



## Fish In The Tea



**T**ravelling through the vast tea estates of Southern Malawi, you might believe that this rolling emerald-green country will continue forever. Yet you know this cannot be so because, before coming to this corner of the country, you travelled through the 'standard' southern African landscapes: small villages, fields being prepared for the next season, and banana groves. Made up of a little bit of many things in fact, but still predominantly brown in colour, as the rainy season ended many months ago.

**B**ut when the tea plantations do end, as this one has, the landscape you see is probably very different from the one you expected. Suddenly, in between groves of bananas are small greenish ponds, with yellow water pipes running alongside them and green fields of maize—remarkably green considering that this is long before the rains.

**I**f you care to stop and learn more, what will surprise you most is probably the fact that the ponds are for fish. Some of them contain so many fish that the surface of the water ripples—a sport fisher's paradise. But these ponds are for professional fishers. As any of the fish farmers will tell you, they are not kept for fun, but for survival and because the owners wish to improve their lives. Their importance is obvious once

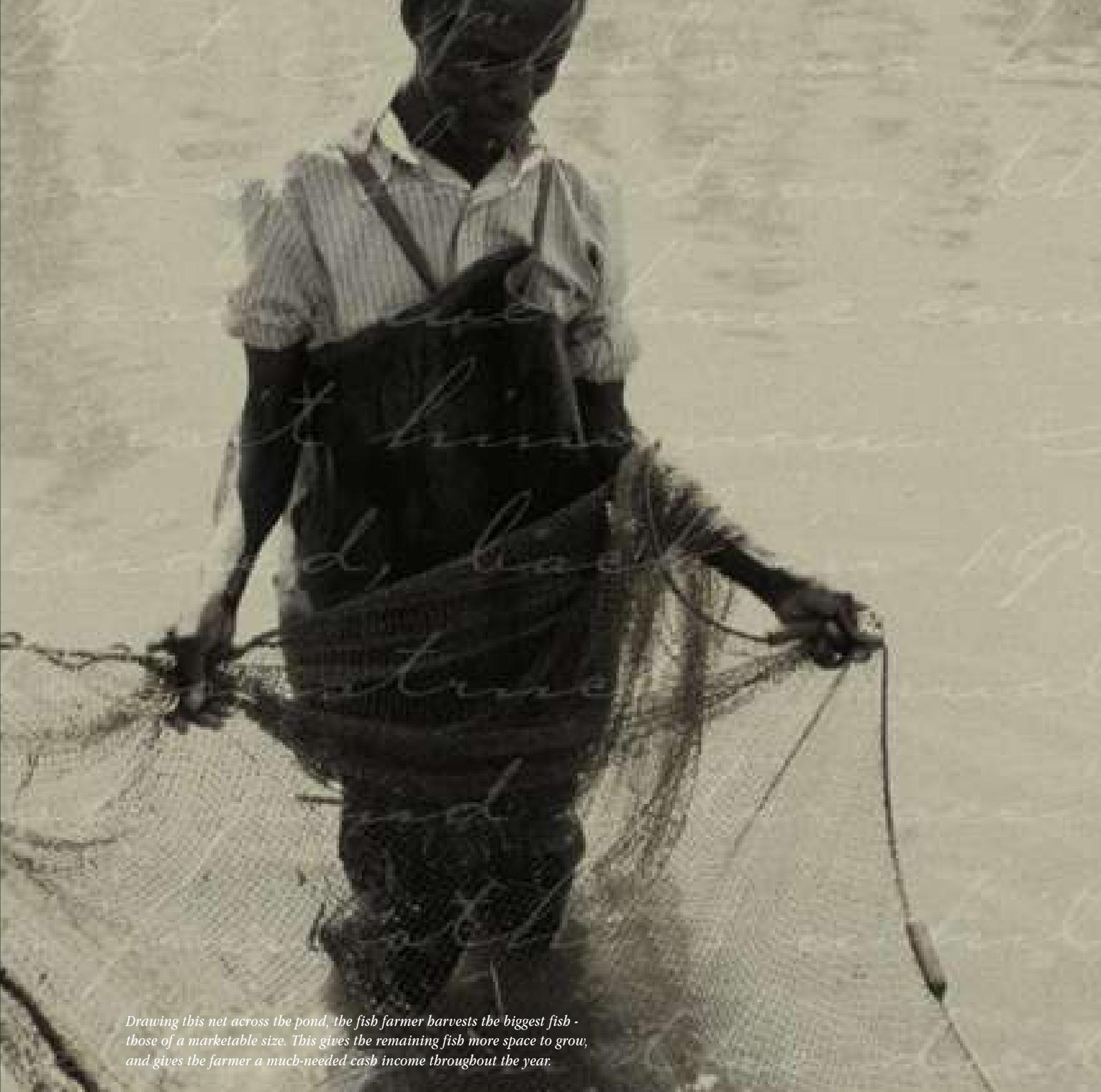
you know how difficult food production is these days in Malawi, because the rains have failed for two consecutive years.

### *A busy car park*

**W**e are in Mlenga Village in the Thyolo district, bordering Mozambique. The area is also known as Changata, the name traditionally used. It is a typical rural area: clay brick houses, thatched with long grasses, and rough roads fit for only the most rugged cars, and completely impassable by car during the rains. So, there is not a car around, though we can hear a lorry negotiating a rocky track somewhere in the distance, and the odd bicycle passing by. There are plenty of pedestrians though, carrying bundles of firewood on top of their heads or returning from the field carrying their hoes. So why here, of all places, is there what at first glance looks like a spacious earthen car park?

"It couldn't possibly be a car park" is your first reaction. But, surprise surprise, this is exactly what it is. The owner of the farm was a little worried that his visitors might have trouble parking their minibuses and four-wheel-drive jeeps on the road. He did not want them to block the road, even though the traffic that dares to come this way is, to say the least, not very intense. So, with his usual inventiveness, he constructed a raised car park which can hold seven to eight cars at a time. What might surprise you even more is that it is sometimes full up, but we will come back to that later.

**F**irst, let us meet 42 year old Friday Limited Nikoloma. Once you have learned a little more about this man, you will probably wonder if his middle name should have been 'Unlimited' or 'Ideas'. Nikoloma took over part of his parents' farm as a young man. He worked this piece of hilly land to produce the rainfed crops that are usual around here, and



*Drawing this net across the pond, the fish farmer harvests the biggest fish - those of a marketable size. This gives the remaining fish more space to grow, and gives the farmer a much-needed cash income throughout the year.*

also grew some vegetables using the moisture left over in the soil after the harvest. These techniques are traditional and not very lucrative. What is more, in years when the rains are poor, these crops are very vulnerable—Nikoloma's neighbours, and many other people who still follow these practices in the countryside, will verify.

But Nikoloma had one of his ideas, the reason we have come to visit him now. He decided, back in 1985, to construct a small fish pond after seeing a few others while travelling in the district.

### *Starting from scratch*

During its first year, Friday's small fish pond worked reasonably well. He diverted water from a nearby spring, and snatched advice from the few people he knew who had ventured into aquaculture, which had only been established in the country in the early 1960s. To collect fish to stock his pond, he walked 60 km to the river. But during the next year he began his career as a professional fish farmer. So, when buying fingerling tilapia from a fish trader he took the opportunity to discuss his work. This man was in steady contact with aquaculture officials from the Malawi Fisheries Department, who have an experimental station at Domasi, some hours' drive north of Friday's farm. As it happened, they were planning to run a course in pond management designed for up-and-coming fish farmers.

It was at this time that WorldFish Center began the work of transferring to Africa some of the excellent, age-old pond-fishery methods that have been developed in Asia. The Center knew full well that the technology from Asia would have to be adapted quite a lot to fit the needs of Malawi.



*This clearing pond is the heart of Friday Limited Nikoloma's fish farm. From here, water is channelled downhill through pipes, filling his ponds and providing his fields and animals with water.*



*Nikoloma's neighbours no longer face a long walk to the river to wash their clothes and dishes. Their clever neighbour has extended the irrigation system fed by his fish ponds and now 'pumps' water to them.*

The 1986 course turned out to have been planned with just the right combination of partners: a generous German donor (GTZ), a first-rate international scientific institution and a local authority with an intimate knowledge of what techniques work best here. Just ask Nikoloma, who will tell you that he was taught almost everything he needed to learn about fish farming in the two-week course at Domasi. As Nikoloma's success proves, the course must have been extremely good.

### *Plenty of news*

Many times during the course, the trainers must have put the mysterious abbreviation IAA on the blackboard in their redbrick classroom. The last two letters actually cover words familiar to all those sitting in the classroom: 'agriculture' and 'aquaculture'. The first letter stands for an unfamiliar word, however: 'integration'. Until he attended the course and learned the word, Nikoloma regarded fish ponds as an add-on to the farm. Something which it would be nice to have as a sideline, and hopefully giving an income and providing better food for the family. Now Nikoloma knows different.

If you walk around Nikoloma's farm with him, he will take you up the hill to learn the meaning of IAA. Up here is the spring, which produces clear water all year round. Some of this water disappears into a broad plastic pipe which then dips underground. If you walk downhill, following the underground course of the pipe, you will soon come to a small basin. This functions as a clearing pond, capturing things that might have crept into the water on its downhill journey. From this basin, the water here splashes into a fish pond containing fresh water.

*The water has a slight green shade. This is not surprising when you notice that, in a corner of the basin, is a small fenced area holding grasses, leaves and other left-overs from Nikoloma's farm. These are either eaten by the fish or rot down, providing a fertiliser for the algae. But this alone would not be enough to promote the algae needed to feed the fish. So Nikoloma keeps ducks. A few of his ten ducks are swimming around now. Though they snatch some of the algae, they also fertilise the waters with their droppings, and so increase plant growth.*

*Still, even this will not always produce enough feed for the growing fish. But, if you follow Nikoloma further downhill, he will lead you to some small plots where he grows vegetables, like cabbage. Some of these will go as supplementary feed to the fish in the eight ponds he has now built. These, altogether, take up about one third of an acre out of the five acres he owns or rents.*

*Nikoloma will also tell you that maize bran works well as feed. Usually he has to buy some of this, as he does not devote much land to maize because it fetches a low market price. But this is not the only way that agriculture contributes to his fish ponds. He also uses manure from his goats, chickens and rabbits, as these work well as fertilisers.*

*If you continue to follow the water pipes, you will learn that Nikoloma has masterminded a whole irrigation network by connecting the main pipe, leading down from the fish pond, to thinner pipes leading to irrigation canals. This is the contribution that aquaculture makes to agriculture. And this was all—more or less—in his basic course back in 1986.*



*Near the edge of the pond, Nikoloma has built a small cage of branches. The grass cuttings and other weeds it contains will fertilise algae in the pond, so helping to feed the fish. Plus, they are a great place for fish fry to hide and grow.*



*By connecting his standard water pipes to narrower pipes as the water flows downhill, Nikoloma realised that he could create enough pressure to power a sprinkler system and irrigate his fields.*

## *Farmer, engineer, entrepreneur...*

If you pass by one of Nikoloma's banana plots, be prepared to jump for shelter. You might easily be hit by a shower of water from a sprinkler rotating behind the big leaves of the banana trees. "A sprinkler" you may wonder, "is that not something which needs a modern water system, with water pumps and electricity?" But there are no wires around here, no electricity for miles. So, how does this sprinkler work?

Well, Nikoloma did some hard thinking. He knew that taking the water downhill was fairly simple. The real problem was lifting it to the fields, above the piping. Making a sprinkler system was a different, and even more difficult, problem. But Nikoloma solved this by running the water from the regular-sized pipes into very narrow pipes, so accumulating a lot of pressure. Enough pressure, in fact, to power the sprinkler. This was something he never learned on his course.

Seeing that this worked well on his own farm he extended the piping, lifting it uphill again to overcome a barrier and leading it from there, underground, down to his parents' house, several hundred metres away. Here he opened two lines to different parts of their homestead for irrigation—so on their farm you will also see green when almost everything else around is brown. Still, Nikoloma actually allows his neighbours to take water when his parents can spare it. So, there are other dots of green around.

The neat thing is that villagers also come here to fetch water to do their washing at home. Some even wash their clothes at the concreted areas he has organised. Before this, the villagers had to carry water from the river far below the village, from where they still take their drinking



*Nikoloma's neighbour inspects her fish pond and realises that it contains too much plant life, and this might kill her fish. Luckily, she has been given good advice, and the problem is easy to solve.*

*water. The whole story sounds like a successful aid project or a useful Government scheme, yet it all came out of the Nikoloma family's pocket.*

*Nikoloma's neighbours have visited and viewed his project with interest. Now, many are also taking up fish farming and grasping the concept of integrated farming. Because of Nikoloma, they have seen that a farmer who is on top of water management on his farm can produce even in years when the rains fail.*

*For many small farming families, years with poor rains have raised the question of survival: at Nikoloma's house this was never a question. He and his wife do well and take good care of their ten children. Friday even helped out his parents when, earlier in the year, they were in dire need because their barns were empty and the green maize was not yet ready to be picked.*

*... teacher*

Nikoloma is keen to teach people the techniques he uses; he invites people to drop by, and encourages them to take up his trade. He gives a lot of advice, all of it free. Visiting a neighbouring farmer, newly established as a fish farmer, Nikoloma points out to us that there are problems with the farmer's ponds: 'integration' is working a bit too well here.

A lot of waste from the farm is floating on top of the first of the farmer's two ponds, and the colour of the water is really too dark. The specialists can give you a simple yardstick to measure the colour of pond water. Roll up your sleeves and put your arm into the pond. If your fingertips disappear from sight when the water is just below your elbow, just right. If it disappears before that, or only after you have dipped most of your

arm into it, there is too much or too little nutrition in your pond: stop fertilising and feeding for a while or add more as appropriate.

Here, there is no need for any of us to roll up our sleeves: the water is obviously far too dark. The problem is worse in the lower of the two ponds. This is fed by spill-over water from the higher pond, so the water here is of an even worse quality. Friday tells the farmer all this, but he also tells him how to fix the problem. The simple solution, he explains, is to branch a pipe from a small brook a few metres away into the two ponds, feeding each pond with fresh water.

Specialists from the WorldFish Center will tell you that Nikoloma often takes his bicycle and travels to farms which are even further away, in order to share his knowledge of IAA. So, his name is becoming a household word around in this area.

Is Nikoloma wasting many hours which might be better used? No, his generosity makes sound business sense, as we shall see. And this is where the car park comes in. Aquaculture experts have visited the Nikoloma family very often since he started his business and have learnt a lot in the process. They have been allowed to drop by with students, visitors and colleagues from Malawi and elsewhere, so that the specialists can listen and learn. Even if this is not registered as a training institution, it would not be out of place to set up a signpost by the road pointing to The Mlenga Open Air IAA School.



*So many scientists come to observe and learn Nikoloma's fish-farming techniques that the car park he built for them is often full.*



*Though the irrigated tea fields end here, the landscape in the distance is still green. This land belongs to a fish farmer in southern Malawi and, irrigated by the water from his fish ponds, remains green even during the dry season.*

*- and businessperson*

It is quite obvious that Friday enjoys showing people around and answering questions. And there is no doubt that he is a most helpful neighbour for the people around here. But if you ask him how he can spend so much time and money on the needs of other people, he will give you direct answers. His generosity is also, very much, a form of marketing. He is one of the few people around who has been able to produce fish fry from a popular tilapia species: so his fingerlings are in demand. By spreading the idea of IAA, he is creating new customers all the time. This year, he sold his juvenile fish for US\$ 1,000 altogether; even the WorldFish Center is among the customers. Is that much money in Malawi? Yes. Certainly you will think so when you learn that the daily minimum wage for a labourer here is somewhat below US\$ 1.

And the pipes for the village water? Well, though this project is less than a year old, the people downhill are gradually getting used to an easier life and better agriculture. So, in the near future, he will ask them to share in the cost of the piping, quite a large amount actually, and to participate in maintenance, if they do not want to be disconnected.

Some of the people will definitely use the new water supply to grow vegetables—everyone is going for that during this season. Everywhere along the road you are offered mountains of delicious tomatoes. But Nikoloma is doing nothing of the sort on his homestead. Vegetables are fetching a low price right now, when there is an abundance for sale. He will wait till the rainy season comes, when everyone else will use their land for maize. In his opinion, this is the time to grow tomatoes. He is quite happy to show you the field that is being prepared for just that purpose, as well as the water-pipes which are being made ready in case the rains are sparse once again.

*But more to come*

If you ask Nikoloma's family about their aspirations for their future, they might take you to a small grove of eucalyptus trees at the back of the farm. Here they are growing the timber for the new house they are saving for. However, this improvement project competes with their need to invest in the farm. But, they are confident that the new house will be completed over the next few years.

But, some other dreams the family have for the future have already materialised. The children who are of school age are now all attending the nearby primary school: some are now above the level attained by Friday and his wife. The family foresees that some of the children will continue on to secondary school, and maybe seek employment in town. But, if you look at the older children shouldering their share of the farm work, it looks as if the future of the farm is in good hands.