



McDonald's Europe Flagship Farms

Wheat – Friedrich Haase, Latvia

Introduction

Friedrich Haase moved from Germany to Latvia in 2003 and started his farming operation with 100 hectares of land. This has since grown to 4,100 hectares with 24 full-time employees. Here he describes how good management and strategic investment in infrastructure, technology and staff, has allowed him to grow the business and provided the opportunity to work collaboratively with Dobeles and Tartu Veski Mills.

The key initiatives on the farm are:

- Friedrich purchased land in this specific area of Latvia because of the low agricultural land values. Land prices in this region have been adversely affected by limited financial investment, infrastructure and management which have resulted in a loss of soil productivity and quality e.g. poor field drainage maintenance leading to water logged soils.
- To help improve the soil health and structure, the farm has introduced a number of practices to increase soil organic matter (SOM) levels and improve the positive effect this has on several elements of the soil's properties, such as nutrient cycling, biological activity and water retention. Crop residues such as cereal straw and cover crops are incorporated into soils to increase the available organic material and cultivations are undertaken to minimise SOM losses
- The farm undertakes a regime of regular soil testing for phosphate, potash and pH levels which are recorded on digital field maps. This data provides the necessary information to the fertiliser spreader which is fitted with GPS (Global Positioning System), to allow variable applications rates across a field to meet targeted soil nutrient levels. This system is helping to apply inputs more precisely and to help balance the soil nutrient profiles across each field.
- To optimise nitrogen fertiliser applications with the aim of reducing quantities needed to maintain yields, the farm has implemented practices and technology which includes:
 - Using the N-sensor technology which automatically adjusts nitrogen applications based on crop demands
 - Planting nitrogen fixing crops to improve soil N levels
 - Trialling the application of nitrogen fixing bacteria to the soil
- Generally, farms in Latvia operate through a system of grain traders and co-operatives which provide both grain storage and drying facilities and ultimately market the grain. To optimise the business and farm management Friedrich has invested in 12,000 tonnes of on farm grain storage facilities and a grain drier. This has also provided him with the flexibility to market and sell his own grain and the opportunity to develop grain contracts with the local mill.
- The grain driers purchased by the Friedrich have been specifically selected to utilise wood chip to generate the heat required to dry the grain. This wood is collected and sourced from around the farm and provides a sustainable and renewable source of fuel for grain drying.

“There are many barriers and challenges to establishing and building a successful farming operation, Friedrich has achieved something only a few would dare to consider. He moved from his native Germany and purchased 100 hectares of land in 2003, he has built this over the intervening years to more than 4000 hectares. Friedrich is clearly a great businessman and farmer, he cares passionately about the farm and the local environment. His greatest achievement is that he has overseen and driven the transformation of poor arable land into a productive and sustainable farming operation.”

Karl Williams, Flagship Farms Programme Manager, FAI

Summary of actions and benefits

The table below summarises the key areas of good practice displayed by Friedrich Haase, and the benefits (EN environmental / EC economic / ET ethical) that arise from taking these actions.

	Action	Benefits
Certification/ Assurance	GlobalGAP assured	<ul style="list-style-type: none"> EN Certifies that criteria for maintaining environmental best practice are met EC Globally recognised certification enhances product marketability ET Ensures product quality and traceability standards are met
Crop Initiatives	Crop rotations	<ul style="list-style-type: none"> EN Minimises build-up of crop-specific diseases and the need for application of plant protection products EC Growing crops like beans and a varied rotation increases soil nitrogen content and improves soil quality, increasing wheat crop yields
	Soil nutrient mapping and GPS application of inputs	<ul style="list-style-type: none"> EN GPS controlled equipment increases the application accuracy of inputs EC Accurate and optimal application of inputs can reduce fuel and product use and lower labour requirement, all providing cost reductions
	Using Yara N-Sensor technology	<ul style="list-style-type: none"> EN Its use has optimised nitrogen applications, which are now applied according to a specific crop demand rather than a blanket approach EC Improves combine efficiency due to a more even crop at harvest
	Trialling the application of nitrogen fixing bacteria on the soil	<ul style="list-style-type: none"> EN Reduces the requirement for the application of synthetic fertiliser inputs EC The aim is to enhance wheat yields through increasing beneficial soil bacteria that increases nitrogen availability for the crop
	Well timed cultivations control weed growth and prepare seedbeds	<ul style="list-style-type: none"> EN Mechanical destruction of weeds lowers the need for plant protection products EC Minimal cultivations for seedbed preparation reduces fuel and labour costs over ploughing
Business planning	Strategic investment in grain drier and store	<ul style="list-style-type: none"> EC Provides flexible management during harvest and storage Enables direct contracts with millers and buffers the business from market fluctuations ET Ensures the farm is in control of grain storage conditions which helps maintain grain quality and reduce food safety risks
	Selling direct to Dobeles and Tartu Veski Mills	<ul style="list-style-type: none"> EC Negotiations on wheat price and quality provides benefits to both farm and mill Contracts are being agreed which will help improve budgeting and income predictions Cooperation with the mill ensures the farm is growing the best varieties for milling ET Provides information to the farm about end consumer and product feedback
Renewable energy	Grain dryer fuelled by woodchip	<ul style="list-style-type: none"> EN Grain driers are fuelled by woodchip produced from materials sourced on the farm EC Eliminates external costs of drying and reduces reliance on fossil fuels and their associated costs
Soil health	Improving soil organic matter levels	<ul style="list-style-type: none"> EN Can help reduce the quantity of fertiliser inputs required EC Incorporating crop residues helps increase the soil's organic matter content and improves its fertility, water holding capacity, and structure which benefits crop growing conditions

Staff	Employment contracts, health insurance and accommodation	<ul style="list-style-type: none"> ● EC Good work environment and conditions improves staff retention and reduces employment costs ● ET Individual staff facilities provides staff members with personal space and the opportunity to relax and socialise <p>Insurance is provided to all staff which is a great employee benefit</p>
Ecosystem protection	Maintenance of polder dams and drains	<ul style="list-style-type: none"> ● EN Clearance of weeds in the drainage system is undertaken via mechanical means rather than using chemical control which protects the surrounding ecosystems ● EC Control water levels, prevents soil saturation and flooding of fields and improves growing conditions
	Wild meadows and grasslands	<ul style="list-style-type: none"> ● EN Encourages and improves the local biodiversity on farm ● ET Supports the biodiversity and cultural value of the neighbouring National Park



“ I always wanted to run my own farm, but in Germany this was not possible due to the cost of land. This is what led me to Latvia and here I saw the great opportunities available, I started with 100 hectares in 2003 and have since invested in more land and the farm’s infrastructure to help build and develop a sustainable farming business of over 4000 hectares. I have learnt a great deal and appreciate the benefit of understanding and collaborating with our customers. In 2008 we formed a partnership with Tartu Veski mill to grow wheat on contract for them; this has been a very successful venture and brought us in contact with McDonald’s.

When we were selected to become a McDonald’s Flagship Farm it was a very proud moment as I feel this is recognition for the hard work of my staff and me and the partnership with Dobeles and McDonald’s. ”

Friedrich Haase

Background

Friedrich grew up on the family farm in the region of Göttingen, central Germany. After leaving the army in 1998 Friedrich undertook his studies in forestry and agriculture at the Universities of Freiburg, Göttingen and Berlin and gained experience working on farms throughout Germany and Europe.

At the time Friedrich finished his studies, reunification of Eastern and Western Germany had taken place, which meant that much of the available farmland had already been acquired. Friedrich chose to look further afield for opportunities to start his own business and purchased the farm in Latvia in 2003 with 102 hectares of land. Over time the farm has grown to cover 4,100 hectares and the business now employs a team of 24 full-time staff. The land includes 1000 hectares of forest and 2,650 hectares of arable land. The farm grows oats, winter and spring wheat, with cereals accounting for 50% of the crops grown on the farm. The remainder of the land is planted with oilseed rape and beans. Three hundred hectares is also reserved as natural habitats to support local wildlife.

Friedrich, what attracted you to this specific area of Latvia?

Having experienced different arable systems, I was looking for an area where I could develop a sustainable arable business. When we first looked in Latvia there were very few farms in the Madona region (situated in Eastern Latvia) and a large proportion of the fields were either not in production or were in poor condition. Therefore, the land was relatively inexpensive and this gave us the opportunity to establish the business and expand as we have grown.

There are some big challenges to farming here, but it's a very beautiful area; we're bordered by the Teici National Park, a large tundra with forest and many lakes, including the Luban, which is the largest lake in Latvia.

You mentioned the challenges of farming in this region, what are they?

Our main challenges are water management and drainage along with soil health. This region is quite flat and low lying and combined with the areas heavy rainfall means the land requires a good, well maintained drainage system to control water levels. Also, soil quality is poor because much of the land was not in a productive state, or was poorly maintained when it was purchased, we are working hard to improve soil health. These have been our biggest challenges to date.



How do you maintain the drainage systems on the farm?

We have introduced management practices to maintain the polder dams and drainage networks, which help improve field conditions and avoid the fields and soil becoming saturated and waterlogged. We are careful to ensure that this management does not impact the water ecosystems in the area and we take care to monitor water levels on the land and direct our management practices accordingly. It is very important to regularly clean out and clear the ditches and waterways to ensure they are operating effectively; periodically we have to renew some of the old Soviet-era drainage systems. We've



“We’ve invested in new cutting equipment to ensure waterways remain unobstructed. This reduces the need for chemical sprays and provides a fuel source for our grain drier”



invested in new tractor mounted brush cutting equipment to help clear the weeds and bushes that grow near the drainage ditches and rivers. This ensures the waterways remain unobstructed, allowing the water to flow more effectively. The aim of this is to ensure the land doesn't become saturated or waterlogged as this impacts our ability to farm the land sustainably.

The larger pieces of cleared brush and wood from the ditches and waterways, along with other wood cleared from around the farm are collected and dried on farm. We then hire a local contractor to come to the farm and chip all this into woodchip. We then burn the woodchip in our biomass grain driers to provide the heat we need to dry the grain to the required moisture content so it can be stored on farm.

Therefore, through the management of the ditches and waterways we are able to maintain the farm's drainage system whilst utilising the waste wood to provide us with a renewable and sustainable energy source.

What technologies have you introduced to address some of the soil fertility issues?

We first started soil sampling and testing the nutrient content of our soils in 2005, we employed a number of local agronomists to take the samples and recorded the results manually. In spring 2012 we introduced digital soil nutrient mapping. This began to build up a GPS map of the farm using soil nutrient samples taken every three hectares. From this we've seen that soil nutrient levels vary considerably across most of the fields. Even within one field the variation can be sizeable. We're now using this data to target and adjust fertiliser treatments across the fields. The information is remotely entered into a GPS guidance system on the fertilizer spreader so that the application rate is automatically adjusted in response to the data from the digital soil maps.

As soil quality is poor, we need to optimise fertiliser applications across the farm to ensure crop yields are maximized. By optimising our fertiliser applications we can reduce the risk of nutrient losses into the surrounding environment and this increases the return on investment for an expensive input.

What benefits has the targeted application of nutrients delivered to the business?

EC

EN

GPS technology has saved us around 10–15% on nitrogen input costs

We're now applying nutrients in response to the crops needs, which helps to optimise crop growth. Using the soil nutrient maps and GPS technology has saved us around 10–15% on fertilizer costs and we are also using less fuel. It's also helped increase the efficiency of the spreader and reduced the workload for us, helping to free up time for other tasks. With large scale farming operations like ours, precision agriculture is a key investment area.

We have also invested in a Yara N Sensor, this device is fitted to the cab of the tractor and analyses the crops' light reflectance as it drives through the field. This calculates the nitrogen requirements and is able to make real-time adjustments to the application rate ensuring optimum nitrogen application rate for that area.

What other practices have you introduced to try and improve soil health & fertility?

Soil quality in the area is quite poor and when we tested soil organic matter levels on farm they were around 1.8%, therefore we're careful not to remove any organic material from the fields, except the grain itself. During harvest all cereal straw is chopped and left on the field which provides a source of organic material to help increase SOM levels. We know that increasing SOM levels will take a long time, but improving this is key to a healthy soil and sustainable farming. The added benefit of incorporating the cereal straw is the level of potash and phosphate that are returned to the soil (see Table 1).

EU Soils Report classifies soil organic matter as follows. Friedrich's land is low at 1.8%OM, which makes improving the soil organic matter a priority for his business.

	Soil Organic Matter Level
High	>10.2%
Medium	3.4 – 10.2%
Low	1.7 – 3.4%
Very low	<1.7%

Source: EUROPA http://eusoils.jrc.ec.europa.eu/ESDB_Archive/eusoils_docs/other/ESF_OM7.pdf

Table 1. Example nutrient content (Kg/t) of fresh-weight straw

	Phosphate kg P ₂ O ₅ /t	Potash kg K ₂ O/t	Magnesium kg MgO/t
Winter wheat/barley straw	1.2	9.5	1.3*
Spring wheat / barley straw	1.5	12.5	1.2*

Source: HGCA (http://www.hgca.com/media/183781/is05_nutrient_content_in_cereal_straw.pdf)

We grow wheat twice in a four-year rotation along with beans and oilseed rape, increasing the number crops within the rotation helps to increase soil fertility and quality. Growing beans also helps to aerate and improve soil structure and increase nitrogen content through nitrogen-fixing bacteria (Rhizobia) on the plants roots. The crop rotation also helps to decrease the level of crop diseases by reducing the occurrence of root pathogens and preventing a build up of resistance to plant protection products. We're currently planting around 40% of the land to beans and oilseed rape at any one time, but aim to increase this to 45–50% of the total growing area to further improve soil fertility and help manage crop diseases and weed control.

We are trialing the application of beneficial bacteria to the soil hoping to increase soil fertility through their ability to fix atmospheric nitrogen, which could help with other processes occurring within the soil such as the breakdown and decomposition of plant material.

We are also currently working with a company to help monitor and improve the micro-element levels in the soil with the aim to increase crop productivity and quality.

How is seedbed preparation undertaken?

Conventional methods of preparing the soil by ploughing bury all of the residual crop residues and weed seeds, but it disrupts the soil structure and on our land can lead to soil erosion by wind and water. In order to protect the soil structure, we limit the use of conventional ploughing to once every four years and employ several alternative methods to prepare seedbeds and reduce weed growth. Ploughing is also a time consuming and a fuel intensive operation to undertake, so reducing the need to do this is important for us to practice.

Our seedbed preparation depends on various factors, including the previous crop and weather conditions. After growing oil rapeseed or beans, we generally cultivate and drill in a single operation or we may cultivate the soil with a set of discs prior to drilling. The residual plant material is not problematic for wheat growth and is easily incorporated into the soil.

When we drill our second wheats in the rotation it is useful to pass over the seedbed twice with the discs to ensure that the straw is well incorporated into the soil and does not transfer disease to the emerging wheat plants. In this case, we can disc immediately after harvesting which encourages weed seed to germinate and then just prior to drilling we cultivate once more to mechanically destroy any growth. That helps us to reduce the amount of plant protection products (PPPs) required to control weed growth in the emerging crop.

When the weather is too wet or we have limited resources (labour, time or rising fuel use), this can affect our seedbed preparation. In these cases we can spread the seed with our fertiliser spreader followed by a single pass of the discs to cover the seed and aerate the soil for root development.



Using legumes as a pre-or break-crop has been shown to increase the yield of cereal crops between 15–25% over continuous cereal planting, even when fertilizer is applied for optimum yield



Source: Peoples et al., (2009) The contribution of nitrogen-fixing legumes to the productivity of agricultural systems. Symbiosis 48: 1–17



How have these practices improved wheat production on the farm?

Our average yields in the first couple of years farming in Latvia were around four tonnes of winter wheat and one tonne of spring wheat. Our average yields in 2012 were 6.7 tonnes of winter wheat and 5 tonnes of spring wheat. In the future, we're hoping to harvest between 7 and 8 tonnes of winter and more than 6 tonnes of spring wheat. So we are pleased with the results and this shows the effort we are putting into managing the farm is paying off.

The quality of our harvested wheat is also improving; we have seen good protein quantity and quality (Zeleny Index) and grain density (hectoliters) which are suitable for flour making.



In 2012 the farm achieved an average wheat yield of 6.7 tonnes/hectare. This compares to the average Latvian wheat yield in 2012 of 4.3 tonnes per hectare

(FAO Stat 2014)

What other investments have you made on the farm?

In Latvia most cereal farms operate as part of a cooperative, selling into a central store that controls the intake, drying and subsequent sale of the grain. In 2008, we installed a Saatotuli batch drier for drying our own harvested grain, having our own grain drier has given us more flexibility in the when and what to harvest. The system is fully automated to load and operate and requires minimal input in terms of labour. The drier is fueled by woodchip which is made from the wood sourced from clearing the waterways around the farm. This is quite a cost saving as the fossil fuel equivalent is around seven times more expensive than woodchip.

In 2012 we also invested in new grain storage facilities with a holding capacity of 12,000 tonnes and has allowed us to expand the farm and business accordingly. Storing grain gives us the opportunity to tailor our sales in response to the market. Being more independent is important for us, as the farm is located far from good transportation routes and industrial processing areas so having some flexibility in our grain marketing is key to our business strategy.



“Installing our own grain drier and store gives us flexibility and allows us to adjust sales in response to changes in market price”





What are the challenges of marketing and selling your grain in Latvia?

In the past we sold our grain to the nearest company that would process, store and market it. However, it was expensive and we incurred a lot of costs, for drying, cleaning and storage, there were also difficulties with transport and the delivery of grain into the processor. Ultimately the contracts were unsustainable and we had to find an alternative. Now, because we have invested in our own drying and storage facilities we can deal directly with the buyers, giving us the freedom to choose our partners ourselves. I've learned since farming in Latvia the importance of choosing partners that suit your business needs. In 2004 we developed the 'Agrikula' brand to market our raw materials and the aim is to grow quality wheat for milling so we are able to sell into the premium market.

In 2008 we formed a partnership with Dobeles Dzirnavnieks, one of the largest grain milling and processing companies with trade in both national and international markets. We contract a set number of hectares to Dobeles Mill and work with them to grow the most suitable variety for the market. Last year we produced 3,800 tonnes of wheat for Dobeles with a protein content of up to 17%. We are also growing 125 hectares of oats on contract for the mill which is destined for human consumption and we are achieving an average yield of 4.6 tonnes / hectare. Next year we hope to again sell them between 6,000 to 7,000 tonnes of cereals.

What benefits has this partnering delivered to the business?

We send the best quality grain to Dobeles Dzirnavnieks and Tartu Veski mills, as their philosophy and approach to business suit ours. They operate to a high standard and have a long-term business plan, so as a result they pay a higher premium for good quality grain. They also provide us with important information about the quality of our wheat and where our product is destined for, allowing us to get to know the final customer and what grain varieties are most suitable. We have a good partnership and work together to continuously improve our relationship.



“Dealing directly with buyers allows us the freedom to allocate the best grain to specific buyers that provide the best returns”

Do you think it's important to know who the end customer for your wheat is?

Although it's less important financially to know who the end customer is, for me personally it means a lot to know the end result of the food we work hard to produce. It gives me a good feeling and reduces the enormous amount of anonymity to know more or less who will be the last client in the line – knowing that McDonald's are selling buns made with our grain gives me a great sense of pride. I also think it's important for McDonald's customers to be able to learn more about the entire food chain, from the primary producer all the way to the McDonald's restaurant they're eating in.

How do you ensure the quality demands of your customers are addressed?

In 2011 we received approval through the BQM farm assurance scheme and in 2012 we were approved under the GlobalGAP assurance scheme. We receive an annual audit that covers standards of food safety, worker welfare, environmental management and good practice throughout all stages of crop production. The audits have helped to engage the farm staff in best practice and focus on key areas of improvement that have been identified. For example we take a sample of every batch of grain coming into the store and records are maintained for the purposes of traceability. We see GlobalGAP as being an important part of the business, which in turn enhances the marketability of our product.

How do you protect the farm's natural habitats?

The local environment is very important, for example the national park brings ecological and cultural value to the area and the many lakes in the park support both market and recreational fishing. We encourage local biodiversity by keeping some of the farm as wild meadows and ecological grasslands that we cut once per year to encourage local flora, insects and small mammals to the area.



How do you maintain staff retention and improve their skills?

In total we have 24 full time employees on the farm and during the busy harvesting season we employ several part-time staff. The work on the farm can be demanding and hard, therefore it's important to create a supportive working environment, both socially and financially. Within the team, people work well together, although it's important to provide facilities where they have their own space, so having private accommodation to relax in is invaluable for the team to cooperate and work well together.



“We strive for a supportive environment; socially and financially and we have long standing staff who stay because they like the security and atmosphere”

We provide staff toilets and washrooms as well as a sauna on site. Working clothes and insurance are also provided. Some of the staff have been working with me for many years and they like the atmosphere and the secure social and financial situation provided by the business.

Where possible I encourage and support my staff to gain more skills and agricultural knowledge, of course it is also in my own interest that their knowledge is always up to date. Similarly, we offer work experience during harvest to local students which provides them with valuable experience about the farming industry. The students are able to learn from the team here and are able to contribute to the daily operation of the farm.

For the various machinery we have, many of our staff have been trained and have specific licences for driving the machines. When we have briefings from the machinery dealers about using machines then all the staff attend to learn and ask questions. I visit as many exhibitions as possible and always take as many staff with me as I can so that they can share the experience.

What future developments are you planning for the farm?

Our plans for the future are focused upon developing new areas of cultivation, controlling weed growth and improving soil quality. For example, incorporating a greater proportion of leguminous crops into the crop rotation will improve soil fertility and reduce our fertilizer requirements. We're also looking to improve efficiency of fertilizer input through combined application of liquid nitrogen and herbicide.

Appendix – Good Practice Matrix for Friedrich Haase

The following matrix has been developed by McDonald's to help assess the sustainability of the agricultural production within the supply chain. Flagship farms have been identified that demonstrate best practice in one or more of the 17 key areas in the matrix, whilst also operating to general high agricultural standards in all other areas.

A ✓ in the matrix below indicates good practices demonstrated in this case study.

Ethical (acceptable practices)

Human health & welfare ✓
 i Employee health & welfare ✓
 ii Food safety

Animal health & welfare
 i Nutrition
 ii Medication & growth promoters
 iii Genetic selection
 iv Animal cloning
 v Husbandry
 vi Transport
 vii Slaughter

Business ethics & supplier relationships ✓
Rural landscape preservation ✓

Environment (protecting the planet)

Climate change
 i Greenhouse gas emissions
 ii Energy efficiency ✓
 & renewables

Natural resources – soil ✓
 i Soil fertility & health ✓
 ii Soil erosion, desertification
 & salinisation ✓
 iii Soil contamination

Natural resources – water
 i Water pollution ✓
 ii Water usage efficiency

Natural resources – air
 i Air emissions

Agrotechnology
 i Agrochemical usage ✓
 ii Bioconcentration & persistent
 organic pollutants
 iii Genetically modified organisms

Ecosystem protection ✓
 i High Conservation Value Land
 (HCVL) ✓
 ii Habitat & species preservation ✓

Waste
 i Production waste
 ii Hazardous waste
 iii Waste to landfill

Economics (long-term economic viability)

Sufficient high quality production ✓
 i Producer income security
 & access to market ✓
 ii Agricultural input costs ✓
 iii Crop & livestock disease ✓

Community investment ✓
 i Local employment & sourcing ✓
 ii Support for community
 programmes