

Also worth considering is introduction of other useful but at present not so popular spices and herbs like chives, lavender, anise, dill, rosemary, oregano, sage,

marjoram, thyme etc as they help in diversifying our spices production and introducing them to non traditional areas too.

Germplasm Introduction in Tropical and Sub-tropical Vegetables in South Asia—Achievements and Opportunities

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It is well understood that while adaptability is a set of characters specific to a particular region or agro-climate, the attributes related with yield and sustainability (stress resistance) have to be pooled from diverse sources which highlights the need of introductions. Among South Asian countries, India is the most privileged nation having almost all sorts of agro-climates, a large area under undisturbed / partially disturbed forests as reservoir of variability, and a large group of tropical and sub-tropical vegetables having maximum diversity and distribution. The existing variability is getting depleted irrespective of the national boundaries with the adoption of only few high yielding genotypes most suited to present day conditions of a particular region. The ill effects of this are now well known, due to fast narrowing of genetic base of varieties getting prone to biotic and abiotic stresses fast. This situation warrants for continued interchange and recombination of plant improvement material, particularly in South Asian countries where a good number of vegetables are grown and farmers are the most important partners of the population.

In India, introductions date back to times even before Christian era as 'Alabu' (bottle gourd, native of Africa), 'Kalinga' (watermelon native to Africa), 'Palandu' (onion native to Central Asia) and similar other types have been described in ancient literature. Adaptation has also effected change in habit of introduced crops viz., cauliflower from temperate Western Europe has given birth to types suitable for warm and humid conditions of North India, the temperate 'long day' perennial onion has been adapted to subtropical / near tropical 'short day' conditions of Maharashtra and Karnataka, respectively as an annual. Chilli introduced in 15th century has now many variable adapted forms. Temperate

garden peas have now variants that are successfully grown in warm and humid western Maharashtra and eastern Madhya Pradesh. The resistance to various biotic factors in plant material introduced from countries / regions devoid of such stresses have helped in developing resistant commercial varieties in many crops. Similarly introductions have also helped in developing cold-set and hot-set varieties in crops like tomato which has facilitated tomato cultivation even beyond the specific growing seasons. Some of the important examples of direct introductions are Sioux, Labonita, Marglobe and Roma in tomato; Asahi Yamato, New Hampshire Midgut and Sugar Baby in watermelon; Pusa Chetaki in radish and many varieties in sweet potato. Similarly, introductions have also led to the development of many outstanding vegetable varieties. Some examples may be cited as Pusa Ruby, Pusa Early Dwarf, Punjab Chuhara and HS 101 in tomato; Punjab Padmini, Parbhani Kranti and Pusa A-4 in okra; Arka Manik and Pusa Bedana in watermelon; Pusa Sharbati and Punjab Sunehri in muskmelon; Pusa Sunehri in sweet potato; Pusa Kesari and Pusa Meghali in carrot; Pusa Himani in radish and several others.

With the globalization now world has become one big market. Competitiveness has increased and we have to produce to the needs of other nations as per their requirement also. As such, more attention is needed towards collection and utilization of genetic variability for sustainable production of quality vegetables. Exchange of plant material between South Asian countries will also enrich one another and help in development. India has rich diversity- both wild and cultivated types- in crops like ridge gourd, egg plant and also in cowpea, okra, tomato, chilli, watermelon etc. which can be utilized

by other South Asian countries. Similarly, resistant sources for leaf curl virus in chillies; bacterial wilt in brinjal; powdery mildew in melons, etc. are available in primitive types, land races and wild forms in India and can be utilized for breeding resistant varieties.

Introductions in vegetable crops in present days are needed for developing tomato varieties with stress resistance, nutritional and processing qualities; chilli varieties for hot conditions and suitability for export; brinjal varieties for heat tolerance (for fruit-set) and resistance to bacterial, viral and phytoplasmal diseases; watermelon and muskmelon varieties suitable for transport, storage and disease and insect (fruit-fly) resistance; bitter gourd and long melon with fruit-fly resistance; sweet potatoes with long neck and resistance to weevil, etc.

Cultivated types with wider adaptability and higher productivity, processing quality and stress resistance will still form the major thrust in introductions. Besides wild related forms having resistance against one or more biotic/abiotic stresses need to be introduced for developing pre-breeding material where crossability is difficult or else for direct utilization in developing commercial varieties. An integrated gene management strategy has to be developed in each mandate vegetable crops. In addition to varieties, new vegetable crops also need to be introduced, particularly for improved nutrition,

value addition and export. Even exchange of elite germplasm among South Asian countries can help a lot in boosting production of tropical and sub-tropical vegetables as experienced in one of the SAVERNET programmes on varietal evaluation.

In agricultural terms, the richest country is one that has maximum bio-diversity. During earlier days bio-diversity was considered a common heritage of mankind and introductions used to be a free and frequent activity. Global conventions during recent years have altered the concept. Now bio-diversity is the sovereign property of the nation in whose political frontiers it occurs, and as such, the introduction of germplasm now involves certain procedures, commitments and cautions. Further, as suggested by Dr. MS Swaminathan, concerned public institutions should create novel genetic combinations under well-designed pre-breeding program and through participatory breeding involving grass-root farmer breeders, get the novel genetic traits for resistance to biotic and abiotic stresses incorporated in to locally adapted varieties. This will ensure ecological, economic and social sustainability as well. Vegetable cultivation in this part of the world is mainly practiced by women and the adoption of the suggested strategy may not be difficult.

Temperate Vegetables: Germplasm Resources, their Utilization and Achievements in India

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The diverse climatic conditions in large number of vegetable crops. Vegetable crops are classified into two major groups according to its temperature requirement namely tropical and temperate. Temperate vegetable crops need chilling temperature (4-7°C) for about 2 months for changing their vegetative phase into reproductive phase. The different pockets in the Hindukush Himalayas namely Humid Western and Eastern Himalayan Region comprising J&K, H.P., Uttarakhand, NE states have congenial climate for seed production of temperate vegetable crops. The history of germplasm introduction

in respect of temperate vegetables and their breeding dates back prior to second world war when seeds of all the temperate vegetable crops were imported from abroad mainly from England by seed company e.g. M/s Suttons & Sons. Later Imperial Govt. in India established a research station at Quetta (Baluchistan) in 1942-43 which went to Pakistan after independence and subsequently Govt. of India set up a Central Vegetable Breeding Substation at Katrain in Kullu valley in H.P. in 1949 that was transferred to IARI in 1955 in order to strengthening the improvement work on temperate