmer extension); and evaluate the take-up of the messages contained in the booklet.

This almanac type booklet was developed specifically for the district of Dogu'a Tembien, where the authors have their attachments, and where much of the mentioned research was carried out. Inspiration was taken from one of the most popular, the Mathieu Laensberg almanac, distributed regularly since 1636 in France and Belgium, and still published as *Almanach de Liège*. All 19 municipalities (*tabias*) of Dogu'a Tembien had been visited through more than 20 years of formal research undertakings, and they were again visited to collect very local information from at least three key informants per tabia. Key informants were at least 50 years old, generally male, and lived their whole life in their village.

The title of the booklet in Tigrigna language “ካብ ሓረሰቶት ደገ-ዓ ተምቢን እንታይ ንስምዕ?” (Kab harestit Dogu'a Tembien entai nsemie? – What do we hear from the farmers in Dogu'a Tembien?) was chosen to give the farmers as much as possible ownership of the books' contents. In its 109 pages, the book contains sections about market days, typical traditional Tigrigna words (landforms, rocks, housing, ploughing, land management, crop harvesting, livestock keeping, roads and footpaths), the geology of the area, names and locations of the best springs and local beer houses, conservation agriculture, soil and water conservation, reforestation, gully control, farmers'

sayings on weather and climate, rain and temperature in the district, all local religious holidays when many people gather in a particular village once a year, tree planting, and catchment management. These sections are organised by larger thematic topics, mingling chapters on local knowledge, scientific findings, some 'wise advice' (e.g., do not mistreat animals; global warming; gender equality), and lighter sections. Generally an organisation by month of the year was attempted. The authors are mentioned in several places of the book by their first names (or even nickname) and the readers are invited to interact with them. An internal review of the book was done by Prof. Dr. Mitiku Haile, former president of Mekelle University, who has a background of soil science and sustainable land management. The first edition of the booklet is printed in 1000 copies; it is being distributed through individual contacts with farmers, in their homes, during social gatherings in small local beer houses on the occasion of the market in Hagera Selam, and also at annual holidays in villages.

Evaluation of contents and process are ongoing, in which we verify whether the ambitions of the booklet with regard to popular education have results, and also through which pathways the information is shared. For instance whether it is read aloud with discussion, in social gatherings or at the wake. All these will be inputs for the second edition of the book.

Jan Nyssen, Romha Assefa and Seifu Gebreslassie

1. Introduction

As authors we had thought that it would be useful to merge different types of knowledge that are available in our *woreda* Dogu'a Tembien. This book contains first of all days and dates, that are useful for all, just like a calendar. This book is not about religion or politics or healthcare, though all that is important. Rather we want to give many kinds of practical information: we want to integrate a lot of fine local knowledge with some of the new findings by researchers from Belgium and Ethiopia. We have visited all *tabias*¹ (municipalities), yes almost all *kushets* (hamlets) of our *woreda* (district) and talked to many residents of these areas; they gave us so many useful information that we have written down in this book. Since it contains calendar events and it mentions the conditions of all areas of our *woreda*,

¹ In this translation some Tigrigna words have been transliterated to Roman script and italicised. At first use, the meaning is then included in between brackets.

we can say that it will help you at any place, at any time!

Changes to society and environmental management also receive the place that they deserve – after reading this book you will be familiar with the whole worda!

When reading this book, you will find many things that you know already but maybe here it is presented in a new context. You will learn also a lot of new things. When moving around in the worda have the book in your pocket and if you see a stone that you don't know, you may look it up; if you want to know where to find water or *suwa* (local beer) in a remote place, look it up; if you need to move to a certain area, you may also check first when there will be *ametu* (yearly village holiday) over there. And if you see some new things in farmlands, gullies or forests, you may look it up also.

The book is yours, if you think that it is incomplete, you may add information. And if you wish you can share that information with the authors.

All three authors have collected the information and Mister John wrote it down in this book. Of course there are so many inputs by Ethiopian and Belgian researchers who were in our woreda. Some have become doctor now, or professor, some are government officials or were translators, but let us just mention their names without titles; after all, we were all born naked and we will all pass away, that is our fate. Thank you to Berti, Amori, Katrien, Mitiku, Sil, Miro, Girmay, Berhanu (Siche), Raf, Kaat, Lutgart, Jef, Etefa, Tesfay, Mehretu, many translators, many more data collectors, Mekelle University, many government officials, Amare, Tesfay, Mulugeta, all those who were there in the beginning, all the kind people of Hagera Selam, and last but not least the so many farmers who gave information for this book.

We wish you a good use of this book!

Jan Nyssen aka Mister John, Seifu and Romha

2. Market days in and around Dogu'a Tembien

Monday: Mekelle

Tuesday: Togogua

Thursday: Tkul, Alaesa

Friday: beware! There is no market anywhere on Friday!

Saturday: Hagere Selam, Adi Edaga (Ruba Weyni), Maigua, Enda Mariam, Agbe, Abi Adi, Tsigareda

Previously there was a Thursday market in Hagere Selam; that's why one of its old names is Edaga Hamus. The other old name for Hagere Selam is Mai Aleqti.

3. Some Tigrigna words (1) – landforms and rocks

In this book, we also include some sections where we present typical Tigrigna words that are well known to most farmers, but which the younger generation tends to forget. Just ask to a youngster or even a teacher what is the meaning of some of the words in this and following sections. You may be surprised by their answer! We start with a chapter on the Tigrigna words for the landscape and the stones.

<i>Gowo</i>	Mountainous area
<i>Tsedifi</i>	Area with many steep slopes
<i>Harhar</i>	Rough area
<i>Hankorakur</i>	Very rough area
<i>Shintro</i>	Valley
<i>Meda</i>	Level area (it can be small or wide)

<i>Sewhi</i>	Level area with grass, even in <i>hagay</i>
<i>Gedel</i>	Cliff
<i>Beati</i>	Cave (even an overhanging rock where you can hide for the rain is called <i>beati</i>)
<i>Guhmi</i>	Gully
<i>Genhi</i>	Rill created by erosion, in size it is not bigger than a plough furrow
<i>Chilachilu</i>	Large stone that gives a sharp sound when hit
<i>Qatsela or chinchihle</i>	Sharp stone that can be used for cutting
<i>Chincha</i>	Small stones; gravel
<i>Kokuhi</i>	Large rock, or rock outcrop, that is level at its top

Farmers say: “*chincha* on farmland is like the hair on somebody’s head. Just like the hair prevents butter

from percolating down from the head, the *chinchá* prevents water from flowing down. Rather the water will infiltrate and there will be less erosion”. *

* All statements with star have been researched and are proven by the research teams in Dogu’a Tembien.

4. Types of rock

Have you ever been wondering where all these stones come from that we have on our farmlands? Obviously, it comes from the rock: it can be from a rock that is nearby, or it can have been transported over a distance from a rock outcrop that is somewhere more upslope. In that case it was transported by the river, by rolling from a cliff, or as part of landsliding. For instance, for Emni Ilias (a very large stone that is found near Hechi and Harena) we can see the place where it was in the cliff before falling. In our woreda we have several types of rock, and we can recognize each rock type if we break a stone and observe it closely.

Here we mention the major rock types in our woreda; the interesting thing is that all these rock types have their own place, and in our area we almost always find the same succession of rocks from *dogu'a* (highland) to *kola* (lowland).

- At the lower part, deep in the gorges, we have the lower sandstone, which are the oldest rocks in our *woreda*: 200 million years old; it is red in colour and gets easily abraded and becomes sandy when we walk on it. Whoever walked all the way down to Abi Adi, has seen the places where the walking has led to imprints of feet in the rock. We also find this lower sandstone in the Geba gorge on the boundary to Saherti, as well as in the Tsaliet gorge and in Kayeh Tekli.

- A bit higher up, we find extensive areas with limestone, for example in Tkul, Hechi or Ruba Weyni. The limestone is composed of chalk that was deposited in the ocean that was here many millions of years ago. The evidence that there was an ocean are the many fossils that you can find in the limestone area. This rock is whitish and yellowish in colour; in some places the weathered rock is suitable as *nora* (lime, chalk), in other places it gives sandy or yellow clay soil. Overall, it is not very suitable for agriculture, because the limestone allows rapid infiltration, so the landscape is dry.

- On top of the limestone, we have the upper sandstone. It is a steep cliff in different tones of red, and the top of it is very hard, with brown colour. Those stones are very heavy because there is iron in it. We see this upper sandstone at many places because it forms such typical cliffs: think about Guyeha, or the slope between Harena and the town, or Amba Raesot.

- The peaks of the mountains are formed by basalt, which is a black stone that was created by volcanic eruptions some 30 million years ago. The cliffs have also a very typical shape because the rock looks like a lot of standing columns.

And then, of course, the valleys are cut into all these rocks; that's why we can actually see the different rock types like layers one on top of the other.

- Inside the valley bottoms in the limestone areas we find the most recent rock type, it is a soft rock called *farkwa* (tufa), and it occurs in large bodies like we have it at Sesemat or Tsigaba. This rock is between

10 000 and 100 000 years old only, and it can be shaped for use as *gabla* (trough) or door lintels.

- Lastly, high up, there is another whitish rock that occurs here and there (for example at Merea Zivan). It were previous lakes, long before humans were on earth, in between the basalt. Here again the evidence that it was a lake are the fossils *tuwiyo* (shell fossils) that can be found and that the children try to sell.



A view from Hagera Selam towards the south, drawn by Mieke Nyssen. On the dogu'a part, behind Dingilet, the Byen and Gumawta mountains are in basalt. In the valley, in Hechi and further on around Rubaksa (at left, in the valley), we have limestone. Rubaksa is also one of the areas where we have a lot of farkwa. In between, there is the cliff of the upper red sandstone, which one can find in between Dingilet and Harena.

5. Some Tigrigna words (2) – houses and house building

- Gebela* Square stone house with flat roof made of soil
- Debri* Square house like *gebela*, but with one storey
- Giltu* Thatched roof of round house
- Amdi* Major wooden pillar that supports the roof of the house
- Seregela* Transversal beam that supports the roof
- Wefa* Pottery used to close the tip of a thatched roof
- Weltem* Large ring of thin woods that is put horizontally to connect the major woods in the roof of a circular thatched hut
- Nadela* Small hole in the *weltem*, used to connect it to *seregela*

Ankle Flexible wood, such as climber or bamboo strips, that is used to tie larger woods in house construction

Gulilat Large decoration, made from woods and sheet iron, which tops the roof of churches. In Tembien it is also a common decoration on house roofs. Generally the shape reminds of a cross.

Did you know that ...

... some drivers who come from Mekelle greet every house in Tembien because the *gulilat* on the roof makes him think that it is a church.

6. Some Tigrigna words (3) – inside the house

<i>Meherher</i>	The main lock of a door; a calibrated piece of wood that slides in an opening in the wall
<i>Ribrab</i>	Traditional shelf
<i>Endefti</i>	An angle in the inside wall of a house
<i>Medeb</i>	Large, elevated place for resting and sleeping, inside the house, made from earth masonry and stones
<i>Maesi</i>	Smooth cattle hide, on which one can sleep
<i>Dino or agoza</i>	Sheep hide, particularly used to sit comfortably
<i>Angare</i>	Dry goat or sheep hide
<i>Shirfa</i>	Small grain store made of bamboo

<i>Godo or kuro</i>	Grain store in earth masonry
<i>Gemgem</i>	Sitting place in the house
<i>Hidmo</i>	Underground food store in a house, closed by woods and some soil
<i>Medhe</i>	A small circular recipient, used for collecting <i>kollo</i> (roasted grains) at the time of grain roasting
<i>Taita or injera?</i>	<i>Taita</i> is the pancake of sour dough; <i>injera</i> indicates food in general
<i>Mdribet</i>	Free space inside the house
<i>Sanduk</i>	Wooden coat rack
<i>Mekulo</i>	Large concave iron used for grain roasting
<i>Gombo</i>	Small pot in earthenware
<i>Wancha</i>	Pottery cup used to drink <i>suwa</i>
<i>Etriro</i>	Large earthenware pot, used to fetch water, before jerrycans came into existence

Genie

Large pot

7. The best *enda suwa* in Dogu’a Tembien

Here are some *enda suwa* (sellers of locally brewed beer – typically a place for social gathering), but there are many more. We have selected them based on information given by local people. Numbers refer to the map on page 30. If you go there, you can relax, have a chat with the other customers, but do not take more than two or three *wantcha* (cups), unless you will walk *shinti baerai* (litt. the track of oxen urine; fig. zig-zag)!

<i>Tabia</i>	<i>Kushet</i>	Owner	No. on map
In and around Hagere Selam			
Hagere Selam	Lisanu	Medhin Teka	1
	Marta	Tsehaynesh	2
		Gebregyorgis	
		Hadush	3
		Gebregziabher	
Limat	Agerba	Amete Kiros	4

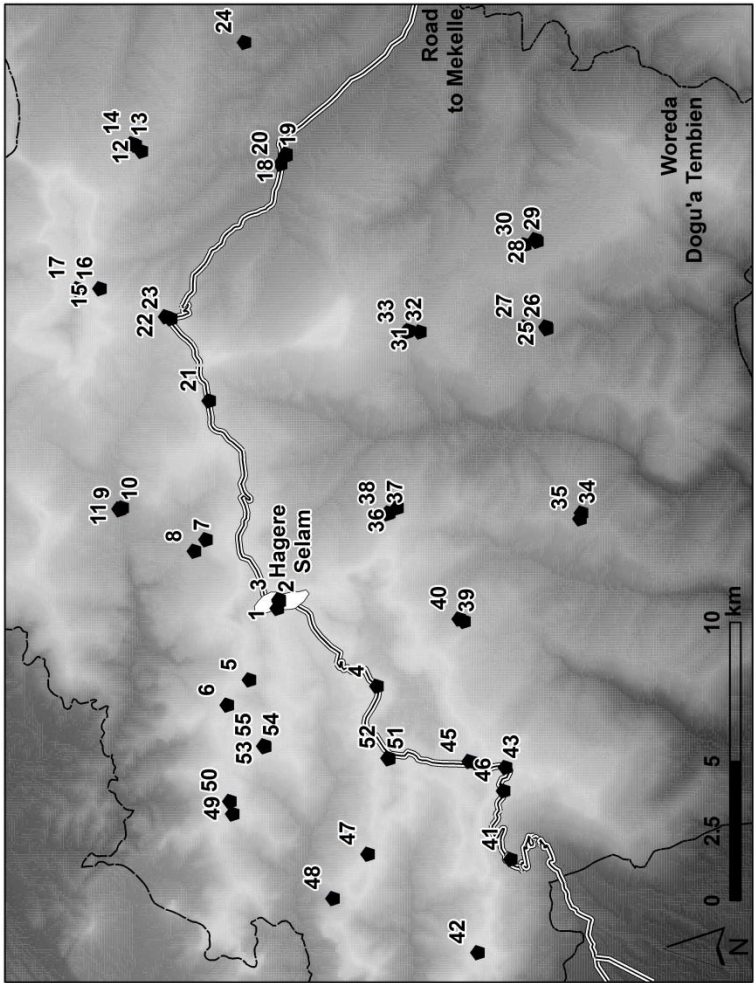
<i>Tabia</i>	<i>Kushet</i>	Owner	No. on map
Mahbere slasie	Guderwo	Keshi Araya Gebreyohannes	5
	Mai Mereb	Hndeya Girmay	6
Ayneme Brkekn	Adi Kolqual	Tsadkan Kiros	
Selam	Tenseh	Kindhafty Abadi	7
		Genet Gebrehiwet	8
To the North of the Woreda			
Hadnet	Adi Edaga	Yergalem Asefa	9
		Mulubrhan Hagos	10
		Mhret Abrha	11
To the Northeast			
Adi Walka	Bet Mokae	Tkun Asgedom	
Adilal	Adilal	Tekle Berhe	12
		Nigsti Teka	13
		Mulubrhan Kindiya	14
Arebay	Arebay	H. Abraha Tafere	15

<i>Tabia</i>	<i>Kushet</i>	Owner	No. on map
		Atakliti Gebremedhin	16
		Hagos Gebremeskel	17
To the East			
Adizmer a	Tkul	Abrehet Reda	18
		Kiros Adane	19
		Wedase Gebregziabher	20
Ayneme brkekn	Adisalem (Halah)	Letay Asefa	21
	Marafjega nu (Alaesa)	Kiros Abadi	22
		Brhan Hadush	23
Emni Ankelalu	Mtsilal Afras	Kndahafti Mezgebe	24
To the Southeast			
Amanit	Mai Genet	Medhin Hayelom	25
		Hadash Mebrahten	26
		Endanuguse Alemayo	27
Debre	Togogua	Gebrisu Tsegay	28

<i>Tabia</i>	<i>Kushet</i>	Owner	No. on map
Nazret		Tsega Asefa	29
		Tnsue Kiros	30
Mizanebrhan	Mead	Roman Gebreazgi	31
		Ngas Dimtsu	32
		Haymanot Gidey	33
To the South			
Endasla	Debre Genet	Kidan Gebretekle	34
		Fetly Gebregziabher	35
Mikael Aby	Megesta	Leteslassie Gebrecherkos	36
		Amit Gebregziabher	37
		Tsehaynesh Tesfay	38
Walta	Lmat	Amlesu Gebremariam	39
		Tinsue Belay	40
Menachike		Amit Berhe	
To the Southwest			
Mizan	Kekema (Yereser)	Letmaram Gebrekidan	41

<i>Tabia</i>	<i>Kushet</i>	Owner	No. on map
	Kerene	Letebrhan Gebreyohannes	42
Seret	Enda	Tiwres Hailesilassie	43
	Mariam	Tsehaynesh Abate	44
		Kidan Gebreazgi	45
Simret	Adi	Letay Gerase	46
	Gumare		
To the West			
Aregien	Aregien	Mebrahten Gebremeskel	47
	Kelkelay	Letebrhan Gebrekidan	48
Degol Weyane	Zala	Tinsue Brhane	49
		Letebrhan Geresea	50
Limat	Maigua	Tekiean Gebresilassie	51
		Tekiaen Alemayoh	52
Melfa	Maekhel	Medhin Kassa	53
	Geza	Tsedal Girmay	54
		Gebregziabher Hagos	55

Map of *enda suwa* in Dogu'a Tembien



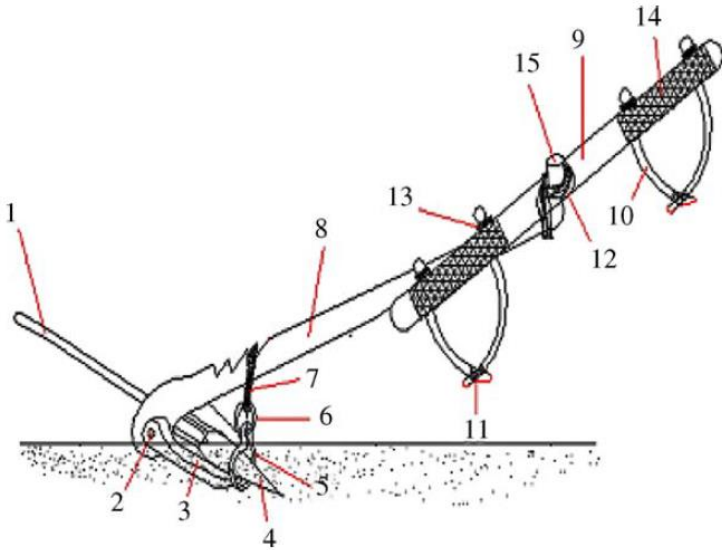
(numbers on the map refer to the list in previous pages)

8. Some Tigrigna words (4) – around the house

<i>Dihribet</i>	Backyard, area around the house that can only be accessed by permission
<i>Midmido</i>	Small level land where children use to play
<i>Sekela</i>	Thatched shed inside the compound, used for sleeping, particularly in the dry season and guest reception
<i>Afe gebela</i>	Cattle shed, with roof similar to that of <i>gebela</i>
<i>Dembe</i>	Livestock pen inside the compound, without roof
<i>Dinglil</i>	Mix of cow dung and soil that is very dry and protects from water
<i>Mofa</i>	Opening at the lower side of the fence of a compound, allowing runoff to leave the compound

<i>Milieti</i>	Bottom stone in home grinding, generally it is a boulder selected from the river bed. In Dogu'a Tembien the villagers of Hechi are specialised in marketing such grinding stones
<i>Bokura</i>	A small circular recipient, adjacent to the <i>milieti</i> , and used for collecting the flour
<i>Mekombia</i>	The cover of <i>tsahali</i> , made up of grass
<i>Endamokulo</i>	Separate shed in the compound where food is cooked
<i>Megogo</i>	Traditional oven, made of earth masonry, used for baking <i>taita</i>
<i>Megudi</i>	Cover of <i>megogo</i> , made of cow dung. The village of Hechi is specialised in preparing this.

9. Some Tigrigna words (5) – ploughing



1	<i>Erffi</i>	6	<i>Gualkerfes</i>	11	<i>Mran kerakro</i>
2	<i>Ktrti</i>	7	<i>Mran kerfes</i>	12	<i>Mran kedem kerfes</i>
3	<i>Doogri</i>	8	<i>Newit</i>	13	<i>Riesi kerakro</i>
4	<i>Mahrasha</i>	9	<i>Ar'oot</i>	14	<i>Korbet or shonkorefia</i>
5	<i>Kerfes</i>	10	<i>Kerakro</i>	15	<i>Meraf</i>

(Drawing by Solomon Gebregziabher)

- Migmas* or *Gemsa* Tillage operation (wide furrows) after maize or sorghum started growing – it is used for thinning and weeding, root pruning, enhanced infiltration and it gives better yields *
- Terwah* Furrows on the contour, created during sowing, with wide spacing
- Derdar* Tillage technique, in which ridges are shaped after the last sowing and most crop will grow on the ridges.
- Dinkul* Large soil clod, when ploughing and excavating *walka* soils

10. This is not an agricultural manual, but we have some advice for conservation agriculture

In this booklet one can read very useful information but it is not an agricultural manual. It does not tell you what to grow, where to grow it, and how to have the best production.

First of all, the farmers have the best knowledge. If we look at the cropping system, what is planted where and when, it is hard to do better than what the farmers are doing*. Farmers know their soils and what can grow on it – most farmers do not make mistakes in this. So, if you hesitate: first of all, talk in your family, with your neighbours and friends.

But of course, improvements can and must be done. How to get rid of the weeds? Shall we use manure or fertilizer, and how much? Could there be small machines to take over some of the most tiresome work? Looking around when you travel is always

useful, and talk with people in other areas. And there are also agricultural experts in every *tabia*; do not hesitate to ask advice from them – they are there to assist you.

One of the improvements is conservation agriculture: it reduces the workload for the farmer, it protects the land and it gives better crop yield. It is done in the following way:

- In the first year, the land is ploughed normally, but at the time of sowing, raised beds are arranged using the *mahrasha*, similar to *derdar* type of ploughing. The crop will mostly grow on the beds, and all rain water will stay in the furrows and infiltrate slowly. There is no more runoff from the land but all water is kept for the crops; it is first stored in the furrows, away from the foot of the plants.
- At the moment of harvesting, half of the straw must remain standing. This *kerim* (stading stubble) will be organic matter for the next years; it will fertilise the soil, make it loose and protect

from erosion. And harvesting is so easy because one needs to cut only the upper part of the straw.

- And then, for the rest of the year, the land takes rest. No grazing, no ploughing, weeds will grow.
- The following year, about a week before sowing, the land needs to be sprayed with a herbicide to kill all the weeds – there will be a lot of weeds in the first year but after some years the weeds will decrease drastically. Follow very well the application rates and safety rules! The weeds will dry in a few days' time.
- Then, sow the grain over the land without preparatory ploughing! And then, simply plough in the furrows that were left from last year – the soil will be brought to the beds and will cover the seeds. So, starting from the second year, there is only one easy ploughing per year.

Once a farmer knows it, the technique is very simple. About ten farmers in Hechi have been doing this; if you are interested, it is best to ask their advice.

If we evaluate it all, many positive things are there, in terms of work load, crop yield and protection of the land. Some farmers said that in this way the farmland soil becomes fertile and loose like forest soil, while allowing having a good production. For the cost, it is also cheap: less ploughing, less weeding, but there is the cost of herbicide (which is not expensive, but you need to be able to get it from Mekelle).

The other issue is of course that the area needs to be free from livestock grazing. Otherwise, somebody's cattle will eat the straw that a farmer kept standing on his land.

Keeping organic matter is one of the reasons why zero grazing is good for the farmland. Another reason is that it prevents cattle from trampling and compacting the soil, and that the one who wants to plant agroforestry or another tree can do so without disturbance by livestock. Keeping livestock at the homestead is then necessary; anyway with more and more children going to school, and most land being

protected in one way or another, it becomes difficult to herd the cattle in faraway places.

11. Some Tigrigna words (6) – land management

<i>Awito grat</i>	Very fertile farm land
<i>Netae</i>	Waterlogging that affects the farmland
<i>Dagna shebr</i>	Standing stones on the corner or in farmland, sometimes with white colour or chalk on it; the aim is to frighten rodents or other predators of crop
<i>Hdaria</i>	Unploughed land for sake of giving it a rest
<i>Gworbi</i>	Unploughed area within a farmland. It can be because there is rock, or because dense shrubs (for example after some years of fallowing)

<i>Zala</i>	Heap of stones that was removed from farmland; sometimes it is elongated so that it serves as soil conservation in the same time*. If you remove the <i>zala</i> you will find very fertile soil under it
<i>Daget</i>	Small terrace created by continuous tillage of land *
<i>Armo</i>	Farmland boundary; after the crops emerge you need to walk <i>armo armo</i>
<i>Maegel</i>	Small weir to collect water for irrigation
<i>Ketri</i>	Check dam to control gully erosion
<i>Aygi</i>	Water with high sediment and nutrient load, that flows in rivers after the first rains (due to erosion of loose soil) *

12. Good experiences with soil and water conservation on farmland

As it is the case all over Tigray, the farmers in Dogu'a Tembien do a lot of soil and water conservation on their croplands. It is done by the whole community and the work starts from the upper part of the slope. That is the good approach, because in this way the water is kept at the place where it falls and it does not run down. In addition to community work, the owners of the land mostly make very nice stone bunds on the land nearby the house, and they maintain the stone bunds that the community has made on the other lands.

Most of the research on soil and water conservation in Tigray has been done in this woreda, not by theory but by measuring really in the fields of the farmers. All the findings were published with many details in a book. Here we give just a short summary of some of the main recommendations.

TIGRAY LIVELIHOOD PAPERS No. 6



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VLIR – Mekelle University Zala-Daget Project

You can read this book if you want to learn on soil and water conservation; it has been written by the Belgium projects and Mekelle University.

On average, for stone bunds that are 3 to 20 years old, soil loss is decreased by 68%. The slope behind the stone bund gradually becomes level. The farmer

should increase the height of the bunds once they get filled with sediment.

The water that you see after the rain behind the stone bunds mostly infiltrates. That gives a lot of moisture in the soil around the stone bunds, and that is the reason why the crop grows well at the upper side of the stone bund but often also at the lower side of the stone bund. There is also high water content deeper below the stone bund, so it can be good to plant trees along the stone bund, from the upper and the lower side. Some of the infiltrated water will also go to the groundwater and to the springs.

Be careful when you make stone bunds: do not remove the *chincha* from the farmland. The *chincha* helps to protect the land. If there are not enough stones on a farmland they should be brought from somewhere else. Of course large stones can be removed to make the stone bunds, but only by permission from the owner of the land, because he knows best the amount of stones that is needed on

his land. And of course, if you dig trenches behind the stone bund, there is double benefit: the water will infiltrate better and the soil can be used to cover the stone bund.

Be careful also when there are shallow soils. At the lower side of the stone bund the plough may finish to remove the topsoil after some years. In that case some farmers will move the position of the stone bund in the downslope direction. Other farmers put manure especially on the lower side of the stone bund, because that is the place that is less fertile.

We'll talk about it at the end of this book (see page 104), but for stone bunds it is not good when there are free roaming livestock on the land after harvest. They will climb over the stone bunds and can destroy it. If a stone bund gets broken, the farmer must repair it. This is in his own interest; otherwise a gully can come at such a place.

Some people will also claim that there are a lot of rats in the stone bunds. That happens in some years, but in the years with rats, they are everywhere, not only in the stone bunds. Note also that there are fewer problems with rats in stone bunds as compared to *zala*, because in a *zala* the rats can climb up and protect themselves from floods. The best way to control the rats is to help their natural enemies. A good farmer will harvest the grasses along the stone bunds, so that the hunting birds can see the rats. If there are trees on the stone bunds they will be a sitting place for the birds from where they can look for the rats. Also jackal, *shukhanbesa* (caracal or red lynx) and other wild cats are the farmer's friends because they hunt rats.

Last but not least, there is not only soil and water conservation by stone bunds. A lot can be done by the farmer within his land, by making some furrows using wide *doogri* on his mahresha. It can be *tilmi*,

or *gamsa* or *derdar*, or conservation agriculture (see page 35).

13. Reforesting our steep slopes

Closed areas are land that is not ploughed or grazed so that the vegetation can grow again. It is good to cut the grass yearly; it can be fed to livestock and it gives space for the trees to grow. A new forest in a closed area will only grow slowly. In our woreda, Belgium is funding two projects that contribute to reforestation: Trees For Farmers project and EthioTrees project. Here are some advices regarding closed areas.

How should new closed areas be selected?

- Areas that have already some shrubs, especially those near existing forests are the best place where new trees will grow easily.
- Hilly land that is not suitable for ploughing can be kept as grazing land; but very steep hills and mountains should be converted to closed areas.

When making a closed area what shall be done with the vegetation that is already there?

- The vegetation that is there will mostly help new trees to come: for example if *kuleaw* (*Euclea racemosa*)² is present, you will see that *awlie* (African wild olive) can start growing under it.
- Closed areas with different types of trees have better chances to develop to forest.
- All trees and shrubs with fruits are important for natural forest regeneration because they attract birds that disperse the seeds from the forests to the closed areas. They should be protected very well. Examples are *andel* (*Capparis tomentosa*), *egam* (*Carissa edulis*), *h'amatrewey* (*Celtis africana*), *auwh'i* (*Cordia africana*), *kuleaw*, *shafa* and *daaro* (two fig tree species).

² In this translation, scientific names are given for most plant species of Tigray, as they do not have commonly used English names. In the original book, that is for daily use, such scientific names are not mentioned

Which management needs to be done to make a good forest?

- First close the area and if necessary plant additional trees. Local trees are preferred, but if the area is very degraded, planting *akacha* (*Acacia cyanophylla*) will help the soil to regenerate in the beginning. Do not plant *qelamitos* (*Eucalyptus* sp.) because it will smother all other trees.

- Pure patches of *gonok* or *arshamarsha* (*Dichrostachys cinerea*) should be broken open so that other trees can grow. The same is true for large patches of *beles* (*Opuntia ficus-indica*).

- Very dense patches of thorn shrubs (*seraw* or *chea*) (various indigenous *Acacia* species) should be thinned to promote tree formation. Pruning of the lower branches from the thorn shrubs also makes them grow as trees. Pruning should be done correctly, by saw or knife, and not by breaking or tearing.

You can get much more information on forestry in the book that is presented on page 43.

We know that forests are very important for the environment. They help water to infiltrate, it gives a lot of grasses and many products can be harvested from it. For instance, there is honey and *etan* (incense); they even started to produce high-value oil from it in Adi Lehtsi. Also the forest soil is very dark because there is a lot of carbon in it; keeping the carbon is good for the climate (see page 67). The EthioTrees project wants to assist the people in Dogu'a Tembien to raise income from the closed areas.

14. What can we do to control gullies?

Gullies have so many negative impacts. They destroy the farmland. Gullies are also a hindrance for people moving through the area. Gullies make the crop dry faster; just look to the edge of a farmland near a gully: that is the place where crops generally start to dry first. Gullies also make the water flushing through rapidly, what creates flooding in downstream areas.

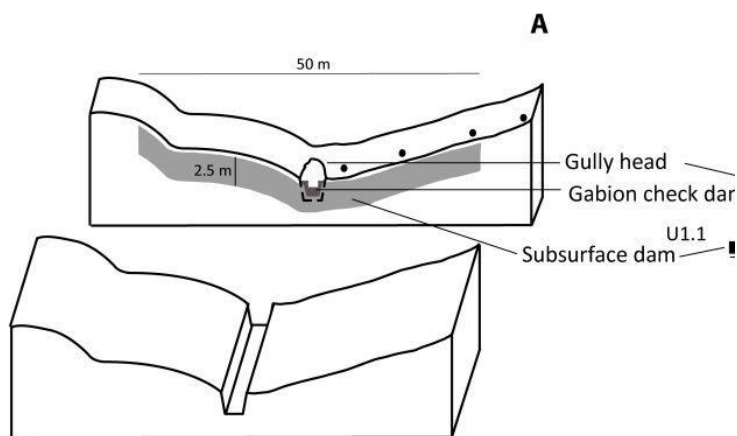
Gullies are created when there is high discharge and the water runs at great velocity. Hence, large and steep catchments without much vegetation are most at risk for gully erosion*. But we have also gullies in level areas, particularly if there is *walka* soil (Vertisol and other dark clay soils). In that case one can also see some tunnels: the water infiltrates and erodes underground; after some time the tunnel gets large and then collapses and it becomes a gully*. The reason for these gullies in level *walka* areas is

that cracks occur in the dry season; the water will run underground through these large cracks, it makes them wider and then gullies will come into existence.

Farmers all know how to work in group and to do gully control works. The most common structure is the check dam. If the government provides gabions they can also be used to make check dams. Such gabions are very expensive, so it is better to use them wisely. However, there are several problems with collapsing check dams, even if they are built in a correct way, using well-shaped stones and having spillway and apron.

One problem is in the *walka* areas: sometimes the check dam stands intact and the water creates a new gully around it. Even if is made very strong, with a lot of gabions, the gully will just round it. The reason are again the cracks in the *walka*: the water that accumulates behind the dam will start flowing through the cracks, and it will round the dam and create an underground tunnel that becomes wider and wider until collapse*. The solution is simple and

cheap, but it needs some organization. It suffices to dig a deep trench (2.5 meter deep and 25 meter long) at both sides of a check dam in a level *walka* area, and to put a heavy (blue or orange) plastic sheet in it, vertically, and then to fill the trench with soil. In this way the plastic sheet prevents any water from flowing underground through the cracks*. No more bypass will be created and the water will be ponding safely behind the check dam.



Schematic view of an underground plastic to control gully erosion in a walka area. Drawing by Dr. Amaury Frankl.

This has been implemented near Kunale (at a place called Zivan Kunale) and it works since more than 15 years, and several near Mai Beati where it works also since more than 5 years already. It can be installed in grazing land or in cropland without problems.

And then there is the problem that some of the strong gabion check dams get damaged and collapse within a few years. Of course the dams should be constructed properly, with wide spillway and with apron, and it should not force the water out of the gully bed. But even if all is done properly damage occurs. Children could take some iron wire for playing that can make the dam to collapse. But most of the damage is due to large stones rolling with the water and falling on the lower gabions and hence breaking the mesh wire. People may repair and repair, each year the wire will be damaged again; that is because gabions are not made to be used in rivers with stones and gravel, they are for sandy

rivers. It is a mistake to install gabion check dams in mountain rivers with a lot of stones*. There are two alternatives for use in mountain rivers. There is the normal check dam with loose stones, and it is best to use very large stones.



Installing a qelamitos trunk dam is as simple as this.

Photo by Seifu Gebreslassie.

Another alternative are the new *qelamitos* (Eucalyptus sp.) trunk dams. It needs less work force than check dams, but it is necessary to purchase two *qelamitos* trees per dam. The trees are cheaper than the gabions anyway, so it is an option for any

organization to buy some trees from local farmers rather than bringing expensive gabions.

If you want to know how it works, best is to go to the area of Agerba, Adawro and Hamute and to observe it in the main gullies. There are also some in the main gully down to Harena. In brief, two *qelamitos* trunks are put across the river, and on the corner they are fixed strongly by gabions. And then some large boulders are placed behind it. There is no need at all to fully close the dam with boulders, a few boulders is enough. They will be an obstacle to the flood and stones will be deposited by itself. Again a cheap and fast method.

But, there are so many structures that we can make to control gullies - which one is the most appropriate in which place? First of all, it is important to control the upper catchment as good as possible. Second when conserving a gully you must start working from the upper part. All of us know the large gabion check dams near the road in Tkul that collapse every

year because very little conservation was done in the upper catchment.

Lastly, in order to assist in the choice of structure to build, there is this decision key that will help you.

	Sandy bed	Gravel bed	Walka area
Small gully	Normal check dam	<i>Qelamitos</i> trunk dam	Normal check dam with underground plastic on both sides
Big gully	Gabion check dam	Gabion check dam with chute made of large stones	Gabion check dam with underground plastic on both sides

*How to use the table: choose whether it is a big or small gully (at left) and the type of material that is in it (on top), and that brings you to the type of dam that is most suitable **

15. Some Tigrigna words (7) –
harvest and after harvest

<i>Awidi</i>	Threshing place
<i>Etsebereket</i>	Tree branches tied as a cross, that will be put on top of the (unthreshed) straw heap in order to wish the harvest to be rich
<i>Chalba</i>	A small pit dug at the centre of the <i>awdi</i> that is used to collect the grain while threshing the crop
<i>Mesea</i>	Large wooden fork to work in the straw
<i>Kerihet</i>	Plaited basket, used as a measuring unit for grain and flour
<i>Kefer</i>	Measuring unit for grain in threshing time

<i>Sefie</i>	Sieve to separate grain from impurities
<i>Mihe</i>	Plaited sieve, well-dimensioned with relatively large spacings
<i>Menfit</i>	Plaited sieve, well-dimensioned with smaller spacings
<i>Leqota</i>	Small bag made from goat skin, typically to keep grain
<i>Abyet</i>	Large bag made from cattle skin, used to keep grain, to transport and to measure the crop yield
<i>Birea</i>	Straw of small grains
<i>Kancha</i>	Straw of sorghum or maize
<i>Kerim</i>	Straw that remains on the land after harvest
<i>Kumri</i>	Crop collection in a small heap to protect from damage
<i>Kulsas</i>	Crop collection in a large heap

that almost covers a piece of land

Abli

Nicely arranged straw that is put centrally on the top of kulsas in order to prevent unexpected rain to damage the heaped harvest

Danda

Platform made in a tree to store the straw

16. Some Tigrigna words (8) – cattle keeping

<i>Gir wetsiom</i>	When people go with their cattle to a faraway place during the rainy season
<i>Merebae</i>	Stone fencing in a remote place, so that cattle can be kept inside
<i>Golgol</i>	Flat area that is used for cattle keeping
<i>Qarsa</i>	Traditional game in group, popular with cattle keepers
<i>Gebeta</i>	Game with 18 holes, frequently sculpted in rock by cattle keepers
<i>Fato</i>	Area near the homesteads that is used for cattle waiting before entering to the homestead
<i>Korfo</i>	Recipient made of grass to collect the milk when milking the cow

Did you ever wonder about the following?

A working donkey can live 15 up to 20 years, but most donkeys in Ethiopia live less than 10 years.

Why?

17. Farmers' sayings on weather and climate

- In *kremti* (main rainy season), if there are clouds, and depending on wind direction, farmers can predict whether rain will come.
- If there is wind from the West, there will be good rain.
- If there are clouds and the wind comes from the East, there will be a short rain.
- In *azmera* (short rainy season, called *azmera* when there is much rain, and *belgi* when there is less rain), if wind is from the Northeast there will be rain. *
- If rain starts around Easter, the rains will be good enough to sow in *azmera*.
- If it rains more in *belgi*, there will be good *azmera* and *kremti* rains. *
- If cattle are happy and have sex, rain will come.

- If the goats jump here and there, rain will come.
- If birds are active, rain will come.
- If there are many bees and they change their sound, rain will come; that is the main indicator that rain is coming.
- If there is strong radiation of sunlight, there will be rain in the afternoon.*
- We have many indicators that rain is coming, but we have no indicators that drought is coming.
- But some people say: in *azmera*, if we see it raining over Saherti, there will be drought in Dogu'a Tembien.
- Now we have radio and television to help us predicting the weather.

Did you ever wonder about the following?

Sometimes the rain seems similar but it gives a very different rate of soil erosion. That is because the rain can be heavy or not heavy, and if it is heavy

sometimes there are small drops and sometimes there are big drops. The big drops create much more soil erosion*. It is difficult to measure rain drop size, but we can hear it: the more noise the rain makes on the *korkoro* (corrugated iron) roof, the more erosion there will be on the land.

* All statements with star have been researched and are proven by the research teams in Dogu'a Tembien.

18. What is global warming?

You will have heard it in radio or television: our planet Earth is warming up. This will lead to a changed climate, with consequences in all places on earth. In northern Ethiopia, scientists show that there will be somewhat more rain in the future, but also that the rain will be more intense*. So it may be necessary to be prepared for this and to have more soil and water conservation. It will also be good to do more conservation on the farmland itself, and not only on the boundaries. You will find more information about this on page 35. Besides, the temperature is getting warmer; for example in Simien and Abune Yosef mountains, on the upper farmlands they could only grow *segem* (barley) and *dinitsh* (potatoes) due to cold, but since some years it has become possible to grow *senday* (wheat) also*.

But what creates this global warming? It is mainly due to pollution of the air by industry and by cars. When there is burning of oil (but also burning of

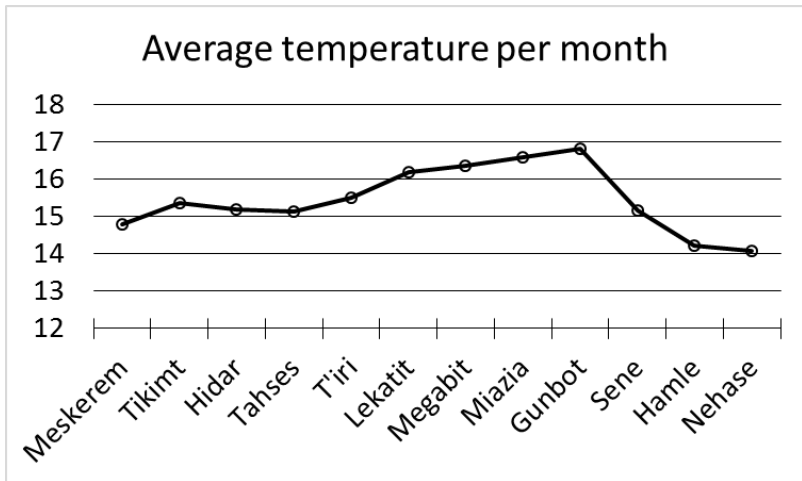
entseyti (firewood) and *faham* (charcoal)), more carbon gets into the atmosphere. This carbon in the atmosphere makes that there is less cooling in the night, so the atmosphere gets warmer. The change is slow, almost 1 degree warmer per hundred years. But this means that the whole climate on Earth gets destabilised and that more extreme events are happening, such as drought or floods.

What can be done against global warming? Definitely this is a concern for all countries in the world: in the first place we need to avoid air pollution, and to use less oil and coal. That is the reason why the Ethiopian government promotes a Climate Resilient Green Economy, which is based on energy production through hydropower, and environmental protection. Another way to decrease carbon pollution and global warming is to establish more forests all over the world. People in rich countries are even willing to pay money for those communities who protect their forest and contribute to prevent global warming. In Dogu'a Tembien such a project has also started; it is called EthioTrees.

* All sentences with a star have been researched and are proven by the research teams in Dogu'a Tembien.

19. Rain and temperature in Dogu'a Tembien

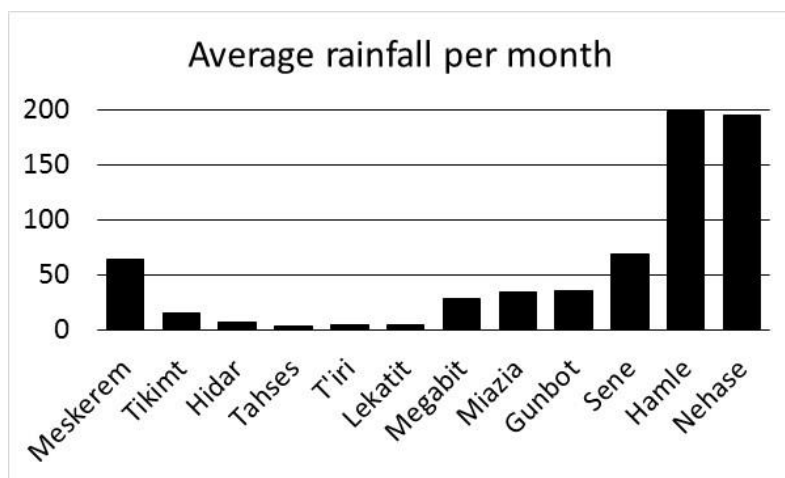
In our *woreda* there is only one full weather station, it is in Hagere Selam.



Average temperature for each month in Hagere Selam, in degrees. These are averages of all days in the month, and averages of day and night temperatures. (Meskerem starts on 11 September in the international calendar)

These temperatures are representative for the *dogu'a* area; in *hawsu dogu'a* (mid elevation) and in *kol'a*

the temperatures are warmer, but the trend through the year is the same. On the figure, we can see that it is cold in *Hidar* and *Tahses*, because the sun is low in those months, and it is also cold in *Hamle* and *Nehase* because there are so many clouds. Especially from *Megabit* up to *Gunbot* it is very hot.



Average monthly rainfall in Hagere Selam. It is expressed in millimeter, or in liter per square meter per month.

Of course, these rainfall values are averages; we all know that some years are dry and some years are wet. And that in some years there are nice *azmera* rains and in other years there is no rain at all in *belgi*.

And the rain is not the same in all places of our *woreda*. Within one event we can see that it rains in one place and not in the other. And if we sum it up over the whole year, some places are dryer and some are wetter. In our *woreda*, generally speaking it is somewhat wetter in *dogu'a* and dryer in *kol'a*. The land will also dry faster in *kol'a* due to higher temperatures. Slopes that are steeper and that are directed towards the wind direction will get more rain than the others*.

Like in all places in Tigray, the farmers in this *woreda* will adapt their cropping system to the amount of rain: *hanfets* (wheat and barley sown together) or *tef* (*Eragrostis tef*) in a normal year, *saesa* (drought resistant wheat variety) in a dry year, and *leqwa* (sorghum) in a wet year*. And of course there will be variations due to soil type: *tef* and *gwayeh* (grasspea) in waterlogged areas, beans in stony upslope areas. In southern Tigray, in a wet year they will grow even two crops in a year, but in this *woreda* we do not know any village where two

harvests in one year are possible. Unless using irrigation of course.

Have you noticed? In full summer the Sun is standing at the North, at noon. As you know, it is not the Sun that changes, rather it is the Earth that changes its position while rotating around the Sun. In summer the Earth is so much tilted that the Sun appears at the North. All countries where the Sun is very high at noon and where its position switches between North and South through seasons are called tropical countries.

20. Some Tigrigna words (9) – on
the move

<i>Mentg</i>	A rough footpath
<i>Akebet</i>	Steep footpath
<i>Kilkulet</i>	Very steep footpath downslope
<i>Hugua</i>	Hiding place
<i>Liwdo</i>	Saddle pad for donkey, made of cloth
<i>Korecha</i>	Saddle pad for horse, used for sitting or also for decoration
<i>Metsian</i>	Leather strings for loading a donkey
<i>Koo</i>	Pack saddle used for loading goods on pack animals such as donkey or camel
<i>Jirba</i>	Pack saddle used for water transportation (fetching) by donkey
<i>Wecho</i>	Traditional cloth that is used to make <i>liwdo</i>
<i>Aladi</i>	75 cents

Shilingi 50 cents

Meyzo 25 cents

Harkam It is the same as *meyzo*, but this word is only used in Agame and around Adwa and Axum

21. Some good springs all over
Dogu'a Tembien

(Numbers refer to the map on page 80)

<i>Tabia</i>	<i>Kushet</i>	Spring	No. on map
Around Hagere Selam			
Limat	Adawro	Mhtsab Alabu	1
	Agerba	Hamute	
Mahbere Slasie	Guderwo	Adi Gezaeti	2
		Mai Zeleqo	3
	Mai Mereb	Adi Anefti	4
Melfa	Maekhel Geza	Mai Ayni	5
	Mai Saeri	Shafahamba r	6
Mikael Aby	Dinglet	Mai Zahla	7
Selam	Khunale	Mai Gudgwad	8

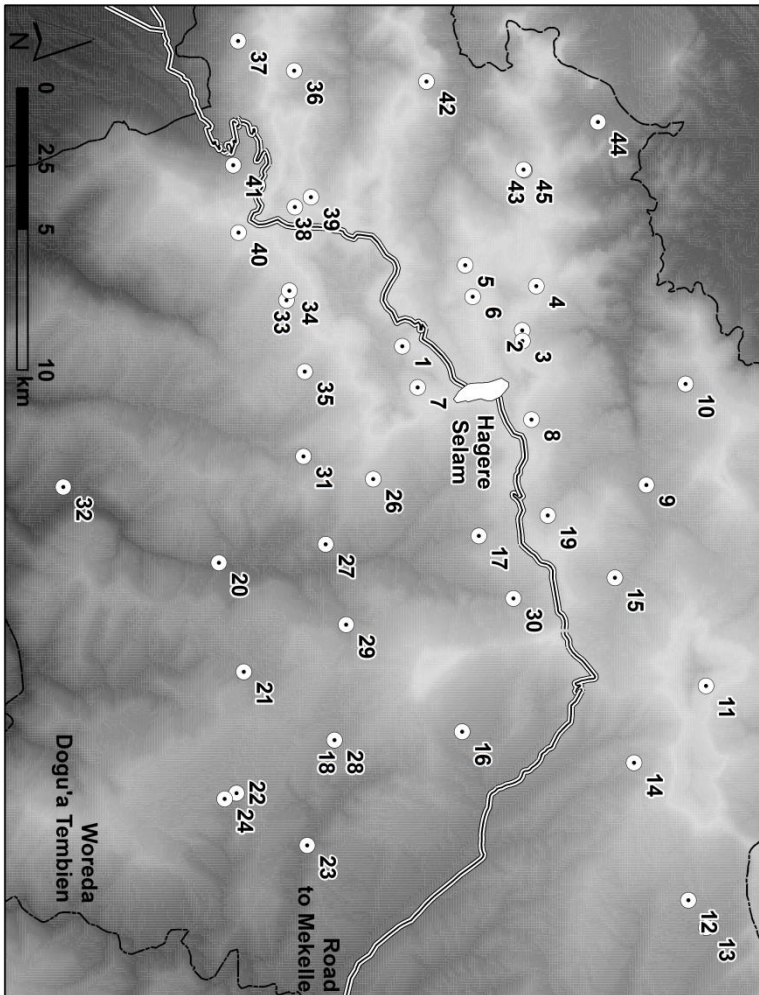
<i>Tabia</i>	<i>Kushet</i>	Spring	No. on map
To the North			
Hadnet	Adi Edaga	Adi Edaga	9
	Atsa	Mai Damo	
	Debre Medhanit	Abune Ayzgi	10
To the Northeast			
Adi Walka	Bet Mokae	Mai Dekisaeri	11
Adilal	Adigedged	Mai Chekofo	12
	Hadnet	Mai Guraerea	13
Adizmera	Zerfinti	Endarbaete Ensisa	14
Ayneme Brkekn	Adi Worat	Mai Genet	15
To the East			
Adizmera	Zerfinti	Mai Egam	16
Ayneme	Mai Beati	Mai Beati	17

<i>Tabia</i>	<i>Kushet</i>	Spring	No. on map
Brkekn	Raesot	Gemgema	18
Selam	Miheno	Mai Miheno	19
To the Southeast			
Amanit	Adi Koshefo	Adi Koshefo	20
	Mai Genet	Gudeli	21
Debrenazret	Miam Atali	Mai Kebkbo	22
		Ruba Minchi	23
	Togogua	Mai Togogua	24
	Geba river	Amdi Hechi	25
Mikael Aby	Megesta	Megesta	26
	Rubaksa	Mai Ayni	27
Mizane Brhan	Gedel Negedu	Lafa	28
	Mead	Mai Wkul	29
	Merhb	Gemgema	30

<i>Tabia</i>	<i>Kushet</i>	Spring	No. on map
To the South			
Endaslasie	Akuwaw	Mai Chelakot	31
	Debreget	Endaslasie Gedam	32
Walta	Adifert	Kalena	33
		Mai Shafa	34
	Lmat	Mai Ayni	35
To the Southwest			
Menachike	Gulha	Mai Gfay	36
		Mai Tsechy	
		Gigbana	
Mizan	Debresemat	Debresemat	37
	Kekema	Debreget	
	Tsilere	Mai Mikale	
Seret	Endamariam	Dechena	38
		Mai Weni	39
Simret	Adigumare	Mai Fata	40
	Drgza	Gunfan	41

<i>Tabia</i>	<i>Kushet</i>	Spring	No. on map
To the West			
Aregien	Kalkalai	Gubarne	42
Degol	Zala	Mai Dara	43
Weyane		Adi Welo	44
Melfa	Mai Krawa	Mai Dera	45

Map of good springs all over Woreda Dogu'a Tembien



(numbers on the map refer to the list in previous pages)

22. Holidays and *ametu*³ in Meskerem and Tikimt

Meskerem

1: all places: Kdus Yowhans - New Year

1: Godwa Yowhans (Tabia Simret)

17: all places: Meskel

24: Hala Teklehaimanot (Tabia Adiwalka)

24: Debremizan (Adi Kolqual) Teklehaimanot
(Tabia Ayneme Brkekn)

Tikimt

8: Debremizan (Mai Beati) Arbaete Ensisa (Tabia
Ayneme Brkekn)

12: Bet Mokaе Micael (Tabia Adiwalka)

³ Yearly holiday in a village; there are religious ceremonies, as well as get-togethers in all houses of the village. Relatives and close or far friends will visit the village on that day in large numbers. The lists in these pages are constructed based on date and names of village, church saint, and municipality between brackets.

12: Debregenet (Hechi) Micael (Tabia Ayneme Brkekn)

12: Adisalem (Raesot) Micael (Tabia Aynemebrkekn)

12: Marafjeganu (Alaesa) Micael (Tabia Aynemebrkekn)

12: Miam Atali Micael (Tabia Debrenazret)

12: Mishlam Micael (Tabia Debrenazret)

12: Debregenet Micael (Tabia Endaslasie)

12: Debregenet Endamicael Endabahadera (Tabia Endaslasie)

14: Bet Mokae (Thiwa) Abne Aregawi (Tabia Adiwalka)

14: all places: Debra Damo

14: Hala Abne Aregawi (Tabia Adiwalka)

14: Adikoshefo Abne Aregawi (Tabia Amanit)

14: Adiamday Abne Aregawi (Tabia Arebay)

14: Mtsilal Afras Abne Aregawi (Tabia Emni Ankelalu)

14: Adi Edaga Abune Aregawi (Tabia Hadnet)

14: Godwa Mariam (Tabia Simret)

21: Debregunful Mariam (Tabia Endaslasie)

23. Holidays and *ametu* in Hidar and Tahses

Hidar

- 3: Debrebrhan Mariam (Tabia Menachike)
- 6: Mtsilal Afras Kuskam Mariam (Tabia Emni Ankelalu)
- 8: Zerfinti Arbaete Ensisa (Tabia Adizmera)
- 8: Kelkelay Arbaete Ensisa (Tabia Aregien)
- 8: Endamariam Arbate Ensisa (Tabia Seret)
- 12: Hadnet Micael (Tabia Adilal)
- 12: Tkul Micael Mesenkoy (Tabia Adizmera)
- 12: Arebay Micael (Tabia Arebay)
- 12: Kelkelay Micael (Tabia Aregien)
- 12: Debre Medhanit Micael (Tabia Hadnet)
- 12: Azef Micael (Tabia Hadnet)
- 12: Adawro Micael (Tabia Limat)

12: Guderwo Micael (Tabia Mahbereslasie)
12: Mai Krawa Micael (Tabia Melfa)
12: Endamicael Micael (Tabia Seret)
18: Drgza Abne Samiel (Tabia Simret)
19: Gedelnegedu Gebreal (Tabia Mizanebrhan)
19: Elala Gebreal (Tabia Simret)
21: all places: Mariam Tsion
21: Adilal Mariam (Tabia Adilal)
21: Zerfinti Mariam (Tabia Adizmera)
21: Segenet Mariam (Tabia Amanit)
21: Aregien Mariam (Tabia Aregien)
21: Adi Edaga Mariam (Tabia Hadnet)
21: Hayelom Mariam (Tabia Hagere Selam)
21: Guderwo Mariam (Tabia Mahbereslasie)
21: May Mereb Mariam (Tabia Mahbereslasie)
21: Megesta Mariam (Tabia Micael Aby)
21: Hadnet Mariam (Tabia Micael Aby)

24: Endamariam Teklehaimanot (Tabia Seret)

27: Limat Medhane Alem (Tabia Walta)

28: Elala Amanial (Tabia Simret)

Tahses

3: Togogua Baeta Mariam (Tabia Debrenazret)

3: Megesta Baeta Mariam (Tabia Micael Aby)

8: Kunale Arbate Ensisa (Tabia Selam)

12: Mai Krawa Abune Samiel (Tabia Melfa)

12: Betmara Micael (Tabia Menachike)

12: Tsilere Micael (Tabia Mizan)

12: Mashih Micael (Tabia Seret)

19: all places: Kulibi

19: Tkul Gebriael (Tabia Adizmera)

19: Harekuwa Gebriael (Tabia Mahbereslasie)

19: Hadnet Gebreal (Tabia Micael Aby)

21: Gulha Mariam (Tabia Menachike)

- 21: Kekema Mariam (Tabia Mizan)
- 21: Endamariam Mariam (Tabia Seret)
- 21: Adifert Mariam (Tabia Walta)
- 21: Nawate Mariam (Tabia Walta)
- 24: Hadnet Teklehaimanot (Tabia Adilal)
- 24: Adifert Teklehaimanot (Tabia Arebay)
- 24: Miam Atali Teklehaimanot (Tabia Debrenazret)
- 24: Agerba Teklehaimanot (Tabia Limat)
- 24: Mashih Teklehaimanot (Tabia Seret)
- 28: Hatsey Yowhans Amanial (Tabia Degol Weyane)
- 28: Debre Medhanit Amanuel (Tabia Hadnet)
- 29: all places: Lidet

24. Holidays and *ametu* in T'iri

- 1: Kolal Estifanos (Tabia Debrenazret)
- 3: Tenseh Libanos (Tabia Selam)
- 4: Togogua Yowhans (Tabia Debrenazret)
- 4: Harena Yowhans (Tabia Micael Aby)
- 4: Debre Semat Yowhans (Tabia Mizan)
- 5: Selam (Adi Keweylo) Enda Gabr (Tabia Ayneme Brkekn)
- 5: Mekmat Awra Abagabr (Tabia Emni Ankelalu)
- 5: Akuwaw Endagabr (Tabia Endaslasie)
- 5: Drgza Endagabr (Tabia Simret)
- 6: Selam (Wahte) Endayesus (Tabia Aynemebrkekn)
- 6: Limat Endayesus (Tabia Walta)
- 7: Hadnet Slassie (Tabia Adilal)
- 7: Kelkelay Slasie (Tabia Aregien)
- 7: Adisalem (Raesot) Slasie (Tabia Aynemebrkekn)

- 7: Mishlam Slassie (Tabia Debrenazret)
- 7: Mtsilal Afras Slasie (Tabia Emni Ankelalu)
- 7: Atsa Slassie (Tabia Hadnet)
- 7: Maigua Slassie (Tabia Limat)
- 7: May Mereb Slasie (Tabia Mahbereslasie)
- 7: Maedi Slasie (Tabia Mizanebrhan)
- 7: Miheno Slassie (Tabia Selam)
- 7: Adigumare Slasie (Tabia Simret)
- 7: Elala Slasie (Tabia Simret)
- 11: all places: Timket
- 12: Tkul Micael (Tabia Adizmera)
- 12: Mtsilal Afras Micael (Tabia Emni Ankelalu)
- 12: Merhb Micael (Tabia Mizanebrhan)
- 12: Gedelnegedu Micael (Tabia Mizanebrhan)
- 12: Didben Endayesus (Tabia Walta)
- 15: Bet Mokae (Thiwa) Cherkos (Tabia Adiwalka)
- 15: Maigenet Cherkos (Tabia Amanit)

15: Azef Cherkos (Tabia Hadnet)
15: Godwa Cherkos (Tabia Simret)
18: Hadnet Gewergs (Tabia Adilal)
18: Sesemat Gewergs (Tabia Adizmera)
18: Limat Gewergs (Tabia Amanit)
18: Adifert Gewergs (Tabia Arebay)
18: Mishlam Gewergs (Tabia Debrenazret)
18: Akuwaw Gewergs (Tabia Endaslasie)
18: Menachike Gewergs (Tabia Menachike)
18: Rubaksa Gewergs (Tabia Micael Aby)
19: Didben Abne Ayezgi (Tabia Walta)
21: Hatemti Mariam (Tabia Adiwalka)
21: Kelkele Mariam (Tabia Adiwalka)
21: Adiamday Mariam (Tabia Arebay)
21: Tsadkan Mariam (Tabia Aregien)
21: Debregenet (Tsigaba) Mariam (Tabia Ayneme
Brkekn)

21: Adisalem (Halah) Mariam (Tabia Ayneme Brkekkn)

21: Selam (Adeksiyat) Mariam (Tabia Ayneme Brkekkn)

21: Debrebrhan (Adi Worat) Mariam (Tabia Ayneme Brkekkn)

21: Miam Atali Mariam (Tabia Debrenazret)

21: Seret Mariam (Tabia Degol Weyane)

21: Mekmat Awra Mariam Tsemora (Tabia Emni Ankelalu)

21: Agerba Mariam (Tabia Limat)

21: Maekele Geza Mariam (Tabia Melfa)

21: Rubaksa Mariam (Tabia Micael Aby)

21: Kerene Mariam (Tabia Mizan)

21: Mashih Mariam (Tabia Seret)

25. Holidays and *ametu* from Lekatit up to Gunbot

Lekatit

16: Adigedged Kidane Mhret (Tabia Adilal)

16: Kelkele Kidane Mhret (Tabia Adiwalka)

16: Mtsilal Afras Kidane Mhret (Tabia Emni Ankelalu)

16: Debregenet Kidane Mhret (Tabia Endaslasie)

16: Atsa Kidane Mhret (Tabia Hadnet)

16: Harekuwa Kidane Mhret (Tabia Mahbereslasie)

16: May Mereb Kidane Mhret (Tabia Mahbereslasie)

16: Megesta Kidane Mhret (Tabia Micael Aby)

16: Tenseh Kidane Mhret (Tabia Selam)

Megabit

5: Mihini Aba Gabr (Tabia Adizmera)

5: Harena Endagabr (Tabia Micael Aby)

8: Drgza Zelibanis (Tabia Simret)

27: Kelkele (Hazgi) Medhane Alem (Tabia Adiwalka)

27: Sesemat Medhane Alem (Tabia Adizmera)

27: Zerfinti Medhane Alem (Tabia Adizmera)

27: Tsadkan Medhane Alem (Tabia Aregien)

27: Marafjeganu (Alaesa) Medhane Alem (Tabia Aynemebrkekn)

27: Mishlam Medhane Alem (Tabia Debrenazret)

27: Harekuwa Medhane Alem (Tabia Mahbereslasie)

27: Gulha Medhane Alem (Tabia Menachike)

27: Kerene Medhane Alem (Tabia Mizan)

Miazia

27: Hagere Selam Medhane Alem

Gunbot

1: Dingilet Ldeta Mariam (Tabia Micael Aby)

- 19: Adilal Abune Ayezgi (Tabia Adilal)
- 19: Hala Abne Ayezgi (Tabia Adiwalka)
- 19: Bet Mokae (Thiwa) Abne Ayezgi (Tabia Adiwalka)
- 19: Kelkelay Abne Ayezgi (Tabia Aregien)
- 19: Kolal Abune Ayezgi (Tabia Debrenazret)
- 19: Debre Medhanit Abune Ayezgi (Tabia Hadnet)
- 19: Kekema Micael (Tabia Mizan)

26. Hamle: tree planting time

Planting trees in gullies

Planting trees in a gully is good, because it makes the area productive and it contributes to restoration. But of course first the gully needs to be well controlled (see page 52). Then the simple fact of protecting it from livestock and wood harvesting allows it to regenerate rapidly, also because there is more water than in other places in the landscape. See this gully in Adi Kolqual:

Before closing:



After closing one year:



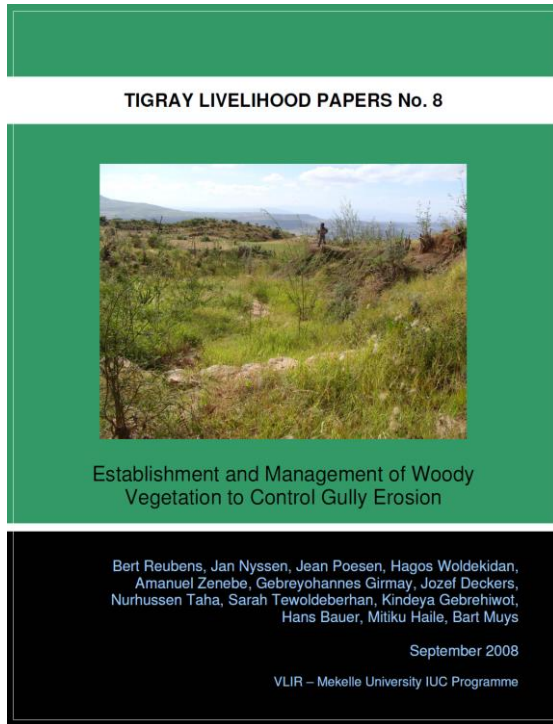
(these photos were made by Dr. Bert Reubens who did much research in that area)

Keeping out grazing animals from vulnerable places is a very important management rule: before planting, that is the first thing to do. Recovering vegetation protects the soil surface against further erosion. A mixture of both naturally growing and planted trees is then most efficient to further control the gully. The treatment of planted seedlings will depend on the selected species and the local conditions, but there are some basic rules. Everything starts with a good planting technique: treat the seedlings well, carefully prepare the planting holes (on slopes it is best to add a half moon

structure), ensure soil coverage of seedling roots, and water the seedlings after planting.

If time, material and budget are available, sheltering seedlings can be very beneficial.

You have some good examples of such controlled gullies in Adi Kolqual, Adi Worho, Dingilet and many other places.



This book on using vegetation to control gullies was prepared by the Belgium projects and Mekelle University. It is also available in Tigrigna language.

Planting apple trees

In the lowlands, the farmers can grow many fruits such as banana, mango, orange or lemon, but in the highlands there are not so many possibilities. For that reason the apple trees have been brought. There are specific trainings and manuals for apples, but here are some ideas about its importance and its management.

- Apple is a tree that needs grafting, just like orange. *Gbrna* (Bureau of Agriculture, the word refers particularly to the local office in Hagere Selam) is doing such grafting in nurseries and also Romha Assefa in Adi Koylo.
- Apple is a tree that needs a cold season so that the leaves can fall; with the new leaves there will also be flowers.
- As we have two cold seasons in a year (see page 69) it is possible to have fruit twice in the year; for example with varieties like Jonagold or Ana.
- During the cold season the leaves will hang down and shrink; most of the leaves will fall and the farmer may rip the other leaves carefully off the branch.
- In the dry season apple needs some watering, just like *gesho* (*Rhamnus prinoides*).
- The apple tree needs sunshine, so do not plant it in the shade of *qelamitos*.
- The apple tree needs to be opened up; one can do that by bending the branches and by pruning.

- Apple fruit gives a good price in the market but you can also eat it in the family. Some people say that the taste is in between lemon and banana.
- To see whether the fruit is ripe: when cutting the apple, the seeds inside should be brown in colour and not white.

27. Holidays and *ametu* in Hamle and Nehase

Hamle

5: all places: Hawaria⁴

7: Debregunful Slasie (Tabia Endaslasie)

8: Mai Krawa Abune Kiros (Tabia Melfa)

8: Kunale Abune Kiros (Tabia Selam)

26: Zala Daba Selema (Tabia Degol Weyane)

26: Mekmat Awra Abuneselema (Tabia Emni
Ankelalu)

26: Atsa Abune Selema (Tabia Hadnet)

26: Adigerahti Abune Selema (Tabia Limat)

26: Hadnet Endaba Selema (Tabia Micael Aby)

⁴ This religious holiday is the occasion for the boys to celebrate. Starting early morning they will move to vantage points around the village and compete in producing most sounds using a whip.

Nehase

13: Rubaksa EgziabherAb (Tabia Micael Aby)

16: all places: first day of Ashenda ⁵(Filseta)

17: all places: second day of Ashenda (Filseta)

18: all places: third day of Ashenda (Filseta)

19: all places: fourth day of Ashenda (Filseta)

20: all places: fifth day of Ashenda (Filseta)

21: all places: sixth day of Ashenda (Filseta)

22: all places: seventh day of Ashenda (Filseta)

⁵ In origin a religious ceremony, *Ashenda* is also the girls' holiday when they sing and dance in group in the village. It is also the opportunity to sing freely all the good and bad things that they know about adults. To our knowledge an anthology of such songs has never been made. (<https://en.wikipedia.org/wiki/Ashenda>)

28. Women's empowerment

In two dozens of years so much progress has been made with regard to women's rights, in Dogu'a Tembien: about schooling, about early marriage, about female genital cutting.

Ethiopia's constitution and national policies are now the same as the international laws on gender equality. The Ethiopian constitution guarantees the rights of women as equal to those of men in all aspects, including equality in marriage, the right to equal employment, the right to property, and the rights to family planning and education.

This equality between men and women, and between boys and girls, is one of the central pillars of the Growth and Transformation Plan. A new Federal Family Code, based on the principle of gender equality also came into effect. It raised the minimum age of marriage from 15 to 18 years and established the rights of women to share any assets the household had accumulated. The Ethiopian penal

code states that it is a crime to beat one's wife, and also harmful traditional practices such as early marriage, abduction and female genital cutting are considered as crime.

Very practically, in our woreda, family planning activities are ongoing, female genital cutting is prohibited, and almost all children are going to school.

Yet a lot remains to be done, just think about the number of girls who stop going to school at grade 8. It is true that there is progress, but many practices still do not fit with the good general objectives!

29. Catchment management

The farmers know how to manage their land very well and there is nowadays also a good knowledge on how to manage the land on the scale of the *kushets* also. If we implement all this knowledge together, with common agreement on how to manage the land in the future and how to share costs and benefits, we call it *mefases* (catchment) management. Some of the things that can be integrated are the following:

- Protection of the farmlands' soil by good crop cover throughout the rainy season.
- Control of soil erosion through good land management and tillage practices.
- Stabilization of soil erosion through specific slope treatment measures such as stone bunds, terraces and furrows in the farmland (*terwah, derdar, gemsu*), see page 33.

- Maintenance of organic matter in the soil and soil fertility through manuring, crop rotation and control of land degradation.
- Revegetation or maintaining remnant vegetation in waterways and valley bottoms and eliminating grazing from these areas. See page 95.
- Control of grazing and revegetation of community land. If possible, and if it are areas away from the houses, zero grazing on farmland is a good option: the soil becomes so soft and infiltration is so easy.
- Another interesting idea is to divert the water from the gully onto closed areas: there will be fewer floods in the gully and the trees in the closed areas are watered without effort. In the area of May Ba'ati and Adi Kolqual such diversions have been prepared at several places.
- Improvement of infiltration can be done by maintaining grass strips at farm boundaries, and try to grow trees on it. If you look to some of the villages in our woreda, particularly in *hawsu dogu'a* areas, you see that people have maintained lots of

trees on the farmland boundaries. These can be local trees, but sometimes also new species such as *suspania* (*Sesbania sesban*). Overall, it will help a lot if cattle are not roaming around on farmlands and if people and children are not cutting every tree that tries to grow.

The idea behind all this is that crops will grow better, vegetation will grow better, less water will flow down the rivers, and more water will be available in the springs.

Many activities in that sense take place in our woreda, including the work of projects such as May Zeg-zeg and Selam Watsani.

About the authors

Mister John is known by this name in Dogu'a Tembien since 1987 E.C. Native from Belgium, he has been doing research in most *tabias* of our *woreda* and lives much time in Hagere Selam. He has also been lecturing in Mekelle University, and after that he became a senior professor in a Belgium university. His formal name is Professor Jan Nyssen, but in Dogu'a Tembien, he works with the farmers and all people call him Mister John. When he goes to Mekelle, the people over there will call him *Wedihagereselam* (Son of Hagere Selam).

Ayte Romha Assefa was born in Adi Koylo, and he grew up in that village, where he learnt a lot of local knowledge from his father and mother. His father Assefa still ploughs his land himself and he is so happy to contribute to all researches going on. When the research teams were in their village, Romha presented himself as a fieldworker, and then he became translator, and then student in Mekelle

University, and then he managed the Ma'ar project. Nowadays he works in REST (Relief Society of Tigray) in Mekelle and he is responsible for the new crop insurance programme.

Ayte Seifu Gebreslassie is also living since many years in our woreda. He is a forester and he is very strong in this capacity, both in theory but also practically as he has been working in different offices. Seifu knows all kushets in our woreda and the people who are living there. He was an expert in the woreda, then he coordinated the Selam Watsani project, and now he is responsible for EthioTrees project that produces incense oil and obtains carbon credits for the villages that do good management of their closed areas.