IoT based smart and efficient crop irrigation solution

- SmartDrop Solution Description (Overview) -

1. INEFFICIENT SURFACE IRRIGATION NETWORKS

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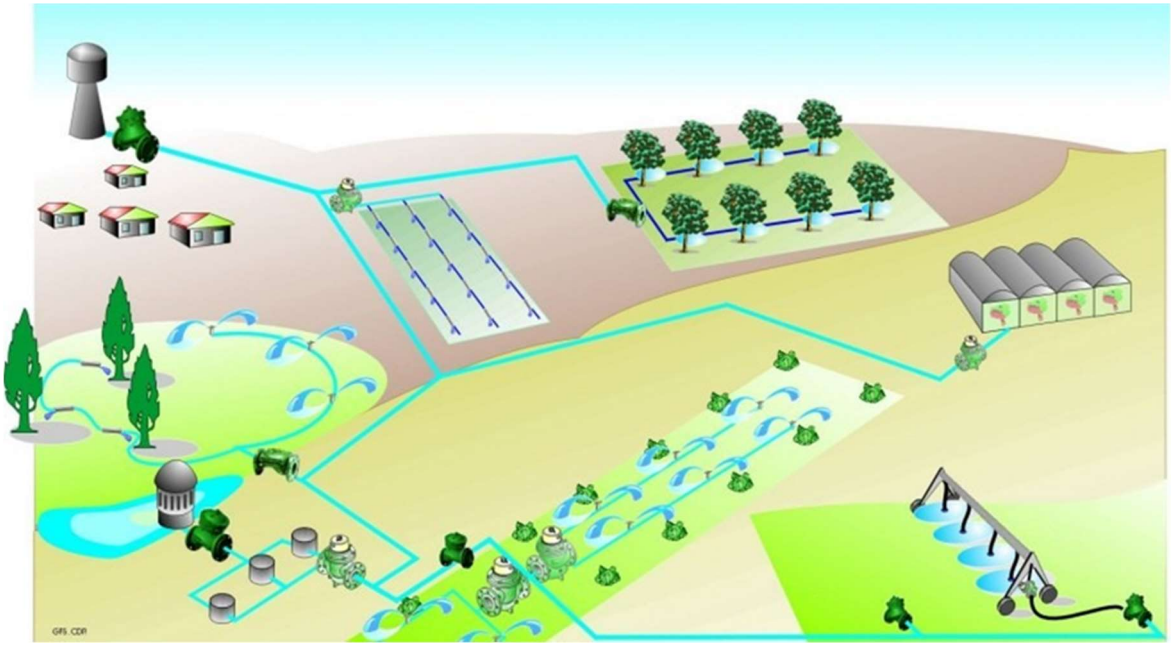
2. EFFICIENT PRESSURIZED IRRIGATION NETWORKS



Drip irrigation on foot⇩

Sprinkler irrigation ⇩

3. DISRUPTIVE NOVELTY OF THE SMARTDROP IRRIGATION SOLUTION

SMARTDROP is an intelligent and efficient irrigation system based on the control of automatic valves that solves the limitations and deficiencies presented by the solutions currently existing in the market, providing the following disruptive innovations with respect to the currently available technology:

- **It allows to control both the pressure of the irrigation network and the flow, using a single model of IoT controller and automatic valve**. In this way, the efficiency of the irrigation water supplied to each growing area is maximized.

- **There is no need to use different models of automatic valves to control flow and pressure,** unifying suppliers and necessary spare parts, as well as facilitating user training in operation and maintenance.
- **Field devices are energy autonomous through the application of *energy harvesting*** technologies, simplifying installation and reducing maintenance operations, investment costs and environmental impact.
- **It allows the operation of irrigation infrastructures fed from different sources of supply**:
    - Raw water from natural resources: rivers, dams, lakes, wells...
    - Treated water from the drinking water distribution network, whatever its operating pressure.
    - Reused water with high nutrient content from slurry processing plants and livestock manure (digestates).

SMARTDROP: IMPROVING THE EFFICIENCY OF IRRIGATION NETWORKS	
Disruptive novelty	**Impact**
It allows to control the flow in the main arteries of the irrigation network	• Increased water efficiency
It allows to control the individual volume in m3 supplied to each plot	• Increased water efficiency
A unique solution to regulate flow and pressure	• Simplification of the operation and maintenance of the system. • Reduction of the number of spare parts.
Full energy autonomy without batteries	Reduction of: • The maintenance easement. • The investment cost. • The impact on the environment.

By **eliminating the use of batteries**, SMARTDROP brings the following advantages:

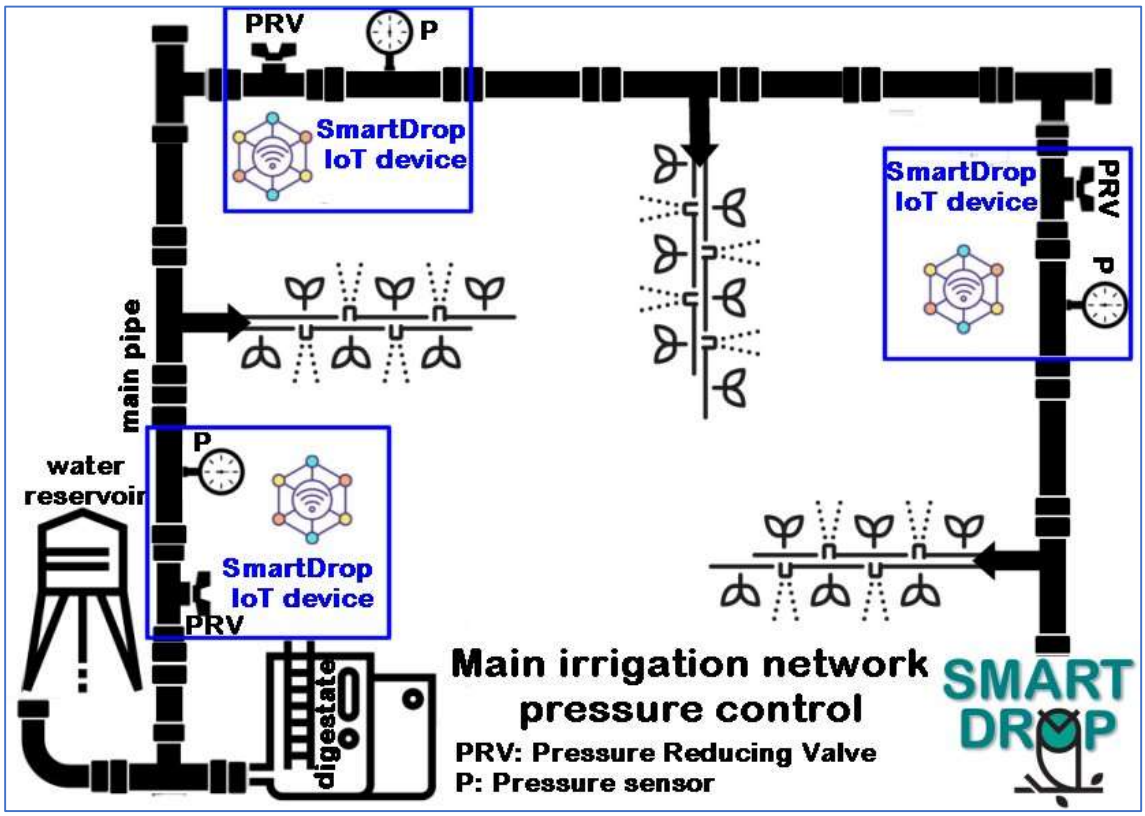
- Eliminates field maintenance operations to replace dead batteries.
- Eliminates the environmental impact derived from:
    - The carbon footprint resulting from battery manufacturing.
    - The generation of a waste with a high recycling cost considering the aggressiveness of the materials and compounds used in the batteries.

Therefore, SMARTDROP is a **comprehensive** solution developed **specifically** for the agricultural sector, which solves the limitations of other proposals:

- There are no comprehensive, complete and specific standard solutions that address the improvement of efficiency in irrigation networks. Current solutions are based on automation and control projects that integrate devices from different manufacturers

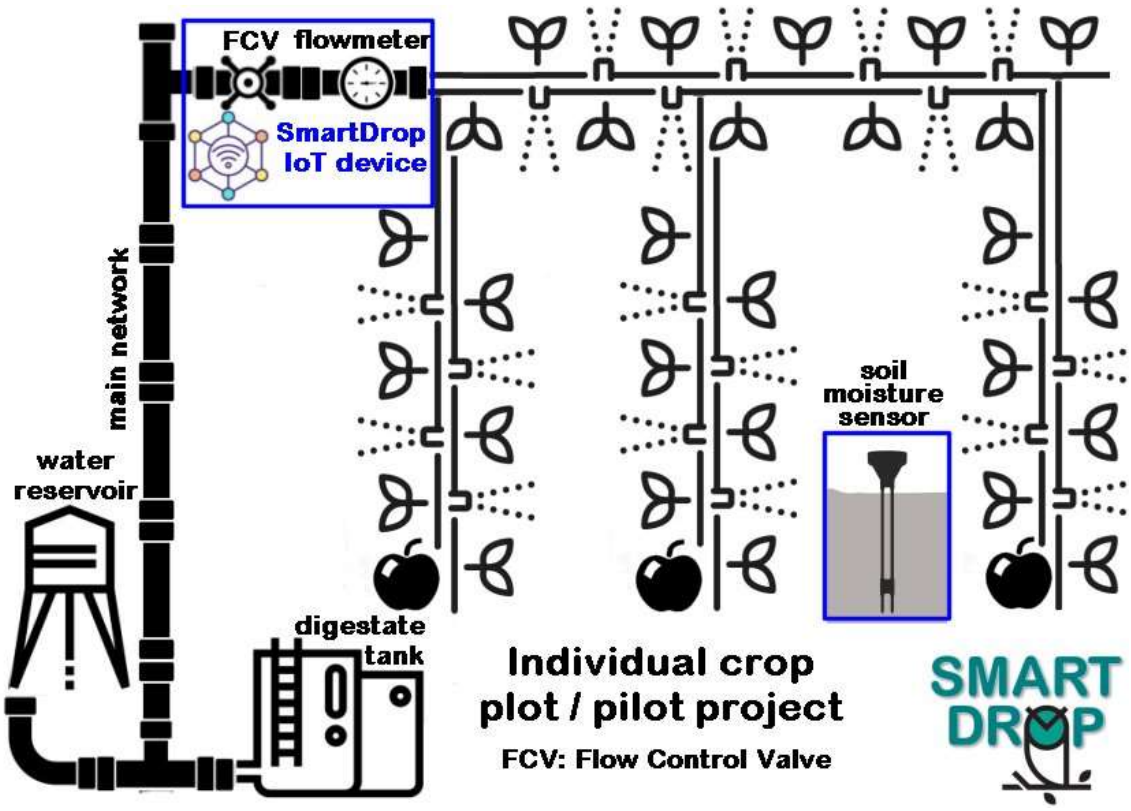
into custom-developed turnkey systems, which considerably increases the investment to be made and requires external energy supply.

- There is no self-sufficient energy solution that meets all the requirements for efficient irrigation management:
  1. Automatic adjustment of the service pressure to the needs of the demand, minimizing losses due to leaks.
  2. Control of the volume supplied to each crop plot according to the calendar and sequence of individualized irrigations programmed by the utility manager.



The simplified diagram above shows the topology of a main irrigation network in which SmartDrop IoT devices have been installed (blue boxes) to ensure maximum water efficiency by controlling network pressure **without the need for power supply**.

The following figure shows the solution architecture for each individual crop plot.



4. COMPOSITION OF THE SMARTDROP SOLUTION

The composition of the SMARTDROP solution is shown in the following diagram: