

DRAFT

Start Your Small Industry

Bakery and frozen pastry

Small Enterprise Development Programme
RAS/92/306

(A UNDP/UNIDO/ILO Regional Programme for the Pacific)



A GUIDE TO A FROZEN BREAD AND BAKERY PRODUCTS

1 - PRESENTATION

1-1 Nature of the Activity

The unit is supplied with flour and additional ingredients (yeast, as well as animal and vegetable fats, butter, sugar, salt, and “improving” ingredients for the production of bakery goods.

It produces frozen unbaked or pre-baked “baguettes” primarily destined for independent bakeries, chains or large supermarkets. The products undergo final processing just before the time of sale :

- placement in a rising chamber, baking in an oven in the case of unbaked dough
- simple **final** baking in the case of pre-baked dough.

The production is exclusively intended for local markets.

The production factories intended for pre-baked products can also produce baked products for a nearby market.

1-2 Alternatives

* Finished Products :

- Adaptation of finished products to local tastes and characteristics of available flour
- Wide range of possible sweet bakery products (butter margarine or almond croissants, chocolate buns, raisin buns, apple turnovers, etc...) or regular bakery products (cheese croissants, ham croissants, etc...)
- Frozen products sold unbaked or pre-baked
- Packaging either in cartons (pallets) or wrapped in plastic.

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The production of bread and bakery goods should be at least semi-automatic to insure consistent quality.

The freezing can be done either by mechanical **cold** (high investment, low operating costs) or by cryogenics/nitrogen (low investment, high operating costs).

1-3 Types of Possible Units

This guide presents three types of **units** :

Unit A : small unbaked products unit (2000 loaves/hour + 6000' bakery **products/hour**).

This unit does not integrate prt-baking, but requires a certain level of equipment and know-how in the places of final sale (controlled fermentation room and steam oven).

Unit B : mixed production unit : pre-baked bread (2000 loaves/hour) and “unbaked bakery products **(6000/hour)**.”

It can supply stores **equiped** with a simple oven for final **baking** and a simple rising chamber.

The techniques for baking, pre-baked bread **and rising** (baking for bakery products) are simple.

Unit C : production unit of pre-baked bread and bakery products. The factory **must** include the range of equipment needed for production-baking. The baking terminals are only needed for the final baking. A large range of clients is thus possible : hotels, restaurants, collectives, even supermarkets.

Production : 2000 loaves/hour and 6000 bakery products/hour.

2 - TECHNICAL AND ECONOMIC GUIDE

2-1 Description of the Unit

2-1-1 Finished Products

Line	A	B	C
	Unbaked products : 2000 loaves/hour + 6000 bakery products/hour	Prebaked products : 2000 loaves/hour Unbaked products : + 6000 bakery products/hour	Prebaked products : 2000 loaves/hour + 6000 bakery products/hour
Range' of products	Bread : Bakery products : croissants, chocolate buns, raisin buns.. apple turnovers	Same as A	Same as A
Type of packaging	Cartons	Cartons	Cartons
Size of packaging	Cartons or pallets	Cartons or pallets	Cartons or pallets
Production daily (10h/day) annual (300 days/year)	20 000 loaves + 60 000 bakery products 6 million loaves + 18 million bakery products	Same as A S a m e	Same as A as A Same as A

2-I-2 **Technological** Choices

OPERATIONS	TECHNOLOGICAL OPTIONS	SOLUTIONS		
		LINE A	LINE B	LINE C
FACTORY				
Reception of flour and ingredients	Sacs or silos for flour	silos	silos	silos
Preparation of dough	Classical bakery equipment : kneading cutting of dough, shaping			
Shaping				
Steaming	Only for prebaked products : in a rising chamber	no	for loaves	for loaves and bakery products
Pre-baking	Electric, gas or fuel oven	no	Depending on energy supply	Same as B
Baking				
Freezing	Mechanical cool or cryogenic	By choice depending on local condition	Same as A	Same as A
Storage • 18°C				
DISTRIBUTION	Truck at - 18°C			
FINAL SALE				
Storage • 18°C				
Steaming	only for products sold unbaked	Controlled rinsing chamber	Pimple steaming for bakery products	no
Baking/return to room temperature	Electric or steam oven	Steam oven	oven	oven

2-2 Economic Analysis

2-2-1 Investments

	LINE A	LINE B	LINE c
Equipment	FOB price us \$	FOB price us \$	FOB price us \$
Panification line	\$ 250 000	\$ 250 000	\$ 250 000
Bakery products lines	\$ 130 000	\$ 130 000	\$ 130 000
Rising chamber	.	\$ 50 000	\$ 65 000
Oven		\$ 65 000	s 100 000
Freezer	600 Kg/h (the cost depends on the chosen method of freezing)	Same as A	Same as A
Storage chamber -18°C	600 m ³	600 m ³	700 m ³
Industrial building	700 m ²	1000 m ²	1000 m ²
Land	Area : 3000 m²	Area : 4000 m²	Area : 4000 m²
Other investment costs to foresee			
<ul style="list-style-type: none"> • Laboratory test cooking • Electrogenerator • Silos 	\$ 50 000	\$ 50 000	\$ 50 000
	Power to maintain storage at Capacity : 15 t	Power to maintain storage at Capacity : 15 t	Power to maintain storage at Capacity : 15 t
			18°C
Total investment	Approx. 1,3 MS (without generating set and silo) Approx. 1,6 MS (with generating set and silo)	Approx. 1,5 MS (without generating set and silo) Approx. 1,8 MS (with generating set and silo)	Same as B

Depending on the type of bakery products, the hourly production will vary from 4000 units/hour (chocolate and raisin buns, apple turnovers...) to 8000 units/hour (croissants). The units are expected to supply **aprox.** 30 retail **sales** outlets.

2-2-2 **Functioning**

	A	B	c
Labour			
- Unskilled	10	14	16
- Skilled	2	2	2
Annual consumption (based on 300 days)			
- Flour	10 500 cwt	10 500 cwt	10 500 cwt
- Energy	Depends on choice of freezing method		
- Wrapping	125 000	225 000	300 000

3 • KEY FACTORS TO **THE** PROJECT'S SUCCESS

3-1 **Supply**

It is necessary to have access to a regular supply of flour (buffer solution storage provided by the workshop). The baking characteristics of the available flour provide no major problems : an initial effort to adapt the process to the substance ; but from then on, it is necessary to maintain a consistant quality of supply.

3-2 **Technology**

The most delicate stages of the process are the pre-baking stage and the maintaining of the negative cold chain up to the consumer.

3-3 **Personnel**

The workshop should be managed by an experienced technician who has been trained at length in an equivalent unit ; the person who installs the workshop, along **with** the future director, will insure the start of the operation and training of the personnel

3-4 **Quality Control**

Requires a mini-laboratory to test :

- ingredients (flour..) . --
- the finished products. A sample from each unit of production (**ex kneading**) is systematically tested.

3-5 Distribution and Commercialization

This is the element which determines the operation's success. The site chosen for the unit must **fulfil** 3 criteria :

- presence of a clientele with high purchasing power : the production **system** of pre-baked dough and final baking in the store results in expensive products. Conversely, the flexibility of the system is well suited to tourist regions which must satisfy a rich, demanding clientele of fluctuating size.
- absence **of** the bakery tradition : the proposed system is costly when mass consumption is aimed at.
- presence of a negative cold chain : nonetheless, the workshop can foresee integrating its own negative cold chain, in providing its own delivery vehicles and installing freezers in the places of sale.

Financing

The investment/turnover ratio is low (between 0.4 to 0.5) and the amount of working capital is unimportant (little storage of finished products).

4 • INDUCED ACTIVITIES

The unit consumes **10** 500 cwt of flour per year.

A unit can **lead** to the opening of 30 retail outlets of bread and bakery products.