

Diversity of Vegetables Marketed During the Pongal Festival in the Tirunelveli District, Tamil Nadu

Saravana Ganthi, A^{1*}, Subramonian, K², Balasubramanian, A²

¹Department of Botany, Rani Anna Govt. College for Women, Tirunelveli, India

²Department of Botany, The MDT Hindu College, Tirunelveli, India

DOI: [10.36348/sjls.2024.v09i06.002](https://doi.org/10.36348/sjls.2024.v09i06.002)

Received: 02.05.2024 | Accepted: 07.06.2024 | Published: 10.06.2024

*Corresponding author: Saravana Ganthi, A

Department of Botany, Rani Anna Govt. College for Women, Tirunelveli, India

Abstract

Fruit and vegetables provide nutrition and food security, income-generating opportunities, ecosystem services, and contribute to cultural identities. Protecting these species, and by extension, demands urgent action. The present study is to understand the diversity of vegetables sold in the markets of Tirunelveli District Tamil Nadu. Field visits were made to the local markets in and around Tirunelveli covering nearly 30 km². A major survey was done at Tirunelveli Town Wholesale Market Complex, Palayamkottai Market complex, and various farmer markets (Ulaver Santhai). A total of 62 species belonging to 41 genera and 19 families were identified in the study. Out of 62 species, 61 belong to angiosperms and 01 to fungi. Cucurbitaceae is the dominant family with 11 species. *Brassica* largest genera share 10 species. Totally 20 species of geophytic vegetables were recorded in the study area. Out of them majority (45% of the species) were monocots, and family Brassicaceae, is dominant with 5 species. The present study concluded with an appeal for sufficient, sustained funding to ensure a global rescue plan for vegetable diversity can shift the research and development agenda to focus on nutrition and well-being.

Keywords: Biodiversity, Geophytes, Sambar, Market, Pongal festival, Vegetables varieties.

Copyright © 2024 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

INTRODUCTION

Harvest festival celebrated by the Tamil community is called Pongal. It's an occasion to give thanks the Sun, Mother Nature and all farm animals that support to a bountiful harvest. Pongal marks the beginning of *Thai*, the Tamil month [1]. Every year, it usually occurs on the 14th or 15th of January. Pongal is also the name of the dish made during this festival. One of the well-known dishes made on Pongal Day is Venpongal [2]. For venpongal, people in Tamil Nadu prepare mixed vegetable sambar (Pongal kuzhambu) in traditional method by using freshly harvested vegetables. In the Kongu region, this sambar is usually made with five or seven distinct types of country vegetables; however, in the districts such as Tirunelveli, Tenkasi, and Tuticorin, this unique sambar is made with as many vegetables as possible. Each region will have its own method of preparing this pongal sambar using coconut, tamarind and dal. It varies according to their custom.

There are about 30,000 edible plants recorded throughout the world, of which 7,000 are cultivated and harvested for food [3], but only a few plant species are

used in the preparation of food in the whole world. Only 30 plant species provide 95% of the world's food [4]. Vegetable biodiversity includes agrobiodiversity. India has made tremendous progress in vegetable production, and ranking second in the world. India produced 204.61 million metric tonnes of vegetables between 2021 and 2022. In 2021–2022, there were 11.28 million hectares for vegetables [5]. Tamil Nadu is one of the leading horticulture states in India contributing 7.7 percent to the national horticultural production with 5.7 percent of the national-level area [6]. During pongal festival week, a variety of vegetables floods the Tirunelveli market. Even though seasonal production, and the perishable character of vegetables, marketing of vegetables is tremendous. Vegetables are marketed through street vendors to large supermarkets. All supermarkets on the street have makeshift stalls outside the main shop to sale vegetables on the eve of the pongal festival. It is a tradition to organize a special Sandhai (market) at the Tirunelveli daily vegetable wholesale market for vegetables. Temporary shops selling the various vegetables were observed, along the road and in market areas witnessed. The trade of vegetables has risen

substantially during the festival. In light of the pongal festival, this study seeks to document the types of vegetables and their varieties marketed, and an attempt has been made to enumerate vegetable plant species with their families, vernacular names and plant parts used. The goal of the present study is to understand the diversity of vegetables sold in the markets during Pongal festival days in Tirunelveli District, Tamil Nadu.

MATERIALS AND METHODS

Study area

Field visits were made to the local markets in and around the Tirunelveli area covering nearly 30 km². Major survey was conducted from Tirunelveli Town wholesale market complex, Palayamkottai market complex, Ambasamudram, Vallioor, Thisayanvilai, Munnirpallam weekly market, Munanjipatti weekly market, Parappadi weekly market, and various Farmers markets (Ulavar Santhai). Vegetables were collected and brought to the laboratory and identified the same using floras. Books such as, Singh *et al.*, [7]; Simpson and Ogorzaly [8] and Wyk [9] were the valuable resources for identification of species. Interviews with vegetable merchants, facilitated by questionnaires, were used to gather data.

RESULTS AND DISCUSSION

Tirunelveli Town Wholesale Market Complex, Palayamkottai Market complex are solely dependent on truck growing. Truck growing is nothing but, the production of crops in large quantities for distant markets such as Madurai and Dindugul. For hilly growing vegetables, such as carrot, cabbage, beetroot, potato etc., Tirunelveli markets depend on Dindugul vegetable wholesale market. Vegetables such as tomato, brinjal, lady's finger, chilly etc. are vegetable growing regions of Tirunelveli and Tenkasi district. During offseason the vegetables also supplied from Andrapradesh and Karnataka.

A total of 62 species belonging to 41 genera and 19 families were identified in the study. Out of 62 species, 61 belong to angiosperms and 01 from fungi

(Table 1). Cucurbiaceae is the dominant family with 11 species. *Brassica* shares 10 species whereas genus *Allium* and *Solanum* represented by 4 species (Table 1), *Dioscorea* and *Cucumis* with each 3 species, *Raphanus*, *Trichosanthes* *Cucurbita* and *Phaseolus* with each 2. Species, remaining genera are represented by one species each. Cucurbitaceous vegetables are dominating with 11 species in the markets of Tirunelveli and it is followed by fabaceae with 09 species each. About 09 families are represented by each one species (Table 1). Fruit vegetables (32) are dominating followed by leafy vegetables in the present study. Some species are having more than one useful part.

The family includes some of the world's most economically important crops, especially members of the genera *Brassica* L. (cauliflower, kale, cabbage, brussels sprouts, kohlrabi, and broccoli) [10].

Geophytic Vegetable in Tirunelveli Market

Geophytes were defined by Raunkiaer [11] as plants with an underground perennation organ and leaves that die back annually. Most of geophytes are occur within the monocotyledon orders and is rarely predominant in eudicot families. Order Asparagales and Liliales of APG system [12] include the majority of important geophytes [13]. True bulbs are absent from eudicot families with the exception of Oxalidaceae [14]. Many scientific papers and trade articles as well as excellent reviews have been published on geophytes [15, 16] Totally 20 species of geophytic vegetables were recorded in the study area (Table 1). The species (24) belonged to 10 families and 13 genera. Out of them majority (45% of the species) were monocots, and family Brassicaceae, is dominant with 5 species. The largest families were the Brassicaceae (5 species), Dioscoreaceae (4 species) and Amaryllidaceae (3 species), The largest genus was *Dioscorea* with 4 species. 5 rhizomatous, 3 bulbous and 5 tuberous plants were recorded in the study area. Genus *Allium* represented by bulb, Genus *Raphanus* represented by fusiform roots and *Dioscorea* represented by rhizome (Table 1).

Table 1: The vegetables available in the markets of Tirunelveli city

Botanical Name	Family	Common name	Tamil name	Useful part
<i>Abelmoschus esculentus</i> (L.) Moench	Malvaceae	Lady's finger	Ventai kay	Fruit
<i>Agaricus bisporus</i> (J.E. Lange) Emil J. Imbach	Agaricaceae	Button mushroom	Mottukalan	Fruit
<i>Allium ampeloprasum</i> L.	Amaryllidaceae	Leeks	Irakuccitam	Leaves
<i>Allium cepa</i> L.	Amaryllidaceae	Onion	Venkayam	Bulbs
<i>Allium cepa</i> L. var. <i>aggregatum</i> G. Don.	Amaryllidaceae	Shallot onion	China venkayam	Bulbs
<i>Allium sativum</i> L.	Amaryllidaceae	Garlic	Vellaipuntu	Bulbs
<i>Amorphophallus paeoniifolius</i> (Dennst.) Nicolson	Araceae	Elephant yam	Karuna kilanku	Corm
<i>Benincasa hispida</i> (Thunb.) Cogn	Brassicaceae	Ash gourd	Sampalpuvani	Fruit
<i>Beta vulgaris</i> L.	Brassicaceae	Beet root	Beet root	Napiform root
<i>Brassica caulorapa</i> (DC.) Pasq.	Brassicaceae	Khol-khol	Nulkol	Underground stem
<i>Brassica oleracea</i> L. var. <i>botrytis</i> L.	Brassicaceae	Cauli flower	Cauli flower	inflorescence

Botanical Name	Family	Common name	Tamil name	Useful part
<i>Brassica oleracea</i> L. var. <i>capitata</i> L. f. <i>alba</i> DC	Brassicaceae	Cabbage	Muttaikosas	Leaves
<i>Brassica oleracea</i> L. var. <i>capitata</i> F. <i>rubra</i>	Brassicaceae	Red cabbage	Sivapu mudaikosu	Leaves
<i>Brassica oleracea</i> var. <i>italica</i> Plenck	Brassicaceae	Broccoli	Broccoli	Inflorescence
<i>Brassica rapa</i> var. <i>rapa</i> L.	Brassicaceae	Turnip	Kocukkilanku	Napiform Roots
<i>Capsicum annum</i> L	Solanaceae	Chillies	Milakay	Fruit
<i>C. annum</i> var. <i>grossum</i>	Solanaceae	Sweet pepper capsicum	Milakay	Fruit
<i>Citrus limon</i> (L.) Burm.f.	Rutaceae	Lemon	Elumiccau	Fruit
<i>Coccinia grandis</i> (L.) Voigt	Cucurbitaceae	Ivy Gourd	Kovvai	Fruit
<i>Cocos nucifera</i> L.	Arecaceae	Cconut	Tenkay	Fruit
<i>Coleus parviflorus</i> L	Lamiaceae	Chinese potato	Serukilanku	Tuber
<i>Colocasia esculenta</i> (L.) Schott.	Araceae		Shamakilangu	Corm
<i>Coriandrum sativum</i> L.	Apiaceae	Coriander	kottamali	Leaves
<i>Cucumis melo</i> L	Cucurbitaceae	Ogen Melons	Mithukay	Fruit
<i>Cucumis sativus</i> L.	Cucurbitaceae	Cucumber	Velari	Fruit
<i>Cucumis sativus</i> L. var. <i>angaria</i>	Cucurbitaceae	Gherkin	Velari	Fruit
<i>Cucurbita maxima</i> Duchesne	Cucurbitaceae	Pumpkin	Pusani	Fruit
<i>Cucurbita moschata</i> Duchesne	Cucurbitaceae	Pumpkin	Pusani	Fruit
<i>Cyamopsis tetragonoloba</i> (L.) Taub.	Fabaceae	Cluster beans	Kottavari	Fruit
<i>Daucus carota</i> L.	Apiaceae	Carrot	Kerat	Conical root
<i>Dioscorea alata</i> L.	Dioscoreaceae		SivapuVallikilanzhu	Rhizome
<i>Dioscorea bulbifera</i> L.	Dioscoreaceae		Kaachalkizhangu	Rhizome
<i>Dioscorea esculenta</i> (Lour.) Burkill.	Dioscoreaceae		Valli kilanzghu	Rhizome
<i>Dioscorea rotundata</i> Poir.	Dioscoreaceae		Karunai Kilanzhu	Rhizome
<i>Glycine max</i> (L.) Merr.	Fabaceae	Soya bean	Soya bean	Fruit
<i>Ipomoea batatas</i> (L.) Lam	Convolvaceae	Sweet potato	Chinikilanku	Starchy Tuber
<i>Lablab purpureus</i> (L.) Sweet	Fabaceae	Country/Garden beans	Avari	Fruit
<i>Lagenaria siceraria</i> (Molina) Standl.	Cucurbitaceae	Bottle Gourd	Surakay	Fruit
<i>Luffa acutangula</i> (L.) Roxb.	Cucurbitaceae	Ribbed/Ridged Gourd	Pirkkankay	Fruit
<i>Mangifera indica</i> L.	Anacardiaceae	Mango	Mankay	Fruit
<i>Manihot esculenta</i> Crantz.	Euphobiaceae	Tapioca	Maravalikilanku	Tuber
<i>Mentha arvensis</i> L.	Lamiaceae	Mentha	Puthuina	Leaves
<i>Momordica charantia</i> L.	Cucurbitaceae	Bitter Gourd	Pakarkay	Fruit
<i>Momordica cymbalaria</i> Hook. f.	Cucurbitaceae	Athalai Kai	Pakarkay	Fruit
<i>Moringa oleifera</i> Lam.	Moringaceae	Drumstick	Murukaikay	Fruit
<i>Murraya koenigii</i> (L.) Sprengel	Rutaceae	Curry leaves	Karuvepilai	Leaves
<i>Musa paradisiaca</i> L.	Musaceae	Plantain	Valakaikay	Unripe Fruit, flower, Pseudostem
<i>Phaseolus lunatus</i> L.	Fabaceae	Butter bean	Butter beans	Fruit
<i>Phaseolus vulgaris</i> L.	Fabaceae	Common Beans	Beans	Fruit
<i>Pisum sativum</i> L.	Fabaceae	Peas	Pattani	Fruit
<i>Raphanus caudatus</i> L.	Brassicaceae	Rat-tail radish	Mulankki	Fusiform root
<i>Raphanus sativus</i> L.	Brassicaceae	Radish	Mulankki	Fusiform root
<i>Sechium edule</i> (Jacq.) Sw.	Cucurbitaceae	Cho-Cho	Koccakay	Fruit
<i>Solanum lycopersicum</i> L.	Solanaceae	Tomato	Thakali	Fruit
<i>Solanum melongena</i> L.	Solanaceae	Brinjal	Katharikay	Fruit
<i>Solanum torvum</i> Sw.	Solanaceae	Turkey berry	Sundai	Fruit
<i>Solanum tuberosum</i> L.	Solanaceae	Potato	Urulaikilanku	Tuber
<i>Trichosanthes cucumerina</i> L.	Cucurbitaceae	Snake Gourd	Putalailankay	Fruit
<i>Trichosanthes dioica</i> Roxb.	Cucurbitaceae	Pointed Gourd	Putatalikay	Fruit
<i>Vicia faba</i>	Fabaceae	Broad beans	Avarai	Fruit
<i>Vigna unguiculata</i> ssp. <i>cylindrica</i> (L.) Verdc.	Fabaceae	Cow pea	Karamani	Fruit
<i>Zingiber officinale</i> Rosc.	Zingiberaceae	Ginger	Enchi	Rhizome

The study area, which has a long tradition in vegetable growing, is particularly rich in local vegetable varieties, obtained by farmers themselves after repeated simple selection procedures generation after generation.

Nowadays this richness could meet the needs of specific or niche markets, such as those characterized by the demand for local products, obtained with environmentally friendly farming techniques.

Table 2: The varieties of vegetables available in the Tirunelveli District

S. No	Vegetable	Varieties
1.	Mango	Neelum, Alphonso, Rumani, Mallika, ArkaAruna
2.	Banana	Rasthali, Vayalvazhai, Poovan
3.	Acid lime	PKM 1, Vikram, Rasraj, Phule Sharbathi
4.	Tomato	TNAU Tomato Hybrid CO 3PKM 1, PUSA
5.	Brinjal	CO 1, CO 2, MDU1, PKM1, PLR1, KKM 1, COBH 2
6.	Bhendi	Arka Anamika, COBH 1, CO 3
7.	Chilli	CO 3, CO 4, PKM 1, Chilli Hybrid CO 1, PLR 1
8.	Capsicum	Arka Gaurav, Arka Mohini
9.	Pumpkin	F1 hybrid, Puas Viswas, Ambili
10.	Snake gourd	CO 2, PKM 1, CSgH 1
11.	Ribbed gourd	CO 1, Hybrid: Ridge gourd COH1
12.	Bottle gourd	Pusa Megdoot, TNAU Bottle gourd Hybrid CO1
13.	Bitter gourd	CO 1, ArkaHarit, Hybrid: COBgoH1
14.	Ash gourd	CO 1, CO 2, TNAU Ash Gourd Hybrid CO 1
15.	Cucumber	Poinsette, Hybrids: KPCH 2, Pant C 2
16.	Cluster bean	Pusa Mausmi, Pusa Sadabahar
17.	Cowpea	PKM 1 and Arka Garima
18.	Dolichos bean	CO 6, Arka Jay and Arka Vijay
19.	French bean	Ooty (FB) 2, Ooty 3
20.	Broad beans	SWS 1 BR
21.	Peas	Ooty 1, Bonneville
22.	Moringa	PKM 1 and PKM 2.
23.	Cabbage	Golden Acre and Pusa Drum Head
24.	Cauliflower	Ooty 1, Early Synthetic, Pawas
25.	Carrot	Ooty-1, Pusa Kesar
26.	Radish	White Icicle, Rapid Red White Tipped
27.	Beetroot	Ooty 1, Red Ball
28.	Potato	Kufri Jyoti, Kufricinraj
29.	Sweet potato	CO 3, CO - CIP 1, IGSP-14
30.	Elephant foot yam	Gajendra, Sree Padma
31.	Taro	CO 1, Sree Rashmi, Sree Kiran
32.	Dioscorea (<i>D. alata</i>)	CO 1, Sree Shilpa.
33.	Siruvalli (<i>D. esculenta</i>)	Sree Latha, Sree Kala.
34.	Chinese potato	CO 1, Sree Dhara
35.	Onion - small onion	CO 1, CO 4 and MDU 1
36.	Big onion or common onion	Bellary Red, Arka Niketan, Arka Kalyan





Fig 1: Vegetables marketed in Tirunelveli

DISCUSSION

Agriculture marketing is one of the leading strategies for the economic development of developing countries like India. The present study recorded three different types of marketing channels for vegetables. The most important channels for the distribution of vegetables are; Channel 1. Producer – Wholesaler - Retailer – Consumer, channel 2: Producer – Wholesaler – Consumer and Channel 3: Producer- village merchant-Commission agent cum wholesaler- Retailer – Consumer. The study also observed that in farmer markets (Ulavar Santhai), the marketing supply chain starts from producer (farmer) to consumer. Similar observations were recorded in several research articles for vegetables across an extensive range of marketing supply chains [17-22].

Among the various vegetables, brinjal or eggplant display a wide range of fruit shapes and colours. The shapes range from oval or egg-shaped to long club-shaped. The colour varied from white, yellow, green, bicour through degrees of purple pigmentation to almost black. The green brinjal (PPI (B)), Purple brinjal (PPL), and long brinjal (Pusa purple long) are available only during Pongal festival week. The varieties such as, PKM 1, KKM 1, CO.1, and CO.2 are marketed throughout the year. The capsicum varieties Arka Gaurav and Rapid Red White Tipped radish are also available during the festival week only. *Capsicum frutescens* and *C. annum* var. *grossum* (sweet pepper capsicum) are common capsicum varieties. Chilly varieties CO.3, CO.4, and Hybrid Chilli CO 1 are common when compared with PLR 1. Similarly, *Coleus parviflorus*, *Allium ampeloprasum*, *Brassica rapa* var. *rapa*, *Brassica caulorapa*, *Momordica cymbalaria*, *Dioscorea esculenta*, *Dioscorea bulbifera* and *Dioscorea alata* are marketed in plenty during the pongal festival. These vegetables are not marketed in other months. The availability of *Moringa oleifera* is less during the festival season, but its availability is plenty from March to September. This is due to the low yield during the North West monsoon season in Tamil Nadu.

In India, most of the festivals herald the beginning of a particular season and the new harvest. In Ranbhaji' festival at Canacona, Goa, around 225 items prepared from over 42 types of forest or wild vegetables known to have high medicinal value and rich in fibre. Such wild vegetables are available only during the monsoon. Bihu is the most important festival in Assam.

The first day of the Bohag Bihu is called Goru (cow) Bihu, and on that particular day, people collect 101 plant species, which are locally known as Akhoh ata sak, and prepare recipes in the evening [23]. Pongal is an agriculture-based festival, celebrated with custom, tradition, and religious festivity. In the study area, during the Pongal festival 62 types of vegetables will be available for the people. All the invaluable different varieties of vegetables are offered to God before the preparation of the special recipe. This festival is celebrated continuously for three days. People make a vegetable recipe on the first day of the festival. The significance of the preparation of this kind of recipe on the first day of the Tamil month "Thai" is the consumption of different vegetables containing many phytochemicals will help to protect against diseases. Agriculture is the major occupation in the study area, and this festival signifies the agricultural-based system of society in Tamil Nadu.

Vegetables are rich in micronutrients and present an astonishing diversity of forms, tastes, and colors, adapted to myriad environments. Vegetable biodiversity is part of agrobiodiversity, underpinning diverse food production systems for both local and global economies and contributing significantly to worldwide health and nutrition [24]. About 1100 vegetable species are recognized worldwide [25]. Vegetable varieties grown by people are part of a cultural heritage with unique tastes and histories [26]. Vegetable biodiversity continues to decline in farmers' fields and natural ecosystems [27] in line with the rapid global decline in biodiversity [28]. Earlier people used to survive and live healthy by consuming indigenous vegetables, which is now forgotten even in the villages. This pongal festival brings awareness about the lesser known vegetables.

Poorly conserved and largely undocumented

Wild relatives of vegetables the source of traits for heat and drought tolerance, pest and disease resistance, color, shape, taste, nutrients, yield and more are poorly represented in gene banks. About 39% of 883 wild fruit and vegetable relatives require urgent conservation and 58% are a medium priority for protection. Only 3% can be considered well-conserved. Better documentation and mapping of genetic variation in fruit and vegetable traits, especially traits related to nutritional quality, will greatly enhance development of varieties suited for specific purposes.

Acknowledgement

We thank Principal, Rani Anna Government College for women, Tirunelveli for providing laboratory facilities and guidance.

REFERENCES

- Santhiya, V. (2022). Important festivals of the Krishnavakka community - A study. *International Journal of Food and Nutritional Sciences*, 11(12), 596-601.
- Sahaya Mary, C., & Asha, D. R. (2022). Traditional cuisine used during harvest festivals in India. *International Journal of Multidisciplinary Research and Development*, 9(9), 77-82.
- Khoshbakht, K., & Hammer, K. (2008). How many plant species are cultivated? *Genet Resour Crop Evol*, 55, 925-928.
- GFU. (2007). Inviting all the World's Crops to the Table. Rome, Italy, Global Facilitation Unit for Underutilized Species (GFU) in cooperation with Bioversity International (www.underutilized-species.org/Documents/PUBLICATIONS/Inviting_all_the_worlds_crops_to_the_table.pdf).
- Sandeep Gautam., Rohit Kumar., & Sachin Kumar Verma, (2023). Marketing of Horticultural Crops: Fruits and Vegetables, *Agriallis*, 5(2), 60-63.
- Abdul Raheem, A., Kesavalu, K., & Asokan, R (2019). Market structure for sale of vegetables and fruits seeds in Tamilnadu: a micro level study. *Indian Journal of Applied Research*, 9(5), 58-59.
- Singh, U., Wadhvani A. M., & Johri, B. M. (1983). *Dictionary of Economic Plants in India*. Indian Council of Agricultural Research, New Delhi.
- Simpson, B. B., & Ogorzaly, M. C. (2001). *Economic Botany: Plants in Our World*, 3rd ed., McGraw-Hill.
- Wyk, B. E. V. (2005). *Food plants of the world*. Timber press, USA.
- Al-Shehbaz, I. A., Beilstein, M. A., & Kellogg, E. A. (2006). Systematics and phylogeny of the Brassicaceae: an overview. *Plant Systematics and Evolution*, 259, 89-120.
- Raunkiaer, C. D. (1934). *The life forms of plants and statistical geography* Claredon, Oxford 632p.
- APG, (The Angiosperm Phylogeny Group) III. (2009). An update of the angiosperm phylogeny group classification for the orders and families of flowering plants: APG III. *Bot J Lin Soc*, 161, 105-121.
- Dahlgren R. M., Clifford, H. T., & Yeo, P. F. (1985). *The families of the monocotyledons: structure, evolution, and taxonomy*. Springer-Verlag, Berlin.
- Oberlander K. C., Emshwiller, E., Bellstedt D. U., & Dreyer, L. L. (2009). A model of bulb evolution in the eudicot genus *Oxalis* L. (Oxalidaceae). *Molecular Phylogenetics and Evolution*, 5(1), 54-63.
- De Hertogh, A. (1996). *Holland bulb forcer's guide*. 5th Edn, Hillegrim. The Netherlands, The International Flower bulb centre and The Dutch Bulb exporters association.
- Hanks, G. R. (2002). *Narcissus and Daffodil; the Genus Narcissus*, London, Taylor and Francis.
- Sidhu, R. H., Kumar, S., Kamal, V., & Singh, P. (2010). Supply Chain Analysis of onion and Cauliflower in Punjab. *Agricultural Economics Research Review*, 23, 445-453.
- Sudha, M., Gajanana. T. M., Murthy, S. D., & Dakshinamoorthy, V. (2002). Marketing practices and post-harvest loss assessment of pineapple in Kerala. *Indian Journal of Agricultural Marketing*, 16(1), 56-65.
- Zulfiqar, M., Khan, D., & Bashir, M. (2005). An assessment of marketing margins and physical losses at different stages of marketing channels for selected vegetable crops of Peshawar Valley. *Journal of Applied Sciences*, 5(9), 1528-1532.
- Murthy, D. S., Gajanana, T. M., Sudha, M., & Dakshinamoorthy. (2007). Marketing Losses and their impact on marketing margins: A case study of banana in Karnataka. *Agricultural Economics Research Review*, 20, 47-60.
- Pandey, D., Kumar, A., & Singh, R. (2011). Marketing of sweet orange (MALTA) in Kumaon region of Uttarakhand. *Journal of Recent Advances in Applied Sciences*, 26, 6-11.
- Gangwar, L. S., Singh, D., & Singh, D. B. (2007). Estimation of post - harvest losses in Kinnow Mandarin in Punjab using a modified formula. *Agricultural Economics Research Review*, 20, 315-331.
- Samim, S. B., & Rajib, G. (2007). Herbal recipe prepared during Bohag or Rongali Bihu in Assam. *Indian Journal of Traditional Knowledge*, 6(3), 417-422.
- Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S., ... & Murray, C. J. (2019). Food in the Anthropocene: the EAT-Lancet Commission on healthy diets from sustainable food systems. *The lancet*, 393(10170), 447-492.
- Meldrum, G., Padulosi, S., Lochetti, G., Robitaille, R., & Diulgheroff, S. (2018). Issues and prospects for the sustainable use and conservation of cultivated vegetable diversity for more nutrition-sensitive agriculture, *Agri*, 8, 112.
- Dwivedi, S., Goldman, I., & Ortiz, R. (2019). Pursuing the Potential of Heirloom Cultivars to Improve Adaptation, Nutritional, and Culinary Features of Food Crops. *Agronomy*, 9, 441, 2-21.
- Pilling, D., Bélanger, J., & Hoffmann, I. (2020). Declining biodiversity for food and agriculture needs urgent global action. *Nat Food*, 1, 144-147.
- Díaz, S., Settele, J., Brondízio, E. S., Ngo, H. T., Agard, J., Arneth, A., ... & Zayas, C. N. (2019). Pervasive human-driven decline of life on Earth points to the need for transformative change. *Science*, 366(6471), eaax3100.