Millet and its significance on the eve of International Year of Millets 2023: Culture, Consumption and Conservation based study by the Biodiversity Education and Research Lab, Shivamogga, Karnataka, India

ABSTRACT

Aims: This study was performed to know the learning of what is millet and its significance on the eve of IYOM-2023 for high school students in Karnataka.

Study Design: The present study was considered essential to know about the perception of the millets year celebration and who gained knowledge about why it is a prerequisite in our society, culture, nutrition, health, and food security.

Place and Duration of the study: we selected different agro-climatic conditions of Karnataka state like Shivamogga, Tiptur, Hassan, Mandya, Dharwad and Chikkamagaluru districts. Where millet growing and consumption have been common from time immemorial but the present status is different.

Methodology: We involved 1095 students from 23 schools with 46 teachers who physically participated in the survey and the participant's family members 3285 grandparents and 2190 parents who supported the students in debating for the information. The data were analyzed for quantitatively by descriptive statistics and qualitatively by Pearson's rank correlation.

Results: The findings revealed that most students do not know what millet is, and many do not hear of their name, their local name, or their importance as food, fodder, or health benefits. The majority of the students lack knowledge about millet, which is directly linked to their non-consumption of millet at home and in hotels. Why so much information and knowledge are not in the textbook is also one of the drawbacks of our system, as has been mentioned by the majority of the teachers. The only millets' knowledge bank is their elders (grandparents and parents).

Conclusions: Our attempt to bridge the gap helped the students, parents, and teachers know what millet really is and why celebration matters to all, especially next-generation citizens (students), to know and act for their responsibility in food security in their region.

Keywords: *Biodiversity; Elders; Food culture; Food security, Knowledge of millet; IYOM-2023, Millet informal education,*

INTRODUCTION

Our traditional food is millet as we have evidence from our civilization; millets are grown and consumed in more than 100 countries covering semiarid tropic areas like Asia and Africa. [1]. Millets are suitable for sustainable means of food security [2]. As millets contain more proteins [3] and are superior to

other crops in getting essential amino acids. What people are consuming and why they are consuming some grains, pulses, cereals, and millet. Consumption is mainly based on what food is cooked at home and agricultural practices they are following, but we have celebrated National Millets Year 2018 and International Year of Millets -2023, and how it impacted its reach to the community and students (younger generation). India shares world millet production around 41 per cent [4]. Millets are one of the staple foods in India. But the present food consumption scenario is lifestyle dependent.

As we know millets are rainfed crops, ecofriendly, need less rain and even can sustain erratic rain and maximum yield, with high nutritional capacity to overcome many malnutrition deficiencies. Millets cultivation area is decreasing is a major concern hence few programs are launched by Krishi Vigyan Kendra (KVKs) and millet awareness through Mann Ki Baat has created demand and ensured a continuous supply of millets [5,6,7].

The study by [8] millet strengthening activities through FPOs by ICAR-IIMR, Hyderabad in the states of Andhra Pradesh, Telangana, and Karnataka by establishing millet-processing units at farm gates. In the global scenario, millet is gaining popularity due to its health advantages, etc. Body mass index and growth of school children have improved according to a millet consumption study [9] in the peri-urban region of Bengaluru, Karnataka.

According to the National Family Health Survey suffering from Malnutrition due to being underweight and anaemia, lack of micronutrients reports that half of the women were anemic, [10]. India's attempt at a school feeding program is aimed at improving the health and well-being of students through a mid-day meal scheme to have good health and enrolment [11]. In many countries including India, millets are traditional food grain hence globally millets are considered one of the smart foods because they are rainfed, climate stress, and rich with micronutrients, hence they are called a boon to humans and the planet [12].

What we grow is not directly proportional to our consumption it shows what we are growing, and consuming is not properly suitable to their climatic condition and health mismatches have lost many food habits and decreasing habitats suitable in the region in the present study area at the global level the scenario is a universal we need to know our identity by our food practices and our health benefits [13]. How the Society and community behavioural aspects matter and the individual role in consumption and conservation needs an assessment.

1.1 Purpose of the study

About the status of Millet –

The International Year of Millets and what do we achieve by celebrating IYM -2023. Millets are one of the traditional crops in several countries like India, China, Japan, Nigeria, Zimbabwe and several other Asian and African countries. Millet is generally considered as a small-seeded grass that is cultivated in arid and

semiarid regions. Amongst the most popular are the pearl millet (bajra), finger millet (ragi) and sorghum (jowar). The Minor millets include foxtail, barnyard, proso and others. [14].

Data sourced from APEDA (Agricultural and Processed Food Products Export Development) Government of India. The United Nations (UN) General Assembly at its 75th session declared 2023 the International Year of Millets (IYM2023) (Figure-1).

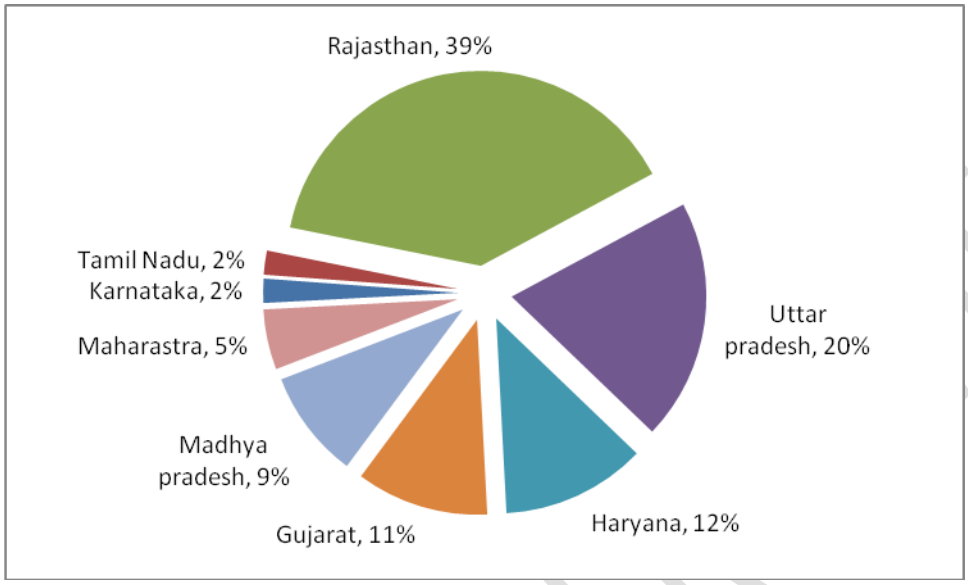

Fig. 1. The state-wise millet production in 2021-22.

An old Kannada saying The rice (Oryza sativa) eater is weightless like a bird; the one who eats Jowar /sorghum (Sorghum bicolor) is strong like a wolf, one who eats Ragi/finger millet (Eleusine coracana) remains 'Nirogi' (illness-free) throughout his life.

1.2 Community effort to restore millets-

An attempt to revive millets as a multi-cropping system for food security has succeeded in enhancing its production in Theertha village of Kundagol, Dharwad supported by NGO Sahaja Samrudha, has empowered hundreds of millet women farmers providing them training now become agripreneurs. [15].

1.3 Millets in Public Distribution System: Government of Karnataka's Approach

The program of the Government of Karnataka to provide stable food sources like millet started collecting millet from farmers (finger millet/ragi in south Karnataka and sorghum / jowar in north Karnataka) and distribution through the Public distribution system in 2013-14. The scheme was launched as "Anna bhagyadinda Krishi bhagya" (Farmer welfare through food welfare) with the intention that by procuring these millets from farmers, substantial cash would flow to rural households while PDS cardholders would get access to nutritious food grains at low prices.[16].

1.4 Millets and Sustainable Development Goals (SDG) - FAO

The sustainable production of millets can fight hunger and contribute to food security and nutrition (SDG – 2). Proper handling of millets is key to maintaining their high quality and nutritional benefits (SDG – 2 and 3). Millets can be an important part of healthy diet (SDG – 3). Greater consumption of millets can offer opportunities to smallholder farmers to improve their livelihoods (SDG – 8). Greater trade in millets can improve the diversity of the global food system (SDG – 8 and 12). The sustainable cultivation of millet can support climate resilient agriculture (SDG –13 and 15). [17].

2. METHODOLOGY

2.1 Study group

In the present study, we selected different agro-climatic conditions where millet growing and consumption have been common from time immemorial but the present status is different due to changing lifestyle as well as agricultural practices. We involved 1095 students from 23 schools with 46 teachers who physically participated in the survey (Figure -2).

2.2 Objectives

Based on our Biodiversity exploration our research always makes a way for outreach we aimed to involve students, teachers and the community with face-to-face interaction with students and teachers to cover a maximum number of individuals to minimize the error. We asked few questions like A. What is Millet to school students and community? B. Who knows millet (student, teacher and parents) C. Who taught about millet for the respondent students? D. Does our behaviour (culture, society and consumption) play a significant role?

We interacted with students and teachers in their schools during their class hours with a mission of working what is millet to students literally. The schools and students involved in the present study are in (Table-1).

Table – 1. Schools involved in the present Millet study of Karnataka.

District	School name	No. of Students	Teachers Involved in the study
	1.Sri Tunga Bhadra High School - Suguru	43	*Shekaraiah M, *Raju K M S
	2.Karnataka Public School – Gajanur	40	*Arun kumar B, **Shabnam Firdos
	3.Government High School – Ullur	75	*Indira N Bedkani, ** Nagaraj H M
	4.Malnad High School – Gowthamapura	60	*Shekarappa M.S, **Srikanth D. M

Shivamogga	5.Government High School – Kadekal	56	*Chandri Bai B, **Sumiah Parveen ** Chandrakala H
	6.Government High School - Thammadihalli	30	*Pushpa, **Prakash R # Dinesh Hosanagara
	7.Jawahar Navodaya Vidyalaya - Gajanur	54	*C Valliammai **Rashmi R S # Dinesh Hosanagar
	8. Government High School Malur-Thirthahalli	60	*Gopalakrishna T, **Nisha kanitkar
Tumkur	9. Government High School - Albur - Tiptur	29	# G. L Muralidhar
	10. Karnataka Public School – Nonavinakere, Tiptur	40	*Rukmini K.M **Jagdish S.C
	11. Government High School - Hongelakshmi	33	*Shivashankar D , **Vinutha P
	12.Bisilu Thimmappa Kamparahalli	38	*Nagabhushana Prasad N B, **G.N. Puttaswamy
Hassan	13.Sri Venkatehwara High school - Girikeshtra	43	*M.R. Ashok **Mani P.L
	14.Nirmala High school - Dasapura	60	# G. L Muralidhar
	15. Government High School Akkanahalli Cross	35	*M. C. Shekhar **V.D.Divya
Mandya	16. Government High School - Koochahalli	60	*Chetan .D, *Manukumar A.S
	17. Government High School - Kadabahalli	59	*Lingaraju , **Amulya
	18.Kitturani chennamma school - Kadabahalli	50	*Anitha G.B, **Srinivas murthy. S
Dharwad	19.Balabalaga – Shriram Nagar	48	*Pratibha Sanjeeva Kulakarni **Mrinalini Narasimha K
	20.Kalkeri sangeetha Vidyalaya – Kalkeri	34	*Vallekar **Vimala, # G. L Muralidhar
	21.Karnataka University school - Dharwad	45	*Anasuya B Nayak, ** Dr. Indu Ravikumar
	22.Gubbacchi gudu school - Malapur	35	*Lakshmi **Suma
Chikkamagaluru	23. Jawahar Navodaya Vidyalaya - Balehonur	68	*R. Premkumar, **Dorothy # Dinesh Hosanagara

(* Head master, ** Science teacher/ involved teacher, # field assistant,)

2.3 Statistical analysis

The data were processed for quantitative assessment by descriptive statistics and qualitatively by Pearson's rank correlation [18]. The collected information or data from students of 1095 (8 and 9) grade, 46 teachers, 3285 grandparents and 2190 parents were analyzed.

3. RESULTS AND DISCUSSION

On the eve of the International Year of Millets, we wanted to know what millets means to school students very few heard the word millet, have seen, eaten, and can identify the respondent students, the main reason we noticed it was very difficult for them to differentiate between millets, pulses, oil crops (Table - 2).

An earlier study by [13] indicates the decline in millets and mixed cropping patterns, changes in food consumption patterns are determined by many parameters like irrigation, lack of awareness, lack of desired price, climate issues and modern lifestyles etc. Even a Public Distribution System started providing Rice and Wheat, resulting in maximum consumption and a major threat to millet consumption and adversely affecting millet cultivation.

Table –2. List of millets and students response

Millets name	Common name (Kannada)	Per cent of students (%)			
		Heard the name of millet	Saw the millet	Ate the millet dishes	Can identify the millet
1. Great millet/sorghum	Joola	15%	10%	10%	5%
2. Pearl millet/ bajra	Sajje	20%	12%	15%	3%
3. Finger millet	Ragi	80 %	80%	60%	55%
4. Fox tail millet	Navane	10%	6%	2%	5%
5. Little millet	Same	1%	3%	1%	2%
6. Kodo millet	Haarka	0	1%	0	0
7. Proso millet	Baragu	0	0	0	0
8. Barnyard millet	Odalu	0	0	0	0

4.1 Student and millet awareness

In the present study the correlation between number of students and millets known had negative significant (Boys r = -0.01, <0.3 and Girls r = - 0.07, <0.6), because the relationship between the number of students and the millet awareness is very poor (Figure -2).

The main reason behind the lack of awareness and consumption is change in agricultural practices (shifting from agriculture to horticulture), changing food practices (cooked to packed food) and the knowledge of food cooking style is not yet transferred from generation to generation (respondent student knowledge information).

As student mention we were not yet exposed to such activities in school, community or scientific exploration to know our traditional agricultural practices and food sources is also one of the draw backs of the present system.

Food consumption is a special area of study and it is important for both the individual and the economy. It provides nutrients for individuals and its economic role is significant [19].

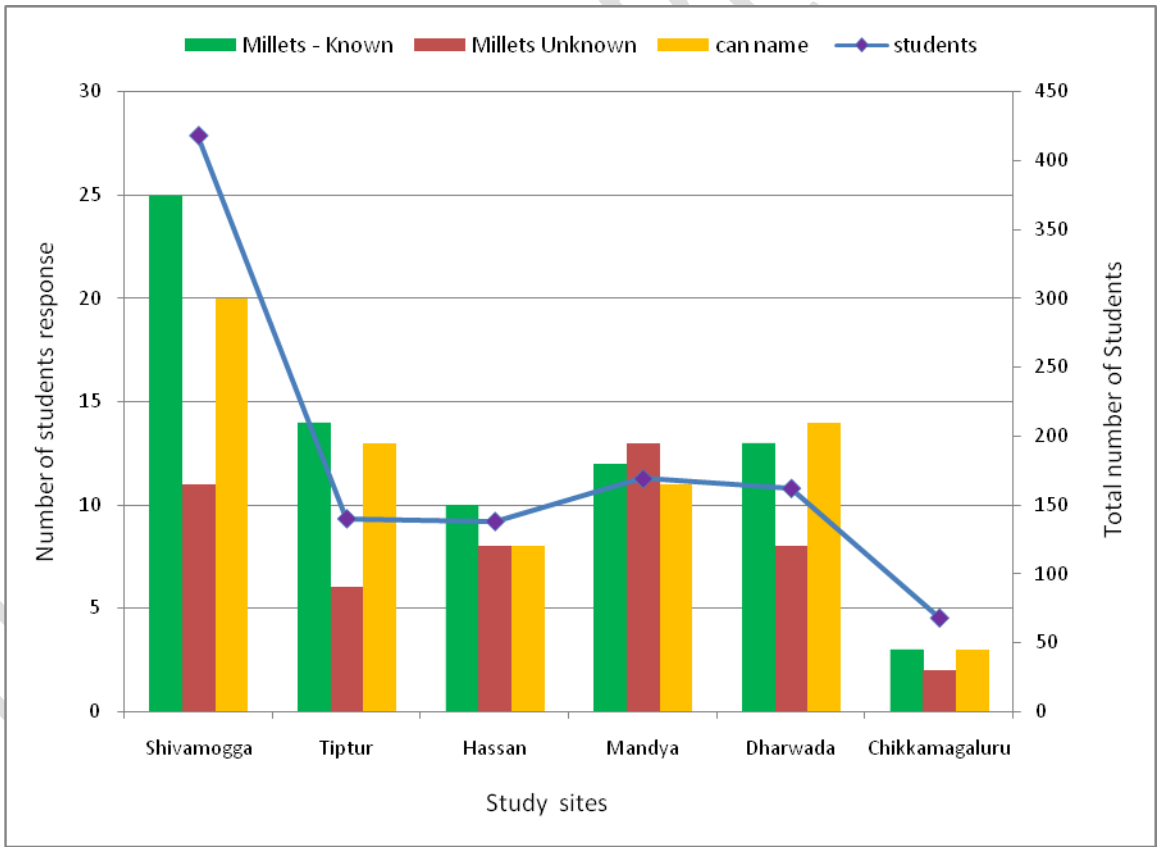

Figure- 2. Student's response towards millets knowledge from the study area.

In our interaction with students for the millets international year celebration in schools, we asked who knows about millets like how many have seen (Boys r = -0.22, <0.3 and Girls r = - 0.098, <0.6) the response is negatively significant and who can identify (Boys r = -0.047, p<0.8 and Girls r = -0.187, <0.3) had a strong negative significance, as it differs from the study site it all depends on their exposure (Figure- 3). The awareness and advertisement programs at the school level as millet fairs, seminars, and workshops at school festivals, village and gram panchayat level required them to see, feel (touch and food/dishes), and identify them, we learned from respondents students, teachers, and community the lack of exposure is the main reason.

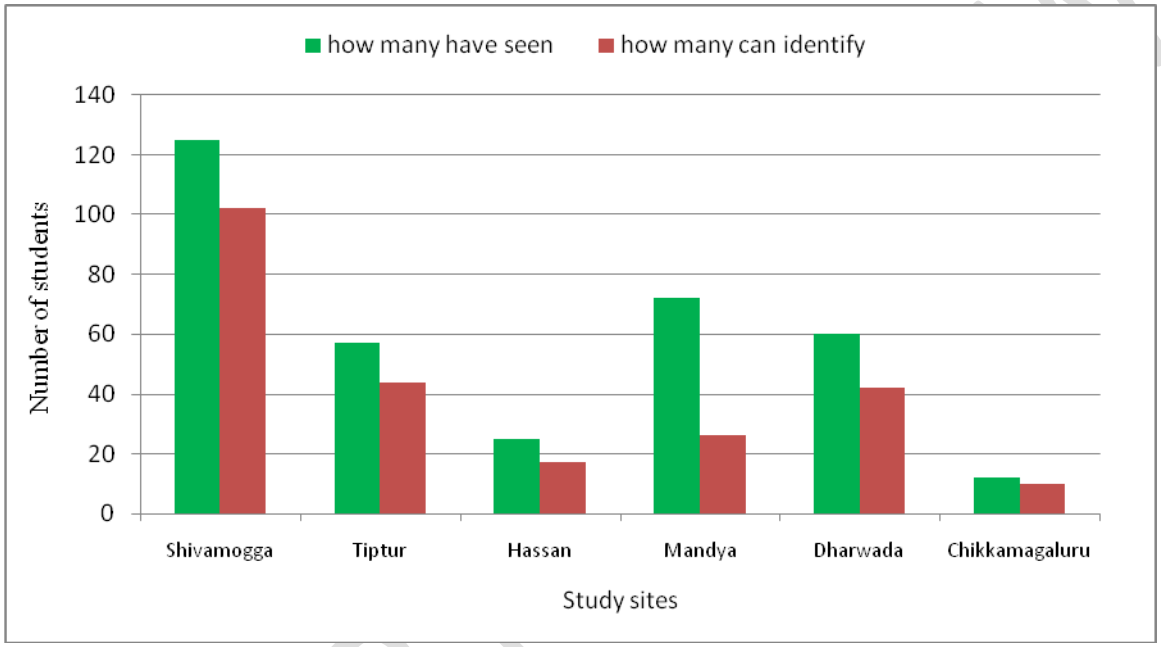

Figure- 3. Student's response towards millets knowledge in the present study area.

Millet production and consumption have decreased over the decade [20] the reason they quote that millet food preparation requires skill and knowledge is declining. The majority of the respondents and students are familiar with one or two millets that till date they are using as staple foods like Ragi (finger millet) 60% followed by bajra 30% sorghum 20%, because it is one of the major stable foods from the study areas.

Respondent students learn more about millets from their grandmother (Boys r = 0.72, <0.0009 and Girls r = 0.79, <0.0006) and grandfather (Boys r = 0.69, <0.009 and Girls r = 0.76, <0.006) grandmother influence had strong positive significance than grandfather, about the mode of consumption (Figure - 4) and its health importance rather than a textbook. The major reason behind diabetes is due to poor knowledge hence education about millet matters. [21].

4.2 Our food, society and culture

Changing cocking method from firewood to a stove and a modern smart kitchen is also not helping to cook the traditional dishes of millet. Cocking methods and utensils are also important components in influencing the decrease of the millet dishes behaviour or changing food preparation and continuity of the present cooking behavioural/cooking pattern (personal observation as mentioned by the community respondents). Due to the lack of cooking skills millets are consumed as festival food in North Karnataka [22], this indicates the knowledge of elders being followed in festivals as our study supports based on elders millets knowledge few millets dishes are prepared for some festivals. The majority of the students do not know what are millets they do not know their local names, and they cannot identify but they know food products like (Paddy, wheat, pulses, fruits, vegetables, and a few greens) which are available in the market get advertised and our dependency is maximum. Millets help in improving the height, weight, and haemoglobin level of primary school children was conducted in Thondamuthur block of Coimbatore District, India, for improving nutrition security and livelihoods through increased use of small millets [23]. An awareness program study [24], revealed that nutritional knowledge of millets increased from their program related to millets.

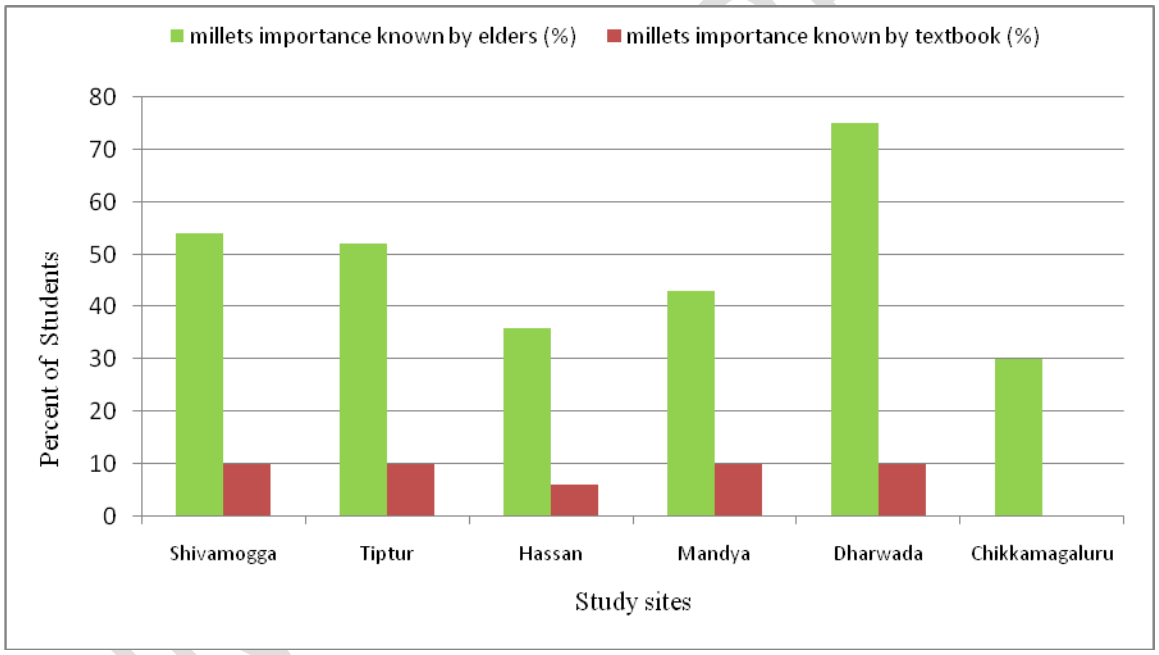

Figure- 4. Millets knowledge for students from family members and textbook.

The intervention of technology for the millets and its scope is the need of the hour as [8] study shows the value chain of millets is enhanced by adapting improved technologies which boosts increased investment in infrastructure. As [20] study demonstrates the ability to recognize millets varies across the state with respect to diverse agro climatic conditions and cropping patterns from India.

A study indicates when farm women were trained for the value addition of millets-based products the millets survived in their demography [25]. The present study shows the student's knowledge from their grandmother revealed gender knowledge and their participation in food, and sweets at home made its

significance and they even mention that their intervention in the restoration of millets in their region is recognized. The student's knowledge acquired revealed boys (Boys r = -0.28, p<0.01 and Girls r = - 0.36, p <0.08) knew very little because the textbook had strong negative significance as it covered very meager information or less than other commercial crops information. (Figure 4).

Millets have been replaced by some cash crops in the present study areas due to a lack of market, and demand is less (personal observation). Millets area of production and productivity of time is decreasing gradually from year to year (parental remarks).There are attempts to introduce millets among communities and schools in Myanmar [26] and Central and Northern Tanzania [27] to change the perception and preference of food choices with millets. We are missing the relationship between our food, culture, and tradition needs a relook and we need more interaction with a farming community that holds skill, knowledge, and scientific and policy-driven acts. Apart from this, we need to educate our next generation future students on millets to meet SDG (Sustainable Development Goals) – the present project on millets with students revealed they learned (Boys r = 0.49, p<0.00006 and Girls r = 0.51, p <0.00001) from our interaction had a strong positive significance on both hence it matters (Figure 5).

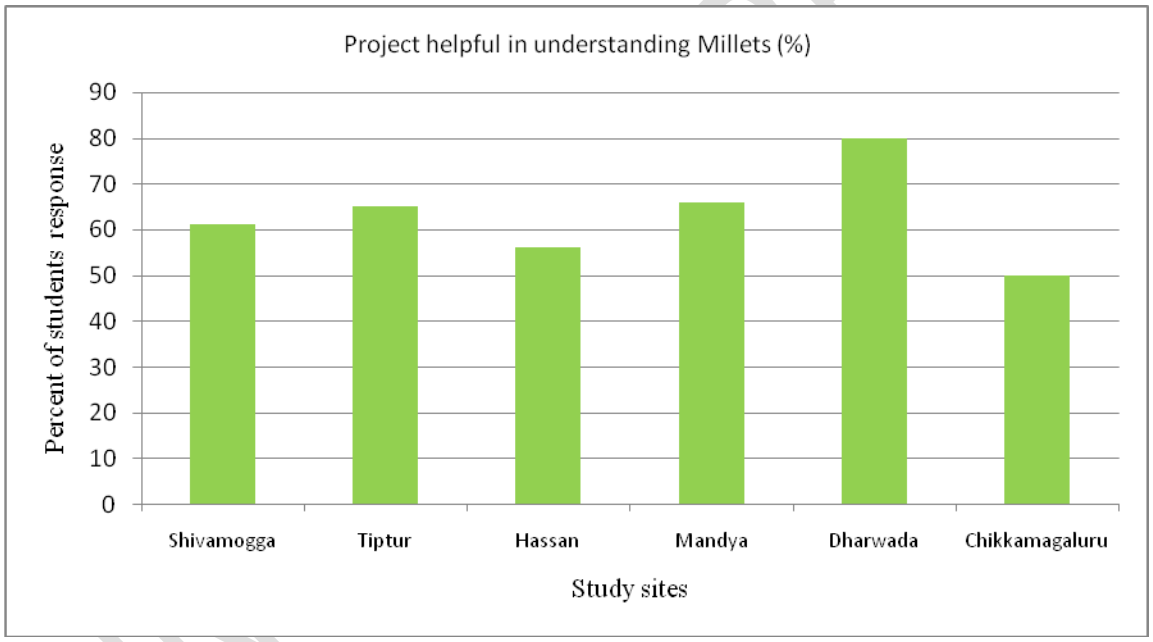

Figure- 5. Per cent of student's millets basic knowledge gained from the project.

The present study shows how many student respondents can name millets and how many can identify, unknown students about millets are more than the known it makes sense that we have forgotten our next generation intervention in learning, educating about the decision for the future who deserves to know a sustainable living with millets for the future. Our intervention was to involve school students, teachers, and the community to celebrate, making them know the different millet's common names and centres of origin and their relevance in the present climate change to meet sustainable development goals.

5. CONCLUSIONS

Our study revealed that students do not know what are the different types of millet and how it is related to our geography, tradition, food, and culture we strongly feel that if they were unaware of the millet name it is the problem of the system education, community, government and polices that we need to have a strong commitment to retain its importance as food and culture. Our biodiversity education and research lab commitment to make them know the millet's name, origin, how, and why millets are disappearing how we are struggling to sustain with the present climate change, and our (individual) role to restore and retain make an impact. Equally important are the initial knowledge, practices, and individual attitudes toward these traditional crops while planning and implementing any nutrition-related interventions using them with a better understanding of acts and policies in the future to make a grand success introducing millets in mid-day meals and stories on origin, health benefits and environment resilience in the textbook and recognizing local unnoticed farmers for the survival of millets. As millets are cultivated or available in less/non-irrigated areas, the food is considered poor community stable food and indicates social status. This behaviour of the present community is one threat to growth and consumption, also deteriorating the society from nutritious food and food practices. From the present survey and interaction, we found that societal behaviour and commonsense in recognizing our food, health and community to restore the biodiversity of food, fodder and climate is the need of the hour.

We need to advertise our millet bowl to the students where it is currently cultivated and allow the community to interact with school students and teachers who are currently nurturing and consuming millet. This will truly serve the aim of Food and Agriculture Organizations and United Nations awareness about our millet wealth and health benefits and India’s celebration of IYOM-2023.

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