

## 9. Business Model for Millets Production Technology

Amit Brrock<sup>1</sup>, Hanuwant Singh<sup>2</sup>

<sup>12</sup> M.Sc Scholar,  
Department of Agronomy,  
School of Agriculture,  
Lovely Professional University,  
Phagwara, Punjab, India.

### **Abstract:**

*The business model for millets production technology intricately revolves around sustainable cultivation, recognizing the nutritional value and environmental benefits of millets. This comprehensive model encompasses innovative farming techniques, technology adoption for enhanced yields, and quality management of the supply chain. Farmer cooperatives play a crucial role in collective decision-making, resource pooling, and knowledge-sharing, empowering farmers for better negotiations and improved incomes. Research and development efforts focus on improving millet varieties for resilience against pests, diseases, and environmental stressors. Awareness and education programs target both farmers and consumers, emphasizing the benefits of millets for health and sustainability. Establishing partnerships with retailers, distributors, and food processors ensures a well-connected supply chain, promoting a diverse range of millet-based products.*

*The distinctive attributes of millets, such as being gluten-free, nutrient-rich, and climate-resilient, contribute to their rising popularity. The business model not only addresses agricultural challenges but also aligns with health-conscious consumer preferences, fostering a sustainable ecosystem for millets production technology. As millets gain prominence on dinner plates, emerging as a conscious dietary choice, the model capitalizes on the increasing demand for millet-based products.*

*Furthermore, by establishing partnerships with government initiatives and NGOs, the business model secures financial support and creates awareness, contributing to the overall sustainability and positive impact on both the agricultural and health sectors. Continuous research and collaboration with agricultural scientists ensure ongoing innovation, adapting to emerging challenges and opportunities in the millets production landscape. Overall, the business model presents a holistic approach that integrates technology, agriculture, marketing, and partnerships, shaping a successful trajectory for the thriving millets production technology sector.*

### **Keywords:**

*Millets Production Technology, Sustainable Cultivation, Farmer Cooperatives, Nutritional Value and Supply Chain Management.*

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## **9.1 Introduction:**

The business model for millets production technology is intricately woven around the sustainable cultivation and promotion of millets, acknowledging their nutritional value and environmental advantages (Chandrasekaran 2016). This model encompasses various facets, commencing with the adoption of innovative farming techniques and technology to enhance millet yields and quality. Efficient management of the supply chain is pivotal, ensuring a seamless transition from farm to market. Collaborations with farmers, providing them access to modern equipment and training, are vital for successful implementation. Additionally, integrating agro-processing units for millet-based products adds value to the supply chain and opens up new markets. A robust marketing strategy educating consumers about the health benefits of millets and emphasizing their versatility in various culinary applications is essential. Furthermore, partnerships with government initiatives and NGOs can help secure financial support and create awareness, fostering a sustainable ecosystem for millets production technology (Adenle *et al.*, 2019). In summary, a comprehensive approach that integrates technology, agriculture, and marketing is key to building a successful business model for millets production technology. Millets are carving out a niche for themselves on dinner plates, emerging as a deliberate choice rather than a forced dietary inclusion for health-conscious individuals. The escalating demand for millet-based products in urban areas is opening up abundant opportunities for aspiring entrepreneurs entering the market. In this blog, we will embark on a journey through a comprehensive millet business plan, exploring the various facets of this flourishing sector.

To implement the business model for millets production technology effectively, the establishment of farmer cooperatives is indispensable. These cooperatives not only serve as a platform for collective decision-making but also empower farmers by enabling them to pool resources, share knowledge, and negotiate better prices for their produce collectively. Fostering a sense of community and collaboration, these cooperatives contribute to the overall sustainability and resilience of the millet production ecosystem. Additionally, investing in research and development is crucial for continuous improvement and innovation in millets production technology. This involves collaborating with agricultural scientists and institutions to explore new varieties of millets that are resistant to pests, diseases, and environmental stressors. Continuous research can also lead to the development of more efficient farming practices, contributing to increased yields and overall crop quality. By staying at the forefront of agricultural innovation, the business model can remain adaptable and responsive to emerging challenges and opportunities.

A fundamental component of the business model is creating awareness and education programs for both farmers and consumers. Farmers need to be educated about the benefits of adopting millets production technology, including improved yields, resource efficiency, and environmental sustainability (Gebreyohannes *et al.*, 2021). Simultaneously, consumer awareness campaigns are crucial to promote the nutritional value of millets and underscore their role in a healthy diet. This dual approach helps create a demand-driven market, incentivizing farmers to invest in millets production and facilitating the integration of millets into mainstream diets. Lastly, establishing partnerships with retailers, distributors, and food processors is integral to scaling the business model. Building a robust network that connects producers to end consumers ensures a consistent market for millet products. Collaborations with food processors can lead to the development of a diverse range of

millet-based products, catering to different consumer preferences. By creating a well-established and interconnected supply chain, the business model for millets production technology can achieve long-term sustainability and positively contribute to both the agricultural and health sectors.

## 9.2 The Distinctive Attributes of Millets:

- A. Nutrient Powerhouse:** Millets are rightfully recognized as a superfood, serving as a potent source of rich nutrients and energy. Their nutritional density has earned them the title of Nutri-Cereals.
- B. Gluten-Free Trend:** In alignment with the escalating trend in the gluten-free market, millets stand out as a gluten-free grain, catering to the dietary preferences of an increasing number of consumers.
- C. Micronutrient Rich:** Millets boast a commendable profile of micronutrients, contributing to a well-rounded and healthful dietary intake.
- D. Zero Trans Fat:** A notable health benefit, millets contain no trans-fat, aligning with the contemporary emphasis on reducing harmful dietary fats.
- E. Dietary Fiber and Resistant Starch:** Millets are a natural source of dietary Fiber and resistant starch, functioning as pre-biotics that promote digestive health.
- F. Alkaline Nature and Non-Acid-Forming:** Millets exhibit an alkaline nature and possess non-acid-forming properties, contributing to a balanced and alkaline-acid ratio in the body.
- G. Balanced Amino Profile:** With a naturally balanced amino profile, millets offer a wholesome source of essential amino acids. Improved digestibility can be achieved through proper processing and malting.
- H. Farmer-Friendly Crop:** Millets prove advantageous for farmers as they are well-suited for dryland farming, demanding fewer agricultural inputs, and demonstrating resilience in drought conditions.
- I. Climate-Resilient Crop:** Recognized for their ability to thrive in diverse climatic conditions, millets contribute to the planet's well-being as a climate-resilient crop.
- J. Pharmaceutical Applications:** Beyond culinary uses, millets find application in the pharmaceutical industry, showcasing their versatility and potential in various sectors.

**Table 9.1: Millets Nutritional and Functional Properties**

Millets	Functional Properties	Nutritional Properties
<b>Finger Millet</b>	High hydration capacity High viscosity	Rich in Calcium
<b>Barnyard Millet</b>	High emulsion activity and stability High dough raising capacity	Rich in Iron
<b>Little Millet</b>	High water absorption index	High-Fat content High Potassium content
<b>Kodo Millet</b>	High water solubility	High Protein content
<b>Foxtail Millet</b>	High viscosity High water adsorption	High ash

<b>Millets</b>	<b>Functional Properties</b>	<b>Nutritional Properties</b>
<b>sorghum</b>	High hydration capacity Low swelling capacity High bulk density	High fiber content
<b>Pearl Millet</b>	High water solubility High oil absorption capacity	Rich in Iron
<b>Proso Millet</b>	High hydration index	High Zinc content

### **9.3 Ten Innovative Millet Business Plan:**

#### **9.3.1 Millet Business Plan – Millet Primary Processing Unit:**

In India, a diverse array of nine millet types thrives, differentiated into two categories based on the presence of husk layers. Sorghum, Pearl Millet, and Finger Millet stand out as husk-free varieties, commonly known as naked grains. Conversely, the remaining six millets, including Little Millet, Foxtail Millet, Barnyard Millet, Proso Millet, Kodo Millet, and Browntop Millet, necessitate husk removal to render them suitable for human consumption. This processing journey initiates with cleaning, grading, and culminates in the removal of the husk layer. The establishment of a millet processing unit requires an appropriate space commensurate with the installed machines (Tobgay 2014). Essential equipment encompasses a Grader-cum-Aspirator, Destoner-cum-Aspirator, and a Dehuller-cum-Aspirator (Single and Double Stage dehuller). The associated costs for establishing such a unit can range from 3-5 lakhs to 60-70 lakhs, contingent upon machine capacity. A small-scale dehuller, costing around Rs. 75,000, represents an accessible option and marks a significant milestone as the first tabletop dehuller in India, developed by the DHAN Foundation. Prior to embarking on the establishment of this primary processing unit, several crucial considerations should be kept in mind:

- Conduct a survey to assess market potential and ascertain the availability of raw materials.
- Thoroughly evaluate the performance and efficiency of machines before making procurement decisions.
- Entrepreneurs should possess familiarity with machine operations, or alternatively, trained machine operators are essential.
- Gain an understanding of the varied shapes and sizes of millet grains, as this knowledge is instrumental in optimizing processing procedures.

#### **9.3.2 Millets Value Addition:**

The concept of value addition involves transforming a raw commodity into a refined form to generate a high-quality final product.

What makes the value addition of millets necessary?

- Meeting the taste/preferences of consumers.
- Reducing post-harvest losses.

- Nutrient enhancement.
- Ready to eat (RTE), ready to Cook (RTC) – Reducing cooking time.
- Enhancing shelf life and making the product available for an extended period.
- Diversifying millet products to address food needs amidst climate changes.
- Improving the consumption of millet products to combat malnutrition.
- Providing millet farmers with more post-harvest technologies to enhance the economic value of millet and improve farmers' status.



**Figure 9.1: Sorghum Flakes**

The Indian Institute of Food Processing Technology in Tamil Nadu has introduced a range of inventive millet-based products. To discover more about Millet Business Plans, you can visit the IIFPT website. Some notable offerings include:

- Flexible Edible Millet Film:
- Dairy-Free Millet Ice Cream:
- Millet Milk Powder:
- Millet Moringa Pasta:

### **9.3.3 Millet Business Plan for Millet Seed Entrepreneurs:**

With the rising demand for millets and a corresponding request from farmers for high-quality millet seeds, India currently boasts a substantial availability of quality seeds for Sorghum and Pearl Millet. However, there remains significant potential for the expansion of quality seed availability, particularly for minor millets. The introduction of superior quality seeds for minor millets holds the promise of elevating millet production and productivity. Farmers have the opportunity to participate in Government Seed Production Programs, contributing to the generation of high-quality seeds (Umesh *et al.*, 2019). This presents a considerable business potential within the seed sector, tapping into the growing market demand for millets and fostering agricultural development.

### **9.3.4 Millet Business Plan for Millets Aggregators:**

Pooling millets in a warehouse for supply to supermarkets and the food industry stands as a viable millet business strategy. Accumulating substantial quantities of millets in the warehouse enables the provision of consistent supply to the food industry as per their requirements.

One distinctive advantage of millet grains lies in their ability to be stored for extended periods, even with the husk intact, provided that proper storage safety protocols are adhered to. This business plan capitalizes on the unique storage characteristics of millet grains, ensuring a long-term and reliable source for the food industry's needs.

### **9.3.5 Millet Business Plan – Millets packaging for Supermarkets and the Retail Industry:**

Creating processed millet products and supplying them to retail and supermarkets serves as a strategic millet business plan in the B2B (Business-to-Business) sector (Shah *et al.*, 2023). Contemporary retail practices involve allocating distinct aisles and shelves for millet-based products.

This strategic placement enhances visibility, leading to increased sales and, consequently, higher revenue. In this business model, millet products are meticulously processed, packaged, and tailored to meet the specific requirements of clients. The versatility in packaging allows for a customized approach, ensuring that the products align precisely with the needs and preferences of the target market. This B2B strategy not only taps into the growing demand for millet-based products but also capitalizes on the evolving retail landscape, contributing to the overall expansion of the millet industry.

### **9.3.6 Millet Business Plan for Bakery Industry (Biscuits and Cakes):**

In the current market scenario, where most biscuits are crafted from refined cereals (maida), opting for biscuits made with millets represents a healthier choice. Establishing a millet bakery unit necessitates the acquisition of three key machines:

- Planetary Mixer
- Cookies cutting machines
- Rotary Convection Oven

As health consciousness continues to rise, individuals are choosing millet-based cakes for birthday celebrations. Notably, Mumbai-based Chef Natasha Gandhi, the founder of House of Millets, has gained recognition for her exquisite cakes crafted with millets.

These unique creations are not only visually appealing but also align with health-conscious preferences, being gluten-free, vegan, and free from refined sugar. Chef Natasha Gandhi's offerings extend to convenient delivery services across Mumbai, providing a wholesome and flavorful alternative for those seeking healthier celebratory treats.

### **9.3.7 Millet Business Plan for Millet-based Hotel Industry:**

It brings immense joy to witness the increasing trend of hotels and restaurants incorporating millet-based tiffins and meals in various cities across India, including Bangalore, Hyderabad, Visakhapatnam, Chennai, and more. One particularly inspiring story is that of Chittem Sudheer from Visakhapatnam, who initiated his startup with a modest capital of Rs. 50,000. His venture focuses on crafting nutritious and delicious idlis, uniquely wrapped in Vistharaku leaves, showcasing a creative and sustainable approach to healthy dining.

This entrepreneurial success story reflects the growing acceptance and popularity of millet-based culinary options in the Indian food industry.

### **9.3.8 Millet Business Plan for Export Industry:**

India holds the position of being the largest producer of millets globally, with a substantial demand for these grains in international markets. The potential export destinations for Indian millets in 2020 included Indonesia, Austria, Netherlands, Philippines, and New Zealand. India's export figures for millets indicate a significant market presence. In the fiscal year 2017-18, millet exports amounted to 24.5 million dollars, followed by 25.76 million dollars in 2018-19, and 21.05 million dollars in 2019-20 (April to December).

A market report indicates that the North America Millets Market reached a value of US\$ 841.87 million in 2018, with an expected growth at a Compound Annual Growth Rate (CAGR) of 4.0% from 2019 to 2027, reaching US\$ 1,192.24 million by 2027. To foster millet exports, the Agricultural and Processed Food Products Export Development Authority (APEDA) has been taking proactive measures. Notably, there have been recent instances of successful millet exports from India, such as Ragi and Barnyard Millet from Uttarakhand being exported to Denmark, opening up export opportunities in European countries. This signifies a positive stride in expanding the global footprint of Indian millets.

### **9.3.9 Millet Business Plan for Farmer Producer Organisation(FPO):**

Establishing Farmer Producer Organizations (FPOs) proves to be an effective strategy in addressing the various constraints and challenges encountered by farmers. By forming FPOs, farmers gain collective strength and enhanced bargaining power, facilitating their access to both financial and non-financial resources, services, and technologies.

This collective approach is instrumental in boosting farmers' income through the joint sale of millet grains. As part of the Odisha Millet Mission, FPOs are systematically established at the block level, actively participating in the procurement of Ragi for Public Distribution System (PDS) and Integrated Child Development Services (ICDS).

The creation of FPOs under this mission not only promotes collaboration among farmers but also aligns with government initiatives, ensuring coordinated efforts to support millet cultivation and marketing. For those interested in establishing FPOs, government support is readily available, providing a crucial foundation for the success and sustainability of these collective farming entities.

### **9.3.10 Millet Business Plan – Creating e-Commerce Online platform on Millet Products:**

The increasing preference for online platforms, especially for household items and groceries, is a notable trend in India. Online sales are experiencing rapid growth, presenting a significant opportunity for businesses. Establishing an e-commerce platform specifically dedicated to millet products can be a strategic move, tapping into a broader customer base. Creating a successful e-commerce platform for millet products involves building a user-friendly website that showcases a diverse range of millet-based offerings.

This digital marketplace provides convenience for customers and has the potential to reach a large audience, thereby boosting business opportunities. By incorporating various millet products on the platform, businesses can cater to the evolving preferences of health-conscious consumers and capitalize on the growing demand for these nutritious grains. A well-designed website, coupled with effective marketing strategies, can contribute to the success of the e-commerce venture, making millet products easily accessible to a wide customer base.

## **9.4 A Comprehensive Overview of the Business Model for Millets Production Technology:**

### **9.4.1 Sustainable Cultivation and Innovation:**

The foundation of the business model rests on sustainable cultivation practices. Farmers are encouraged to adopt innovative techniques that enhance millet yields while prioritizing environmental sustainability. These interventions go beyond traditional farming methods, incorporating modern technologies such as precision agriculture, organic farming, and water-use efficiency measures to optimize crop production.

### **9.4.2 Farmer Cooperatives:**

A key feature of the business model is the establishment of farmer cooperatives. These collaborative platforms empower farmers through collective decision-making, resource pooling, and knowledge-sharing. The cooperatives provide a unified voice for negotiating better prices and accessing resources, fostering a sense of community and resilience within the millet production ecosystem. Government support is pivotal in creating and sustaining these cooperatives, ensuring the economic upliftment of small-scale millet farmers.

### **9.4.3 Supply Chain Management:**

Efficient supply chain management is pivotal for the success of the business model. The model emphasizes quality control from farm to market, ensuring that millet products maintain their nutritional integrity. Partnerships with retailers, distributors, and food processors contribute to a well-connected supply chain, enabling a diverse range of millet-based products to reach consumers. Cold chain logistics and storage solutions are explored to further extend the shelf life of processed millet products.



#### **9.4.4 Nutritional Focus:**

The business model places a significant emphasis on the nutritional value of millets. Research and development efforts are directed towards improving millet varieties, making them resilient against pests, diseases, and environmental stressors. The nutritional benefits are communicated through awareness and education programs targeting both farmers and consumers. Collaboration with nutritionists and health experts ensures that millets are positioned as not only a sustainable crop but also a superfood with numerous health benefits.

#### **9.4.5 Consumer Preferences and Market Demand:**

Understanding and aligning with consumer preferences are integral components of the business model. Millets, being gluten-free, nutrient-rich, and climate-resilient, have gained popularity among health-conscious consumers. The model capitalizes on this trend, positioning millets as a conscious dietary choice. Market research and consumer feedback mechanisms are incorporated to adapt millet-based products to evolving preferences.

#### **9.4.6 Partnerships and Government Initiatives:**

Establishing partnerships with government initiatives and non-governmental organizations (NGOs) is a strategic aspect of the business model. These collaborations not only secure financial support but also contribute to creating awareness about the benefits of millets. This multi-stakeholder approach enhances the overall sustainability of millets production technology. Government policies that promote millet cultivation, provide subsidies, and facilitate market linkages are crucial components of the supportive ecosystem.

#### **9.4.7 Continuous Research and Adaptation:**

To stay at the forefront of agricultural innovation, the business model prioritizes continuous research and collaboration with agricultural scientists. This ensures that the model remains adaptable to emerging challenges and opportunities in the dynamic landscape of millets production. Genetic modification, precision farming technologies, and advancements in processing techniques are areas of ongoing research to enhance millet production efficiency.

### **9.5 The Impact of Government Policies On the Business Model for Millets Production Technology:**

The impact of government policies on the business model for millets production technology is substantial and multifaceted. Supportive policies play a pivotal role in fostering the growth and sustainability of millet cultivation. Government initiatives that provide financial incentives, subsidies, and technical assistance empower farmers to adopt innovative farming techniques and modern technology, contributing to enhanced millet yields. Additionally, policies that promote the formation of farmer cooperatives and facilitate access to markets strengthen the supply chain. Regulatory frameworks that recognize and prioritize the nutritional and environmental benefits of millets further contribute to the success of the business model.

Government-backed research and development initiatives drive continuous innovation, ensuring that the millets production technology sector remains adaptive to emerging challenges and opportunities. Overall, the positive impact of government policies creates an enabling environment for the comprehensive business model, aligning with broader goals of sustainable agriculture, food security, and public health.

- **Financial Incentives:** Government policies offering financial incentives and subsidies encourage farmers to adopt millets production technology. For instance, direct financial support or subsidized loans for purchasing modern equipment.
- **Technical Assistance Programs:** Government-led programs providing technical assistance and training to farmers on innovative farming techniques, machinery operation, and millets processing. An example is the establishment of agricultural extension services.
- **Formation of Farmer Cooperatives:** Policies that support the creation of Farmer Producer Organizations (FPOs) empower farmers through collective decision-making, resource pooling, and enhanced bargaining power. (Nikam *et al.*, 2019). This aligns with the Odisha Millet Mission's approach of establishing FPOs at the block level.
- **Market Access Initiatives:** Government initiatives facilitating market access for millet farmers. This can include setting up procurement programs for millets in Public Distribution Systems (PDS) and Integrated Child Development Services (ICDS), as seen in the Odisha Millet Mission (Balam *et al.*, 2021).
- **Regulatory Frameworks:** Policies that recognize the nutritional and environmental benefits of millets. This can include labelling regulations that highlight the health advantages of millet-based products, contributing to market building and consumer awareness.
- **Research and Development Support:** Government-backed research and development initiatives to improve millet varieties, making them more resilient to pests, diseases, and environmental stressors. Collaborations with agricultural scientists and institutions contribute to continuous innovation.
- **Promotion of Sustainable Agriculture:** Policies promoting sustainable agriculture practices, including organic farming and agroecological approaches. This can enhance the overall sustainability of millets production.
- **Public Awareness Campaigns:** Government-led campaigns to raise awareness about the nutritional benefits of millets. For instance, campaigns promoting millets as gluten-free, nutrient-rich, and climate-resilient grains.
- **Subsidized Inputs:** Policies offering subsidies on inputs such as seeds, fertilizers, and irrigation systems, making millet cultivation more economically viable for farmers.
- **Export Facilitation:** Government initiatives to facilitate millet exports, opening up international markets. An example is the proactive role of the Agricultural and Processed Food Products Export Development Authority (APEDA) in promoting millet exports from India to countries like Denmark (Chhetri 2018).

## 9.6 Conclusion:

The business model for millets production technology offers a holistic approach that integrates sustainable cultivation, technology adoption, supply chain management, and partnerships.

As millets gain prominence on dinner plates, this model not only addresses agricultural challenges but also aligns with health-conscious consumer preferences, shaping a successful trajectory for the thriving millets production technology sector.

The dynamic nature of the model, with continuous adaptation to technological advancements and market dynamics, ensures its resilience and long-term impact on sustainable agriculture and nutrition.

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