



Inventory of the traditional sorghum varieties in North-eastern Karnataka

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Abstract

Farmers in the rural parts of the North eastern region Karnataka are still know to retain traditional sorghum varieties in their farming systems. In present study, an attempt was made to inventories the traditional sorghum varieties cultivated in a North-eastern region of Karnataka. A total 15 varieties were collected from the study area and found that agro-ecological conditions and quality are the main considerations in the region to grow the particular type of crop. Traditional sorghum varieties represent important genetic reservoirs with valuable traits and there is an urgent need to provide proper incentives and encourage the farmers to cultivate sorghum varieties to help in the on-farm conservation for to avoid genetic erosion.

Keywords: agro-ecological, conservation, genetic erosion, traditional sorghum varieties

Introduction

Sorghum is the major staple food in North-Eastern Karnataka and is also valued greatly for other uses like poultry and animal feed. The landraces of sorghum, are continued to be maintained for cultural preferences and traditional practices by the farmers which could play an important role in the food security, income generation and food culture of the rural poor in the area. This crop diversity is once and for all lost by many factors, includes rise of modern agriculture, demographic changes, pests and disease outbreaks, consumer preferences, lack of knowledge on conservation of plant resources and unsustainable breeding programs also contributed to the loss of plant resources and consequently loss in the diversity within crops Hammer and Teklu ^[1]. Besides this, the recent acceleration in market forces, particularly economic liberalization and free trade has created new consumer preferences, migration and demographic pressures, land degradation, overgrazing, soil erosion and the indiscriminate use of chemical fertilizers and pesticides, all have impacted negatively to on natural habitats and the diversity Sodhi and Erhlich ^[2]. So, many farmers have been replacing traditional local crop varieties with newly developed hybrids/improved varieties of crops and have adopted the practice of monocropping on a large scale. Furthermore, lack of proper documentation of the traditional knowledge and practices, a number of crop varieties are thinning from the areas without proper knowledge about varieties and their cultivation Sunwar *et al.* ^[3] Regmi *et al.* ^[4] Baral *et al.* ^[5]. This rapid decline in diversity of crops species and local knowledge systems related to their uses and management hampers agro-ecosystems resilience, reduces options for adaptation to changing biophysical conditions and limits the potential to develop improved varieties Rudebjer *et al.* ^[6] Ford-Lloyd *et al.* ^[7] Dansi *et al.* ^[8]. It has been estimated that six per cent of wild relatives of cereal crops (wheat, maize, rice, sorghum *etc.*) are under threat as are 18 per cent of legume species. Thus, conservation of traditional crop varieties is need of the hour in attaining balanced ecological agriculture.

Methodology

Research design is the most important and crucial aspect in extension science research. The *exploratory* design was used to the present study. The conservation of crop varieties was one of the important farm practices adopted by farmers in India and other countries. As it is a new phenomenon observed in recent years and there were hardly any studies conducted on this topic. Thus, exploratory research design was used in the form of documentation, which helped in better understanding of conservation of traditional varieties in the study area. The study was conducted in North-Eastern districts of Karnataka *viz.*, Bidar, Kalaburagi, Raichur, Koppal, Ballari and Yadgir during the year 2018-19, based on criterion of cropping pattern and districts coming under the jurisdiction of University of Agricultural Sciences, Raichur. There is no secondary database on conservator cum cultivator of traditional varieties of sorghum and minor millets. To over this, an effort was made to collect the information on sorghum and minor millet cultivator with the consultation of the officials of the Department of Agriculture, NGOs, progressive and award winner farmers in the study area. In order to identify the respondents, who had actually cultivated at least one or more of traditional varieties from last five years *i.e.*, 2013-14 to 2018-2019, a list of farmers was prepared and considered as respondents. After socialization process with selected respondents and were asked to provide names of farm families in their neighbourhood or locality, who are engaged in conservation of traditional sorghum and minor millets varieties. This procedure continued till the appropriate sample size is achieved. A sample size of 30 farmers, who cultivate traditional sorghum and minor millets varieties were identified as respondents by following the principle of the snowball technique.

There is no universally accepted method to document the conservation of sorghum and minor millets in the literary. In this connection, a special effort has been made by the researcher in selecting the method of documentation for different ecosystems *viz.*, different cropping pattern were

Purposively considered for identification and documentation of traditional sorghum varieties. In documentation process, an interview of the respondent was considered as one of the essential method. With this, collected a detailed information on conservation and cultivation aspects of traditional sorghum varieties in the study area. Further, area of distribution of traditional varieties and its common and vernacular names, locality and date of collection, date of sowing were collected. Besides the documented the farmers utilization pattern of traditional sorghum varieties from their socio-economic point of view.

Results and discussion

Table 1: Traditional sorghum varieties grown in North-eastern Karnataka

Common Name	Vernacular/ Local Name
Billi Jola	Gundu tene
	Chapdi Jola
	Maldandi
	Kodmurki
	Belli suli
	Sergandi
	Aralina
	Basavanna mothi
	Seetani
	Kenchu
	Bhogapur
	Raichur
	Kadubina
Kempu jola	
Haseru Jola	Haseru Jola

The number of farmers conserving traditional sorghum varieties in North-eastern Karnataka is explained in Table 2. In Bidar district, four farmers engaged in conservation of five traditional sorghum varieties viz., Chapdi jola, Gundu tene jola, Maldandi jola and Aralina jola. Meanwhile, in Kalaburagi district 11 farmers were found conserving and cultivating of different traditional sorghum varieties such as Gundu tene jola, Maldandi jola, Kenchu jola, Sergandi jola, Kodmurki jola, Basavanna mothi jola, Seetani jola, Holige jola, Kadubina jola and Aralina jola.

In Raichur and Koppal districts four and three farmers found engaged in conservation of traditional sorghum varieties like Gundu tene jola, and Maldandi jola respectively. Whereas, in Ballari district four farmers were conserving and cultivating varieties like Gundu tene jola, Basavanna mothi jola, Bhogapur jola, Raichur jola and Kempu jola. Likewise, in Yadgir district three farmers were conserving and cultivating such as Gundu tene jola and Maldandi jola.

From the above research highlights, it can be inferred that, the maximum number of varieties were identified from Kalaburagi district (10) followed by Bidar (5), Ballari (5), Raichur, Koppal and Yadgir (1 or 2 varieties) in order. The

Gundu tene jola and Maldandi jola was most popular sorghum varieties in all districts.

Another conclusion one can draw in that in Kalaburagi district maximum numbers of farmers are even today engaged in conservation and cultivation of traditional sorghum varieties followed by Bidar. Likewise, in Raichur, Koppal, Ballari, Yadgir districts only few farmers were engaged in conservation of traditional varieties. According to ecological history, in the past these regions had a high diversity of landraces, but due to modern intervention in present scenario and many factors, including introduction of new varieties (M-35), climatic changes, crop duration and yield parameter all these factors were influenced the farmers to shift improved varieties which leads to loss of diversity. The findings from the table 3 were found that agro-ecological conditions and quality are the main considerations in the region to grow the particular type of crop.

Gundu tene jola and Maldandi sorghum varieties are growing in a larger area of land (>500 acres) in all districts of north-eastern Karnataka as expressed by the farmers. It was also revealed that (20 acres) area of Basavanna mothi and Kodmurki (8 acres) sorghum varieties are growing in Kamalpura taluk and Chincholli taluk of Kalaburagi. Whereas equal area (8 acres) of Bhogapur jola and Raichur jola varieties are most commonly cultivating in Hagari Bommanahalli of Ballari district in smaller area.

Likewise, as the part of the survey work of the researcher it was found that the varieties of sorghum i.e., Haseru jola (15 acres) and Chapdi jola (8 acres) are grown in a small area of land in Basavakalayan and Aurad taluks of Bidar district. The Seetani jola (20 acres) is very commonly grown in entire Kalaburagi district whereas Kenchu jola variety are grown in small area of Kalaburagi district. Kempu jola is rarely grown in Ballari and Kalaburagi districts with equal land area of 10 acres.

On the other hand equal (8 acres) area of Belli Suli and Sergandi varieties are most commonly grown in Chincholli taluk of Kalaburagi districts. Two varieties such as Kadubina jola (30 acres) and Aralina jola (30 acres) are grown in lesser area of land i.e., in one acre of land and or border line crop in main crop in all districts of North-Eastern Karnataka.

According to farmers opinion the above observations were made, it can be concluded that annually the traditional sorghum varieties are grown in a smaller plot. But, day by day decrease in cultivating area of the traditional crop varieties, this might be due to lesser productivity of traditional sorghum varieties is less compared to the high yielding varieties (HYVs) and many other factors like crop duration, yield parameter, income and pest and disease incidence. If the situation continues, then within no time, these varieties may get eroded which is composed of this vast genetic wealth.

Table 2: Distribution of farmers according to conservation of traditional sorghum varieties in North-Eastern Karnataka n=30

District	Conservation of traditional sorghum varieties by farmers															
	Haseru	Chapdi	Gundu tene	Maldandi	Kenchu	Sergandi	Kodmurki	Basavanna mothi	Seetani	Holige	Kadubina	Kempu/Seriyola	Aralina	Belli Suli	Bhogapur	Raichur
Bidar	2	1	1	2*	-	-	-	-	-	-	-	-	2*	-	-	-
Kalaburagi	-	-	4	2	2*	1	1*	3	1*	1*	1*	-	3*	1	-	-
Raichur	-	-	2	2	-	-	-	-	-	-	-	-	-	-	-	-

Koppal	-	-	1	2	-	-	-	-	-	-	-	-	-	-	-	-
Ballari	-	-	2	-	-	-	-	1	-	-	-	1*	-	-	1	1
Yadgir	-	-	1	2	-	-	-	-	-	-	-	-	-	-	-	-

* Multiple responses

Table 3: Area and distribution of traditional sorghum varieties in North-Eastern Karnataka as expressed by the farmers n=30

Sl. No.	Variety (jola)	Distribution	Village/ Circle/ Hobli	Taluk	District	Acreage (appr.)
	Gundu tene	Widely growing	-	-	Entire North-Eastern Karnataka	>500
	Chapdi Jola	Small Plots	Tadola	Basavakalayan	Bidar	8
	Maldandi	Widely growing	-	-	Entire North-Eastern Karnataka	>500
	Kodmurki	Small Plots	Ainapura	Chincholli	Kalaburagi	8
	Basavanna mothi	Widely growing	Kamalapura	Kamalapura	Kalaburagi	20
	Belli Suli	Small plots	Chincholli	Chincholli	Kalaburagi	8
	Sergandi	Small plots	Chincholli	Chincholli	Kalaburagi	8
	Seetani	Small plots	-	-	Entire Kalaburagi	20
	Kadubina	Rarely growing	-	-	Entire North-Eastern Karnataka	30
	Aralina	Small plots	-	-	Entire North-Eastern Karnataka	30
	Kenchu	Small plots	Gola, Chittapur	Aland, Chittapur	Kalaburagi	8
	Raichur	Small plots	Hulugondi	Hagari Bommanahalli	Ballari	8
	Bhogapur	Small plots	Hulugondi	Hagari Bommanahalli	Ballari	8
	Kempu	Small plots	Uttangi, Chincholli	Hadagli, Chincholli	Ballari Kalaburagi	10
	Haseru	Small Plots	Tadola Aurad	Basavakalayan Aurad	Bidar	15

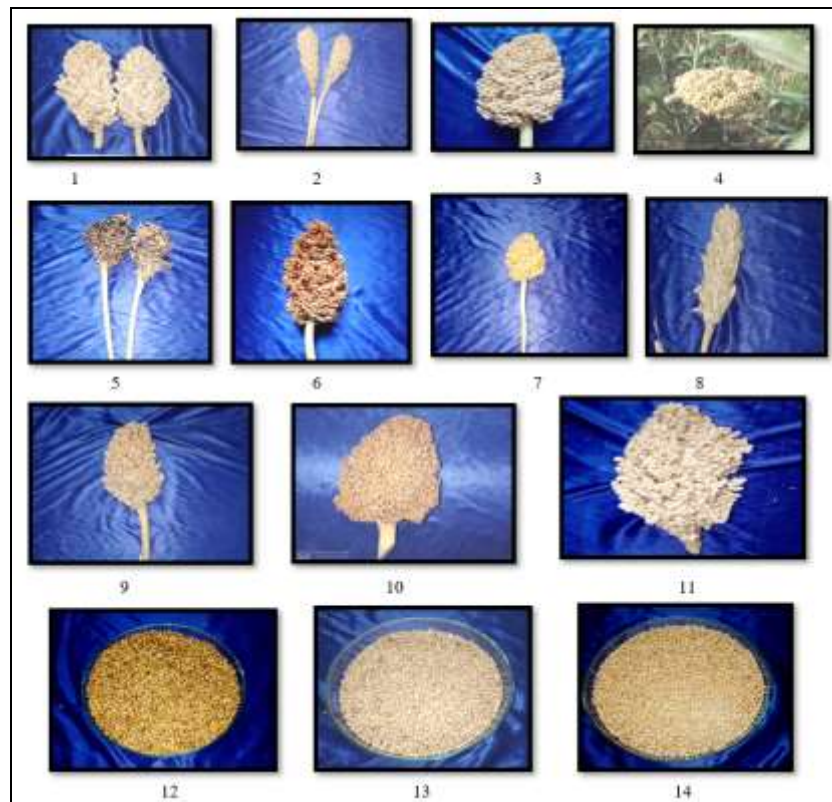


Fig 1

Special feature of traditional sorghum varieties as expressed by the farmers

The findings of results that the special feature of the traditional sorghum varieties as expressed by the farmers were recorded in Table 4. A majority of the farmers grown as major staple food crop sorghum varieties as a main crop viz., Maldandi (93.33 %) and Gundu tene jola (86.67 %) in *rabi* season because these varieties having a special character like softness, high grain, palatable fodder yield and its fodder is also best suitable for hay in the local situation resulted for larger area of its cultivation. Nearly two third of the respondents grow Seetani jola due to

its tender and sweetness of the grains to consume at its milky stage in the form of Seetani (roasted sorghum) and also to confirm the rituals ceremonies offered by the respondents in the locality, in addition to consumed as a snack.

Whereas one third (33.33 %) of farmers are stated that Basavanna mothi which have unique quality for preparation of roti as well as its stover is an important dry fodder resource for large ruminants used in Kamalapura taluk while only one fifth (20.00 %) of farmers mentioned that Haseru jola with the identical feature of medicinal value and becoming extinct because these variety is very popular in

Bidar district only. Similar findings with Mathieu *et al.* [9]. Out of 30 farmers only two farmers were expressed that Belli Suli sorghum variety stalk in form of green fodder is

preferred by large and small ruminants due to its sweetness and high palatable coupled with juicy nature.

Table 4: Special feature of traditional sorghum varieties as expressed by the farmers n=30

Sl. No.	Variety	Special Feature	Frequency*	Per cent
1.	Gundu tene Jola	Dual purposes (consumption +Fodder) High yield	26	86.67
2.	Maldandi	Dual purposes (consumption +Fodder)	28	93.33
3.	Basavanna mothi	Dual purposes (consumption +Fodder)	10	33.33
4.	Seetani Jola	Sweet grain	22	73.33
5.	Haseru Jola	Medicinal value	6	20.00
6.	Belli Suli	Highly palatable and juicy type fodder	2	06.67

*Multiple responses

Some implications

- Farmers showed a deep knowledge of their grown varieties through folk taxonomy. Medicinal uses of sorghum to treat for high sugar level are proven. These characters of sorghum can be explicitly used by pharmaceuticals and crop improvement programs. Hence the government should take a lead in introduction of these land races in nutritive sector to improve the health status of the consumers at large.
- The sustainability of seed conservation depends on capacity building through training at various levels. Hence, there is a need to take up awareness building, development of technical skills and re-orientating motivational activities for farming community and developmental functionaries at all levels for the cause of empowering the farmers.

Conclusion

Crop diversity is the sources for further use in crop improvement programs. Unless these traditional varieties are collected and conserved and protected, we cannot have legal right on these diverse lines. Hence, they need to be registered first with NBPGR and then protect them under Protection of Plant Varieties and Farmers' Rights Act 2001 in India, so that bio-piracy and extinction of these valuable resources, is prevented. There is a huge responsibility on the stakeholders engaged in sorghum research to collect, conserve and protect them in a scheduled timeframe on mission mode basis. Traditional sorghum varieties represent important genetic reservoirs with valuable traits and there is an urgent need to provide proper incentives and encourage the farmers to cultivate sorghum varieties to help in the on-farm conservation for to avoid genetic erosion.

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