



# McDonald's Europe Flagship Farms Florette baby leaf – Pentaflor Hortícola, Spain

This case study shows how baby leaf production can provide high quality raw materials throughout the year, produced to high standards of food safety with strictly controlled inputs. It focuses on excellent employment practices, and on optimising growing conditions while minimising negative environmental impact.

In particular it highlights good practice in plant and soil testing, irrigation, the use of greenhouses, and communication between the grower and producer.

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)

<b>Human health &amp; welfare</b> ✓ i Employee health & welfare ✓ ii Food safety ✓	<b>Animal health &amp; welfare</b> i Nutrition ii Medication & growth promoters iii Genetic selection iv Animal cloning v Husbandry vi Transport vii Slaughter	<b>Business ethics &amp; supplier relationships</b> ✓  <b>Rural landscape preservation</b>
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### Environment (protecting the planet)

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

### Economics (long-term economic viability)

<b>Sufficient high quality production</b> ✓ i Producer income security & access to market ✓ ii Agricultural input costs ✓ iii Crop & livestock disease ✓	<b>Community investment</b> ✓ i Local employment & sourcing ✓ ii Support for community programmes ✓
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Good practices demonstrated in this case study

## Executive summary

### Key areas of good practice:



Hortícola employs a large number of workers on fixed-term contracts.

The farm offers substantial assistance and support to all staff, helping with issues such as the application of work permits, organising travels arrangements (from as far away as Thailand), and providing a support worker to help with any personal or financial matters.

This provides benefits to both the staff and the company; the staff benefit from secure employment from a company which cares about their welfare, while the company benefits from an incredibly low staff turnover, demonstrating that these practices are working.



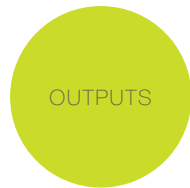
Excellent communication lines between Pentaflor Hortícola and Florette enable quality issues relating to raw material to be quickly assessed and, if required, corrective actions put swiftly into place.

This is also a benefit when the raw material is of exceptionally high quality; the production procedures can be replicated and help refine the growing systems.



The incidence of diseases in the plants has been reduced by altering seed rates (and therefore field plant density) during certain times of the year and according to weather conditions.

This policy limits the amount of plant protection products being used, whilst maintaining raw material quality.



Salads are one of the few items on the McDonalds menu which are not cooked prior to consumption.

With this in mind a pre-harvest risk assessment is completed before salad crops are harvested.

The assessment ensures that any potential food safety hazards which may have occurred in the field are recognised, and if for any reason a crop fails the risk assessment, it will not be harvested.

### Additional areas of good practice:



One of the key benefits of growing crops in the greenhouses is the ability to control the growing climate.

Without the greenhouses the crops are vulnerable to extreme weather, or conditions which are conducive to increased disease or pest threats.

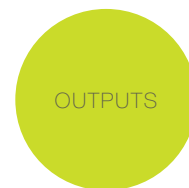
The greenhouses have automatic sensors which control the environmental conditions which are best suited to crop growth and disease reduction, thus minimising necessary inputs.



Filling the crop sprayer is relatively simple, although any chemical spillages, however small, can have dire consequences for local water quality.




Pentaflor Hortícola has made concrete banded areas which are used for filling the sprayer.

Any spillages can be captured and dealt with in the correct manner, thus avoiding any pollution risk.






The business supports the Milagro XXI Foundation which helps the local community with several different projects and social development schemes.

## Summary of actions and benefits

Action		Benefits		
		Environment 	Economics 	Ethics 
<b>Staff</b>	195 staff employed with 2% of the work places reserved for handicapped staff.			The farm is a large employer which provides employment opportunities for disabled people.
	Workers are provided with full-time fixed contracts and migrant workers have access to a support worker.		Reduces staff turnover, lowers recruitment costs and the company is able to retain trained employees for longer periods.	Support staff are able to help migrant workers with any issues, from banking to dental appointments.
<b>Management</b>	Close communication with the processing plant on raw material quality.		Allows quick response if poor quality raw material is identified and field practices can be altered accordingly.	Reduces waste and low quality raw materials.
	Farm is inspected and approved under GlobalGAP.	Environmental considerations within standards.	Improves product marketability.	Food quality, safety and staff welfare are all areas covered by the standards.
<b>Inputs</b>	Irrigation scheduling.	Ensures necessary amounts of water are applied whilst avoiding excessive applications.	Strict scheduling has been developed to maximise plant growth with minimum water input.	
	Regular soil sampling for potash and phosphate.	Prevents over-application and risk of water pollution.	Targeted applications, maximises yields and efficient use of nutrients.	
	Nitrogen testing.	Reduces the risk of highly soluble N leaching from the soil into the water courses.	The mobilised N is tested in the soil to ensure 100kg N/ha is available for plant growth. This policy has reduced nitrogen usage by 30%.	
	Fertigation is used.	Nutrients are applied via the irrigation system which reduces losses and decreases the risk of pollution.	Nutrient application rates are matched precisely to plant requirements, leading to lower fertiliser costs.	
<b>Operations</b>	Pheromone traps used to monitor pest levels.	Allows precise and targeted use of plant protection products.	Pest levels can be verified and plant protection products can be applied only when required.	
	The sprayer is filled over a concrete bunded pad.	This ensures that any splashes or spilt chemical is captured and causes no pollution.		
	Automatic sensors measure and maintain set climatic conditions in greenhouses.	Reduces the requirement of fungicide treatments.	Climatic conditions which can increase disease levels can be avoided.	
	All baby leaf crops are grown under plastic (90%) or mesh (10%).	Reduced pest and disease incidence lowers intervention need and limits risks to the environment.	Reduces climatic variations which improves plant growth and limits pest/disease incidence.	
	Planting density adapted to climatic conditions.	Reduces the requirement of fungicide treatments.	By reducing the plant density it is possible to limit the growth of some diseases.	

## Summary of actions and benefits (continued)

Action		Benefits		
		Environment 	Economics 	Ethics 
<b>Resources</b>	Timing of irrigation.	Reduces quantity of water required to achieve maximum plant growth.	Automatic system allows irrigation to be carried out when water losses from evapotranspiration is minimal.	
<b>Outputs</b>	Pre-harvest risk assessment completed.		Reduces food safety risks and therefore costs to the business.	Food safety is a critical aspect of salad production and any risks can be identified prior to harvest.
<b>Community</b>	Support the Milagro XXI Foundation.			Provides financial investment in community projects and local businesses.

## Introduction

The Florette Group is part of Agrial, which is an Agricultural Co-Operative. The business selects, prepares and sells ready-to-use salads and vegetables. Florette has 10 sites throughout Europe and employs a total of 2,600 staff, producing 1 million bags of finished product per day (equating to around 75,000 tonnes of product packed annually).

In Spain 75% of Florette's raw material requirement is sourced from their farming subsidiary Pentaflor Hortícola (founded in 1998 by Florette Spain). Pentaflor Hortícola farms (through contract farming agreements) around 1,333 hectares of land across Northern and Southern Spain, and in 2008, produced 26,000 tonnes of raw material. The crops grown include Iceberg, Scaroles, Baby Leaves, Romaine, Batavia, Lollo, Spinach, Chard and Radicchio. Around 75% of Pentaflor's production goes to Florette with the remaining 25% supplied into the wholesale market. Pentaflor supplies 60% of the raw material required by Florette Spain to supply McDonald's (Spain) requirements.

Pentaflor Hortícola has two thirds of its land in Northern Spain (divided over 5 areas) with the remaining one third in Southern Spain (divided over 3 areas). This facilitates a spread of planting and harvesting dates, producing a continuous flow of raw material for the factory. By having this division of land, any possible problems resulting in a crop failure can be restricted to one area, while other areas continue to supply raw material to the factory.



## Staff

Pentaflor Horticola currently employs 195 people, and the company has a policy to ensure that 2% of the workforce places are reserved for handicapped staff. This policy widens the pool of potential employment candidates, enabling the business to employ a diverse workforce which can then attract a diverse range of clients. It makes the business more representative of the community and promotes a good public image as a fair and inclusive business/employer.

Employing staff to undertake manual harvesting and agricultural work is an issue for small and large-scale employers alike. Local and national workers are occasionally unwilling to undertake this type of work, resulting in employers looking further afield to recruit staff. Over 80% of the workforce is made up of migrant workers and the company has a policy to look after the welfare of all their employees. All permanent workers are provided with a full-time fixed contract, have full legal labour rights, are provided with the necessary tax documentation and advice from an approved consultant, have all necessary work permits processed, and are provided with accommodation. They also benefit from the 24-hour availability of support staff to help with any issues, weekend day trips, all company documentation being provided in the workers own languages and holidays home being arranged by the company.

This highly structured staff care programme has benefitted the company by almost eliminating staff turnover. This avoids problems associated with high staff turnover such as the need to retrain replacement staff on systems and procedures, and the time-intensive recruitment process. It is therefore a testament to the company, that the staff are happy with the employment conditions.



Forward-thinking employment practices have enabled Pentaflor to develop an excellent employer reputation, reducing staff turnover and the associated costs.



## Management

The farm maintains very open and close communication lines with the processing plant on raw material quality. Ultimately the businesses are dependent upon each other and the need to communicate effectively is vital to their survival. Issues surrounding low quality raw materials at the processing plant can be quickly fed back to the farm, and corrective actions put directly in place, or future operations altered to avoid the occurrence of a similar nature. One example of an improvement made as a result of this relationship is that by reducing soil nitrogen levels and the quantity of irrigation water during the week prior to harvest, raw material quality at processing is improved and input costs for the farm are reduced (also benefitting the natural environment). In addition, a pre-harvest risk assessment has been introduced by Florette, which is executed prior to harvesting the crops, reducing the risks associated with any food safety issues.



**Excellent two-way communication between the farm and the processing plant enables both parties to adapt their practices where required to improve the end product, bringing benefit to the businesses and the consumer.**

*Improving relationships and communication in UK agri-food supply chains*

*The UK research identified several success factors for sustainable supply chain relationships and communication.*

- *Businesses need to have common or strongly compatible objectives/interests.*
- *Businesses need to be important to each other as valuable suppliers or customers. In building a relationship, efforts should be made to understand each other's business and what is important to them.*
- *Commercial benefits - such as value creation, cost savings, enhanced business flexibility, or improved risk management - are evident in sustainable relationships, whether they are created by improved practices or investment. In addition, these commercial benefits need to be shared equitably amongst those responsible for their creation, if the relationships are to be enhanced.*
- *Common investments can enhance relationships but they also need trust and commitment from all.*
- *A high level of professional / technical competence amongst the participants serves to reinforce the levels of trust and personal bonds amongst those involved.*
- *Good quality communication is required, both in relation to technical and logistical issues, as well as creating awareness of market conditions. Good quality communication builds chain transparency, confidence and trust, and helps to resolve conflict.*

**(Source: Business Relationships and Communication in Agri-food Chains, Philip Leat and Cesar Revoredo-Giha, June 2008)**

The farm is independently inspected and approved under the requirements of the GlobalGAP farm assurance scheme. The GlobalGAP standards are primarily designed to uphold and maintain consumer confidence in the quality and food safety standards of the raw materials grown on the farm. 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.

## Inputs

Soil testing for phosphate, potash, magnesium and acidity (pH) are undertaken when new fields are introduced into the farming system, ensuring that the farm's fertiliser applications are based on good practice and sound data. Subsequently, ideal soil nutrient reserves are maintained for the growing crop, providing the perfect balance between profitable agricultural production and environmental protection. By ensuring nutrient rates are tailored to crop needs, the risk of applying excessive fertiliser is reduced, thereby minimising the risk of nutrient pollution in the environment.

Nitrogen is a crucial component for plant growth. Deficiency symptoms are generally seen on older leaves which are usually yellow or pale green. Low nitrogen levels in the soil will slow crop growth and reduce final yields, whilst excessive nitrogen levels can result in low yields and decreased crop quality. Soil nitrogen supply which exceeds crop demand may lead to nitrate (NO<sub>3</sub>) entering ground or surface water. The farm has chosen to undertake tests for nitrogen levels in soil and in leaf samples. This approach ensures that nitrogen application is based on sound data which reduces the risks associated with nitrogen losses and provides optimum levels for the growing plants. Although nitrogen testing of leaf samples gives variable results it does show whether application rates are correct. This is crucial as high levels of nitrogen can reduce raw material quality. This policy has led to a 30% reduction in the use of nitrogen fertilisers.

The principle of irrigation scheduling is to calculate the precise volume of water required by a crop and the specific timings of application. This approach maximises irrigation efficiencies by applying the exact amount of water required to replenish the soil moisture levels to the determined point. This approach taken by the farm enables both water and energy to be saved through careful attention to detail.

*Research in Nebraska, where most water is pumped, shows that irrigation scheduling provides an average of 35 percent savings in water and energy. In fuel costs alone, this is a per-season savings of about 550 kWhrs per acre for a center pivot sprinkler or about 200 kWhrs per acre for a gated pipe.*

**(Source: Irrigation Scheduling, I. Broner, 2005)**



## Inputs (continued)

Fertigation is a method of applying dissolved nutrients (fertilisers) to a growing crop through an irrigation system. This is the technique the farm uses to supply nutrients to the growing crop. The farm chooses to use fertigation as it is increasingly important in salad production that the nutrients can be accurately applied to the growing plants in the correct dosage, at the optimum time and at a specific stage of plant growth. With conventional fertiliser and methods (two or more top dressings of granular solid fertiliser), plants can receive a larger dosage of nutrients than they can use at the time and deficiencies may occur during the interval between applications. The benefits to the farm of the fertigation system is that the plants receive measured amounts of liquid fertiliser as the crop requires them (when plants are vegetative - growing) and nutrient levels are then decreased as the crop approaches harvest. The farm's policy is to reduce soil nitrogen levels to 50 kg/hectare in the week prior to harvest, benefitting raw material quality, reducing fertiliser costs and diminishing soil nitrogen reserves which limits the risk of leaching.



*Common advantages of fertigation, include:*

- *Considerable savings in the labour and energy costs of application*
- *Chemicals are already in solution form and thus immediately available to the plants throughout the root zone*
- *Small doses of chemical are applied when needed, reducing leaching of water-soluble nutrients during periods of excessive rainfall or over-irrigation (Burt et al. 1998, Boman and Obreza 2002).*
- *Flexibility in irrigation timing makes it easier to schedule fertilization*
- *Soil compaction is minimised by avoiding heavy equipment traffic through the field*

**(Source: Injection Rates and Components of a Fertigation System, A. Fares and F. Abbas, June 2009)**



Leaf and soil testing and the use of precise irrigation & fertigation techniques have resulted in plants receiving the optimal application of water and nutrients to optimise crop quality and minimise environmental damage.

## Operations

Any successful integrated pest management programme should monitor for pests and diseases, and target pests at the right time, with the best product. This approach will increase efficiency and efficacy of a pest control program. One of the best ways to monitor insect (pest) occurrence is with the use of pheromone traps. Pheromones are chemicals produced by some types of insects to communicate with members of the same species; generally these are produced by a female trying to attract a mate. The chemically synthesised pheromones used by the farm are species-specific and are designed to trap a targeted moth species. The traps are checked twice per week by the technicians and if determined threshold levels are exceeded then a spray programme can be implemented which is best suited to the degree and stage identified. Of greater importance is the necessity to do nothing if threshold levels are not exceeded.

*In commercial agriculture, commonly used monitoring traps utilise natural insect mobility to lure insects into the trap by either using pheromones (= scents), shape and/or colour. Effective deployment and routine checks can provide information for calculating economic thresholds; thus, money invested in long-term monitoring with multiple traps can potentially save thousands of dollars of insecticides and protect the environment.*

**(Source: Introduction to Insect Pest Monitoring Using Pheromone Traps. Dr. Ayanava Majumdar)**

The farm has built small fenced compounds on each growing site, each containing a secure storeroom to stock any necessary plant protection products, and a concreted bunded pad in which liquid fertiliser containers are sited. The concrete bunded pad is also used as a filling area for the crop sprayer as this minimises potential risks to the environment, as operator errors, such as dropping a foil seal from a chemical container, can have perceptible consequences for local water quality. Staff receive specific training in the handling and the application of plant protection products via a tractor-mounted sprayer and only trained personnel are authorised to use the sprayer.

*A significant proportion of pesticides reaching ground and surface water may come from pesticide handling areas. Water is vulnerable from tiny splashes and spills that occur when filling the sprayer and when rinsing the container. Inappropriate wash down, cleaning and disposal activities can also have significant adverse environmental impact. Just one dropped foil seal can contain enough pesticide to increase residues above the 0.1ppb standard in 30 km of stream. In one study it was possible to reduce the pesticide residues coming from the handling area by 99%.*

**(Source: The Voluntary Initiative, Pesticide Handling Areas. October 2007)**



## Operations (continued)

Crop growth, disease and pest levels are all widely influenced by climatic conditions. One of the main concerns of any farm growing crops is the unpredictability of the weather which can have serious economic effects on the crop and business. Certain weather conditions can be conducive to disease outbreaks or increased risk of pest attack. These issues can be countered by the use of plant protection products, but there is a cost to their use and the potential to damage the environment. To enable improved control over the crops' growing environment the farm grows around 90% of their produce in greenhouses. These are fitted with automatic sensors to monitor and maintain pre-determined climatic conditions, and local weather conditions are monitored via the use of weather stations on site. The ability to exert some control provides an environment which is favourable to reducing disease and pest incidence, reducing input costs and any risks associated with their use. The remaining 10% of the crops are grown under mesh. Although not providing the environmental controls which the greenhouses offer, there are benefits in their use. The incidence of pest infestations is greatly reduced as they cannot reach the plant, and evapotranspiration losses are reduced due to the micro climate which is produced under the mesh. This policy has enabled the farm to reduce irrigation quantities by 20%.

Crop planting density can be adjusted to varying degrees dependent on several factors. The farm has found that by reducing the seed rates and therefore plant density at specific times of the year, the growing crop suffers less from fungal disease outbreaks, which then requires less fungicide control. Along with the use of pheromone traps this policy has reduced pesticide use by an overall 20%.



The use of greenhouses and mesh enables the farms to grow crops under ideal conditions, optimising the quality of the product and minimising the need for inputs such as water and crop protection products.

## Resources

The farm uses a system of micro-sprinklers which are designed to reduce the quantity of irrigation water applied to the crop. This system produces a very uniform application of water which decreases the likelihood of flooding and improves water use efficiency. Irrigation scheduling (the ability to programme the equipment) allows the irrigation to be undertaken during periods where evapotranspiration rates are lowest (at night and early morning) therefore maximising efficiency.

*Irrigation should occur during the early morning hours (before 10:00am) to reduce potential of wind blowing the irrigation water from the targeted area and to reduce evaporation of irrigation water.*

(Source: Yeager et al., 1997)

## Community

The business has three main goals associated with the local community; social development, cultural development and enterprise development. To help achieve these goals the company, along with five other local businesses including the Bank Caja Navarra, are supporters of the Milagro XXI Foundation. They have sponsored several activities including Spanish lessons for migrant workers, a literature contest, economic aid to small businesses within Milagro, prizes for local primary school children in recognition of outstanding achievements, a concert for the "Cherry Day" (Milagro is well known for their cherries), economic aid for the Milagro's chorus group, an International festival of Folklore, and training courses for local workers.

## Outputs

The salads and fruit served in McDonald's are the only food items which are sold to the customer without prior cooking. Therefore the food safety standards and quality of these products have to be second to none. Adherence to high standards starts on the farm, with Pentaflor using a pre-harvest risk assessment covering the critical areas of production. This risk assessment covers several areas of crop production as well as the local conditions within and around the field. Once the risk assessment has been undertaken, the crop can be harvested. If for any reason a failure is identified during the assessment then, depending on its severity, the crop can be rejected in the field prior to harvest. This procedure ensures the integrity of all the raw materials reaching the processing plant.



Detailed risk assessments are carried out prior to the crop being harvested. Any concerns identified will result in the harvest being rejected, ensuring the integrity of material being sent to the processing plant, and on to the consumers.



## Appendix

"Our aim is to continuously innovate and to offer the highest quality products which contribute to the health and well-being of our consumers. We strive to act in a responsible manner in all our dealings with Customers, Suppliers and Growers with whom we will continue to forge even closer links. Based on the principles of Sustainable Development we will continue to develop our business through profitable growth, respecting the Health, Safety and Personal Development of our staff and with a strong commitment to protecting the environment. By doing all these we shall remain Europe's leading player in our market.

Following this vision, Florette Group has developed the next 5 Sustainable Development Commitments:

### N° 1 : Products

To ensure safety/quality vegetables, develop sustainable-driven innovations & influence nutrition patterns.

### N° 2 : Supplies

Responsible & safe sourcing and fair relationship with farmers.

### N°3 : Environment

To reduce environmental impacts related to factories, crops and activities.

### N°4 : Staff

To improve social conditions & create a win-win relationships with Employees.

### N°5 : Management of sustainable development

To ensure follow-up and implementation of sustainable development commitments in the Group.

Florette BU Spain has been supplying ready-to-use salads to McDonald's since 1991. To be chosen by McDonald's considering the crops of our subsidiary Pentaflor Horticola (Florette Agricultural Business unit) as part of the program "Flagship Farm" means the express recognition from one of our most important partners of the efforts made by our company in the field of sustainable development and our policy of ongoing improvement towards excellence."

### Comment from Jose Mari Garrido from the Florette Group

"It is very impressive to see that the controls put into place to regulate inputs have shown some impressive reductions in water and fertiliser usage. These are critical areas to control, and ultimately reduce, in any farming operation. With the co-operation and communication between the farm and processing plant, raw material quality and safety is excellent, which clearly benefits both businesses. A very inspiring operation which should be a model for any farming enterprise."

**Karl Williams**