Millet: The Grain of *Future* India.

Introduction

Millets are more than just a grain – they are nutrient-rich, climate-resilient, and deeply tied to India's agricultural identity. Yet, despite their benefits, they've been overlooked in favor of crops like rice and wheat. This overview explores millets' nutritional profile and varieties, highlights their role in sustainable agriculture, and addresses the challenges and opportunities in reviving millet consumption. It also examines the market, tracing millets' underutilized and underappreciated pre-awareness, limited product innovation, and an ineffective Public Distribution System further widen this gap.

Our synthesis map explores how climate, agriculture, and consumer behavior intersect, revealing millets' potential as a crop for the emergent patterns; we uncover leverage point for awareness, and perception – laying the foundation for millet's transformation from the "grain of the past" to the "grain of the future."

Let us follow along the conversation of a mother and child who are discussing millets, and how millets are a key ingredient in their preparation and how revenge effects of Green Revolution that caused it to vanish from our lives.

HELP

RETRO

What

1. Mapping Stakeholders in Bread-making
2. Capturing the Extremes Related to the Stakeholders
3. Different Types of Bread and Regional Variations in Ingredients Across India
4. History of Bread and Western Influence
5. Mapping Mainstream Grains to Their Cultivation Regions in India
6. Classification of Bread: Flatbread, Steamed Cake, Pancake
7. Pros and Cons of Wheat and Rice Bread
8. Analyzing the Digestive Breakdown of Bread
9. Digestion of Bread Across Different Age Groups
10. Mapping Different Equipment Used in Bread Making
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Why

Millets & Coarse Grains (Pre-Green Revolution)

Introduction of High-Yield Crops

Gradual Cultural Shift

Mainstreaming Fine Grains

Processed Diet Phase

Current Phase & Opportunity for Reversal

"Mom, I have so many questions! What exactly are millets? Are they tasty, quick to make, or expensive? Also, can grandpa eat them and what about our dog? Did you or grandma eat millets growing up?"

"Oh, someone's super curious today! Millets are small, tasty grains, grandma always cooked, easy like rice, affordable, great for grandpa, and safe for our dog too! Come, let me show you."

Traditional Millet Consumption

Millets were a staple food but declined as rice and wheat became tied to food shortages.

START

Revival of Millets

Governments and consumers are reintroducing millets for a healthier, sustainable diet.

END

Rise of Rice & Wheat

The Green Revolution introduced subsidized wheat and rice, making them the preferred staple.

Health Issues & Awareness

Overconsumption of refined grains led to health problems, prompting millet awareness.

Life Cycle of Millets in India

We are exploring India's food system through bread – a universal staple with deep roots in both flatbread traditions and fermented varieties. Historically, diverse grain consumption narrowed towards wheat and rice dominance due to the Green Revolution's influence. Today, health and sustainability concerns are driving a renewed emphasis on millet-based breads, reconnecting tradition and nutrition.

History

Variations and Evolution

Indian breads have evolved alongside agricultural and cultural changes, starting with flat, millet-based varieties like Bhakri and Bajra in Rishi in ancient times, which suited regional climates and farming. The introduction of wheat in the Indus Valley civilization with breads like Wankaya Roti and Dhuska, incorporating mixed grains, in the modern era. The Green Revolution boosted wheat and rice and Bhakra grains popularity. Today, there's a renewed interest in traditional, health-focused grains like millets and ancient varieties. These breads can be classified by type, flatbreads, fermented, pancake-style, and steamed breads, and by its rich ancient, medieval, and modern.

For over 5,000 years, India has cultivated millets, especially ragi (finger millet) and bajra (pearl millet).

"Mom, millets sound amazing—can't we just start putting them in everything?"

"They are good, but using too much makes the food dry, coarse, and sometimes bitter. That's why I now mix smaller amounts with flour so the breads stay tasty, soft, and nutritious."

Problems with millets

Problem Ecosystem

Despite their nutritional and environmental benefits, millets face significant challenges in modern food systems. Stakeholder efforts, cultural perceptions, and market hesitation limit awareness and access. Challenges like cooking complexity, lack of ready-to-use millet products, and farmer disinterest further deter integration. Moreover, exclusion from Public Distribution Systems (PDS) and limited government-subsidized ecological potential reveal a systemic neglect. These issues, split between urgent policy gaps and long-term opportunities, highlight the pressing need for behavioural change.

Geographical Data

Rice

Wheat

Millet

Lentil

"Here, are millets good just for us, or for India and the whole planet too? Are farmers there want to grow them, and do they use a lot of water?"

"Millets are great for India and the planet! Our farmers actually love growing them because millets need very little water, keep our soil healthy, and help the environment."

"I read somewhere that millets were called the grain of the poor. Why was that?"

"Because they were grown in villages, easy to farm, and affordable so people saw them as less fancy than rice or wheat.

Regional Relevance

India is the world's largest producer of millets, contributing about 41% of global production in 2023. Millets are cultivated across more than 6 million metric tons of millets, cultivated across 6.60 million hectares of land. Major millet-producing states include Rajasthan, Karnataka, Maharashtra, Uttar Pradesh, Gujarat, Madhya Pradesh, and Andhra Pradesh. Millets thrive in arid and semi-arid regions, offering a climate-resilient, low-input alternative to water-intensive crops. Their production is driven by both climate and by policy preferences for rice and wheat after the Green Revolution, which prioritized food security. Today, rising demand for millets is driven by urban and traditional grains from Indian diets, along with limited market infrastructure and changing habits.

Soil

Temperature

Rainfall

Season

Socio-Economic Influences

Dietary Transitions During Migration

Migration

Wheat dominant region

Affordability

Income

Cultural Norms

Rice based region

Local Market

Supply Shifts

Taste Economic Migration

Food security

Adaptation

Regional high consumption

Staple Substitute

Millets and Tradition

Transition of consumption

Regional consumption culturaleconomic

Awareness Program

"Mom, I heard millets are becoming popular again. Why now? And if we're growing more, how come we don't see them much? Is the government doing anything about it?"

"That's a smart question! Millets are rising again because people are realizing how healthy and eco-friendly they are. In fact, 2023 was declared the International Year of Millets by the United Nations. Many farmers grow more, spreading awareness in schools and cities, and even promoting millet-based foods in public programs. It's taking time, but millets are definitely finding their way back to our kitchens!"

9 out out of 10 individuals claimed to know their millets

	Correct Responses	Incorrect Responses
Jowar (Sorghum)	8	2
Jau (Barley)	7	3
Sanwi (Wheat)	6	4
Ragi (Finger Millet)	5	5
Bajri (Pearl Millet)	4	6
Rajgir (Grain Millet)	3	7

National Year of Millets

India recognized the importance of millets for nutritional security and declared 2018 as the "National Year of Millets". This initiative aimed to boost the cultivation and consumption of millets like jowar, ragi, and bajri. Millets were also reintroduced as "Nutri Cereals" in April 2018.

Objectives:

1. Observation of Year of Millets will help in promotion of production and consumption of millets.
2. The production will substantially contribute in fight against targeted hunger and mitigate affect of climate change in long run.
3. Popularising millets will also benefit future generations of farmers as well as consumers. Millet has untapped uses such as food, feed, biofuels, and brewing.

2023 was declared the International Year of Millets by the United Nations General Assembly

Who

Stakeholder Analysis

We also identified and understood how the various industries are supporting each other in order to survive the bread and grain business. We zeroed in on millets and how it's production and consumption – consumption despite the plethora of health benefits.

Millet Farmers

Diabetic Patients

People seeking Alternatives (Lactose Intolerant)

Health Conscious Consumers

Bakeries

Food Technologists

Grain Handling Individuals

Farm Hills

Delivery

Chefs and Cooks

Restaurants

Artisanal and Small Scale Millet Bakers

Hospitals

Bakery Shops

Online Food Delivery Platform

Agriculture Research Bodies

Nutritionist

Government Led Food Organizations

Grocery Stores

Supermarkets

Food Safety Authorities

Product Development Cell

Logistics Provider

Local Food Markets

Manufacturing Hubs

Bridge for Farmers

Storage Facilities

Regulatory Agencies

50%

Primary Stakeholders

Secondary Stakeholders

Tertiary Stakeholders

Perceiving millets

Events and Trends

At the tip of the iceberg, we see that cultural perceptions continue to limit millet adoption – seen widely as a "poor man's food" and overshadowed by rice and wheat, while education on millets' nutritional benefits persists, reinforcing misconceptions about digestion and taste. Urban trends like gluten-free diets and fitness culture are overshadowed by dominant brands. India's proactive millet advocacy is global forums contrasts with slow local consumption and integration.

67% of urban Indians associate millets with poverty or rural hardship.

"But Mom, why did people stop eating millets? Did they not like the taste?"

"Well, people started eating millets the 'poor man's grain,' thinking rice and wheat were fancier. When families moved from villages to cities, they left behind their traditional foods, including millets."

Factors limiting to millet consumption in the households

Traditional knowledge of millet farming being lost due to generational shift

Re-branding of Millet as Superfood

Migration

Consumption

Nutrition

Digestion

Lifestyle Disease

Cultural Factors

PDS

Economic Factors

Rural and Urban

Socio - Economic

Store & Market Dynamic

Millet still seen as a 'poor man's food' in many rural areas

Urban populations unaware of traditional millet- based cuisines

Millet-based festivals & government campaigns increasing but impact unclear

"Here, earlier you said millets are good for grandpa—but why exactly? Is it because he has diabetes?"

"Exactly! Millets digest slowly, keeping grandpa's blood sugar steady instead of spiking it. That's why they're considered a great option against diabetes and other lifestyle diseases."

Structures and Systems

Below the surface, agricultural policies, subsidies, and market infrastructure established during the Green Revolution continue to favor rice and wheat over millet cultivation. Limited processing facilities, modest investments, and supply chain support reinforced historical preferences. Recent efforts, like millet-based initiatives – shaped by policy priorities, profit-driven market structures, and narrowly focused research – are slowly shifting this dynamic, highlighting the need for structural reforms to integrate millets into mainstream production and consumption.

Underlying Causes

Food Consumption Patterns

Agricultural Patterns

Economic & Market Trends

Decline in Millet Consumption

Increase in Processed Wheat & Rice Intake

Generational Shift

Urban vs. Rural Diets

Rising Diseases

Government Promotion of Wheat & Rice

Decline in Millet Farming

Soil Degradation from Monoculture Farming

Requirement of Water during Farming

Higher Demand for Processed Foods

Low Commercial Investment in Millets

Supermarket Dominance

High Millet Prices Due to Low Supply

From staple food to niche health food

Fast food, instant meals, packaged foods

Younger generations prefer bread, pasta, noodles

Rural diets still include millets; urban diets favor processed grains

More requirement for gluten-free, organic, whole-grain options

Green Revolution, subsidies procurement policies

Farmers switch to cash crops, wheat, rice due to higher profits, pricing

Repeated wheat & rice farming depletes soil nutrients

Wheat & rice require more water compared to millets

millets are drought- resistant but ignored

Supermarkets flooded with instant wheat-based products

Limited R&D, few product innovations

Packaged food made from wheat and rice dominates, pushing out traditional grains

Millets cost more than subsidized wheat/rice

Paradigms

Government Policies

Market & Industry Influence

Cultural & Social Structures

Education & Awareness Systems

Public Distribution System (PDS) Focus on Wheat & Rice

MSP (Minimum Support Price) for Wheat & Rice Only

Subsidized Chemical Fertilizers for High-Yield Crops

Agricultural Research & Development (R&D) Focus on Major Grains

Food Processing Industry Focus on Wheat & Rice

Supermarkets & Retail Chains Push Processed Foods

Millet Supply Chain Issues

Fake Advertising & Marketing

Traditional Beliefs About Millets

Changing Food Habits Due to Urbanization

Lack of Culinary Knowledge About Millets

Western Diet Influence

School Curriculum Excludes Native Grains

Lack of Consumer Awareness on Health Benefits

Influence of Western Nutrition Standards

Limited regional millet inclusion in ration shops

No stable pricing for millet farmers

What is ragi got priority, millets ignored

More funding for wheat, rice

Breads, noodles, and biscuits made from refined wheat

More shelf space for wheat/ rice-based products

Millet Challenges: grains often contain over 40% refined flour

Seen as "poor man's grain" in many regions

Rice is brewed, pasta, cereals, and fast food consumption

Children not educated about millets

Misconceptions about digestibility, cooking difficulty

Preference for protein-heavy dairy over balanced whole grains

World View & Values

Deep-rooted notions of progress and modernity prioritize refined grains – millets are in government schemes, but cultural perceptions have not influenced behavior. Ingrained beliefs, reinforced by policies like irrigation, boosting wheat and rice production. However, millets were neglected due to their association with poverty and low yields. Overcoming these misconceptions requires a cultural and values shift, challenging traditional hierarchies of grains.

Deep Myths

Millets are portrayed as outdated and inferior compared to wheat or rice, reinforcing the idea that refined grains represent modernity and higher social status. Marketing further amplifies this by emphasizing how refined foods seem safer, big brands appear more trustworthy, and the FDA's focus on wheat and rice signals their importance. These myths create barriers to millet use, nutrition, diversity, traditional knowledge, and discourage broader millet adoption.

"Mom, if millets are so good, why didn't you feed me this when I was little? Is cooking them complicated?"

"I know—I used to think cooking millets was complicated too. But it's actually as simple as cooking rice. You don't even need special utensils, our regular pots work perfectly!"

Metaphors

Perceptions About Food

Millets are inferior to wheat & rice

Millets are difficult to cook

Wheat & rice are more modern

Packaged food is safer than fresh grains

Historical bias from colonial and Green Revolution policies

Instant food is favored for convenience, lacking FTI (cultic) and cooking know-how.

Modern trends encourage processed flour-based diets

Mental model of food items that are properly packaged will be more hygienic

Economic & Industrial Influence on Products

Traditional Foods Are Outdated

Global Diet Trends Are Superior

Convenience Over Nutrition

Social Status & Food Choice

Trust in Government Policies

Big Food Companies Know Best

Marketing shapes food choices more than health knowledge

Perception that millets belong to the poor, not modern diets

Public perception of cleaning and following the Hindu

People prioritize ease of cooking over spending long time on cooking from the past

Eating white rice & bread seen as wealthier than eating coarse grains

If FDA publishes wheat/rice, people assume they are the "best" grains

Modern Shaping Consumer Behavior

Decline

Revenge Effects of Green Revolution

The Green Revolution significantly boosted India's agricultural productivity, but it also led to unintended consequences, reshaping dietary trends, millets cultivation. Traditionally valued for nutritional benefits and climate resilience, millets faced drastic declines, exemplifying a revenge effect – resolving immediate food shortages at the cost of biodiversity, nutritional diversity, and resilience to climate variability.

"But Mom, if millets are so good, why don't we see them around our house or even at the canteen/mall? What happened?"

"That's because people started growing more rice and wheat after the Green Revolution. Millets slowly disappeared as we focused on more crops. Let me explain."

Post 1965, India focused entirely on HYV wheat and rice, ignoring millets potential.

High-Yield Crops, Tech Advancements & Millet Neglect

The Green Revolution introduced HYV seeds, chemical fertilizers, pesticides, and modern irrigation, boosting wheat and rice production. However, millets were neglected due to their low yields and resilient. Chemical use of chemicals and water led to soil degradation and groundwater depletion, making sustainability concerns.

Shift from Import to Export

India transformed from being a food-deficient nation reliant on imports to a major exporter of rice by the 1980s, wheat and rice production skyrocketing, enabling India to export food grains globally.

Achievements & Consequences

While India became self-sufficient in food production, it led to widespread issues like groundwater depletion, and regional disparities emerged. Today, there is a call for a second Green Revolution focused on sustainability and crop diversification.

Food Crisis & Unplanned Agriculture

Before the Green Revolution, India faced severe food shortages due to low-yield farming and unplanned crop selection. The country was highly dependent on monsoons, leading to frequent food security a critical concern.

Harvesting the Ideas

Intervention Points

Millet Experiential Store

Creating Millet Cooking Experiences

Chefs + cafe using millets in their menu

Behaviour Change

Providing a space to see, try, learn and buy

Community engagement

Adaptation of techniques to new ingredient

Direct Trust Innovation

Positioning like millet brand

Capturing a market gap with product innovation

Healthier alternative to otherwise cafe / baked food

Modern day packaging and branding

Enabling Transition

willingness to try new things

Capacity to change habits and forget old ways

need for new, tasty, and convenient recipes

Ease of Use

A way for trying millets into items without going out of comfort z

Affordability

Availability

Taste

Cultural Norms

Millet Literacy

Millet Experiential Store

Millet Cooking Experiences

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Cultural Norms

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Cultural Norms

Solution

The Millet Store is conceived as an experiential intervention strategically located near cafeterias and grocery outlets to bridge the gap between awareness and consumption. Inside, commercial complexes, or community hubs, it encourages organic engagement with millet-based products through sampling, cooking demos, and hands-on baking workshops, and digital platforms, the store fosters informed discovery. This integrated approach aims to drive long-term dietary shifts towards millet consumption.

The Millet Store

Cafeteria

Grocery Outlet

Only 3% of millets in India are sold in Ready- to-Eat or Ready-to-Cook formats.

Behaviour Change

Parts of our solution are designed to encourage behavior change. The touch points, working together to drive behaviour change around millet consumption. These touch points include like awareness media, news, and quick commerce, spark curiosity and encourage trial, which is complemented by the physical experience through a millet café, where customers can taste millet in various forms. Together, these elements aim to gradually shift preferences and promote consistent millet adoption.

Physical Presence

Millet Market Zone

Learning Hub

Live Cultivation Area

Sustainable Packaging

Millet Cafe

Behaviour Change

Digital Presence

Digital Awareness Media

Digital Hub

Quick Commerce

Zoomed-in Areas

Collaboration with QSRs & Hawkers

Millets can shape future food systems and support SDG 02 – Zero Hunger, SDG 3 – Good Health and Well-being, SDG 12 – Responsible Consumption and Production, and SDG 13 – Climate Action, but low urban millet literacy limits their adoption. Raising awareness and accessibility can boost millet consumption, promoting nutrition and sustainability.

Millet Literacy and Urban Consumption

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Millet in Public Distribution System

Post-harvest processing preserves nutrition, but FSS, irrigation, and logistics impact access. The decentralized procurement system manages storage, transport, and distribution across local, interstate, and export channels.

Millets in Elderly Healthcare

Rich in nutrients, millets benefit all ages, especially the elderly. They support thyroid health, aid digestion, and reduce bloating caused by wheat. Each millet offers unique health benefits, making them a superior dietary choice.

Division of millets

Exports

Estimated Domestic Use

Post-Harvest Losses

1 unit represents represent 30,760 metric tonnes of millet produced in India in 2024.

Processing of Millets

Weather dependency

Dry

Harvest

Threshing

Winnowing

Cleaning

Grading

Storage

Pest and Moisture control

Leverage Point

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Affordability

Availability

Taste

Habit Formation

Introducing millets into Daily Quick Service Restaurants

Millet Experiential Store

Introducing millets into street food

New Millet Product Innovation

भारतीय प्रौद्योगिकी संस्थान कानपुर
Indian Institute of Technology Kanpur

Parnavi Dinkar

Rahul Raj Singh

Tina Soni