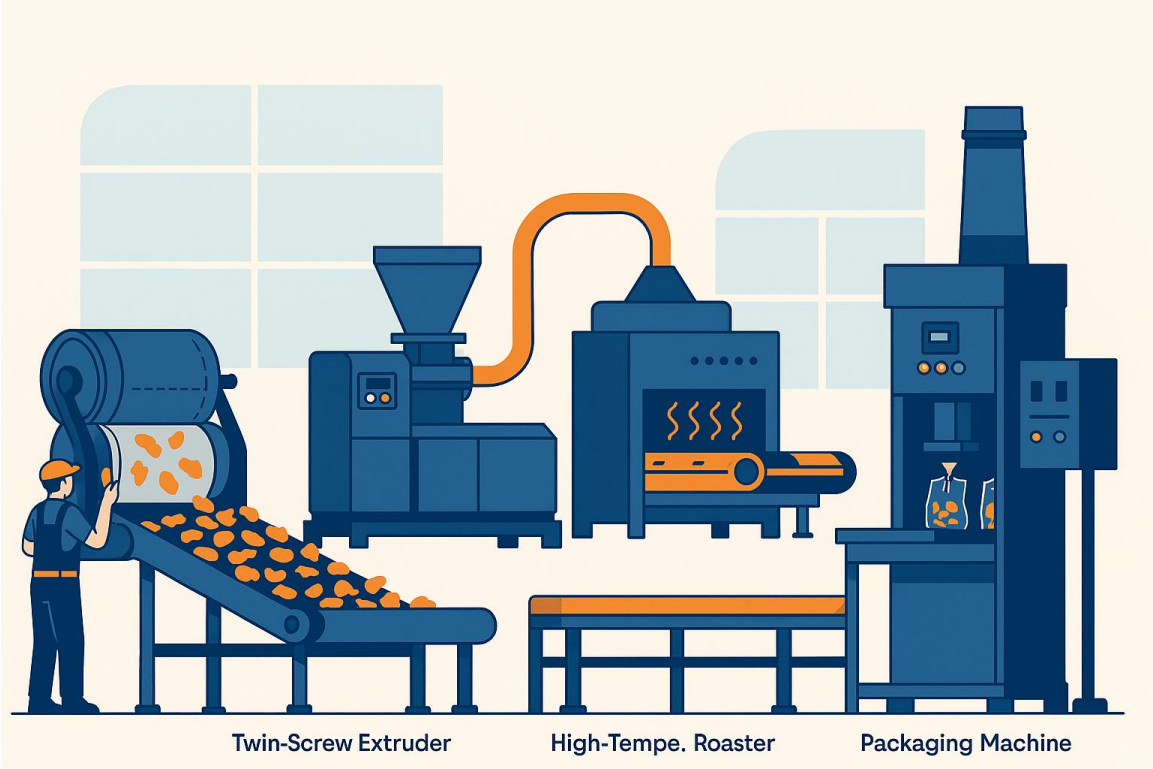
SANAATCHI
INDUSTRIAL VISION GROUP

CEREAL PRODUCTION LINE



Complete TurnKey Business Proposal

Executive Summary

The proposed cereal production line delivers a complete **turnkey solution** designed to establish a premium breakfast-cereal and corn-flakes manufacturing facility. By combining advanced twin-screw extrusion technology with comprehensive support services, the project enables investors to bypass high entry barriers and quickly launch a profitable operation. Key highlights include:

- **Production capacity:** 150 – 500 kg per hour depending on automation level.
- **Investment range:** US $50 000 – $150 000 covering equipment, installation, training and working capital.
- **Payback period:** 6 – 18 months.

- **Market size:** Growing global demand for convenient, ready-to-eat breakfast foods and strong local demand in Afghanistan.

This document provides a comprehensive roadmap for developing the cereal plant. It details the manufacturing process, product portfolio, market opportunity, raw-material requirements, investment analysis, quality and regulatory standards, and the next steps for launching the line. Each step is elaborated to ensure clarity and professional presentation.

About Sanaatchi Industrial Vision

Sanaatchi Industrial Vision is Afghanistan's premier partner for **turnkey manufacturing and industrial solutions**. Operating under the motto "Your vision, our expertise," clients supply the idea and capital while Sanaatchi manages the entire journey from concept to first finished product. Our multidisciplinary team covers engineering, procurement, construction and commissioning so that clients can remain focused on their strategic vision. Services are organised into four integrated phases:

1. **Engineering & Design:** Comprehensive technical and economic feasibility studies plus conceptual and basic design of the production line. The plant layout is optimised for hygienic workflow, future expansion and compliance with food-processing standards.
2. **Global Sourcing & Logistics:** Identification and vetting of global suppliers (primarily in China and Turkey), negotiation of competitive pricing, pre-shipment inspection, procurement and management of cross-border logistics.
3. **Implementation & Construction:** On-site project management, civil works, installation and positioning of heavy machinery such as twin-screw extruders, flakers and dryers; supervision of electrical and steam piping infrastructure.
4. **Commissioning & Support:** Pre-commissioning and final load testing, training of technical staff and operators, formulation development and ongoing technical support to ensure long-term success.

Sanaatchi emphasises customer trust, transparent pricing and strict adherence to project timelines. This comprehensive approach ensures clients receive a fully operational production line that meets technical specifications, regulatory requirements and market needs.

Market Opportunity in Afghanistan

Afghanistan's packaged food market relies heavily on imported breakfast cereals, creating a substantial opportunity for **local manufacturing**. Key market drivers include:

- **Import substitution and tariff advantages:** Tariffs on imported finished foods give local manufacturers a structural price advantage. Producing cereals locally avoids duties of 10–20 % or more and benefits from lower duties on raw grains.
- **Demographic dividend:** Afghanistan has one of the youngest populations globally. Urban youth exposed to international food trends increasingly demand flavoured cereals such as chocolate balls and fruit-loops.

- **Nutritional needs and institutional demand:** Widespread iron and zinc deficiencies make fortified cereals attractive to public-health institutions. A local plant can supply schools, hospitals and aid programmes with fortified corn-flakes meeting Ministry of Public Health standards.
- **Export potential:** Neighbouring Central Asian markets (e.g., Tajikistan, Uzbekistan) consume Halal-certified processed foods. An Afghan cereal brand with high quality can access these markets via regional trade agreements.

By establishing a domestic facility, investors can supply the local market with fresh, affordable cereals, create private-label products for retailers and explore regional export opportunities while reducing exposure to currency fluctuations and import disruptions.

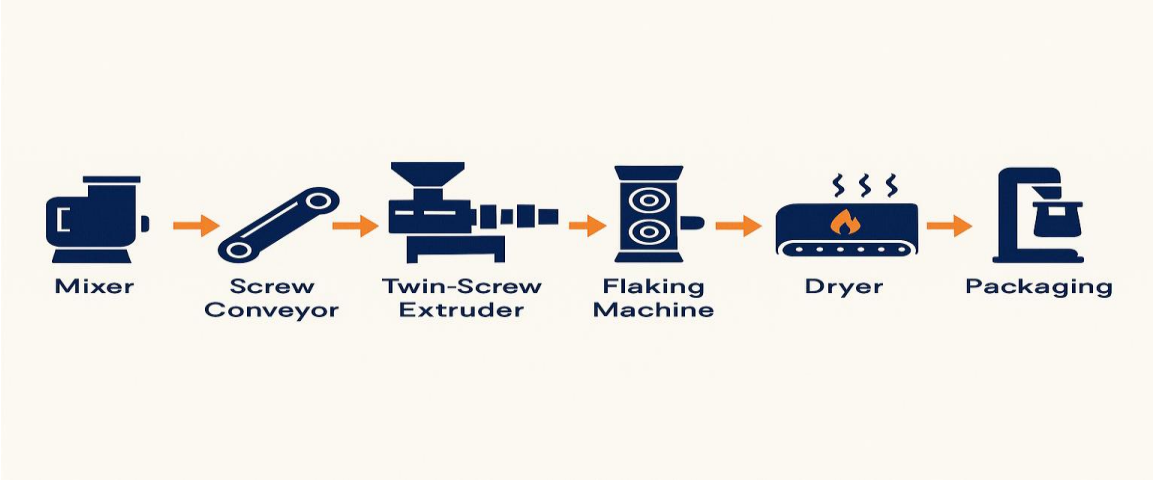
Product Portfolio – Phase 1 Launch

The initial product portfolio focuses on three categories of cereals using the same core extrusion and flaking technology. Each product can be customised for sugar level, coating and packaging.

Product line	Key features	Target market	Typical price range
Classic Corn Flakes	Crispy, golden-toasted corn flakes fortified with vitamins and minerals	Mass-market families	US $1.50 – $3.50 per box (300 g)
Kids' Breakfast Loops	Sweetened, multi-coloured loops or cocoa balls with high crunch factor	Children and youth	US $1.00 – $2.50 per box (250 g)
Healthy Muesli/Granola	Whole-grain oats mixed with dried fruits and nuts; high fibre content	Premium/health-conscious segment	US $4.00 – $7.00 per bag (500 g)

Manufacturing Process Flow

Production is organised into ten sequential steps from raw-material preparation to final packaging. The flowchart below visualises the overall process, ensuring consistent texture, taste and food-safety compliance.



Step	Process name	Key equipment	Main parameters
1	Raw-materials mixing	Powder mixer or ribbon blender	Mixing time 3–5 min; moisture adjusted to 12–18 %
2	Extrusion & cooking	Twin-screw extruder	Temperature 100–160 °C; screw speed 200–400 RPM; pressure 5–10 MPa
3	Flaking (for corn flakes)	Industrial flaking machine	Roller gap 0.1–0.5 mm; cooling water circulation
4	Pre-drying	Continuous belt dryer	Temperature 50–80 °C; reduces moisture to prepare for roasting
5	High-temperature roasting	High-temperature roaster	Temperature 180–220 °C; creates blistering and crispy texture
6	Flavor coating	Double drum coating line	Syrup sprayer pressure 2–4 bar; drum rotation 15–25 RPM
7	Final drying	Multi-layer belt oven	Temperature 100–120 °C; final moisture content <3 %
8	Cooling	Cooling conveyor	Brings product to 20–25 °C to prevent caking
9	Quality control	Metal detector and QC lab	Checks for metals, moisture content and crispness
10	Packaging	Vertical form-fill-seal (VFFS) machine	30–60 bags per minute; nitrogen flushing for longer shelf-life

Detailed Process Descriptions

Step 1 – Raw-Materials Mixing

Corn grits (60–80 mesh) and other grains such as wheat, rice or oats are mixed with water and micronutrient premixes in a stainless-steel ribbon blender. Uniform hydration is critical to achieving consistent extrusion and flake texture.

Step 2 – Extrusion & Cooking

The hydrated mixture is fed into a **twin-screw extruder**. Inside the barrel, high shear and friction cook the grains at high temperatures (100–160 °C). Starch is gelatinised and the product is shaped through interchangeable dies to produce balls, rings or pellets. Screw speed (200–400 RPM) and barrel temperature are controlled to achieve the desired expansion and texture.

Step 3 – Flaking (Corn Flakes Only)

Extruded pellets destined for corn flakes are transferred to a heavy **flaking machine**. Two water-cooled rollers press each pellet into a thin flake. The roller gap (0.1–0.5 mm) determines the flake thickness. Immediate cooling prevents sticking and preserves flake structure.

Step 4 – High-Temperature Roasting

Raw flakes or extruded shapes enter a **high-temperature roaster** where sudden exposure to 180–220 °C causes blistering and imparts a golden colour. This step creates the signature crispy texture of premium corn flakes. Residence time and temperature are carefully controlled to prevent scorching.

Step 5 – Flavor Coating

Roasted cereals are fed into a rotating coating drum. A syrup sprayer applies sugar, honey or chocolate while a powder feeder can dust the product with cocoa or vitamins. Drum rotation (15–25 RPM) ensures even coverage without breaking delicate flakes.

Step 6 – Final Drying

Coated cereals pass through a multi-layer belt oven at 100–120 °C to evaporate moisture from the syrup. The aim is to achieve a final moisture content below 3 %, ensuring shelf stability and crispness.

Step 7 – Cooling

After drying, the product travels along a cooling conveyor equipped with fans to bring it down to ambient temperature (20–25 °C). Packaging hot cereal would cause condensation and spoilage; cooling avoids this.

Step 8 – Packaging

The finished cereal is weighed by a multi-head weigher and packed by a **VFFS machine** into laminated pouches. Nitrogen gas is flushed into each bag to prevent oxidation and keep the product crisp. Semi-automatic or fully automatic systems can package 30–60 bags per minute.

Raw Materials Requirements

Cereal formulations consist of readily available ingredients:

- **Base grains (70–85 %):** Degermed corn meal, wheat flour, rice flour or oat flour.
- **Sweeteners (5–15 %):** White sugar, brown sugar, malt extract, honey or glucose syrup.
- **Additives (1–3 %):** Salt, emulsifiers (soy lecithin) and baking soda.
- **Flavourings (0.5–2 %):** Cocoa powder, vanilla extract or fruit essences.
- **Fortification:** Vitamin and mineral premixes (B-complex, iron, zinc) to meet nutritional labelling requirements.
- **Packaging materials:** Aluminium-laminated film for freshness and cardboard outer cartons.

Production costs for standard corn flakes are estimated at US $0.80 – $1.20 per kg. With a retail price of US $4.00 – $6.00 per kg, the margin potential is significant.

Investment Summary & Returns

The table below summarises the expected investment. Costs vary with capacity and automation level.

Component	Low range (US $)	High range (US $)	Note
Equipment cost	20 000	40 000	Includes extruder, flaker, roaster, dryer, coating and packaging units
Installation & training	3 000	5 000	Engineers' travel, visa,

Component	Low range (US $)	High range (US $)	Note
			accommodation and on-site training
Working capital	30 000	50 000	Raw-material stock and first three months of operating expenses
Total investment	**53 000**	**95 000**	Aggregate of equipment, installation and working capital

Timeline:

1. **Months 1–3:** Manufacturing of custom machinery (extruders often require 60–90 days).
2. **Month 4:** Shipping and logistics.
3. **Month 5:** Installation and commissioning.
4. **Month 6:** Trial production and staff training.
5. **Month 7:** Commercial launch.

ROI: Break-even is projected between 18 and 30 months assuming a single-shift operation at roughly 70 % of rated capacity.

Quality Standards & Compliance

To compete with imports and serve institutional clients, the cereal plant will adhere to international food-safety and quality standards:

- **HACCP (Hazard Analysis Critical Control Point):** Systematic identification of hazards and critical control points throughout the process.
- **ISO 22000:** Ensures the facility meets global hygiene norms and traceability requirements.
- **Halal certification:** Essential for the Afghan and regional market.
- **Fortification standards:** Compliance with Ministry of Public Health guidelines for iron and folic acid enrichment.

Conclusion and Next Steps

Establishing a cereal production line in Afghanistan offers a compelling opportunity to capitalise on local demand for convenient nutrition, reduce import dependency and create high-quality, fortified breakfast foods. Sanaatchi Industrial Vision's turnkey approach minimises risk by providing complete services—from design and equipment procurement to installation, training and after-sales support. With competitive pricing, adherence to international standards and a focus on nutritional fortification, this project can deliver both financial returns and social impact.

Contact Information

Sanaatchi Industrial Vision – Afghanistan's premier turnkey manufacturing partner

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- **Website:** www.sanaatchi.com

Next steps:

1. **Schedule a consultation:** Arrange an initial call within 24 hours to discuss specific capacity requirements and site constraints.
2. **Receive a customised proposal:** Sanaatchi will prepare a tailored quotation reflecting equipment size, automation level and budget.
3. **Site assessment & utility planning:** Conduct a detailed review of site infrastructure (electricity, gas, water) and layout to finalise design.
4. **Project implementation:** Proceed with manufacturing, logistics and commissioning with continued technical support.