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Shared production facilities for the small scaled preservation and packaging of primary agricultural production

CTCPA

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Dissemination Level		
PU	Public	
PP	Restricted to other programme participants	
RE	Restricted to a group specified by the consortium	
CO	Confidential, only for members of the consortium	

1. Title of the case description

Shared production facilities for the preservation and packaging of primary agricultural production

Indicate your role in the Smart Food Supply Chain (CTCPA, project partner):

- individual member of the chain:
- chain operator:
- network operator:
- association:
- technical, scientific, or management expert: X**
- advisor:
- policy maker:
- other:

2. Indicate the region (if applicable):

France, rural areas

3. WP2 Cross-reference table

Please indicate with an X in the relevant box of the matrix for which needs and the steps / functions of the supply chain the described innovative solution is applicable

		Individual steps of the SFSC							Short food supply chain as whole						
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Needs of the consumers (citizens)	food safety				X	X					X				
	food quality				X						X				
	trust														
	ethical aspects														
	accessibility														
Needs of the chain actors	fair price														
	increased negotiating power														
	shared use of available resources				X										
	product development support				X						X				
	access to markets and consumers														
	access to infrastructure				X	X					X				

1: Farming

2: Primary production

3: Transport

4: Processing and packaging

5: Storage

6: Logistics

7: Sale

8: Product integrity, authenticity, transparency

9: Marketing concepts

10: Food chain management and networking for enhancing cooperation among chain actors

11: Business modelling

12: Policy environment

13: Legal requirements

14: Labelling

4. Short description of the innovative solution

- **Describe the specific need or problem being addressed by the case and please explain what is the novelty of this innovative solution**

Real technological innovations are difficult to implement in small structures (farmers, small food manufacturers...). Moreover workshop buildings, processing equipments are highly expensive for a down scaled activity achieved by Smart Food Supply Chains (SFSC) actors : i.e. no milk producer can afford a pasteurized milk bottling complete facility for only 1000 liter milk a day.

However, sharing farming equipments (agricultural tractors, harvesting machines...) is old history practices among agricultural actors : agricultural / farming cooperatives.

The innovative solution we describe is the implementation of locally implemented shared facilities devoted to the small scale transformation of primary production, into finished products, likely to return to the producer for further direct retailing.

Those facilities can be both stationary (processing platforms) or small scale mobile processing facilities (“plant in a truck”).

The complete SFSC can therefore include a shared facility, allowing transformation of raw materials in the chain, as : Primary producer => shared processing plant => preserved, packaged food *back to the producer or directly sold* => direct sale to consumer

➔ They are no more than 2 actors between producer and consumer ; local production ; small scale production : the SFSC spirit is fulfilled.

The novelty points of this innovative solution are :

- 1) It can overcome the lack of transformation and therefore significantly increase the added value of agricultural productions (both vegetal and / or animal productions)
- 2) It can limit raw food material spoilage, and food waste, occurring when raw materials are not preserved or transformed
- 3) It helps local producing of transformed foods : as required by consumers

- **Describe the enabling function(s) and the practical benefit(s)-(e.g. for which types of problems and opportunities is used and can it be used, and how)**

Case 1 : A farmer breeds ducks for foie gras production, but : (i) farm production is seasonal activity, and (ii) production volume is not large enough to justify the investment in dedicated equipment (retort, room according to UE food safety standard for facilities, etc.) => **a shared mobile canning facility** is coming directly in farmyard, four times three days every year.

Case 2 : One organic fruit producer has returned grade-outs after sorting of fruit at agricultural cooperative, with few opportunities of valorisation (except fruit puree national producer, but selling price covers only.... Transport cost !) therefore present situation offers no added value : grade-out organic fruits are locally given... for animal feed.

=> **a local implemented small scaled fruit juice processing line** is located in one pilot plant used for student training and R&D trials. It can be hired for small fee, for the production of organic fruit juices, sold locally by producer himself with good margin on open-market markets.

Case 3 : A farmer grows on small land plots, old varieties of “ancient local cereals” with special technological properties for bakery and appreciated sensory qualities. But : (i) Harvest quantity is too low to go to industrial mills, event those dedicated to organic productions ; (ii) investment in flour production complete equipments is not affordable for only one farmer.

On the other hand, local bakers network (in a 100 km area) seek supply solutions for flour specialties, including “ancient grain blend”.

=> the final user (bakers network) implement a **small processing (milling / sifting) facility** in one of the baker workshop and uses this shared equipment to produce high value-added flours, locally used to produce breads for local sales.

- **Describe the method/procedure/technology/solution implemented. (Please explain, whether the innovative method is a product / service / process / marketing or organisational / management innovation) After completing the description, please indicate, whether this innovation is a technological or non-technological one.**

Case 1 : Small Cannery In A Truck

The SFSC solution is the implantation of all equipments required to achieve canned foie gras and other meat products, retorted for pasteurization or sterilization, in on single skid designed for truck’s usable width and length :

- glass jars lid closing with steam injection, semi-manually operated
- metallic cans seamer, semi manually operated
- under-vacuum plastic pouches thermo-sealer
- autoclave retort for 100 4/4 equivalent capacity, with electric heating, temperature recorder, compliant for all canning regulation requirements
- electric air compressor, essential tool to ensure counter-pressure in retort, and to run all closing machines

The farmer supplies only : electrical power (25 KW, triphasic 380 V current) and cold drinkable water.

Product are prepared from raw refrigerated ingredients, filled into containers in the farmer’s facility (“kitchen”) and immediately covered with lids, then placed in reusable covered plastic cases, to protects against contamination, then transported inside the truck, tightly closed, heat treated (pasteurisation or

sterilisation, cooled, returned back to the farmer for room or refrigerated storage, labelling and sales.

No unpackaged raw materials enter in the truck, therefore cleaning of the skid in truck is very simple.

The truck can be exploited both through private owner (truck for rent) or through collective (cooperative) owning with circular right of use for a fee

technological X

non-technological

Case n°2 : Local implemented small scaled fruit juice processing line

The SFSC solution is the implantation of all pilot sized equipments required to achieve pasteurized fruits juices (and/or other products from fruits : jams, preserves, etc. depending of the equipment), in a stationary local facility for rent. Typical implantation is done in already existing R&D or training facilities (technical centers, agricultural highschoools, etc.).

Required equipments are designed for transformation up to 1000 kg fruit/day :

- cold rooms for raw fruit storage in bulk (pallox type)
- washer (with flow rates about 500 kg / h)
- pits removal devices if needed
- crusher for crude size reduction before extraction
- extraction through : (i) batch press – for apple juice as typical example ; centrifuge device (“extractor”) for pulpy fruits : peaches, apricot, cherries, etc. ; special juicer for orange or lemon type fruits ; other
- filtration (optional) with pump and plates filter.
- continuous pasteurization (plate or tubular heat exchanger) with hot fill in bottles, then handling and cooling OR cold packaging in bottles then batch heat treatment in pasteurizer or autoclave, then cooling.

In all cases, acid (pH < 4.5) pasteurized products are then shelf stable at room temperature.

technological

non-technological X

No innovative technologies in this flow chart, but innovation can be introduced with replacement of heat pasteurisation with High Pressure Processing in cold conditions, therefore the quality increase is very significant, but the final product must be refrigerated. The HP press is highly expensive, so only few manufacturers can invest, for toll manufacturing or use of machine on a rental basis.

technological X

Case N°3 : Small cereal processing (milling / sifting) facility

The SFSC solution is the implantation of all pilot sized equipments required to achieve cleaning, husking, grinding, milling, sifting of cereals, from grain to flours with different extraction rates, in a stationary local facility. Typical

implantation is done in already existing bakeries part of a bakers network, on a limited territory to fulfil with the SFSC spirit : i.e. bakeries located max 100 km around both cereal production plots and central milling facility.

Innovation is the use of down scaled equipments, not available in big production plants, and usually only for R&D, but now used for flour production.

At this scale, high quality flours are preferably obtained by traditional stone-milling.

technological

non-technological X

- **Describe the business, which implemented the innovated solution (size, country, region, location, type of food)**

Case 1 : Some example of “food plants in truck” already exist : one is performing in France south-east, but only for fruits and vegetable products (see : <https://www.cestpossible.me/action/faut-quon-serve-la-conserverie-mobile-et-solidaire-de-la-drome/>). Another one is under building in France west (around Nantes).

Due to the relatively high processing cost €/kg when using The Cannery In A Truck, this business system is well adapted only for products with high intrinsic value (duck foie gras as best example), or foods with high added value when raw materials are cheap (i.e. out-grade vegetables after sorting), and finished product can be sold with good market prices, or individuals are ready to pay when able to transform their own production : best example is for the production of soups from vegetables. Especially with organic raw materials.

Case 2 :

As an example, CTCPA R&D pilot plant in Avignon has the technical capacity for fruit juice production as described.

Some small companies in France are performing this activity on commercial basis, liked to agricultural cooperatives. Due to acidic pH of the products, food safety is easy to handle

Case 3 : to be implemented (no existing organizations yet). Still under reflexion.

- **Describe the distribution channels of the product(s)**

Case 1 : Small Cannery In A Truck

Agricultural primary raw material producer (and supplier of packagings) => transformation on the farm : the truck is mobile factory and parks in farmyard the time required for transformation ; no sales of raw material or finished products at this step. The production truck is only for rent => packaged finished products are immediately returned to the farmer.

Distribution channels : (i) directly by the farmer/producer : open-air markets ; at the farm itself ; use for customers and sales at Farmhouse-Inn ; e-commerce ; (ii) by third party retailer : through local small retailers or “direct from the farm” distribution networks ; local restaurants and hotels ;

Case n°2 : Local implemented small scaled fruit juice processing line

Agricultural primary raw material producer (and supplier of packagings) => transportation and transformation in the rented pilot plant ; no sales of raw material or finished products at this step. The production tool is only for rent => packaged finished products are immediately returned to the farmer.

Distribution channels : (i) directly by the farmer/producer : open-air markets ; at the farm itself ; use for customers and sales at Farmhouse-Inn ; e-commerce ; (ii) by third party retailer : through local small retailers or “direct from the farm” distribution networks ; local restaurants and hotels ;

Case N°3 : Small cereal processing (milling / sifting) facility

Cereal producer => transportation and sales at local small sized milling facility shared by bakers (which supplies the flours packagings) => local used of flours by bakeries to produce breads => locally sold to consumers.

Distribution channels : (i) finished products (breads) are mainly sold at the bakery where the flour is produced, and in other bakeries located near + sales at local restaurants and hotels ;

- **Describe what makes the innovation work.**

Case 1 : Small Cannery In A Truck

Key features are : the added value must be sufficient to transform in farm and pay the rental fee for the trucks, rather than sell the raw material to an industrial processor ; the volume to transform is not enough to deserve individual investment ;

Case n°2 : Local implemented small scaled fruit juice processing line

Key features are : the agricultural production cannot be stored fresh for cheap for a long time, and cannot be frozen : immediate transformation is required ; farmer cannot afford complex investment for such seasonal activity ; high quality “premium” fruit juices have good market price and can be a suitable solution for out-graded fruits not sold on consumer fresh fruits market.

Case N°3 : Small cereal processing (milling / sifting) facility

No industrial milling facilities accept small batches of cereal batches with “special quality”, to be processed separately . Only pilot sized milling facilities are likely to produce those high added value flours. Locally grown cereal with local

stone grinding technology gives highly acceptable high priced breads. In France, willingness to pay is high for premium special breads.

- Describe the specific prerequisites for the business related to the implementation of the method and/or related to the location, method, procedure, solution

a: List the relevant necessary resources (including the estimated cost) for the specific innovation.

Please list the relevant ones only (list is annexed)

	Case n°1: Small cannery in a truck	Case n°2 : Local implemented small scaled fruit juice processing line	Case n°3 : Small cereals processing facility
Material	Access to raw products (meat) and ingredients Metallic cans and glass jar lids Water Electricity	Access to fruits and other necessary ingredients	Access to cereals
Humans	A processor	A processor	A processor
Facilities	The truck as a processing plant	The stationary local facility	The stationary local facility
Equipments	Autoclave, electric air compressor	Cold room, washer, crusher, batch press and centrifuge device for extraction, pump and plates filter for filtration, plate or tubular heat exchanger and autoclave or pasteurizer for pasteurization	Equipments required to achieve cleaning, husking, grinding, milling and sifting of cereals
Estimated cost	Between 50 000 and 100 000€ (investment about 55 000€)	/	/

**b: List the relevant necessary capabilities for the specific innovation.
Please list the relevant ones only (list is annexed)**

- **Food safety:**
 - basic skills to comply with the EU food safety regulations
 - ability to understand what makes the product safe (the key controls, which ensure the safety of the product – biological, chemical and physical hazards, providing the safety shelf life of perishable products)
 - food safety culture (motivation, responsibility for food safety) and basic skills for the implementation of HACCP
- **Food quality:**
 - production experiences which help to provide the expected quality reliably, uniformly;
- **Accessibility to consumers:**
 - ability to develop and implement new business models for ensuring access of consumers to products and augmented services;
- **input for R+D**
 - access to innovative technologies; distribution and marketing solutions and methods
- **access to infrastructure:**
 - ability to use existing own infrastructure in a focused way to serve consumer needs or to combine it with complementary infrastructures of other SFSC actors, cooperation culture;
- **production, processing:**
 - management system, production experience, specific controlling, monitoring, continuously;

5. Describe the results, achievements and typical failures

Among the presented examples, only the first one already exists. One “food plant in truck” has been implemented in the east of France in 2017 for cook and process the excess of fruit and vegetables from farms. This truck does not aim to make profit (non-profit organization). Today, the truck is supplied by 30 local producers and it is a success.

But this type of facility requires a high processing cost. It is only adapted for product with high intrinsic or food with high added value (when raw materials are cheap i.e. soups from vegetables).

6. Summarize what makes the case to a good practice for the members of the SFSCs (e.g. lessons learned)

This type of innovation could allow to increase the added value of agricultural production for small farms. Fresh processing products could be available in rural areas where the shops are missing. It is also a way to limit waste from farms.

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7. Aspects, methods for transfer of methods for other SFSC members

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8. Recommendations for members of other SFSCs for further applications

This type of facilities could be generalized among short food supply chains. This innovation is only profitable with some products with a high added value.

9. More information is available at (web), if it is relevant

Annex

1. Checklist for necessary resources (tangible and non-tangible):

- materials (access to: raw materials/ ingredients - including volume, land – including size, packaging materials)
- human: labour force: size, knowledge & skills (production, technical, marketing, managerial, ICT, financial, etc.)
- technology: patents, know-how, trademarks, copyrights, trade secrets
- infrastructure, equipment, facilities, - size, minimum volume of production/sales, IT infrastructure
- information, reputation, brand, trust
- financial*

*: estimated cost:

0 - 10 000 Eur
10 001 - 50 000 Eur
50 001 - 100 000 Eur
100 001 - 300 000 Eur
300 001 – 1 000 000 Eur
1 000 000 Eur above –

- other specific necessary resources for the application of the specific innovation

2. Checklist for the necessary capabilities

- **food safety:**
 - basic skills to comply with the EU food safety regulations
 - ability to understand what makes the product safe (the key controls, which ensure the safety of the product – biological, chemical and physical hazards, providing the safety shelf life of perishable products)
 - food safety culture (motivation, responsibility for food safety) and basic skills for the implementation of HACCP

- **food quality:**
 - ability to define the target segments of consumers for SFSCs
 - ability to define the product characteristics which are (tacit) basic requirements for the target segment(s) of consumers;
 - ability to define which product attributes/levels and augmented services represent an added value for the target segments of consumers;
 - food quality culture (motivation, responsibility for food quality);
 - production experiences which help to provide the expected quality reliably, uniformly;
 - ability to provide distinguishable quality which meets the needs of the targeted consumer segment;
 - meeting (local) legal requirements, application of the labelling rules;
 - ability to access the consumer willingness to pay for specific products of SFSCs.

- **trust:**
 - ability to ensure product integrity, authenticity and transparent information for the consumers (including systems, tools);
 - ability to access external trust enhancers (third party certification, internal certification system, participatory guarantee systems);
 - application of the labelling rules and branding (mandatory and voluntary);
 - ability to meet third party certification requirements

- **ethical aspects**
 - ability to understand consumer needs for ethical behaviour related to the specific product(s) of the SFSCs;
 - culture for ethical food production and supply;
 - ability to implement necessary measures to ensure ethical food production and supply;
 - ability to access the consumer willingness to pay for products meeting ethical aspects

- **accessibility to consumers:**
 - ability to organize logistics efficiently and to exploit innovative solutions and distribution channels;
 - efficient, innovative sales methods;

- ability to develop and implement new business models for ensuring access of consumers to products and augmented services;
- **fair price:**
 - collecting marketing information;
 - ability to enhance and maintain cooperation among chain actors including the combined use of available complementary resources, capabilities, competences of SFSCs actors, networking, understanding the principles of food value chain management;
 - ability to define, develop or maintain unique quality of products and augmented services;
 - ability to develop and implement new business models;
 - ability to access the consumer willingness to pay for fair price
- **increased negotiation power:**
 - collecting marketing information;
 - ability to enhance and maintain cooperation among chain actors including the combined use of available complementary resources, capabilities, competences of SFSCs actors, networking, understanding the principles of food value chain management, cooperation culture;
 - ability to define, develop or maintain unique quality of products and augmented services;
 - ability to develop and implement new business models;
- **shared use of available resources:**
 - ability to enhance and maintain cooperation among chain actors including the shared and combined use of available complementary resources, capabilities, competences of SFSCs actors, networking, understanding the principles of food value chain management, cooperation culture;
 - the level of value chain management culture;
 - ability to access the consumer willingness to pay for food with reduced environmental impacts

- **input for R+D:**
 - ability to monitor, research, evaluate, and understand the needs and wants of customers and consumers;
 - ability to develop new products, processes, packaging, preservation techniques, systems and access to new markets, including in other categories;
 - access to innovative technologies; distribution and marketing solutions and methods. management systems;
 - access to local input for R+D covered by other aspects

- **access to markets: and market success**
 - effective promotion, customer service, efficient and innovative sales methods;
 - ability to understand consumer's needs;
 - ability to organise logistics efficiently and to exploit innovative solutions and distribution channels,
 - unique value propositions;
 - ability to develop and implement new business models for ensuring access of consumers to products and augmented services, develop the market accessibility for the suppliers.
 - stock control;
 - ability to access to required raw materials within a restricted geographical area

- **access to infrastructure:**
 - ability to use existing own infrastructure in a focused way to serve consumer needs or to combine it with complementary infrastructures of other SFSC actors, cooperation culture;

- **management:**
 - to implement management systems for vision, planning, implementing), coordinating, controlling, monitoring, continuously;
 - improving; ability to motivate, authorize staff;

- **production, processing:**
 - management system, production experience, specific controlling, monitoring, continuously;
 - willingness to consider and ability to evaluate the adoption of TECI and NTI in the current production processes;
 - any additional specific resources necessary for the application of the specific innovation.