



McDonald's Europe Flagship Farms Potatoes – Farm Frites, Poland

Well-managed potato production in a developing market can bring local community and environmental benefits.

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.

The McDonald's Flagship Farms scheme has been developed in co-operation with the Food Animal Initiative to showcase good agricultural practices which are environmentally sound, economically valuable and ethically acceptable. A limited number of 'flagship' farms have been selected from within the McDonald's supply chain to represent progressive agricultural practice.

The following matrix has been developed by McDonald's to help assess sustainability within the agricultural supply chain. Farms selected demonstrate good practice in at least one of the matrix key areas, whilst also operating to generally high standards in all other areas.

Symbols are used to highlight good practice in environmental, economical and ethical issues.

McDonald's Good Practice Matrix

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 – 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

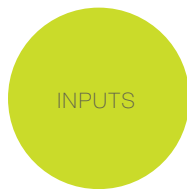
Community investment ✓
i Local employment & sourcing ✓
ii Support for community programmes ✓



Good practices demonstrated in this case study

Executive summary

Key areas of good practice:



A wide array of technology has enabled Farm Frites Poland Dwa Sp. zo.o to maximise yield and quality while simultaneously ensuring that agrochemicals and fertilisers are only applied where needed. Through soil analysis and the annual calibration of their spraying equipment (rather than every three years as required) accurate field applications are ensured.



Water management is an important environmental consideration and Farm Frites Poland Dwa Sp. zo.o has invested in a centre-pivot irrigation system that increases the efficiency of water usage, and which also has a beneficial impact on potato yields and quality. Combined with diligent pollution control, the farm can be assured its operations do not affect local water quality.

Additional areas of good practice:



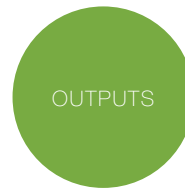
There is no minimum salary requirement for casual staff in Poland. To ensure fair remuneration Farm Frites Poland Dwa Sp. zo.o electively decided to pay its casual staff the same hourly rates as permanent staff in Poland.



Farm Frites Poland Dwa Sp. zo.o is 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, 65% of its contract-grown potatoes are also from GLOBALGAP certified farms.



Farm Frites Poland Dwa Sp. zo.o continues to explore potential improvements in its farming approach. Through a 2007 field trial found that the energy-intensive destoning that is usually undertaken is not essential. This has opened up the possibility for savings in fuel consumption, greenhouse gas emissions, staff time and machinery renewal.



Its impressive storage facilities for 50,000 tonnes of potatoes help maximise quality and yield at harvest. Any products that do not meet specifications are used by other local business thereby ensuring nothing is wasted.



Farm Frites Poland has invested in a wide range of local projects, making it a valuable member of the community.

Summary of actions and benefits

Action		Benefits		
		EN Environment	EC Economics	ET Ethics
Staff	Casual staff are paid a calculated hourly rate based on the same amount as a permanent Polish worker.			Up to 150 casual staff receive a calculated hourly rate based on permanent staff rates.
Management	<p>Farm Frites Poland Dwa Sp. zo.o (FFPD) is the first potato farm in Poland to attain GLOBALGAP certification.</p> <p>FFPD have since supported 14 of its contract farmer growers to gain GLOBALGAP certification.</p>	GLOBALGAP covers environmental considerations in its standards.		GLOBALGAP standards are designed to control food quality, food safety and worker welfare.
Inputs	The Dacom PLANT-Plus (PP) system introduced.	The system ensures that agrochemicals are only applied when disease/pest conditions demand their use.	Maximises yield and quality as a result of effective and targeted agronomy.	
	Sprayer calibration every season – three times more frequent than Polish law demands.	Ensures accurate application of sprays.	Prevents overuse of expensive crop health products.	Ensures pesticide residue limits are not exceeded.
	Regular laboratory analysed soil sampling for nutrients and investment in GPS technology for accurate fertiliser application.	Prevents over application.	Targeted applications maximises yield returns per tonne fertiliser used.	
Operations	Trial work undertaken by FF identifies opportunities for less energy intensive machinery operations re: de-stoning of potato ridges.	Energy-use reduction.	Reduction in fuel consumption, staff time and machinery repair/renewal.	
Resources	<p>FFPD continues to invest in more accurate/efficient centre pivot irrigation systems.</p> <p>FFPD measures purity of river water before and after the farm.</p>	<p>Increased water use efficiency.</p> <p>Control point ensures absence of water pollution from farm.</p>	Accurate water management increases yield and quality, whilst reducing water requirement.	
	Use of autumn & winter cover crops to prevent soil erosion.	Minimises soil erosion.	Aids disease prevention.	
Outputs	50,000 tonnes of potato storage on farm.	Optimum storage conditions reduce losses and wastage in store.	Allows farm to harvest quickly and to maximise quality.	
Community	Farm Frites Poland has invested in a range of local community projects.			Improved water supply/ road maintenance for the village, sponsorship of local school and football team.

Introduction

More than sixty percent (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 <1 hectare and the remainder are 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 3900 hectares, were rented on a 15-year tenancy agreement from the Polish Government's Land Agency. Farm Frites also sources potatoes from local Polish farmers under contract.

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).

A potato processing plant was constructed near the town of Lebork in 1994 and it now processes around 135,000 tonnes of potatoes annually into fries and potato products.

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 50,000 tonnes of potatoes.

Staff

The farm employs 62 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 work force.



Management

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.



Independent organisations certify that the farm and other contract growers comply with GLOBALGAP standards.

Farm Frites Poland Dwa Sp. zo.o 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 14 of the Farm Frites contract growers are approved under the GLOBALGAP scheme and these supply around 65% of the potatoes to the factory.

"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,
McDonald's Europe**

Inputs

Agrochemical use

Potato blight is the worst disease problem challenging the potato grower and can wipe out plants almost overnight. The biological cause of the Irish Potato Famine (1845–1849) was potato blight. 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 systems currently available in Poland the use of technology is essential. Farm Frites Poland works closely with its growers and all blight outbreaks on farm are reported and assessed, with action taken only when necessary.

To this end Farm Frites Poland Dwa Sp. zo.o has introduced the Dacom PLANT-Plus system, 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 effective spraying programmes thereby supporting the lowest 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 page 12.)



Optimal fungicide spraying minimises negative environmental impact while maximising yield.



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 Dwa Sp. zo.o however have taken the decision to have this calibration undertaken annually on all of their sprayer machines to ensure optimum operation and application during every season.



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



"Calibration is the most important step in producing and maintaining quality spray coverage."

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.

"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)**

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. The application of fertilisers is achieved by using a Global Positioning System (GPS). The GPS enables accurate field positions to be determined and fertilisers can then be applied in accordance to the digital maps. Fertiliser is therefore targeted on areas that need it, better matching crop requirements, and preventing over-application which can be both environmentally damaging and costly.



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



Operations

Farm Frites Poland's commitment to applying management approaches and technology that define best practice in modern potato production will lead to the ongoing identification of efficiencies that bring both environmental and economic benefits. Changes in operational practices are rarely straightforward and without compromise but Farm Frites Poland are open to investigating and adapting common practices where an overall benefit can be seen.

For instance, in 2006/2007 Farm Frites Poland Dwa Sp. zo.o undertook trial work to assess whether it was necessary to continue to de-stone potato ridges prior to planting. This is an energy-intensive machine operation to remove stones from the area in which the potatoes are planted, to avoid damage to the potatoes and machinery at harvest. The trial conclusions were complicated, finding many advantages and disadvantages to the procedure. The balanced decision was taken to cease de-stoning; obvious benefits include the reduction of fuel use and costs, reduction of GHG emissions, and reduced machinery costs.



Trial work undertaken by Farm Frites resulted in changes in operational practices, reducing costs and decreasing fossil fuel use.

Resources

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.

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.

Farm Frites Poland Dwa Sp. zo.o mostly operates a centre-pivot irrigation system; there are currently four 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 of potatoes is strictly controlled via three key components. 1) Diviner – this system measures soil moisture over three depths (10, 20 & 30 cm) in the crop's root zone and shows water movement through the soil structure. 2) EnviroSCAN is also a system for measuring soil moisture, and is more technically advanced than the Diviner system. 3) 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 three systems is used by management to calculate the crops 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.

"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))

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.



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



Soil

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).



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

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 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 disease prevention. In addition to this the cereal and oilseed rape crops used in the farms rotation are also sown in the autumn.

Outputs

To allow potatoes to be harvested at the correct time to maximise yield and quality, Farm Frites Poland Dwa Sp. zo.o has invested in 50,000 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.

Yield: tonnes per hectare

Farm Frites 2007	Polish average
40.6	15.04
Yield is taken across all varieties and crops (ware and seed)	Information taken from statistics in Potato World Europe

Poland is the largest producer of potatoes within the EU-25, 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.



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. 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.



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

"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."

Jaroslav 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

Appendix – Agrochemical use

Data from Dacom PLANT-Plus

The table shows the results of 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%.**

