



McDonald's Europe Flagship Farms

Potatoes – Farm Frites, Poland

Introduction

This case study shows how potato production can be undertaken in a developing market using good practice and well-recognised techniques and equipment in a locally-relevant way. It focuses on good practice in the areas of soil use, water use, energy use reduction and employee welfare.

Since it was first established, Farm Frites Poland has proven itself as a company responsive to changing industry requirements and eager to establish best practice in Poland.

The key initiatives undertaken by Farm Frites can be summarised as follows:

- Farm Frites was the first Polish potato farm to attain GlobalGAP certification which covers wide-ranging policies in the areas of food quality and safety, environmental standards and worker welfare. Through Farm Frites' support, 75% of its contract-grown potatoes are from GlobalGAP certified farms.
- There is no minimum salary requirement for casual staff in Poland. To ensure fair remuneration Farm Frites electively decided to pay its casual staff the same hourly rates as a full time Polish employee.
- A wide array of technology has enabled Farm Frites to maximise yield and quality while ensuring that agrochemicals and fertilisers are only applied where needed. Through soil analysis and the annual calibration of their spraying equipment accurate field applications are ensured.
- Crop rotation and cover crop planting reduces soil erosion, limiting the environmental damage of soil displacement.
- Water management is an important environmental consideration and Farm Frites has invested in soil moisture monitoring equipment which ensures water is only applied as necessary. Accurate application of water improves potato quality and yield and maximises water use efficiency. Combined with diligent pollution control, the farm can be confident its operations do not affect local water quality.
- EASYAG centre-pivot irrigation system increases yield and quality, whilst reducing water requirement.
- Its impressive storage facilities for 63,000 tonnes of potatoes help maximise quality and yield at harvest. Any potatoes that do not meet the required specifications of the factory can be used by other local business thereby ensuring no potatoes are wasted.
- Farm Frites has invested in a wide range of local projects, making it a valuable member of the community.

“ We aim to lead the way in how we manage and run the farm, setting an example for farmers locally and to the industry as a whole. We like new challenges and are looking forward to a positive future. ”

Jaroslaw Wankowicz, General Farm Manager, Farm Frites Poland Dwa Sp. zo.o

“ Farm Frites is a progressive and forward looking company with a clear focus on its environmental and ethical practices. It has invested in cutting-edge technology to ensure it maintains strict control of both its inputs and outputs. Farm Frites welcome opportunities to improve their standards while supporting the development of new and higher standards for Polish agriculture in a financially competitive marketplace. ”

Karl Williams, Flagship Farms Programme Manager, FAI

Summary of actions

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

	Action	Benefits
Certification/ assurance	20 FFPD farms GlobalGAP assured	<ul style="list-style-type: none"> EN Environmental considerations within standards ET GLOBALGAP standards are designed to control food quality, food safety and worker welfare
Employee welfare	Fair wages for casual staff	<ul style="list-style-type: none"> ET Up to 150 casual staff receive a calculated hourly rate based on permanent staff rates
Agrotechnology	The Dacom PLANT-Plus (PP) system used	<ul style="list-style-type: none"> EN The system ensures that agrochemicals are only applied when disease/pest conditions demand their use EC Maximises yield and quality as a result of effective and targeted agronomy
	Sprayer calibration every season	<ul style="list-style-type: none"> EN Ensures accurate application of sprays EC Prevents overuse of expensive crop health products ET Ensures pesticide residue limits are not exceeded
	Field IQ – GPS system for the sprayer	<ul style="list-style-type: none"> EN Limits over-laps as system shuts down boom section automatically EC Reduces the overall amount of plant protection products required, therefore reducing costs ET Ensures plant protection products are not applied above their maximum dose rates
Soil health	Regular soil analysis	<ul style="list-style-type: none"> EN Prevents over-application of nutrients EC Soil testing ensures fertiliser applications meet soil conditions and crop requirements
	River purity measured above and below farm	<ul style="list-style-type: none"> EC Control point ensures absence of water pollution from farm
	Crop rotation and cover crop planting	<ul style="list-style-type: none"> EN Reduces soil erosion, and reduces environmental damage through soil displacement
Water	EasyAG irrigation scheduling	<ul style="list-style-type: none"> EN Increased water use efficiency EC Accurate water management increases yield and quality, whilst reducing water requirement
	River purity measured above and below farm	<ul style="list-style-type: none"> EN Control point ensures absence of water pollution from farm
Product quality	63,000 tonnes of potato storage on farm	<ul style="list-style-type: none"> EN Optimum storage conditions reduce losses and wastage in store EC Allows farm to harvest quickly and to maximise quality
Community	FFPD has invested in a range of local community projects	<ul style="list-style-type: none"> ET Improved water supply/ road maintenance for the village, sponsorship of local school and football team

Background

More than 60% (18.5 million hectares) of Poland's total area is farmland. The country is currently one of the largest producer of potatoes and rye in the EU. Agriculture employs almost one third of the total Polish work force but contributes less than 4% to the gross domestic product (GDP). There are over three million private farms in Poland, of which one third are less than one hectare, the remainder being on average 8.44 hectares. Agricultural productivity is generally below EU average figures. Over 20% of all farming households in Poland produce only for their own consumption.

In 1993 a joint venture between two Dutch companies, Farm Frites and Aviko, formed the company Farm Frites Poland. Owing to the lack of good quality potatoes available locally for processing, the company decided to grow their own potatoes, and four former state farms, comprising a total of 3,900 hectares, were rented on a 15-year tenancy agreement with the Polish Government's Land Agency. The farm plants 900 hectares of potatoes annually, with other crops including winter wheat, winter oilseed rape, maize, radish, and grass also being grown. A wide range of modern farm machinery and equipment is operated, with up-to-date storage facilities for around 63,000 tonnes of potatoes.

The company farm is situated in the communities of Damnica and Głowczyce in the northern region of Poland, around 120 kilometres west of Gdansk. The region is well placed as an excellent potato-growing area owing to the weather conditions and the soil type (the majority of soils on the farm are graded 3b and 4a – loamy sand).

Farm Frites also works closely with local farmers who grow potatoes on contract for the business.

A potato processing plant was constructed near the town of Lebork in 1994 and it now processes around 200,000 tonnes of potatoes annually into fries and potato products.



Certification/assurance

GLOBALG.A.P.



GlobalGAP assured

The farm is inspected to the GlobalGAP standards by ECAS, an independent certifying organisation for the agricultural sector in Europe. The GlobalGAP standard is primarily designed to maintain consumer confidence in food quality and food safety. Other important goals are to minimise detrimental environmental impacts of farming operations, optimise the use of inputs and to ensure a responsible approach to worker health and safety.

Farm Frites Poland was the first potato farm in Poland to be approved under the GlobalGAP scheme in 2004. The company has undertaken a policy of assisting its contract growers to achieve compliance under the GlobalGAP standards and is also paying for the inspections. Currently 20 of the Farm Frites contract growers are approved under the GlobalGAP scheme, supplying around 75% of the potatoes to the factory.

Since 2010 all crops grown by Farm Frites Poland are approved under the requirements of GlobalGAP certification (wheat, rape seed, maize, rye).

“ Farm Frites has embraced the concept of McDonald’s Agricultural Assurance Programme (MAAP) from the beginning. When they found no local scheme to use they brought GlobalGAP to Poland, leading by example to encourage their contract growers to work towards certification. Farm Frites is always open to share best practices with our other MacFry suppliers, host journalists and other opinion leaders to show how they have established modern sustainable agriculture in Poland. ”

Dell Thornley, European Quality Director
Potato Products and Frying Oils



Farm Frites Poland and the other contract growers are independently audited to the requirements of GlobalGAP.

Employee welfare

Fair wages for casual staff

The farm employs 66 full-time staff with up to a further 150 casual staff employed during the peak harvest period. Currently Poland has a minimum wage set for full-time staff but nothing for part-time casual staff. To this end the management team has calculated what a full-time worker in Poland receives (calculated on an hourly basis) and pays the same hourly rate to all casual staff.



Farm Frites exceeds local legislation with regard to reward for its part-time workforce.

Agrotechnology

Dacom PLANT-Plus system installed

Potato blight is the worst disease problem challenging the potato grower and can wipe out plants almost overnight. The disease is caused by a fungus and spreads through the air, developing when the weather conditions are warm and humid, causing plant death or rotting of infected tubers in storage. Regular preventative applications of fungicides are required as these are ineffective once infection has occurred. Common practice is to spray the crop every 7–14 days, but this can be less frequent during prolonged dry spells. Potato varieties have different levels of resistance to blight.

Many countries have national programmes for reporting and assessing the risk of blight (e.g. Blightwatch in the UK), but as there are no such schemes currently available in Poland, therefore the use of technology is essential. Farm Frites Poland works closely with its growers and any local blight outbreaks on farm are reported and assessed, with action taken as necessary.

Fact:

The biological cause of the Irish Potato Famine (1845–1849) was potato blight.



Optimal fungicide spraying minimises negative environmental impact while maximising yield.



Farm Frites Poland uses the Dacom PLANT-Plus system, this is a decision-support mechanism for the management of late blight (*Phytophthora infestans*) and early blight (*Alternaria solani*), which provides a predictive disease risk assessment for the coming days. The system then recommends when to spray and what type of chemical to use, whether contact, translaminar or systemic. PLANT-Plus enables an effective spray programme to be implemented thereby supporting the best possible use of chemicals for the control of blight and the application of the most effective chemicals where necessary. The benefits of the system have been clearly demonstrated in field trials and commercial evaluations by leading potato producers. (See Appendix 1, p11.)

Sprayer calibration every season

All staff applying pesticides are trained and licensed. This license has to be renewed every three years with the added requirement of an annual operator health check. Spraying equipment is required to be inspected and calibrated every three years under current legislation. The management at Farm Frites Poland however have taken the decision to have this calibration undertaken annually on all of their sprayers to ensure optimum operation and application during every season. Calibration is the most important step in producing and maintaining quality spray coverage.



Innovative technology and efficient calibration has resulted in reduced fungicide use, minimising cost and negative environmental impact, and maximising yield.



Field-IQ Global Positioning System (GPS) fitted to sprayer

In 2011 Farm Frites Poland purchased a self-propelled sprayer which was fitted with the Field IQ GPS system.

The advantages of having a GPS system fitted to the sprayer are that it decreases pesticide application inaccuracies by reducing overlaps. This is achieved by the system automatically switching boom sections off when it passes over a previously sprayed area, or if it goes beyond field boundaries.

By reducing overlaps, saves on chemical inputs (and their associated cost), limits crop stress, and reduces application time and operator stress (as the driver does not have to calculate when to switch off the sprayer). One study revealed a significant 6.2% reduction in off-target application after fitting a GPS system to their sprayer.

Soil health

Soil testing to minimise fertiliser use

Careful attention to fertiliser application is an important first step towards maximising both profitable agricultural production and environmental protection. Good practice reduces the risk of applying more fertiliser nutrients than the crop needs and minimises the risk of causing nutrient pollution of the environment.

To ensure the farm's fertiliser applications are based on good practice and sound data, routine soil testing for phosphate, potash, magnesium and acidity (pH) are undertaken every four years.

Soil samples are sent to a laboratory and the results are plotted on a digital map which gives detailed information about the fields and identifies where fertilisers are needed.



Optimal fertiliser application results in minimal negative environmental impacts and minimised wastage (and therefore reduced costs).



“The use of phosphate and potash fertilisers should be based on regular soil sampling and laboratory analysis. Under most cropping systems, the soil nutrient status only changes slowly and it is safe to use soil analysis results as a basis for fertiliser recommendations for up to 4 years from the date of sampling. Soil sampling and analysis should therefore be carried out approximately every 4 years.”

(Fertiliser Recommendations (RB209) 7th Addition)

Cover crops

The majority of soils on the farm are graded 3b and 4a (loamy sand) and therefore have a high risk of erosion. Land used to grow potatoes (a spring-planted crop) is especially at risk as unplanted winter soils are easily eroded.

Farm Frites Poland has a policy of planting a cover crop of radish in the autumn on all land destined for potato production, which

substantially reduces the threat of soil erosion while also aiding in disease prevention. In addition to this the cereal and oilseed rape crops used in the farms rotation are also autumn sown.



Crop rotation and cover crop planting reduces soil erosion, and reduces environmental damage through soil displacement.



Efficient analysis results in optimal irrigation; reducing water use, wastage and cost.



Facts: Soil erosion

Accelerated soil erosion, by water or wind, affects both agricultural areas and the natural environment and is one of the most widespread of today's environmental challenges. It has impacts both on site (at the place where the soil is detached) and off site (where the eroded soil ends up).



Water

The sustainable use of water for irrigation is an increasing problem for water management across the world. The profitability of potato production is heavily influenced by irrigation management with efficiency of water usage being highly dependent on timing, uniformity and volume.

Centre-pivot irrigation system

Farm Frites Poland mostly operates a centre-pivot irrigation system; there are currently five of these on the farm, which are able to irrigate around 85% of the potato crop. The centre-pivot spray nozzles are more accurate and efficient than the conventional rain-gun system which is now only used to irrigate a small percentage of potato land.

Irrigation scheduling

Irrigation of potatoes is strictly controlled via the EasyAG system. EasyAG soil moisture probes provide measurements at depths of 10cm, 20 cm, 30cm, 40cm and 50cm. A high frequency electrical field created

around each sensor provides an accurate soil moisture measurement. The data from each sensor are then wirelessly transmitted to the office where they are displayed on third party application software that also integrates a range of other on-farm technologies and information, such as data from the on farm Dacom PLANT-Plus weather stations. PLANT-Plus (as used in blight control) has an integrated 10 day weather forecast programme, which is updated regularly by two Dacom weather stations on the farm and also calculates field moisture evaporation rates. The data from these two systems is used by management to calculate the crop's water (irrigation) requirements.

The management team aims to keep field capacity for moisture retention at 70% (100% field capacity is the amount of water held in soil after excess water has drained away) and with all the data gathered from the different systems, allows them to accurately define when to irrigate, and the appropriate amount of water to apply, thus ensuring optimal application.

Facts: Importance of correct irrigation on potato crops

Correct irrigation applications during tuber initiation is vital. If water stress occurs during 'initiation' there will be fewer tubers set per plant, thus reducing total yield. Stress during the potato 'bulking' stage reduces tuber size and results in misshapen potatoes. Dry matter and specific gravity (a measure of potato quality) can be reduced whilst other aspects such as common scab and hollow heart can be attributed to poor water management during potato sizing. The sugar content in the stem-end may also be increased, affecting processing quality.

“Currently, significant proportions of irrigators do not use scientific methods for irrigation scheduling but rely on personal experience and judgment; significant water savings could be made by improving the uptake of existing technology.”

(DEFRA Science and Research Opportunities for reducing water use in agriculture (WU0101))

River water purity monitored

The farm has an extraction licence to remove water from the river Lupawa which runs through the centre of the farm. The river water is tested at three points: prior to the farm, in the middle of the farm and as it exits the farm; monitoring water quality and any related pollution to the river water. There are seven wells sunk at different points on the farm where it is inefficient to pump the river water. The river Lupawa has recently been incorporated into the European programme “NATURA 2000” to protect some of the unique species of plants and animals which can be found in the river. The farm's water extraction practices have been adapted to take into account the river's environmental status.

Product quality

63,000 tonnes of potato storage

To allow potatoes to be harvested at the correct time to maximise yield and quality, Farm Frites Poland has invested in 63,000 tonnes of potato storage facilities. This allows potatoes to be stored on the farm for several months prior to being sorted and despatched to the factory for processing. Any poor quality potatoes are graded out and are used for animal feed or for processing at a local distillery for alcohol production.

Poland is the largest producer of potatoes within the EU25, representing 20% of total EU production, despite a strong decline over the last 15 years (from 29.6 million tons in 1990 to 9.6 million tons in 2005). Potatoes have traditionally been staple animal feed. However, an increasingly specialised feed industry has been given strong incentives to use alternatives such as cereals and other inputs. Combined with a reduction in cattle stock this has greatly lowered market demand for potatoes in Poland. This trend is expected to continue to affect Polish producers where 44% of potatoes produced were still used for animal feed in 2001.

There are still many smallholdings and subsistence farms in the new member states with poor connections with the market, especially in Poland and the Baltic countries. Potato production there is affected by significant quality problems and lack of modern storage equipment. Limited processing capacities also constrain the development of local manufacturing firms and farmer producers.

Farm Frites, with its integrated processing and storage facilities, has created new opportunities for Polish farmers and contract growers who have suffered from the lower demand of potatoes.



On site storage reduces waste and enables on-site quality control, maximising returns and providing opportunities for local farmers and contract growers in a declining industry.

Yield: tonnes per hectare

Farm Frites 2007

40.6

Yield is taken across all varieties and crops (ware and seed)

Polish average

15.04

Information taken from statistics in Potato World Europe

Community

Farm Frites Poland is involved in several local projects, from sponsorship of the local school, improving the water supply to a local village, to financing road maintenance through local villages.

Another major benefactor of sponsorship is the local football team. The sponsorship was provided at a crucial time for the team as they qualified for promotion into the next league.



Community programmes run by Farm Frites bring benefits to the people living and working in the area which it operates.

The promotion required specific improvements to be made including erecting a fence around the football ground, building changing rooms and constructing seating for 200 supporters. This would have been impossible for the small local team to finance, but the support from Farm Frites Poland has enabled the football team to invest in the necessary improvements as they move up into the next league. These projects have all been of benefit to the wellbeing of the community local to Farm Frites.



Appendix 1: Agrochemical use

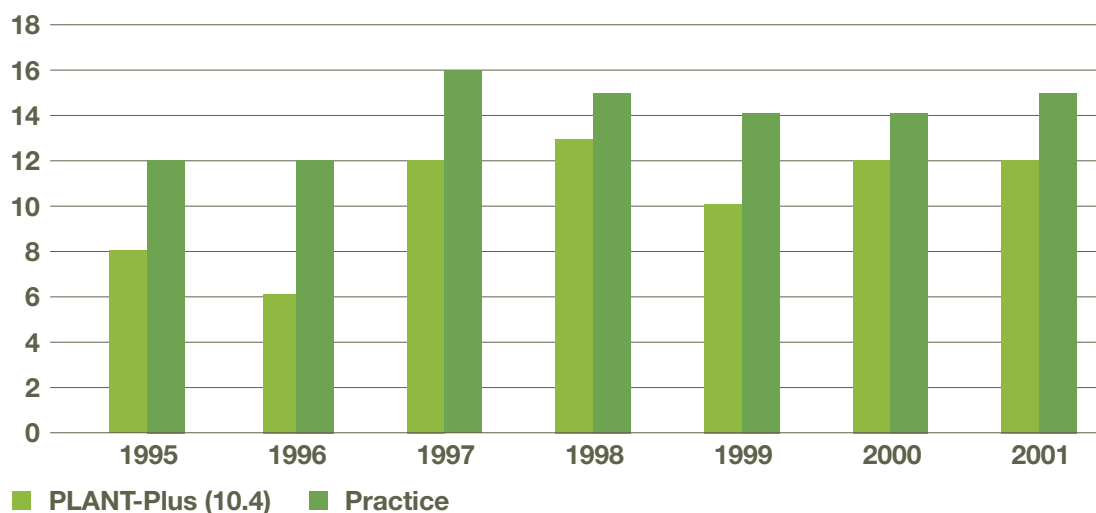
Data from Dacom PLANT-plus

The table shows the results of the field trials with PLANT-plus *Phytophthora infestans* model. This table compares the number of sprays per season, chemical costs in Euro per hectare, foliage infection at the end of the season, tuber blight after harvest and yield in tonnes/ ha for two strategies:

STD (common practice in the area) and PP (PLANT-plus)

Country	Sprays (no.)		Costs (Euros/ha)		Foliar blight (%)		Tuber blight (%)		Yield (tonnes/ha)	
	Std	PP	Std	PP	Std	PP	Std	PP	Std	PP
South Africa 1998	7.0	5.0	-	-	76.5	78.5	3.8	2.3	33.2	40.4
Australia at BFL 1998	7.0	7.0	-	-	69.0	42.0	-	-	-	-
Spain, Trial 1998	4.0	2.0	-	-	0.00	0.01	-	-	-	-
United States 1998	4.0	3.0	-	-	10.0	5.0	-	-	-	-
UK, BPC 1998	12.0	15.0	252	295	1.50	3.50	-	-	54.1	60.8
Netherlands 3 Trial 1999, 2001, 2003	14.9	11.8	290	229	0.04	0.15	1.6	1.2	71.6	71.1
Germany 2001, 2002	10.5	11.0	430	437	59.0 (2002)	42.0 (2002)	-	-	73.8 (2002)	75.6 (2002)

This graph shows the reduction of the number of sprayings in the years between 1995 and 2001 at Kompas in Valthermond (NL), emanated by the use of PLANT-Plus, compared to the common practice of automatic weekly sprayings. **The average reduction of spray applications over the years is 28.5%.**



Appendix 2

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 16 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
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Environment (protecting the planet)

Climate change i Greenhouse gas emissions ii Energy efficiency & renewables	Natural resources – water ✓ i Water pollution ii Water usage efficiency ✓	Ecosystem protection i High Conservation Value Land (HCVL) ii Habitat & species preservation
Natural resources – soil ✓ i Soil fertility & health ✓ ii Soil erosion, desertification & salinisation ✓ iii Soil contamination	Natural resources – air i Air emissions Agrotechnology ✓ i Agrochemical usage ✓ ii Bioconcentration & persistent organic pollutants iii Genetically modified organisms	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 ✓
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