

Foxtail Millet, The Crop of the Future, and the Possibilities of Including It in the ICDS: A Microlevel Study in Tripura

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ABSTRACT

The recent surge in awareness, demand, and recognition of millets can be attributed to the United Nations declaring 2023 as the International Year of Millets, largely due to India's advocacy. Millets are being hailed as "future crops" owing to their resilience to the adverse effects of climate change, making them adaptable to various challenging climate conditions. The significance of millets has been underscored by the Indian government, which officially rebranded them as "nutri-cereals" in lieu of coarse cereals starting in 2018. Furthermore, numerous studies have emphasized the nutritional value of millets (Taylor R.N, 2017, RR Chapke, 2017), showcasing their potential to address nutritional deficiencies. This study aims to shed light on the significance of a specific millet variety, Foxtail millet, with recommendations to incorporate it into the staple grains distributed through the "Supplementary Nutrition Program (SNP)" under the Integrated Child Development Services (ICDS) Scheme. Through a micro-level study involving a sample of 50 farmers, this research not only highlights the nutritional benefits but also reveals that the cost-benefit ratio of cultivating this nutritious crop surpasses that of other staple grains like rice and wheat. Additionally, secondary data from various sources supplements the findings of this study, underlining the promising potential of Foxtail millet in addressing nutrition and food security challenges.

Keywords: jhum cultivation, Supplementary Nutrition Program, monocrop, dryland cultivation

INTRODUCTION

The sudden surge in awareness, demand, and fame in millets can be attributed to the UN, declaring 2023 as the International Year of millet at the behest of India. Millet is labelled

as the "future crops" because of the adverse impact that climate change has forecast to bring about but millet is climate-resilient and can adapt to adverse climate conditions. Such is the importance being accorded to millets that the government of India has renamed it as "nutri-

cereals” in place of coarse cereals since 2018. According to the Indian Council of Medical Research, compared to rice Fox tail millet has 81% more protein, little millet has 840% higher fat, 350% higher fiber and 1,229% higher quantity of iron (F.E. Bureau, 2018). There has been demanded to declare these crops as Nutri Cereals to boost its demand and allow farmers to get higher prices. Even noted agriculture scientist M S Swaminathan had suggested the name change in 2006 (F.E. Bureau, 2018) Production of millets will also contribute towards the fulfilment of the 2030 agenda for sustainable development.

Background

While millets have long been recognized as important grains, their full potential remains untapped. According to the Food and Agriculture Organization (FAO) forecast for the close of the 2023 season, world cereal stocks are expected to reach 850 million tons, indicating a slight decline of 0.3 percent from their opening levels (FAO, April 2023, World Food Situation). Additionally, the FAO has projected a -1.3 percent decrease in wheat production for 2023 compared to 2022 (FAO, March, Crop Prospectus and Food Situation).

In a world grappling with food security challenges and malnutrition, with the United Nations aiming to end global hunger by 2030, it is crucial to focus on alternative sources of cereals, including lesser known but highly nutritious options like millets. Millets belong to the Poaceae grass family and are among the oldest crops cultivated by humans. The Food and Agricultural Organization (FAO, January 2023) has outlined six compelling reasons why millets deserve global attention:

- a. Millets can be harvested in dry seasons, providing a vital food source for populations vulnerable to food insecurity.
- b. They contribute to a healthy diet due to their rich fiber content, low glycemic index (GI), and gluten-free nature, making them suitable for individuals with diabetes.
- c. Millets are climate-resilient and can thrive in adverse climatic conditions, including drought.
- d. They offer promising livelihood opportunities for small-scale farmers.
- e. Millets enhance diversity in global food systems, promoting resilience in trade and providing a strong alternative to typical grains.
- f. Millets can be used innovatively in various therapeutic and pharmaceutical applications due to their genetic diversity.

India has a long history of millet cultivation, with traces of millets found in archaeological sites such as Harappa and Mohenjo-Daro (Varshney R.K. ICRISAT, Happenings Newsletter, 2021). Numerous studies have highlighted the nutritional aspects of millets (Hassan Z.M. et al., 2021; Kumar Ashwani et al., 2018; Gowda Nanje N.A., 2022; Yousaf L. et al., 2021), focusing on processing, nutritional value, and functional properties.

This present study aims to underscore the significance of a specific millet variety, foxtail millet, and suggests its inclusion in the distribution of food grains through the “Supplementary Nutrition Program (SNP)” under the Integrated Child Development Services (ICDS) Scheme.

Millet Cultivation Regions in India

In India, millet cultivation thrives in several key regions, including Haryana, Uttar Pradesh, Chhattisgarh, Gujarat, Rajasthan, Madhya Pradesh, Maharashtra, Andhra Pradesh, Karnataka, Tamil Nadu, and Telangana. The country boasts a rich diversity of millet varieties, with some of the most widely grown and consumed types being:

- finger millet (Ragi)
- foxtail millet (Kangni or Kakum)
- pearl millet (Bajra)
- sorghum millet (Jowar)

Among these, foxtail millet (*Setaria italica*) holds a significant position as the third most important millet crop globally. It belongs to the *Poaceae* family and is cultivated in various Indian states, including Andhra Pradesh, Karnataka, Telangana, Rajasthan, Maharashtra, Tamil Nadu, Madhya Pradesh, Uttar Pradesh, and, to a lesser extent, in the northeastern states of India.

The indigenous communities in the northeastern region of India have a longstanding tradition of cultivating foxtail millet, albeit in limited quantities. Foxtail millets are primarily cultivated in the tribal regions of the Northeast, often as part of mixed cultivation alongside

other crops. They hold a significant place in the daily dietary habits of these tribal communities, locally referred to as “Kaon chal.” Typically, foxtail millet is prepared and consumed in a manner akin to rice meals, often accompanied by various vegetables. Additionally, they are also enjoyed as a key ingredient in traditional Indian Rice Pudding, known as “Payesh.”

Cultivation of Foxtail Millets in Tripura

In the northeastern state of Tripura, Foxtail millet is primarily grown in upland areas through Jhum cultivation, a traditional method utilized especially by the indigenous tribes of the region. This cultivation method involves mixed cropping, where Foxtail millet is intercropped with other crops like sesame, rice, maize, etc., across all eight districts of Tripura. In the plains, non-tribal communities have also adopted Foxtail millet cultivation as a standalone crop, thanks to the initiatives undertaken by the Department of Agriculture. Currently, the department is promoting High Yielding Varieties of Foxtail millet to enhance its productivity in the state.

The last 3 years’ area, production, and productivity data are given below:

Table 1: Area, Production, and Productivity of Foxtail millet in the last 3 years

Sl. No.	Year	Area (in Ha.)	Production (in MT)	Productivity (Kg/Ha)
1.	2019-20	1338	1099.04	821
2.	2020-21	1806	1457	807
3.	2021-22	1637	1330	812

Source: Department of Agriculture, Tripura 2022

The data in Table 1 reveal minimal fluctuations in both the area under cultivation and the production of Foxtail millet in Tripura over the past three years. However, there has been no significant increase in productivity during this period.

Material and methods

This study gathered primary data through field surveys conducted among foxtail millet and rice (Gomati Variety) farmers. A structured questionnaire was employed to collect information covering all aspects of production, including material costs. Additionally, data on fixed assets, land use, cropping patterns, yields, returns, quantities sold, price realization, and the challenges faced by producers were obtained. Field visits were conducted in West Tripura and Sipahijala Districts of Tripura, as well as in other tribal areas where foxtail millet is grown both as a monocrop and in mixed cultivation within the Jhum system.

Due to limitations in time and resources, the sample size for the survey was limited to 50 such farmers. Information was also sourced from secondary resources, including the Department of Agriculture, Krishi Bhawan, and the Education (Social Welfare & Social Education) Department of Tripura. The study employed a tabular method to compile data on the costs and returns associated with Foxtail millet and rice cultivation, as well as the marketed surplus.

RESULTS AND DISCUSSION

The effects of climate change have manifested in the form of erratic rainfall patterns, particularly in some regions where approximately 50% of the annual rainfall occurs

within just 7-10 rainy days. This phenomenon is more prominent in arid and semi-arid areas, resulting in reduced soil moisture retention and substantial crop losses. Additionally, extended periods of insufficient rainfall create a significant lean period, further exacerbating crop losses due to water scarcity.

In this context, Foxtail millet emerges as a resilient dryland crop capable of withstanding dry spells while also thriving in well-irrigated conditions. When irrigated, it can be sown as early as January. For rainfed cultivation, the seed is typically sown in the last week of May, with a harvesting period of approximately 75-80 days.

To enhance foxtail millet cultivation in the state, the Department of Agriculture has collaborated with the Indian Institute of Millet Research in Hyderabad. The aim is to introduce high-yielding Foxtail millet varieties that can yield up to 1100 kg/ha. In the current year, a trial target of 40 hectares has been set. However, it is important to note that the area and production of Foxtail millet have remained relatively unchanged over the years. Foxtail millet cultivation in the state is yet to gain significant traction and recognition among crops. Currently, it is predominantly cultivated in 'Jhum' by tribal farmers for their own consumption, with minimal quantities allocated for a marketable surplus.

Costs and Returns of Foxtail Millet Cultivation Compared to Rice

In recent times, the cultivation of foxtail millet has gained popularity as a monocrop in many non-tribal regions of Tripura. High-yielding foxtail millet seeds are supplied free of charge by the Department of Agriculture

through village stores. To assess the cost-benefit ratio of the two major grains cultivated in the state, namely rice and foxtail millet, a comprehensive survey was conducted in the West Tripura and Gomati districts. The survey also encompassed tribal areas where Foxtail millets are grown as part of mixed cultivation in the 'Jhum' system.

Table 2: Costs and gross revenue of cultivation of foxtail millet and Rice (Gomati)

Sl. No.	Particulars	Value (\$ /ha) Foxtail (HYV)	Value (\$ /ha) Paddy (Gomati)-SRI
1.	Variable Cost		
i.	Material Cost		
a)	Seed	30 (8Kg)	22.5(9kg)
b)	FYM	56.25	55
c)	Chemical Fertilizer	54	54
d)	Plant Protection Chemicals	27.5	22.5
ii.	Labor Cost		
a)	Men Labor (@500/day)	143.75	275
b)	Women Labor (@ 300/day)	101.25	240
c)	Bullock Labor	-	
d)	Machine Labor (500/hr)	100	150
iii.	Interest on working capital (6%)	30.77	49.14
	Total Variable Cost (i+ ii+ iii)	543.52	868.14
2.	Fixed Cost		
a)	Land Revenue	.63	.81
b)	Depreciation	26.25	28.75
c)	Rental value of Land	31.25	30
	Total Fixed Cost	58.12	59.56
3.	Total Cost of Cultivation (1+2)	601.44	927.7
1.	Returns		
a.	Main Product (q)	11	59
b.	Bi-Product (MT)	6	6
c.	Price of the Main Product (per q)	112.5	23.75
d.	Price of the Bi-Product (per MT)	12.5	6.25
e.	Gross Revenue	1312.5	1401.25
f.	Net Revenue	711.06	473.55

Source: Field visits (primary source) *calculated as 1\$= 80 INR

The total costs and gross revenue are calculated based on field survey

Cost-effectiveness = gross revenue/total cultivation cost

a) Cost effectiveness of foxtail millet

$$= 1312.5 / 601.44 = 2.18$$

b) Cost-effectiveness of rice

$$= 1401.25 / 927.7 = 1.51$$

The findings reveal that the cost-effectiveness of foxtail millet significantly outpaces that of rice cultivation. Rice cultivation is inherently labor-intensive, requiring substantial manpower. Moreover, rice cultivation in plains demands consistent standing water throughout much of its vegetative growth period. Any interruption, such as drought during the vegetative or fruiting phases, leads to reduced yields. In contrast, Foxtail millet does not require standing water and can even endure drought patches. It is

particularly well-suited for dryland cultivation.

One of the most notable distinctions between the two crops is the duration of cultivation. While cultivating the Gomati variety of rice typically spans 135-145 days, foxtail millet can be harvested within a relatively shorter timeframe of 75-80 days. This shorter cultivation period can significantly benefit farmers in terms of time and resource management.

Nutritional Benefits of Foxtail Millets

Foxtail millets are a nutritional powerhouse, brimming with essential nutrients that contribute to overall health and well-being. These millets are rich in proteins, carbohydrates, vitamins such as vitamins A and E, and essential minerals like phosphorus, calcium, magnesium, and sodium. Below, you'll find a breakdown of the nutrient content in Foxtail millet:

Table 3: Nutritional content in 100gm foxtail millet

Sl. No.	Nutritional Components	Value per 100gm
a)	Energy	331 kCal
b)	Protein	12.3 g
c)	Dietary fiber	8 g
d)	Fat	4.3 g
e)	Phosphorus	290 mg
f)	Potassium	250 mg
g)	Magnesium	81 mg
h)	Vitamin A	32 mg
i)	Calcium	31 mg
j)	Vitamin E	31 mg
k)	Folic acid	15 mg
l)	Sodium	4.6 mg
m)	Niacin	3.2 mg
n)	Iron	2.8 mg
o)	Zinc	2.4 mg

Source: FarmEasy, foxtail millets: Uses, Benefits, Side Effects and More by Dr. Rajeev Singh

Key Benefits of Foxtail Millet

- a) Diabetes management: foxtail millet serves as an excellent rice substitute. Its consumption helps in preventing mid-day hunger pangs and stabilizes blood sugar levels. With a low glycemic index of 50.8, it effectively reduces blood sugar and glycosylated hemoglobin levels.
- b) Weight loss support: foxtail millet contains a generous amount of tryptophan, which helps curb hunger, making it an ideal choice for those aiming to shed excess weight, particularly abdominal fat.
- c) Bone health: abundant in iron, calcium, and phosphorus, foxtail millet plays a vital role in maintaining strong bones and muscles. It aids in combating conditions like brittle bones, inflammation, osteoporosis, arthritis, and spondylitis.
- d) Nervous system support: foxtail millets are rich in vitamin B1, a nutrient crucial for a healthy nervous system. Regular consumption can help prevent neurological disorders.
- e) Cardiac health: being gluten-free and packed with protein while low in carbohydrates, Foxtail millet contributes to heart health. It aids in the production of the neurotransmitter acetylcholine, promoting cardiovascular well-being.
- f) Immunity enhancement: foxtail millet is a nutritional powerhouse that bolsters stamina and builds immunity, helping the body fend off infections and enhancing overall strength.

Given its nutrient-rich composition, foxtail millet is an excellent choice for lactating mothers, providing a balanced diet source while supporting the growth and development of young girls. It is a valuable addition to a healthy and nutritious diet.

Supplementary Nutrition Program in ICDS (Centralized Program) in Tripura

In Tripura, the Supplementary Nutrition Program (SNP) under the Integrated Child Development Services (ICDS) scheme is designed to provide essential food items to pregnant/nursing mothers, children aged 0.5-6 years, and severely underweight children aged 0.5-6 years. This program operates for 25 days each month, and the following details outline the specific food items and their quantities distributed as part of this initiative:

Table 4: Quantity of food items under the SNP program for distribution (25 days in a month)

Sl. No.	Food Items	Pregnant/Nursing mothers	Children (.5 years – 6 years)	Severely underweight children (.5-6 years)
1.	Rice+ Dal (3:1)	4.475 kg	3Kg	5kg
2.	Bengal Gram	1.75 kg	1.75 kg	1.75 kg
3.	Suji	1.25 kg	1.25 kg	1.25 kg
4.	Flattened Rice	1.25kg	1.25 kg	1.25kg
5.	Soyabean	2.25 kg	2.25 kg	2.25 kg
6.	Eggs	10 Nos.	10 Nos.	10 Nos.

Source: Education (Social welfare & Social Education) Department, Tripura 2022

The Supplementary Nutrition Program, a component of the ICDS scheme, serves as a crucial source of additional nutrition. The nutritional content (food value) delivered to mothers and children during these 25 days of the month is as follows:

Table 5: Nutrition (Food Value) under SNP Program

SL.No.	Nutrition (Food Value)	Pregnant/Nursing mother	Children (.5 – 6 years)	Severely underweight children (.5-6 years)
1	Protein (Gram)/Month	756.08	577.25	926.63
2.	Energy (KCal) /Month	21018	15699	25769
3.	Cost for 25 days in a month	237.36	199.91	299.43

Source: Education (Social Welfare & Social Education) Department, Tripura, 2018-19

The Importance of the SNP Program under the ICDS Scheme and Expenditure in Tripura

The primary objective of the Supplementary Nutrition Program (SNP) is to establish a strong foundation for the holistic development of children, encompassing their psychological, physical, and social well-being, with the ultimate aim of reducing child mortality, morbidity, malnutrition, and school dropout rates. This mission is articulated by the Ministry of Women and Child Development.

In the state of Tripura, the SNP program is implemented in alignment with other states across the country. Over the past five years, the financial allocation for the SNP program in Tripura is as follows:

Table 6: Last quinquennial fund for a state under the SNP program

Year	No. of Beneficiaries		Fund by the Ministry of Women & Child Dev. GOI (in Lakhs)
	Children (.5- 6 years)	Mothers (Pregnant/ Nursing)	
2022-23	3,14,017	53,766	5736.14
2021-22	3,45,175	67,521	6883.37
2020-21	3,25,883	63,415	7664.15
2019-20	3,25,419	69,304	7028.04
2018-19	3,32,353	71,074	7781.78

Source: Education (Social welfare & Social Education) Department, Tripura, 2023

During this period, the allocation for the Supplementary Nutrition Program has witnessed a gradual decline, primarily attributed to the reduction in the number of beneficiaries. Nevertheless, it is noteworthy that approximately 57 crore rupees from the central fund were expended for the scheme in the previous fiscal year.

It is important to note that the SNP program is funded centrally, and a significant portion of the food items procured under the scheme are sourced from other states. Consequently, local farmers in Tripura receive limited benefits from this arrangement. The

program could substantially benefit the state if a larger proportion of the food items were locally produced by the Tripura's farmers. For instance, foxtail millet, known for its exceptional nutritional value, can be cultivated within the state and subsequently sourced locally to support the ICDS scheme.

How foxtail millets can contribute to ICDS Scheme and its benefits

The percentage share of food items in the SNP program is given below in the Table 7.

Table 7: Amount of food items under SNP and their percentage share

Sl. No	Food Items	Total amount (Rs.)	% share	Total amount (Rs.)	% share	Total amount (Rs.)	% share
1.	Rice	9.41	4.71	15.68	5.24	14.11	5.94
2.	Dal	60	30.01	100	33.40	90	37.92
3.	Bengal Gram	24.5	12.26	43.75	14.61	24.50	10.32
4.	Suji	17.5	8.75	31.25	10.44	17.50	7.37
5.	Flattened Rice	17.5	8.75	31.25	10.44	18.75	7.90
6.	Soyabean	8.5	4.25	15.0	5.01	10.0	4.21
7.	Eggs	62.5	31.26	62.5	20.87	62.5	26.33
Total		199.9	100	299.43	100	237	100

Source: Education (Social welfare & Social Education) Department, Tripura, 2018-19

Table 7 reveals that rice and wheat jointly account for 22% of the grains procured by the department for the SNP program. However, it is worth noting that both these grains can be effectively replaced by foxtail millets, which offer significantly higher nutritional value.

In the state of Tripura, wheat cultivation is not a prevalent practice, leading to its procurement for the ICDS scheme from the Food Corporation of India (FCI). Wheat is transported into Tripura from other states and supplied to the ICDS scheme at subsidized rates.

Regarding rice, although it may be sourced from within the state via the FCI, rice production is not particularly profitable for local farmers. Moreover, rice cultivation necessitates consistent standing water, rendering it vulnerable to disruptions caused by erratic rainfall patterns, resulting in prolonged dry spells.

Hence, both of these staple food grains can be effectively substituted with Foxtail millets, which can be cultivated by state farmers. This transition would not only lead to higher returns for farmers but also provide a more nutritious alternative to rice and wheat. By embracing the foxtail millets, Tripura has the opportunity to enhance both agricultural prosperity and the nutritional quality of the ICDS scheme.

The Millet Revolution by the Government of India

India has solidified its position as one of the top five millet exporters globally, with the millet exports amounting to \$64.28 million in the fiscal year 2021-22, marking a notable increase from \$59.75 million in 2020-21 (APEDA,

Indian Millet, 2021). The Government of India has actively championed millet production as a pivotal component of the National Food Security Mission (NFSM). There is evolving production trends of millets in India (APEDA, Indian Millet).

In a significant move, the Government has intensified its efforts to foster millet cultivation by designating 212 districts across 14 states as the dedicated millet-growing districts. In these regions, the Government is committed to offering incentives to the farmers for the activities such as quality seed production, distribution, on-field demonstrations, training programs, establishment of primary processing clusters, and research support. Furthermore, the 'One District One Product' (ODOP) initiative, which was already in operation, has now incorporated additional 27 districts, with a specific emphasis on millet. The Farmer Producer Organizations (FPOs) program, backed by an investment of USD 924 million, is also geared toward empowering millet producers to actively engage in the market as stakeholders.

Among various state governments, Odisha was the pioneer in planning to introduce locally produced millets into the Integrated Child Development Scheme (ICDS) and Public Distribution System (PDS) under its Millet Mission in 2017 (Drishtias, Introduction of Locally Produced Millets in ICDS, PDS, 2020). Karnataka and Telangana are following suit by incorporating millets into their mid-day meal programs for government and government-aided schools (Daily Current Affairs, Production of Millets in India, 2021). In Karnataka, the University of Agricultural Sciences has played a vital role in processing raw and finished millet products, extending support to farmers.

However, it is noteworthy that the initiatives launched by various state governments, as mentioned above, have yet to be realized in the state of Tripura.

Despite a significant upsurge in the productivity of major grains in India since independence, the production trend of millet in the country has not witnessed the same level of growth. This could be attributed to the Green Revolution, which primarily focused on two major crops, rice and wheat.

CONCLUSION

In recent times, climate change has become an undeniable reality, impacting regions worldwide and including Tripura. The state has experienced the consequences of erratic and unreliable rainfall patterns. Rice cultivation, primarily undertaken during the Kharif season, heavily relies on monsoons, often leaving the crop vulnerable to the extended periods of drought during its vital growth stages. This recurrent trend has led to the failure of rice crops in numerous fields across Tripura. Substituting rice with foxtail millet emerges as a promising alternative, given its resilience to drought conditions and suitability for dryland cultivation yields satisfactory harvests.

The present study has demonstrated that, when compared to other food grains cultivated in Tripura, foxtail millet boasts superior nutritional value. Table 2 indicates that, while foxtail millet may have slightly a lower productivity when compared to paddy, its market value is substantially higher. Furthermore, the study highlights a favorable cost-benefit ratio for foxtail millet, standing at 2.18, surpassing that of rice at 1.51. Consequently, cultivating foxtail millet presents a more profitable prospect for Tripura's farmers than rice.

Additionally, Tripura, like other states, operates the Supplementary Nutrition Program (SNP) under the Integrated Child Development Services (ICDS) scheme, distributing food items to pregnant and lactating mothers, as well as to children aged 0.5 to 6 years. Foxtail millet could play a significant role in enhancing the nutritional value of the ICDS program. Table 7 reveals that rice, flattened rice, and semolina, the by-products of rice and wheat, constitute approximately 22% of the total costs, suggesting that they could be effectively replaced with locally grown foxtail millet.

The efforts must also be intensified to facilitate the marketing of products by connecting the small and marginal farmers to the online marketing platforms like e-NAM (Electronic National Agriculture Market). The formation of Farmers' Producer Organizations (FPOs) among the millet-growing farmers can further strengthen their bargaining power.

Furthermore, it is an imperative to extend the Minimum Support Price (MSP) to include the foxtail millet, which currently applies only to the crops like jowar, bajra, and ragi. This measure will incentivize the farmers to engage in the foxtail millet cultivation.

Finally, there is a compelling rationale for incorporating millet-based foods into the international, national, and state-level feeding programs. This step is essential to address the significant nutritional deficiencies among the growing children and lactating or expectant mothers, ensuring their access to vital nutrients.

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Talijansko proso, usjev budućnosti; mogućnosti uključivanja u ICDS studiju na mikro razini u Tripuri

SAŽETAK

Nedavni porast povećane svijesti, potražnje i prepoznavanja prosa kod potrošača može se pripisati tome što su Ujedinjeni narodi 2023. godinu proglasili Međunarodnom godinom prosa, uglavnom zahvaljujući zalaganju Indije. Proso se naziva “usjev budućnosti” zbog svoje otpornosti na nepovoljne učinke klimatskih promjena, što ih čini prilagodljivim različitim izazovnim klimatskim uvjetima. Indijska vlada je naglasila važnost prosa, koja ih je 2018. godine službeno rebrendirala u “hranjive žitarice” umjesto krupnih žitarica. Nadalje, brojne su studije naglasile nutritivnu vrijednost prosa, prikazujući njihov potencijal za rješavanje prehrambenih nedostataka. Ova studija ima cilj rasvijetliti značaj specifične sorte prosa, Talijansko proso, s preporukama za njegovu ugradnju u osnovne žitarice koje se distribuiraju kroz “Program dodatne prehrane (SNP)” u okviru Programa integriranih usluga za razvoj djeteta (ICDS). Kroz studiju na mikrorazini koja uključuje uzorak od 50 poljoprivrednika, ovo istraživanje ne samo da naglašava prehrambene prednosti, već također otkriva da omjer troškova i koristi uzgoja ove hranjive kulture nadmašuje onaj kod drugih osnovnih žitarica poput riže i pšenice. Osim toga, sekundarni podaci iz različitih izvora nadopunjuju nalaze ove studije, naglašavajući obećavajući potencijal Talijanskog prosa u rješavanju problema prehrane i sigurnosti hrane.

Ključne riječi: uzgoj Jhum, program dopunske prehrane, monokultura, uzgoj u suhim uvjetima