

SWIG AWARDS 2012 Application

Applicant: Agroinversiones Valle y Pampa Peru S.A. (“VALLE Y PAMPA”)

I. Definition of the product | process (Define What, Define Why and Define How)

We define our product as High Frequency Intermittent Drip Irrigation System (HFDI SYSTEM). We have successfully applied this system to our asparagus, pomegranate and blueberry crops.

Among the main advantages this innovative practice provides -which will be detailed further in this document- are considerable savings in water and fertilizer usage (45 – 65%), minimum or zero pollution of underground water supply and same scale savings on energy usage.

a. Elements of the system

- Field measurement stations that provide real time soil conditions, mainly humidity as the trigger for irrigation but not limited to this. Additionally these stations provide physical and chemical conditions such as conductivity, pH and concentration of Nitrogen, Phosphorus and Potassium. This real time data is provided in 2 minute intervals on a permanent basis.

- We use self-compensated and no-drain drippers, which gives us the capability to control the exact dosis of water and fertilizer to provide. This system does drain the water lines after every shift as in a conventional drip system).

Other Considerations:

- The HFDI SYSTEM system takes into account the variable "oxygen" in the concept of irrigation as a fundamental value for the optimal development of crops. It prioritizes the ideal humidity conditions required (optimum combination of oxygen and water).

- The HFDI SYSTEM exploits the capillary force (horizontal movement force) of water, so the moisture bulb is wider and has an optimal depth. This horizontal movement of water is achieved by irrigating in very short shifts (4 – 6 minutes) during the day, instead of the usual 3 hour shifts in conventional drip irrigation.

- Our fertilizing program is adjusted according to phenological stage of each crop. Fertilizer is provided in exact quantities and diluted through the water lines, providing savings proportional to water's. The efficiency of the HFDI SYSTEM to optimize the dose of fertilizer and, combined with the above, it offers permanent

nutrition to the plant (we call it “the buffet effect”).

Note: For more information and technical support, see Annex 1 - Technical Overview of the HFDI SYSTEM.

b. Origin and application of the concept

Valle y Pampa is the world’s first Asparagus, Pomegranate and Blueberry operation to succeed in the application and adaptation of this concept | process.

The original concept was developed by Eng. Eitan Israeli (iL) for Autoagronom Systems. The autoagronom computer was acquired by Valle y Pampa on december 2009. Following design, testing, tuning and adaptation of the system to our 177 hectare operation was done by Valle y Pampa.

All components that make up the system are all found in the market, but are not found together. The key lies in the selection and correct use and installation of the multiple items required, in accordance with the parameters, identified needs, research and design by Valle y Pampa.

The system build-up began in September 2009 at its headquarters located in the desert of Pisco, Ica, Peru.

Success was preceded by long process of design and implementation. Since this system works very precisely, it is necessary that the physical structure ensures that all field drippers start and end the supply of water and fertilizer at the same time. The hydraulic design plays a big role in the success of the system. To achieve this goal we had to study topography, soil conditions and requirements set out therein in terms of power, pressure and flows for maximum operational accuracy.

III. How is this initiative beneficial for the company a the global agribusiness sector (How Much)

The HFDI SYSTEM provides savings in core resources that were unimaginable before Valle y Pampa’s venture. On the other hand, health and development of crops are optimal. With the successful implementation of HFDI SYSTEM Valley and Pampa takes the concept of efficiency to a new level for the Peruvian agricultural sector worldwide.

Asparagus is a very popular crop in Perú. It has played a big part in Peru’s agricultural export boom in the last 10 years or so. The big downside asparagus brings is its well known high water needs. Nevertheless, although asparagus is indeed one of the most demanding crops, other crops are not far in terms of water consumption. For instance, the pomegranate might be perceived as a rustic, low water usage crop, but it has water consumption levels only 25% lower than asparagus.

Quantitative achievements

Valle y Pampa has succeeded in demonstrating the success of the HFDI SYSTEM for asparagus as well as for pomegranates, judged by the crop development and production to date. The lower consumption of resources (water soluble fertilizer and energy) is based on the accurate calculation of the needs of the plant. Under no circumstance supply of water and nutrients is restricted. On the contrary, we provide sufficient quantity and quality of water and nutrients and guarantee their availability during 100% of the time. This drastically reduces any deficiency or water stress to a minimum. Valley and Pampa has shown that most of the criteria currently used for conventional drip irrigation system generates waste of resources.

A. Water usage

First year (2010)

Crop	Water use (cubic meters per hectare)		Savings %
	Valle y Pampa - HFDI	Industry Benchmark	
Asparagus	3720	12000 ⁽¹⁾	69%
Pomegranate	1176	10000	88%

Second year (2011 - Adult crops)

Crop	Water use (cubic meters per hectare)		Savings %
	Valle y Pampa - HFDI	Industry Benchmark	
Asparagus	8930	16000 ⁽¹⁾	44%
Pomegranate	3720	12000	69%

Following years (2012 +) - estimation

Crop	Water use (cubic meters per hectare)		Savings %
	Valle y Pampa - HFDI	Industry Benchmark	
Asparagus	9200	17000 ⁽¹⁾	46%
Pomegranate	4200	12000	65%

(1) This data varies depending on the source and is in the range of 13.000 to 20.000 m³ per hectare.

Note: Blueberry crop not included because the crop has not completed its first year, therefore data is not complete or fully verifiable.

B. Fertilizer usage

First year (2010)

Crop	Fertilizer use (US Dollars per hectare)		Savings %
	Valle y Pampa - HFDI	Industry Benchmark	
Asparagus	\$792.20	\$1,920.00	59%
Pomegranate	\$430.56	\$1,840.00	77%

Second year (2011 - Adult crops)

Crop	Fertilizer use (US Dollars per hectare)		Savings %
	Valle y Pampa - HFDI	Industry Benchmark	
Asparagus	\$1,536.45	\$2,400.00	36%
Pomegranate	\$1,207.08	\$2,300.00	48%

Following years (2012 +) - estimation

Crop	Fertilizer use (US Dollars per hectare)		Savings %
	Valle y Pampa - HFDI	Industry Benchmark	
Asparagus	\$1,600.00	\$2,500.00	36%
Pomegranate	\$1,400.00	\$2,400.00	42%

C. Energy usage (electricity for water collection and pumping)

First year (2010)

Crop	Energy use (US Dollars per hectare)		Savings %
	Valle y Pampa - HFDI	Industry Benchmark	
Asparagus	\$7.53	\$24.30	69%
Pomegranate	\$2.38	\$20.25	88%

Second year (2011 - Adult crops)

Crop	Energy use (US Dollars per hectare)		Savings %
	Valle y Pampa - HFDI	Industry Benchmark	
Asparagus	\$18.08	\$32.40	44%
Pomegranate	\$7.53	\$24.30	69%

Following years (2012 +) - estimation

Crop	Energy use (US Dollars per hectare)		Savings %
	Valle y Pampa - HFDI	Industry Benchmark	
Asparagus	\$18.63	\$34.43	46%
Pomegranate	\$8.51	\$24.30	65%

Besides the above tangible benefits, we believe that this successful venture will benefit our industry, our region, and the world. The use of our super efficient system can help ensure development and sustainable growth of agriculture in other areas. As an important side it can allow agriculture to guarantee market supply responsibly in the very long term.

Finally, the unprecedented water, fertilizer and energy savings will generate positive external effects (or externalities) both socially and environmentally.

Environmental Benefits:

1. Minimized impact on the already affected local aquifers. Even a reversion of damage can be achieved by eliminating overextraction of underground water.
2. Eliminating the risk of groundwater contamination by leaching of fertilizers through the soil, as the HFDI SYSTEM system only keeps fertilizer near the surface, surrounding the fine root system (vital area).
3. Reducing the noise impact area by using fewer pumps and water extraction machinery
4. Valle y Pampa has set the groundwork for other companies to venture with confidence and adopt the same system, thus generating a multiplying effect and contributing to local social and environmental sustainability of regional agribusiness.
5. Water conservation helps reduce pressure on the water level in the aquifer and any other ecosystem whose water supply depends on it.
6. Reduced use of fertilizers reduces the risk of eutrophication of adjacent water bodies (or imbalance of aquatic flora by contamination with fertilizer overloads)
7. Saving this amount of fertilizer results in a reduction in the use of fossil fuels for manufacturing and heavy machinery for transportation, thus contributing to the reduction of emissions of greenhouse gases along the value chain.
8. By reducing electricity consumption also will reduce the demand for power, leading to reductions in emissions of greenhouse gases from power plants generating electricity.
9. Better profits due to cost efficiency generates the opportunity for investment in research for the improvement of current successes.

Social benefits:

1. Reduced use of fertilizers and pesticides dramatically reduces exposure of field workers to harmful chemicals.
2. The possibility of developing agriculture in very arid can generate more labour for the local community than is possible using conventional methods.
4. The lower water consumption reduces the risk of reducing the availability or polluting of this resource for the surrounding towns, much of which is supplied directly from the aquifer.
5. Better profits allows Valle y Pampa to invest in intangible value creation for the company, part of which is the development and implementation of policies of social responsibility for its workers and residents within its area of influence.
6. Valle y Pampa aims to consolidate its regional leadership in the social and environmental areas, which will result in a decrease in social and environmental liabilities. This makes the company more competitive and financially sustainable, allowing it to contribute to local economic growth steadily through the provision of long-term and better paid employment for the surrounding communities.

We at Valle y Pampa believe that the main beneficiaries of our innovation are our industry, our country and the world.

This set of positive externalities presents itself as the main solution to the problems caused by irresponsible use (waste) of water resources and pollution of it, and to ensure the sustainability.