



**Practice Abstract 26 -
Digital Product Passport for high-value crops
(SENTIPEDE OC SIP)**

26. Digital Product Passport for high-value crops (SENTIPEDE OC SIP)

Short Summary for Practitioners in English

Problem:

Producers of high-value crops and medicinal plants (e.g. medicinal cannabis and pharmaceutical herbs) face increasing requirements for traceability, certification, and product transparency throughout the supply chain. At the same time, documentation and compliance processes are often manual, time-consuming, and costly. Farmers and producers therefore need reliable ways to demonstrate product origin, cultivation conditions, and quality without creating an excessive additional administrative burden.

Consumers, buyers, certifiers, and regulators increasingly expect transparent information on how products are cultivated, monitored, harvested, and handled. Existing traceability systems often record only selected supply-chain events or certification documents. Information may also be entered manually and stored in separate systems used by different organisations. This fragmentation makes it difficult to compile a coherent product history and can be particularly costly and burdensome for small and medium-sized producers.

Solution:

SENTIPEDE developed an ADS combining RFID/NFC identification, environmental sensors, EdgeAI, and a Digital Product Passport (DPP). RFID (Radio-Frequency Identification) uses radio waves to identify tagged plants or batches. NFC (Near-Field Communication) is a short-range RFID technology that allows tags to be read with compatible smartphones or readers. Each plant or batch receives a persistent digital identifier linked to cultivation, harvest, temperature, humidity, and energy data. A mobile application enables authorised users to scan the tag and retrieve the corresponding product information. Unlike conventional systems that often store individual transactions or certificates, the DPP provides an updatable seed-to-harvest record. It complements existing certification and farm-management systems by connecting product identity with relevant production, environmental, and quality information. The solution was tested at the Smart Greenery vertical-farming pilot in Austria. During a cultivation cycle, RFID/NFC tags were read, environmental and energy data were connected to production records, and DPP information was successfully accessed through the mobile application. Tag and antenna tests also demonstrated the importance of calibration in humid and equipment-dense environments.

Benefits:

The pilot demonstrated that the solution can:

- Combine plant or batch identity with cultivation, environmental, energy, and harvest data in one record
- Give authorised users direct access to product information using NFC-enabled mobile devices
- Provide documented temperature and humidity records for quality assurance
- Support certification and compliance by making relevant information easier to retrieve
- Provide buyers and consumers with verifiable information about product origin and production conditions.
- Be introduced gradually, starting with basic identification and adding sensors or system interfaces when required.

Practical recommendations:

The solution is most relevant where product identity, origin, cultivation conditions, or authenticity influence compliance or market value. Before implementation, producers should define whether individual plants or batches will be traced, which data are required, who may access them, and how the DPP will connect to existing certification and farm-management processes. Technical

prerequisites include suitable RFID/NFC tags and readers or NFC-enabled smartphones, compatible sensors, network connectivity, secure data storage and backups, and stable product identifiers. Tags and antennas should be tested in the actual cultivation environment because moisture, metal structures, tag position, and reading distance can affect performance. For daily operation, responsibilities should be assigned for creating identifiers, placing tags, checking sensor data, recording events, and validating information. Small and medium-sized producers should start with one crop and a limited number of batches. NFC-enabled smartphones and batch-level identification provide a cost-effective entry point. Dedicated RFID infrastructure and continuous sensing should be added only when the expected compliance, efficiency, or commercial benefits justify the additional costs.

Further information

- n/a

About this practice abstract and Farmtopia

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Farmtopia: The project is running from September 2023 to August 2026. The overall goal of Farmtopia (**GA No.: 101083541**) is to democratize digital farming to empower small and medium farms.

Website: <https://farmtopia.eu/>

CISC Semiconductor GmbH: SIP leader, ADS provider

Website: <http://www.cisc.at>

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