

Entrepreneur India

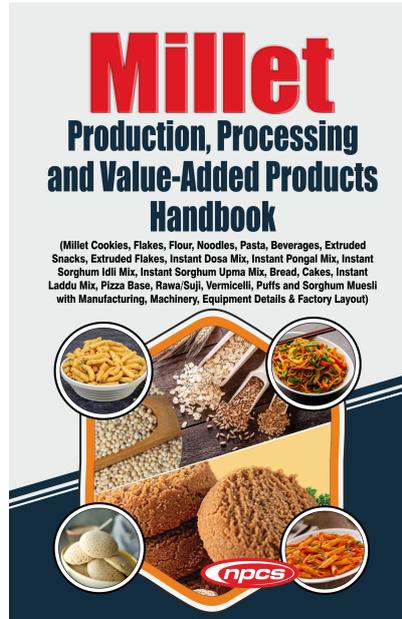
106-E, Kamla Nagar, New Delhi-110007, India.

Tel: 91-11-23843955, +91 9097075054

Mobile: +91-9097075054

Email: npcs.ei@gmail.com, info@entrepreneurindia.co

Website: www.entrepreneurIndia.co



Millet Production, Processing and Value-Added Products Handbook

Code	NI364
Format	paperback
Indian Price	₹2495
US Price	\$225
Pages	536
ISBN	978-81-969153-4-6
Publisher	NIIR PROJECT CONSULTANCY SERVICES

Description

Millet Production, Processing and Value-Added Products Handbook (Millet Cookies, Flakes, Flour, Noodles, Pasta, Beverages, Extruded Snacks, Extruded Flakes, Instant Dosa Mix, Instant Pongal Mix, Instant Sorghum Idli Mix, Instant Sorghum Upma Mix, Bread, Cakes, Instant Laddu Mix, Pizza Base, Rawa/Suji, Vermicelli, Puffs and Sorghum Muesli with Manufacturing, Machinery, Equipment Details & Factory Layout)

Millet is a type of cereal that is a part of the grass family Poaceae. This small round whole grain is grown in India and Nigeria, especially in Asia and Africa. There are multiple types of millets. However, most common varieties include Finger Millet, Foxtail Millet, Pearl Millet, Proso Millet, Little Millet and Sorghum Millet. Millet is loaded with nutritional value and that is why many dieticians and doctors recommend it as one of the breakfast cereal that must include in diet. Additionally, millet muesli is also recommended by diet consultant experts because it is a more nutrient dense type of millets.

Key features of the handbook include:

Cultivation Techniques: The book provides detailed information on millet cultivation techniques, including land preparation, planting, irrigation, pest and disease management, and harvesting. It offers guidance on optimizing millet yields while minimizing environmental impact.

Millet Varieties: Readers will find descriptions of different millet varieties, their adaptability to various climates and regions, and their nutritional profiles. This knowledge can help farmers select the most suitable millet varieties for their specific conditions.

Processing Techniques: The handbook delves into post-harvest processes, from threshing and cleaning to milling and storage. It highlights best practices for preserving millet quality and reducing post-harvest losses.

Value Addition Product Innovation: This handbook is a treasure trove of information on creating a range of millet-based products like flour, flakes, pasta, beverages, and snacks. Manufacturing process and recipes are provided, empowering entrepreneurs to innovate in product development.

The Millet Market size is estimated at USD 11.53 billion, and is expected to reach USD 14.43 billion, growing at a CAGR of 4.60%. Millets are small grass seeds that are widely grown. They are treated as Cereal Crops for Human Food. Generally, a huge percentage of the Millets Produced is consumed and the remaining percentage is used for producing Beer, and Instant ready eat Foods. Breakfast Foods like Cornflakes are made from Millet. The growing awareness regarding health and fitness among the consumers are resulting in a higher uptake of organic, natural, and gluten-free products, which, in turn, is fueling the millet market.

This book offers comprehensive reference that covers various aspects of millet production and its value-added Products Production Process, Machinery, Equipment Details, Factory layout and Photographs with Suppliers Contact Details are also given.

The Millet Production, Processing, and Value-Added Products Handbook is a comprehensive guide that offers a wealth of knowledge and practical insights into the world of millet agriculture and its various applications. This handbook serves as an invaluable resource for farmers, agricultural researchers, startups, entrepreneurs, food processors, and anyone interested in the cultivation, processing, and utilization of millet grains.

Content

1. INTRODUCTION

1.1 Importance of Millets

1.2 Millets are Smart Foods

1.3 Nutritional Benefits

1.4 Technologies for Processing Millets

1.4.1 Principal Methods of Preparing Millets

1.5 Importance of Millet Processing

1.6 Advantages of Millets Processing

1.7 Primary Processing Methods

1.7.1 De-Cortication

1.7.2 Pounding

1.7.3 De-Hulling

1.7.4 Parboiling

1.7.5 Milling

1.8 Secondary Processing of Millets

2. ROLE OF GOVERNMENT IN MILLETS PROMOTION

3. HOW TO GROW MILLETS

3.1 Select the Millet Variety

3.2 Soil Preparation

3.3 Seed Option and Sowing

3.4 Irrigation

3.5 Weed Control

3.6 Plant Food Application

3.7 Pest and Condition Administration

3.8 Harvesting

3.9 Threshing and Processing

3.10. Benefits of Millet Cultivation in India

4. HOW TO START MILLETS PROCESSING BUSINESS

5. PLANT LAYOUT DESCRIPTION OF MILLETS PROCESSING

6. PEARL MILLETS (BAJRA) FARMING

6.1 Uses

6.2 Health Benefits of Bajra or Pearl Millet

6.3 Commercial Hybrid Varieties of Bajra in India

6.4 Temperature Requirements

6.5 Rainfall Requirements

6.6 Soil Requirements

6.7 Propagation

6.8 Planting

6.9 Fertilization

6.10 Irrigation

6.11 Weed Control

6.12 Pest Control

6.13 Cultural Practices

6.14 Gathering Harvest Maturation

6.15 Yields of Pearl Millets

6.16 Dishes made from Pearl Millets

7. FOXTAIL MILLET (KAKUM/KANGNI) FARMING

7.1 In Indian Languages, Foxtail Millet

7.2 Health Benefits of Foxtail Millet

7.3 Varieties/Types (Cultivars)

7.4 Temperature and Soil Conditions

7.5 Land Preparation

7.6 Propagation

7.7 Seed Rate, Season, Sowing and Spacing

7.8 Irrigation

7.9 Intercultural Operations

7.10 Pests and Diseases in Foxtail Millet Cultivation

7.11 Harvesting of Foxtail Millet

7.12 Yield

7.13 Market and Distribution

8. SORGHUM MILLET FARMING AND ITS FLAKES MANUFACTURING

8.1 Various Other Uses of Sorghum

8.2 Origin, Distribution and Production of Sorghum

8.3 Sorghum's Components and Health Benefits

8.4 Health Benefits

8.5 Nutrition Credentials of Wholegrain Sorghum

8.6 Cultivation, Bearing & Post Harvest Management

8.7 Cultivation and Bearing

8.8 Processing & Value Addition

8.9 Sorghum Flakes Savouries

8.10 Primary Processing of Sorghum

8.10.1 Cleaning and Grading

- 8.10.2 Parboiling
- 8.10.3 Milling
- 8.10.4 Drying
- 8.11 Secondary Processing (Flaking) of Sorghum
 - 8.11.1 Soaking
 - 8.11.2 Softening
 - 8.11.3 Pre-Drying
 - 8.11.4 Flaking
 - 8.11.5 Roasting
 - 8.11.6 Sieving and Grading
- 8.12 Market Demand and Supply for Sorghum Flakes
- 9. KODO MILLET (VARAGU) FARMING
 - 9.1 Benefits of Kodo Millet Farming
 - 9.2 Climate Requirements
 - 9.3 Soil Requirements and Field Preparation
 - 9.4 Crop Characteristics and Issues
 - 9.5 Irrigation Requirement
 - 9.6 Seed Spacing/Plant Spacing
 - 9.7 Seed Production
 - 9.8 Manures and Fertilizers
 - 9.9 Specific Field Standards
 - 9.10 Seed Standards
 - 9.11 Seed Selection and Sowing
 - 9.12 Weed Management
 - 9.13 Roguing
 - 9.14 Diseases and Its Control Measure
 - 9.15 Insect-Pests Management
 - 9.16 Harvesting and Processing
 - 9.17 Drying and Storage
 - 9.18 The Yield
- 10. FINGER MILLET (RAGI) FARMING
 - 10.1 Nutritional Profile
 - 10.2 Health Benefits
 - 10.3 Culinary Uses
 - 10.4 Agricultural Aspects
 - 10.5 Climatic Requirements
 - 10.6 Soil Requirements
 - 10.7 Land Preparation
 - 10.8 Sowing Methods and Propagation
 - 10.9 Seed Rate
 - 10.10 Manures and Fertilisers

- 10.11 Intercropping
- 10.12 Irrigation
- 10.13 Weed Control
- 10.14 Diseases and Pests
- 10.15 Harvesting
- 10.16 Productivity
- 10.17 Product Made from Finger Millet
- 11. PROSO MILLET (CHENA/BARRI) FARMING, CULTIVATION PRACTICES
 - 11.1 Uses of Proso Millet
 - 11.2 A Step-by-Step Approach on Growing Proso Millet
 - 11.2.1 Climatic and Soil Requirements for Proso Millet Farming
 - 11.2.2 Proso Millet Distribution and Area
 - 11.2.3 Production of Proso Millet
 - 11.2.4 Spacing and Seed Rate in Proso Millet Farming
 - 11.2.5 Proso Millet Development
 - 11.2.6 Seed Sowing in Proso Millet Farming
 - 11.2.7 Manures and Fertilizers in Proso Millet Farming
 - 11.2.8 Irrigation Requirement for Proso Millet Farming
 - 11.2.9 Harvesting and Threshing of Proso Millet
 - 11.2.10 Marketing
- 12. BARNYARD MILLET (SANWA) FARMING
 - 12.1 Health Benefits of Barnyard Millet
 - 12.2 A Comprehensive Guide to Cultivating Barnyard Millet
 - 12.2.1 Different Types of Barnyard Millet
 - 12.2.2 Climate and Environmental Requirements for Barnyard Millet Cultivation
 - 12.2.3 Land Preparation and Soil Requirements
 - 12.2.4 Propagation of Barnyard Millet
 - 12.2.5 Barnyard Millet Farming Nursery Raising and Transplanting
 - 12.2.6 Spacing Between Plants in Barnyard Millet Farming
 - 12.2.7 Planting
 - 12.2.8 Barnyard Millet Fertilization
 - 12.2.9 Barnyard Millet Farming Irrigation
 - 12.2.10 Weed Control
 - 12.2.11 Organic Management of Pests and Diseases in Barnyard Millet Farming
 - 12.2.12 Harvesting of Barnyard Millet

12.2.13 Barnyard Millets Produce

13. LITTLE MILLET (MORAIYO) FARMING

13.1 Health Benefits of Little Millet

13.2 World's Top 10 Producing Countries of Little Millet

13.3 A Step-by-Step Guide for Beginners

13.3.1 Land Preparation and Soil Requirements

13.3.2 Temperature, Climate and Rainfall Requirements

13.3.3 Propagation

13.3.4 Seed Propagation

13.3.5 Seeds and Seed Rate for Organic Little Millet Farming

13.3.6 Sowing and Spacing

13.3.7 Organic Manures and Bio-Fertilizers

13.3.8 Irrigation

13.3.9 Weed Control Practices

13.3.10 Organic Pest and Diseases

13.3.11 Yields and Threshing

13.3.12 Harvesting and Storage

13.3.13 Conclusion

14. BUCKWHEAT MILLET (KUTTU) FARMING

14.1 Gluten-Free

14.2 Soil Requirement

14.3 Various Variations

14.4 Growth Habits

14.5 Right Time to Plant Buckwheat

14.6 Site Preparation

14.7 Climatic Requirements

14.8 The Seed Rate and Seedbed Preparation

14.9 Seed Preparation and Germination

14.10 Sowing of Seed

14.11 Field Preparation and Fertilization

14.12 Pests or Diseases Management

14.13 Harvesting and Yield

14.14 Buckwheat Recipes

15. AMARANTH MILLET (RAJGIRA) FARMING

15.1 Uses of Amaranth Millet

15.2 Cultivars (Varieties) of Amaranth

15.3 Climate Requirement

15.4 Soil Requirement

15.5 Preparation of Land

15.6 Seeding, Sowing and Spacing

- 15.7 Irrigation
- 15.8 Fertilizers and Manures
- 15.9 Intercultural Operations
- 15.10 Pests and Diseases in Amaranth Cultivation
- 15.11 Harvest and Yield
- 16. KODO MILLET COOKIES MANUFACTURING
- 16.1 Origin, Distribution and Production of Kodo Millet
- 16.2 Health Benefits and Nutritional Information
 - 16.2.1 Nutritional Value
- 16.3 Constituents and Health Benefits of Kodo Millets
- 16.4 Processing & Value Addition
- 16.5 Preparation of Kodo Millet Cookies
 - 16.5.1 Mixing
 - 16.5.2 Shaping and Forming
 - 16.5.3 Baking
 - 16.5.4 Cooling
- 16.6 Market Demand and Supply for Kodo Millet Cookies
- 16.7 Machinery and Equipment Requirements
 - 16.7.1 Planetary Mixer
 - 16.7.2 Cookie Wire Cut Machine
 - 16.7.3 Rotary Oven
 - 16.7.4 High Speed Biscuit Wrapping Machine
- 16.8 Why to Start Millet Cookie Manufacturing Business?
- 16.9 Future Opportunities for Startups and Entrepreneurs
- 16.10 Quality Control
- 17. HOW TO START MILLETS COOKIE MANUFACTURING BUSINESS
- 18. PLANT LAYOUT DESCRIPTION OF MILLET COOKIES MANUFACTURING
- 19. MILLET FLAKES MANUFACTURING
- 19.1 Historical and Cultural Relevance
- 19.2 Culinary Applications
- 19.3 Health and Wellness Conveniences
- 19.4 Incorporating Millet Flakes in Diet Plan
- 19.5 Sustainability Aspect
- 19.6 Functions of Millet Flakes
- 19.7 Flake Production
 - 19.7.1 Grain Cleaning
 - 19.7.2 Dehusking/Degermination

19.7.3 Cooking Process

19.7.4 Flaking

19.7.5 Drying

19.7.6 Packaging and Storage

20. HOW TO START MILLETS FLAKES MANUFACTURING BUSINESS

21. PLANT LAYOUT DESCRIPTION OF MILLET FLAKES MANUFACTURING

22. MILLETS FLOUR MAKING PROCESS

22.1 How to Use Millet Flour

22.2 Millet Flour Variety

22.3 Popular Recipes and Dishes

22.4 Basic Nutritional Information

22.5 Is Gluten-Free Millet Flour Available?

22.6 As an Alternative to Wheat Flour

22.7 Millet Flour Manufacturing

23. HOW TO START MILLETS FLOUR MANUFACTURING BUSINESS

24. PLANT LAYOUT DESCRIPTION OF MILLET FLOUR MANUFACTURING

25. MILLET NOODLES MANUFACTURING

25.1 Diverse and Delicious Millet Noodle Dishes

25.1.1 Stir-Fried Millet Noodles

25.1.2 Cold Millet Noodle Salad

25.1.3 Millet Noodle Soup

25.2 The Nutritional Advantages of Millet-Based Noodles

25.3 Medicinal Properties of Millet Noodles

25.4 The Millet Noodle Manufacturing Process

26. HOW TO START MILLETS NOODLES MANUFACTURING BUSINESS

27. PLANT LAYOUT DESCRIPTION OF MILLET NOODLES MANUFACTURING

28. MILLET PASTA MANUFACTURING

28.1 Comparing Millet Pasta and Regular Pasta

28.1.1 Taste and Texture Comparison

28.1.2 Nutritional Comparison

28.1.3 Price Comparison

28.2 Common Types of Pasta

28.2.1 Macaroni

28.2.2 Sphagetti

28.2.3 Vermicelli

28.3 Worth Enhancement in Pasta

- 28.4 How to Make Millet Pasta
 - 28.4.1 Pasta Making
 - 28.4.2 Pasta Production Methods
 - 28.4.2.1 Extrusion
 - 28.4.2.2 Sheeting or Rolling Techniques
 - 28.4.2.3 Pasta Manufacturing and Sanitation Technologies
 - 28.4.2.4 Pasta Product Quality Assessment
- 28.5 Packaging of Millet Pasta
 - 28.5.1 Pasta Packaging
 - 28.5.2 Functions of Pasta Packaging
 - 28.5.2.1 Components of Pasta Packaging
 - 28.5.2.2 Key Factors in Pasta Packaging
 - 28.5.2.3 Dried Pasta Packaging Using Cellophane Bags
- 29. HOW TO START MILLET PASTA MANUFACTURING BUSINESS
- 30. PLANT LAYOUT DESCRIPTION OF MILLET PASTA MANUFACTURING
- 31. MILLET BEVERAGES PRODUCTION
 - 31.1 Historical and Cultural Significance
 - 31.2 Nutritional Value
 - 31.3 Types of Millet Beverages
 - 31.4 Production Process
 - 31.5 Challenges and Innovations
 - 31.6 Environmental and Economic Impact
 - 31.7 Consumer Trends and Market Growth
 - 31.8 Future Outlook
 - 31.9 Sensory Characteristics
 - 31.10 Health and Dietary Considerations
 - 31.11 Distribution Channels
 - 31.12 Regulatory Compliance and Safety Standards
 - 31.13 Research and Development
 - 31.14 Collaboration with Local Communities
 - 31.15 Health Research and Consumer Education
 - 31.16 Sustainability in the Supply Chain
 - 31.17 Potential Health Risks and Misconceptions
 - 31.18 Cultural Preservation and Promotion
 - 31.19 Impact on Biodiversity
 - 31.20 Nutritional Education and Partnerships
 - 31.21 The Role of Millet in Global Food Security
 - 31.22 Community Engagement and Social Responsibility

31.23 Market

32. HOW TO START MILLETS BEVERAGES MANUFACTURING BUSINESS

33. PLANT LAYOUT DESCRIPTION OF MILLET BEVERAGE MANUFACTURING

34. EXTRUDED SNACKS MANUFACTURING

34.1 Benefit of Extruded Snacks

34.2 Kind of Extruded Snacks

34.2.1 First-Generation Treats

34.2.2 Second-Generation Snacks

34.2.3 Third-Generation Snacks

34.3 Product Applications

34.4 Manufacturing Process of Extruded Snacks

34.4.1 Basic Ingredients

34.4.2 Mixing

34.4.3 Extrusion

34.4.4 Frying

34.4.5 Seasoning

34.4.6 Metal Detecting

34.4.7 Packing

34.5 Why to Start Extruded Snacks Manufacturing Business

34.6 Plant & Machinery

34.7 Equipment and Tools

35. EXTRUSION TECHNOLOGY AND ITS APPLICATION IN FOOD PROCESSING

35.1 Extrusion Process Simplified

35.2 Extruder and Its Classification

35.3 Extruders are Categorized on the Basis of

35.3.1 Method of Operation

35.3.2 Method of Construction

35.4 Raw Material or Ingredients used in Extrusion

35.5 Antioxidant and Total Phenol Content

35.6 Advantages of Extrusion Technology

35.7 Disadvantages of Extrusion Technology

35.8 Application of Extrusion Technology

36. PRINCIPLES OF EXTRUSION TECHNOLOGY OF MILLETS

36.1 Raw Material Preparation

36.2 Moisture Control

36.3 Temperature and Pressure

36.4 Die Design

- 36.5 Mixing and Ingredient Addition
- 36.6 Cooking and Expansion
- 36.7 Cooling and Drying
- 36.8 Quality Control
- 36.9 Packaging and Storage
- 36.10 Nutritional Enhancement
- 36.11 Texture Modification
- 36.12 Versatility
- 36.13 Reduced Anti-Nutritional Factors
- 36.14 Quality Assurance
- 36.15 Research and Development
- 36.16 Sustainability
- 36.17 Health Benefits
- 36.18 Allergen Management
- 36.19 Consumer Acceptance
- 36.20 Market Opportunity
- 36.21 Local Food Security
- 36.22 Training and Skill Development
- 36.23 Research Collaboration
- 36.24 Global Nutrition Initiatives
- 37. HOW TO START EXTRUDED SNACKS MANUFACTURING BUSINESS
- 38. PLANT LAYOUT DESCRIPTION OF EXTRUDED SNACKS MANUFACTURING
- 39. MILLETS BASED FERMENTED FOOD PRODUCTS
- 40. Extruded Flakes Manufacturing from Millet
 - 40.1 Production of Extruded Flakes
 - 40.1.1 Raw Material Selection
 - 40.1.2 Conditioning
 - 40.1.3 Addition of Water
 - 40.1.4 Mixing Process
 - 40.1.5 Roller Flaking
 - 40.1.6 Extrusion
 - 40.1.7 Packaging
 - 40.2 Quality Control
 - 40.3 Marketing
 - 40.4 Future Opportunities for Startups and Entrepreneurs
- 41. EXTRUDED SNACKS MADE FROM MILLET GRAINS
 - 41.1 Raw Materials
 - 41.1.1 Jawar (Sorghum)

- 41.1.2 Rice
- 41.1.3 Ragi (Finger Millet)
- 41.1.4 Wheat
- 41.1.5 Corn Millet
- 41.2 Processing Steps
 - 41.2.1 Conditioning
 - 41.2.2 Water Mixing
 - 41.2.3 Extrusion and Cutting
 - 41.2.4 Kneading
 - 41.2.5 Drying Extruded Snacks
 - 41.2.6 Packaging
- 41.3 Machinery and Equipment
 - 41.3.1 Conditioning
 - 41.3.2 Water Mixing
 - 41.3.3 Extrusion and Cutting
 - 41.3.4 Kneading
 - 41.3.5 Drying Extruded Snacks
 - 41.3.6 Packaging
- 41.4 Quality Control
 - 41.4.1 Raw Material Inspection
 - 41.4.2 Process Monitoring
 - 41.4.3 Product Testing
 - 41.4.4 Packaging Quality
 - 41.4.5 Hygiene and Sanitation
- 41.5 Marketing
 - 41.5.1 Branding and Packaging
 - 41.5.2 Product Variety
 - 41.5.3 Market Research
 - 41.5.4 Distribution Channels
 - 41.5.5 Advertising and Promotion
 - 41.5.6 Quality Assurance
- 41.6 Description of Raw Materials
 - 41.6.1 Jawar (Sorghum)
 - 41.6.2 Rice
 - 41.6.3 Ragi (Finger Millet)
 - 41.6.4 Wheat
 - 41.6.5 Corn Millet
- 41.7 Future Opportunities for Startups and Entrepreneurs
 - 41.7.1 Health-Conscious Snacks
 - 41.7.2 Organic and Non-GMO Snacks

- 41.7.3 Niche Flavors and Ingredients
- 41.7.4 Private Label Manufacturing
- 41.7.5 Sustainable Packaging
- 41.7.6 Export Opportunities
- 41.7.7 Research and Development
- 42. INSTANT DOSA MIX FROM SORGHUM FLOUR AND BENGAL GRAM DAL
 - 42.1 Benefits
 - 42.2 Production Steps
 - 42.2.1 Ingredients
 - 42.2.2 Equipment
 - 42.2.3 Preparation
 - 42.2.4 Mixing the Ingredients
 - 42.2.5 Mixing Process
 - 42.2.6 Packaging
 - 42.2.7 Labeling and Storage
- 43. INSTANT MILLET PONGAL MIX PRODUCTION
 - 43.1 Advantages
 - 43.2 Description of Machinery
 - 43.2.1 Sorghum Processing Equipment
 - 43.2.1.1 Sorghum Cleaning Machine
 - 43.2.1.2 Sorghum Dehuller
 - 43.2.1.3 Sorghum Milling Machine
 - 43.2.2 Lentil Processing Equipment
 - 43.2.2.1 Green Gram Dal Cleaning Machine
 - 43.2.2.2 Lentil Dehuller
 - 43.2.2.3 Lentil Milling Machine
 - 43.2.3 Spice and Condiment Mixing Equipment
 - 43.2.3.1 Mixing Machine
 - 43.2.4 Packaging Equipment
 - 43.2.4.1 Automatic Packaging Machine
 - 43.2.4.2 Labeling Machine
 - 43.3 Manufacturing Process
 - 43.3.1 Sorghum Processing
 - 43.3.2 Lentil Processing
 - 43.3.3 Spice and Condiment Mixing
 - 43.3.4 Packaging
 - 43.4 Packaging and Marketing
 - 43.5 Quality Control
 - 43.5.1 Raw Material Inspection
 - 43.5.2 Production Monitoring

- 43.5.3 Hygiene and Sanitation
- 43.5.4 Sampling and Testing
- 43.5.5 Packaging Inspection
- 43.5.6 Shelf-Life Testing
- 43.6 Description of Raw Materials
 - 43.6.1 Sorghum Millet
 - 43.6.2 Green Gram Dal
 - 43.6.3 Spices and Condiments
- 43.7 Future Opportunities for Startups and Entrepreneurs
 - 43.7.1 Health and Wellness Focus
 - 43.7.2 Gluten-Free Market
 - 43.7.3 Diversification
 - 43.7.4 Sustainability
 - 43.7.5 E-Commerce and Online Sales
 - 43.7.6 Quality and Innovation
- 44. INSTANT SORGHUM IDLI MIX MANUFACTURING
 - 44.1 Description of Raw Materials
 - 44.2 Machinery and Equipment Required
 - 44.2.1 Cleaning and Destoning Machine
 - 44.2.2 Sieving Machine
 - 44.2.3 Mixing Machine
 - 44.2.4 Packaging Machine
 - 44.3 Production Process
 - 44.3.1 Cleaning and Destoning
 - 44.3.2 Sieving
 - 44.3.3 Ingredient Addition
 - 44.3.4 Mixing
 - 44.3.5 Instant Idli Mix Ready
 - 44.3.6 Packaging
 - 44.4 Quality Control
 - 44.5 Packaging and Marketing
 - 44.6 Future Opportunities for Startups and Entrepreneurs
 - 44.7 Conclusion
- 45. INSTANT SORGHUM UPMA MIX MANUFACTURING
 - 45.1 Benefits
 - 45.2 Raw Materials
 - 45.3 Machinery and Equipment
 - 45.4 Production Process
 - 45.5 Quality Control
 - 45.6 Marketing

45.7 Future Opportunities for Startups and Entrepreneurs

46. MILLET BREAD MANUFACTURING FROM PEARL, FINGER AND FOXTAIL MILLET

46.1 Raw Materials

46.2 Machinery and Equipment

46.3 Manufacturing Process

46.4 Quality Control

46.5 Packaging and Marketing

46.6 Future Opportunities for Startups and Entrepreneurs

47. MILLET CAKES PRODUCTION

47.1 Description of Raw Materials

47.1.1 Millet Flour

47.1.2 Fats

47.1.3 Sugars

47.1.4 Eggs

47.1.5 Flavoring Agents

47.2 Manufacturing Process

47.2.1 Ingredient Preparation

47.2.2 Mixing

47.2.3 Mold Preparation

47.2.4 Pouring and Baking

47.2.5 Cooling and Packaging

47.3 Marketing

47.3.1 Branding and Packaging

47.3.2 Online Presence

47.3.3 Retail Partnerships

47.3.4 Sampling and Tasting Events

47.3.5 Health and Nutrition Claims

47.4 Quality Control

47.4.1 Ingredient Quality

47.4.2 Batch Consistency

47.4.3 Hygiene and Sanitation

47.4.4 Sensory Evaluation

47.4.5 Shelf-Life Testing

47.5 Detailed Description of Machinery

47.5.1 Mixing Machine

47.5.2 Oven

47.5.3 Baking Molds

47.5.4 Parchment Paper

- 47.5.5 Packaging Machinery
- 47.5.6 Quality Control Equipment
- 47.6 Future Opportunities for Startups and Entrepreneurs
 - 47.6.1 Diversified Product Range
 - 47.6.2 Nutritional Supplements
 - 47.6.3 Health and Wellness Focus
 - 47.6.4 Export Opportunities
 - 47.6.5 Collaboration with Farmers
 - 47.6.6 Research and Development
- 48. MILLET INSTANT LADDU MIX MANUFACTURING FROM SORGHUM, RAGI AND SAJJA
 - 48.1 Advantages of Instant Laddu Mix
 - 48.2 Description of Raw Materials
 - 48.2.1 Millets Flour (Sorghum, Ragi, and Sajja)
 - 48.2.2 Sugar Powder
 - 48.2.3 Fried Dry Fruits
 - 48.2.4 Cardamom
 - 48.3 Manufacturing Process
 - 48.3.1 Sieving
 - 48.3.2 Roasting
 - 48.3.3 Cooling
 - 48.3.4 Mixing
 - 48.3.5 Packaging for Marketing
 - 48.4 Quality Control
 - 48.5 Packaging Description
 - 48.6 Future Opportunities
 - 48.7 List of Machinery and Equipment Required
- 49. MILLET PIZZA BASE PRODUCTION
 - 49.1 Raw Materials
 - 49.2 Machinery and Equipment
 - 49.2.1 Milling Machine
 - 49.2.2 Sieving Machine
 - 49.2.3 Mixing Machine
 - 49.2.4 Kneading Machine
 - 49.2.5 Dough Sheeting Machine
 - 49.2.6 Baking Oven
 - 49.2.7 Cooling Conveyor
 - 49.2.8 Cutting Machine
 - 49.2.9 Packaging Equipment
 - 49.3 Manufacturing Process

- 49.3.1 Milling
- 49.3.2 Sieving
- 49.3.3 Mixing
- 49.3.4 Kneading
- 49.3.5 Dough Sheeting
- 49.3.6 Baking
- 49.3.7 Cooling
- 49.3.8 Cutting
- 49.3.9 Packaging
- 49.4 Quality Control
 - 49.4.1 Raw Material Inspection
 - 49.4.2 Testing
 - 49.4.3 Quality Assurance
 - 49.4.4 Hygiene
- 49.5 Marketing
 - 49.5.1 Branding
 - 49.5.2 Promotion
 - 49.5.3 Distribution
 - 49.5.4 Packaging
 - 49.5.5 Customer Feedback
- 49.6 Future Opportunities for Startups and Entrepreneurs
 - 49.6.1 Health and Wellness Trend
 - 49.6.2 Niche Markets
 - 49.6.3 Product Diversification
 - 49.6.4 Export Opportunities
 - 49.6.5 Sustainable Practices
 - 49.6.6 Research and Development
- 50. MILLET RAWA/SUJI PRODUCTION
 - 50.1 Raw Materials
 - 50.2 Machinery and Equipment
 - 50.2.1 Cleaning
 - 50.2.2 Conditioning
 - 50.2.3 Water Addition
 - 50.2.4 Pulverization
 - 50.2.5 Cooling
 - 50.2.6 Shifting
 - 50.2.7 Millet Semolina
 - 50.2.8 Packaging
 - 50.3 Production Process
 - 50.3.1 Cleaning

- 50.3.2 Conditioning
- 50.3.3 Water Addition
- 50.3.4 Pulverization
- 50.3.5 Cooling
- 50.3.6 Shifting
- 50.3.7 Millet Semolina
- 50.3.8 Packaging
- 50.4 Quality Control
- 50.5 Marketing
- 50.6 Future Opportunities for Startups and Entrepreneurs
- 50.7 Conclusion
- 51. MILLETS VERMICELLI AND PASTA MANUFACTURING

- 51.1 Raw Materials
- 51.2 Cleaning
- 51.3 Conditioning
- 51.4 Adding Water
- 51.5 Pulverize
- 51.6 Cooling
- 51.7 Shifting
- 51.8 Millet Semolina/Pasta Production
- 51.9 Packaging
- 51.10 Quality Control
- 51.11 Marketing
- 51.12 Future Opportunities for Startups and Entrepreneurs

52. PUFFS MANUFACTURING FROM MILLETS (SORGHUM, PEARL AND FOXTAIL)

- 52.1 Production Process of Millet Puffs
 - 52.1.1 Raw Materials
 - 52.1.2 Grading
 - 52.1.3 Dehulling
 - 52.1.4 Conditioning
 - 52.1.5 Water Addition
 - 52.1.6 Gun Puffing
 - 52.1.7 Puffs Formation
 - 52.1.8 Quality Control
 - 52.1.9 Packaging
- 52.2 Marketing
- 52.3 Future Opportunities for Startups and Entrepreneurs

- 52.4 Profitability
- 52.5 Branding and Marketing
- 53. SORGHUM MUESLI MANUFACTURING
 - 53.1 Health Benefits of Sorghum Muesli
 - 53.2 Production of Sorghum Muesli
 - 53.2.1 Sorghum Processing to Flakes
 - 53.2.2 Adding Honey
 - 53.2.3 Adding Roasted Dry Fruits
 - 53.2.4 Mixing Process
 - 53.2.5 Final Product - Sorghum Muesli
 - 53.2.6 Packaging
 - 53.3 Machinery and Equipment Required
 - 53.4 Marketing and Sales
 - 53.5 Quality Control
 - 53.6 Packaging
 - 53.7 Raw Materials
 - 53.8 Future Opportunities
 - 53.9 For Entrepreneurs and Startups
- 54. FOOD OF THE FUTURE
 - 54.1 Climate Change Challenges in Agriculture
 - 54.2 Disappearing Millet System
 - 54.3 Global Pattern of Millet Consumption
 - 54.4 Securing Food, Securing Climate
 - 54.5 Millets are Store-Houses of Nutrition
 - 54.6 Millets: Pest-Free and Ecologically Friendly Crops
 - 54.7 Beyond Just Crops: A Comprehensive Cropping System
 - 54.8 Multiple Securities Offered by Millets
- 55. POST-HARVESTING PROCESSING
 - 55.1 Comprehensive Post-Harvest Cereal System
 - 55.2 The Post-Harvest Cereal System
 - 55.2.1 Post-Harvest Treatment for Storage
 - 55.2.1.1 Harvesting Cereals
 - 55.2.1.2 Threshing
 - 55.2.1.3 Winnowing
 - 55.2.1.4 Drying
 - 55.2.1.5 Storage
 - 55.2.2 Primary Processing
 - 55.2.2.1 Grain Preparation
 - 55.2.2.2 Grinding and Milling Processes
 - 55.2.2.3 Additional Processing Steps

55.2.2.4 Storage and Secondary Processing of Dried Grains

56. EXPORT OF MILLETS FROM INDIA

56.1 Introduction

56.2 Challenges in Millet Production

56.3 Opportunities in Millet Production

57. GOOD AGRICULTURAL PRACTICES IN MILLETS

57.1 Site Selection

57.1.1 Risk Assessment for New Site

57.1.2 Water Availability

57.1.3 Risk Management Plan

57.1.4 Meteorological Data Collection

57.2 Soil Conditions/Management

57.2.1 Mapping of Soil

57.2.2 Soil Health

57.2.3 Soil Test and Nutrition Profile

57.2.4 Water Suitability

57.2.5 Water Quality

57.2.6 Shade Availability

57.3 Seeds and Propagation Material

57.3.1 Planting Material Identification

57.3.2 Sowing Record Keeping

57.3.3 Seed

57.3.3.1 Seed Purity

57.3.3.2 Seed Quality

57.3.3.3 Seed Producing Record

57.3.3.4 Seed Treatment Protocol

57.3.3.5 Seedling Transplanting Plan

57.3.4 Good Practices for Quality Seed Production in Millets

57.4 Crop Management For Cultivation

57.4.1 Field Preparation

57.4.1.1 Soil Bilth

57.4.1.2 Soil Preparation

57.4.2 Sowing and Transplanting

57.4.2.1 Seed Rate

57.4.2.2 Seed Sowing Depth

57.4.2.3 Spacing

57.4.2.4 Seedling Transplanting Stage

57.4.2.5 Plant Population

57.4.2.6 Seed Quality Document

- 57.4.3 Manures and Fertilizers
 - 57.4.3.1 Source of Manures/Fertilizers
 - 57.4.3.2 Organic Manure Preference
 - 57.4.3.3 Manure Use
 - 57.4.3.4 Nutritional Care
- 57.4.4 Irrigation
 - 57.4.4.1 Water Requirement Estimation
 - 57.4.4.2 Water Optimization
 - 57.4.4.3 Water Harvesting and Conservation
 - 57.4.4.4 Water Testing
- 57.4.5 Weeding and Intercultural Operations
 - 57.4.5.1 Control of Initial Flush of Weeds
 - 57.4.5.2 Inter Culture Operations Optimization
 - 57.4.5.3 Rare Use of Herbicides
- 57.4.6 Crop Protection
 - 57.4.6.1 Preventive Measures
 - 57.4.6.2 Protective or Control Measures
 - 57.4.6.3 Management Protocols
- 57.5 Harvest & Post Harvest Management
 - 57.5.1 Harvesting of Millets
 - 57.5.2 Primary Processing
 - 57.5.2.1 Cleaning
 - 57.5.2.2 Drying and Handling
 - 57.5.2.3 Processing Area Conditions
 - 57.5.2.4 Drying and Temperature Requirements
 - 57.5.3 Packaging Storage and Transportation
 - 57.5.3.1 Packaging Material
 - 57.5.3.2 Container Filling
 - 57.5.3.3 Storage Conditions
 - 57.5.3.4 Separate Storage
 - 57.5.3.5 Multiple Commodities Storage
- 57.6 Identification and Traceability
 - 57.6.1 Identification
 - 57.6.1.1 Product Labeling
 - 57.6.2 Traceability
 - 57.6.2.1 Traceability Record
- 57.7 Personnel and Equipment
 - 57.7.1 Training of Personnel
 - 57.7.2 Safety and Hygiene Awareness
 - 57.7.3 Calibration of Equipment
 - 57.7.4 Equipment Cleanliness and Placement

- 57.7.5 Cleaning of Grain Contact Parts
- 57.7.6 Grain Contact Material Safety
- 57.8 Workers Health, Safety and Welfare
 - 57.8.1 Risk Assessments
 - 57.8.1.1 Risk Assessment of Working Conditions
 - 57.8.1.2 Safety and Hygiene Policy
 - 57.8.2 Training
 - 57.8.2.1 Training in Use of Chemicals etc.
 - 57.8.2.2 Health and Safety Training
 - 57.8.2.3 First Aid Training
 - 57.8.3 Hazards and First Aid
 - 57.8.4 Protective Clothing/Equipment
- 57.9 Record Keeping and Internal Self-Assessment/ Internal Inspection
 - 57.9.1 Duration of Record Keeping
 - 57.9.2 Internal Self-Assessment
 - 57.9.3 Corrective Actions
- 57.10 Waste and Pollution Management, Recycling and Reuse
 - 57.10.1 Identification of Waste and Pollutants
 - 57.10.2 Waste and Pollution Action Plan
 - 57.10.3 Clean Premises
 - 57.10.4 Designated Place for Waste Storage
- 57.11 Environment and Conservation
 - 57.11.1 Impact of Farming on the Environment and Biodiversity
 - 57.11.1.1 Wildlife Conservation Plan
 - 57.11.1.2 Benefit to Local Community
 - 57.11.1.3 Avoid Damage Habitat
 - 57.11.1.4 Increase Biodiversity
- 57.12 Complaints
 - 57.12.1 Availability of Complaint Procedure
 - 57.12.2 Records of Complaints
- 58. BIS STANDARDS
- 59. FACTORY LAYOUT AND PROCESS FLOW CHART & DIAGRAM
- 60. PHOTOGRAPHS OF PLANT AND MACHINERY WITH SUPPLIERS CONTACT DETAILS
 - Millet Destoner Machine
 - Pasta Making Machine
 - Biscuit and Cookie Extruder
 - Automatic Cookie Dropping Machine

- Millet Dehuller Machine
- Millet Peeling and Polishing Machine
- Millet Thresher
- Millet Flake Machine
- Sorghum Peeling Machine
- Pasta Extruder Machine
- Tunnel Ovens
- Spiral Mixer
- Millet Mill Machine
- Cookie Making Machine
- Grain Roaster
- Cookie Packaging Machine
- Grain Grinding Machine
- Noodles Making Machine
- Flour Sifter Machine
- Dough Sheeter Machine
- Rotary Seasoning Drum
- Millet Roasting Machine
- Sorghum Milling Machine
- Snacks Production Line
- Millet Flour Packing Machine
- Millet Packing Machine
- Vibrating Screen
- Rotary Oven
- Puff Machine
- Grain Storage Silos
- Dough Divider
- Millet Pulverizer

About Niir

NIIR Project Consultancy Services (NPCS) is a reliable name in the industrial world for offering integrated technical consultancy services. Its various services are: Pre-feasibility study, New Project Identification, Project Feasibility and Market Study, Identification of Profitable Industrial Project Opportunities, Preparation of Project Profiles and Pre-Investment and Pre-Feasibility Studies, Market Surveys and Studies, Preparation of Techno-Economic Feasibility Reports, Identification and Selection of Plant and Machinery, Manufacturing Process and/or Equipment required, General Guidance, Technical and Commercial Counseling for setting up new industrial projects and industry. NPCS also publishes various technology books, directories, databases,

detailed project reports, market survey reports on various industries and profit making business. Besides being used by manufacturers, industrialists, and entrepreneurs, our publications are also used by Indian and overseas professionals including project engineers, information services bureaus, consultants and consultancy firms as one of the inputs in their research.