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Status of floriculture in Sikkim

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Abstract

Sikkim is a very small hilly state in India and located in the Eastern Himalayas with rich biodiversity and formidable physical features. More than 64% of the population of Sikkim depends on Agriculture for their livelihood directly or indirectly. Sikkim is home to around 5,000 species of flowering plants. Main flower which are grown in commercial manner are Cymbidium Orchids, Carnation, Anthurium, Gladiolus, Lillium, Gerbera etc. Climatic advantage coupled with a skilled workforce gives Sikkim a definite edge in the business of floriculture. Realizing the potential of this sector, many budding entrepreneurs are taking up floriculture. It has good potential to develop as state for the leading producer of special and geographically suitable flowers, which have potential to grab the international market. State Government also has positive response for the development of this sector. Just need is to start cultivating flowers in a commercial manner. Instead of having natural advantage, floriculture is not flourished as it should to be. There are many concerns for this sector to develop. As such need is to have good infrastructure facility as per need of floricultural development and the ultimate concerns for floriculture entrepreneurs is to access market easily. This study tried to showcase the scenario of floriculture especially cut flowers of Sikkim and its economic prospect and the situation of marketing system.

Keywords: Floriculture, diversity of Sikkim, marketing system

Introduction

Floriculture is the branch of horticulture that deals not only with the cultivation of flowering and ornamental plants but also their marketing. Floriculture has blossomed into commercial activity with a considerable growth and crop diversification option, particularly for small farmers over the past three decades. Demands for floriculture product are steadily increasing both in the domestic as well as export markets. India has made significant improvement in the production of flowers, particularly cut flowers, which have good potential for export. About 248.51 thousand hectares area was under Cultivation in floriculture in 2014-15. Productions of flowers are estimated to be 1,685 thousand tonnes loose flowers and 472 thousand tonnes cut flowers in 2014-15 (NHB data base, 2014-15). The county has exported 22,518.58 MT of floriculture products to the world for the worth of Rs. 479.42 crores in 2015-16.

Floriculture Prospect in Sikkim

Sikkim has a comparative advantage in being a small natural resource rich state whose benefits should be harnessed for environmentally sound and sustainable development (Lama eds.; 2004) [6]. It is existing in high altitude, medicinal plants and floral wealth have great potential for cultivation, value addition and commercialization in the state.

Sikkim with only 0.2 percent of the geographical area of the country shelters around 25 percent of the flowering plants of India. Just by exploring 70 percent area of state, it appears that 10 largest plant families of Sikkim account for around 40 percent of the flowering plants of the state. The region is also rich in endemic as well as plants restricted to the eastern Himalayas. The state supports luxuriant tropical, temperate and alpine vegetation in its most pristine and virgins formal. Its unique geographical position, varied topography, high annual precipitation, minimum demography pressures make the area one of the rich botanical treasure houses of the country. The vegetation of Sikkim can be broadly classified into the tropical, sub-tropical, temperate and alpine types (Singh and Chauhan, 1998; Lama *et al.* 2004) [9, 6]. The climate of Sikkim is conducive for growing a large number of high value

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cash crops. Even Sikkim has been declared as an Agro-Export zone with focus on floriculture (Lama *et al.* 2004)^[6].

Geographical Congenial for Floral Development

Agro climatology of the North East (includes Sikkim) is much suitable for commercial floriculture and Ornamental horticulture. The region has great potential to become one such hub of commercial floriculture that can be comparable to Holland/Netherlands (world largest market cum exporter of floral product) due to its climate. The need for providing artificial cooling can be done away with due to its mild climate round the year. Almost all the hilly states of the region have favourable climatic condition for commercialization of flower cultivation (Mishra and Misra, 2008)^[7]. The geographical location of Sikkim, which allows it to do away with artificial temperature controls for growing flowers, is expected to give it production cost advantage over other flowers (specially orchid) growing nations like Holland and Australia (Boshale, 2007)^[3].

Floristic Diversity of the Sikkim Himalayas

Presences of around 4500 species of Angiosperms (flowering plants) clearly indicate the floristic diversity of this Himalaya State. The country harbours 17,500 Angiosperms out of 2, 50,000 species of the world constituting about 7%; out of which the state (Sikkim) harbours about 25.17% of the country. Further, the state harbour 350 Gymnosperms (ferns and fern-allies) against the national record of only 64 species so far. Gymnosperm's world wealth is about 750 species, of which 46.67% is available in Sikkim. The region harbours a number of primitive taxa like *Exbucklandia*, *Houttuynia*, *Magnolia*, *Michelia* and several species of *Annonaceae*, *Myrsinaceae*, *Piperaceae*, *Lauraceae* etc. An analysis of ten dominant families of flowering plants and of gymnosperms present in Sikkim further throws lights on floristic richness. *Orchidaceae* is the most dominant family with 515 species in Sikkim (J. R. Subba, 2002)^[10].

Climate

The climate of a locality is the synthesis of day to day values of the meteorological parameters like precipitation, temperature, humidity, sunshine and wind velocity. The climate of a place is mainly governed by the following factors *viz.* latitude, longitude, position to large scale atmospheric circulation pattern like monsoon, local geographical features like forest vegetation and position relative to continents and oceans (Bandyopadhyay and Singh, 1998; Lama eds. 2004)^[9, 6].

Sikkim is a land of great climatic contrast within very short distances. Latitudinally, the basin is located within the sub-tropical climatic regime. But due to the presence of high mountains, here one can experience climates as varied as temperate, alpine and even arctic type (Chaudhury, 1998)^[4]. It has its own climatic peculiarities caused by its geographical location, relief and altitudinal variation. As such, temperature conditions vary from sub-tropical in the southern lower parts to cold deserts in the snowy north. It is the most humid place in the whole of the Himalayan range because of its proximity to the Bay of Bengal and direct exposure to the effects of the moisture laden southwest monsoon (Lama *et al.* 2004)^[6].

The State has a unique horseshoe type of physical feature, varied altitudinal zonation starting from alpine meadows to

hot tropical valleys. The Sikkim Himalaya in particular possesses the maximum variation in the macro-climatic environments. The hot tropical valley penetrates deep inside the heart of the mountainous state with warmer southern and cooler northern aspects.

This nature of climatic condition is suitable for many thousands of flowering plant on which numerous contemporary commercial crops are also suitable to grown and seize locational advantage.

Soil

Lama *et al.* (2004)^[6] quoted the Planning Commissions' (1981) statement that Sikkim enjoys a wide range of climates, physiography, geology and vegetation that influence the formation of different kinds of soils. In accordance with the physiographic sequence and terrain features, soils of Sikkim are in general acidic in reaction due to heavy rainfall and leaching of bases from surface soil to low horizons. They are somewhat excessively drained, coarse-loamy and fine-loamy in texture.

Natural variation of climatic conditions and wide range of parent materials involved in the soil formation of Sikkim have resulted in the development of acidic soils of diverse nature. Among the four districts of Sikkim, the frequency of soil samples having pH less than 5 are 50 percent in North Sikkim and in other districts it is below 12 percent (Bhutia *et al.* 1985; Lama *et al.* 2004)^[2, 6]. Flowers which are grown in Sikkim as a commercially is highly supported in such conditions and nature of soil.

Contemporary Development of Floriculture in Sikkim

Indian floriculture is mostly in small scale and unorganized in nature. In different parts of the country, mainly small and marginal farmers are engaged in cultivation and production of floricultural products. Sikkim as a Himalayan state has high possibility for floriculture activity is in small scale.

Floriculture which is fast emerging as vibrant sector in bio diversity hot spot of Northeast India (Singh, 2013). It has a high potential as demand in India and abroad would continue to grow. The state (Sikkim) produces varieties of orchids, gladioli, anthuriums, rhododendrons, lilies, gerbera, *alstroemeria*, rose etc. Commercial cultivation is rapidly picking up (Sikkim Development Report, 2008). There is a good scope for commercial floriculture. The important factors which decide the scope for Commercial Floriculture are Soil, Climate, labour, Transport and Market. In context of soil and climate of Sikkim, it has advantage but for the transport and market need to concern. Even governmental policies are also on positive direction to make it as an alternative livelihood source.

Sikkim Organic Mission and Floriculture

After the merged with Indian territory as 22nd state, Sikkim followed the intensive agriculture by adopting the regional concept of agricultural development and divided the State in 9 regions and 7 sub-regions each having seed multiplication farms for seed multiplication and distribution to the farmers. A large number of improved and hybrid seeds were introduced for cultivation. Use of fertilizer and pesticides was at the maximum during this period. A number of improved and hybrid livestock were also introduced leading to intensive agriculture with mixed farming. As result, the sloppy lands of mountainous Sikkim were eroded, natural

resource base depleted, and productivity declined (Subba, 2008).

He continued to mention that the state government realized the Sikkim being a mountainous region has no scope for intensive agriculture. Hence, the policy of organic agriculture was adopted. This facilities low/slow use of natural resource-base and also provides ample scope for conservation and regeneration of natural resources. Thus, the state has adopted stall-fed livestock and precision farming with green house cultivation, drip irrigation, organic composting for growing organic high value horticultural crops based on regional advantage.

Sikkimese farmers are much more conscious about the use of manure than those in other parts of the country. Organic matter in one form or other has long been used to rejuvenate soil fertility. To the maximum extent their farming systems rely upon crop rotation, crop residues, animal manures. Organic manures have profound influence on soils physical, chemical and biological properties affecting its capacity to hold as well as release nutrients (Lama *et al.* 2004)^[6].

The impact of chemical fertilizers, machinery and diesel fuel energies on yield were estimated statistically non-significant with a negative sign as found by Banaeian and Zangeneh (2011)^[1] on their study of Walnut orchard of Iran. In case of Sikkim, this indicate that the way agriculture development is taking place has tremendously appreciative without using all above factor (inorganic) for sustaining and consistent production function.

Once Chief Minister Pawan Kr. Chamlin reported that “Sikkim is promoting floriculture in the state as an alternative livelihood among the educated youth with free infrastructure, planting material and technology to cultivators to develop cut flower varieties. It is becoming a profession because we plan to make Sikkim an organic state by 2015. It will be the only state to grow flowers organically”. This have good prospects in local, national and global market when, people are more conscious about health disease caused by inorganic substances. This has advantage as Lahiri *et al.* (2001) pointed out that the current low chemical, fertilizer and pesticide use can be converted to an advantage by promoting organic farming and building up a brand, for floricultural development without the use of inorganic substances.

Sikkim has become India’s first fully organic state by converting around 75,000 hectares of agricultural land into sustainable cultivation by 2016.

State Government Approach

As per the research and findings study reserved to state that government of Sikkim is main factor for the development of commercial floricultural activity in Sikkim for to encourage the farmers to grow flower government provides variety of opportunity. It can be listed out like training, providing infrastructure (Green House), seeds, organic medicine and even to an extent marketing with the help of SIMFED (Sikkim Marketing Federation).

Sikkim is destination for floriculture development it’s because as Misra (2013)^[8] stated in article that it is worth to notice the efforts which has been led by government to make floriculture blossom in Sikkim, which not only enhancing the beauty of state but also helping to farmers to make alternative livelihood.

Sikkim Government, Department of Horticulture extending its support to farmers by different sources. As such,

different centres are established and even policy as packages for encouraging the farmers to start cultivating the commercial flower.

- Cymbidium Development Centre – Cymbidium is the most important flower for the State and the departmental interventions in the form of updated technology and high quality imported planting materials has advanced this sector. For promotion of this flower to a level of industry, a centre has been established at Rumtek, East Sikkim to coordinate critical activities like varietal screening, multiplication, technology up-gradation, training and skill development of farmers.
- Model Floriculture Centre – A Model Floriculture Centre has been established at Maniram (South Sikkim), 9th mile (Namli, East Sikkim) to serve as demonstration unit, act as a centre for imparting training and standardize production technology for various flowers.
- Pack Houses - To ensure reduction in post-harvest losses and quality retention of farm produce, one Integrated Pack House has been set up at Rangpo, East Sikkim to handle collection, grading, treatment, storage and various other related activities for fresh cut flowers.
- Sikkim has successfully established a number of Rose Villages, a concept which is unique to this region. As per this concept, the whole lot of farmers in a village are encouraged to adopt rose cultivation on commercial scale, using scientific inputs provided by the State Department of Horticulture under the Horticulture Mission.
- Another activity which is worth mentioning is establishment of a joint venture between the State Department of Horticulture and Florance Flora of Bangalore for production and export of anthurium cut flowers. As a result of these interventions, the economy of the farmers has improved.
- Likewise, each rose grower earns Rs. 80,000-Rs. 100,000 from an area of 500 sqm. Gerbera farmer’s have recorded an earnings of Rs. 25,000-Rs. 30,000 from an area of 134 sqm. The average income per unit area probably is the highest in floriculture, ranging from Rs. 100 to Rs. 200 per sqm (De and Singh, 2016)^[5].
- Currently about 210 ha of land area has been brought under commercial flower production (De and Singh, 2016)^[5].

National Research Centre for Orchids

The National Research Centre of Orchids was established on 5th October 1996 by the Indian Council of Agricultural Research (ICAR), New Delhi to organize research programme on improvement in productivity, quality and commercialization of orchids. The Sikkim state authorities handed over 22.19 acres of land belonging to Regional Agricultural Centre along with all other assets to ICAR for establishment of the centre. It is situated in Dikling, Pakyoung, which is 27 km from the state capital, Gangtok. According to NRCO there are over 1300 different species of orchids in India. Arunachal Pradesh, with more than 550 species, boasts of the largest number of orchid species. Next comes with Sikkim with 500 plus species which also include famous *Dendrobium Nobile* (consider as state flower). It has 35 poly houses which keep more than 800 varieties of orchids found all over the world. The orchids here are provided by the government solely for research purposes

and not for commercial use. These are later returned to the government or given away to local farmers. It has developed

more than 11 distinct hybrids of orchids over the years.

Table 1: Production of Flower in Sikkim during 2014-2015:

Sl. No.	Name of the flower	Area (In '000 ha)	Production	
			Loose (In '000MT)	Cut (In Lakh Nos.)
1.	Orchids	0.04	-	0.25
2.	Gladiolus	0.03	-	0.88
3.	Gerbera	0.03	-	0.11
4.	Rose	0.03	-	0.18
5.	Marigold	0.02	16.50	-
6.	Carnation	0.01	-	0.04
7.	Anthurium	0.01	-	0.03
8.	Other flowers	0.08	-	0.44

Source: Ministry of Agriculture and Farmers welfare, Govt. of India.

Conclusions

Floral eco system of Sikkim is quite unique and it should be treated as reward of landscape. It is essential to develop this Himalayan state as an especial zone for floriculture by utilizing its natural advantage. With governmental support and their scheme growers are enthusiastically involved in this agricultural activity but for sustaining this enthusiast need to develop accessible supply chain for proper management for produced flower to reach in the hand of consumer with less post harvesting loss.

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