Horticulture Trends in Gujarat

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Abstract

Over the years, horticulture has emerged as an indispensable part of agriculture, offering a wide range of choices to the farmers for crop diversification. Its role in the country's nutritional security, poverty alleviation and employment generation programmes are becoming increasingly important. It offers not only a wide range of options to the farmers for crop diversification, but also provides ample scope for sustaining large number of agro-industries which generate huge employment opportunities. Gujarat has a wide variety of soils, rainfall pattern, temperature regimes, and irrigation availability. This diverse agro-climatic situation across the state holds promise for development of the horticulture sector in a significant way. The paper explores such horticultural trend over the period of seven years. Based on the trend it also tries to suggest the top five crops in each segment like fruits, vegetables, spices and flowers, for pursuing entrepreneurial opportunities.

Keywords: Agripreneurship, Food Processing, Firming Practices

JEL Classification: N5, P32, Q1, O13

1. Introduction

Agriculture sector is considered to be the backbone of Indian economy and contributes substantially to the GDP of India. In recent times, the landscape of agriculture has changed from subsistence farming to commercial farming, import oriented to export oriented sector, supply driven technology to demand driven technology etc. (Mishra, et al, 2013). Due to these reforms, agriculture has evolved in to agribusiness and includes a comprehensive system to include all those who are involved in bringing food and fiber to consumers (Baruah, n.d.). The Oxford Dictionary defines agribusiness as the group of industries dealing with agricultural produce and services required in farming. In developing countries like India, agribusiness is a generic term that refers to the various businesses involved in food production, including farming and contract farming, seed supply, agrichemicals, farm machinery, wholesale and distribution, processing, marketing, and retail sales (Mishra et al, 2013).

Agriculture and allied industry is further divided into several segments such as horticulture and its allied sectors (including fruits and vegetables, flowers, plantation crops, spices, aromatic and medicinal plants); fisheries sector; animal husbandry and livestock; and sericulture. India's varied agro-climatic conditions are highly favourable for the growth of large number of horticultural crops. The Government of India has recognized horticulture crops as a means of diversification in agriculture in an eco-friendly manner through efficient use of land and optimum utilization of natural resources. Horticulture seeks to create ample opportunities for employment, particularly for unemployed youths and women folk. The paper explores horticulture trend and entrepreneurial opportunities based on trend, in Gujarat.

2. Review of Literature

As discussed earlier, horticulture is a part of agriculture and allied sector. While going through the literature on horticulture, it was observed that majority of the research was based upon secondary information and presented in the form of reports highlighting in India and Gujarat, the horticulture developments, infrastructure for horticulture, year wise information pertaining to area and production for fruits and vegetable crops etc. The research in the area of entrepreneurship in horticulture is few and far between. The available literature for entrepreneurship in agriculture and horticulture is summarized as below:

Alsos et al (2003) conducted an exploratory study to find out why farmers start additional business activities. The researchers conducted in-depth interviews with the Norwegian farm households. They applied three different perspectives i.e. rural sociology perspective, opportunity perspective and the resource based perspective. The study found three types of farmer entrepreneurs i.e. the puriactive farmer, the resource exploiting entrepreneurs and the portfolio entrepreneurs. They differ in their motivation to start the new business activity.

Campos-Climent et al (2012) had undertaken a strategic review of horticultural cooperatives and applied Delphi method to get a view of the strategic situation of horticultural cooperatives in Spain. The findings of the study revealed that agricultural cooperatives helped in addressing the crisis situation of agriculture. It was suggested that cooperatives should make an effort in improving their management, building on their strengths (traditional image and strong roots in the area) and their opportunities (greater potential for cooperation) to address their weaknesses (scattered agricultural offer) and threats (the stronger bargaining power of the distribution companies).

Mulder et al (2007) conducted a study on competence assessment on ten small business entrepreneurs in innovative horticulture where those competencies were rated by the entrepreneurs themselves, their employees and external consultants. The findings revealed that competencies were being rated differently. The top competence strength had been a learning orientation. A total of 99 learning activities were found embedded in the innovative work processes of the entrepreneurs. The top three learning activities were reflection, observation and experimentation.

From the discussion, it may be noted that the research in the area of entrepreneurship in agriculture and horticulture is focused on examining the skills, competencies and identities of farmers as entrepreneurs. This paper seeks to practically address the opportunities for starting business for farmers in horticulture by examining the scope based upon secondary information.

3. Farming Practices

India is a country with diversified topography. Apart from the variations in landform, varieties of climatic conditions, soil types, availability of irrigation, use of machinery, modern agricultural inputs, insecticides and pesticides have played a role in the evolution of different farming practices in India. The characteristics of various farming practices are summarized in Table 1.

4. Research Objectives

Following objectives were set for the study.

1. To highlight the different practices adopted by farmers in agriculture.
2. To understand the concept of horticulture and its importance in Gujarat.
3. To empirically evaluate the secondary data on horticulture and identify the crop specific trend over the period of seven years.
4. To explore the entrepreneurial opportunities in horticulture based on the evaluation of trend.

5. Research Methodology

The study is based upon the descriptive research design to empirically test the entrepreneurial opportunities in horticulture. The study is based on the secondary data collected from the Directorate of Horticulture Department, Gandhinagar. The data were collected from the websites as well as through personal visit of the said organization. Time series data across 26 districts of Gujarat were collected for seven years starting from the year 2005-06 to 2011-12 for 42 types of crops and it was collected on two parameters i.e. area of cultivation and production. The detailed explanation is presented in Table 2. Approximately, 15,288 data values were used in the research.

Thus, sample size consisted of various horticulture crops grown across 26 district of Gujarat. Sampling duration consisted of one month i.e. 1st November, 2014 to 30th November, 2014, in which, the data elements were gathered starting from the year 2005-06 to 2011-12. Sampling technique used was area sampling. Sampling unit was the office of Directorate of Horticulture and sampling element were details of the horticulture crops. Sampling area was 26 districts of Gujarat.

The data were managed through Microsoft excel programme and it was analyzed and interpreted with the help of SPSS 19 programme. For data analysis, frequency distribution, descriptive statistics such as mean, maximum, minimum, range, rank and percentage were used. Percentage change was also computed by taking the difference in the output of latest year (2011-12) and oldest year (2005-06). As the data pertains to all the 26 districts of Gujarat, the mean computed could be treated as the population mean. In order to get the correct results for descriptive statistics, a special care was taken in which the missing value was inserted for the cells of area and production, where the cultivation of item was not done. Missing value facilitated in avoiding the pulling of mean towards the higher or lower cell count. Inferential statistics such as Analysis of Variance (ANOVA) test was applied for more meaningful analysis.

6. Concept and Importance of Horticulture

Horticulture, the term is derived from latin word hortus: garden plant; cultura: culture denotes culture of garden plants. Traditionally, horticulture involved four areas of study namely, Pomology (fruit culture), Olericulture (vegetable culture), Floriculture (culture of ornamental crops), and Post Harvest Technology (management of produce after harvest). However, over the years, the scope of the above field has been expanded to include other crops like mushroom, bamboo, plantation crops like tea, coffee, and rubber. In view of the above developments, horticulture can now be redefined as the 'Science of growing and management of fruits, vegetables including

tubers, ornamental, medicinal and aromatic crops, spices, plantation crops their processing, value addition and marketing' (Report of the Working Group on Horticulture, Plantation Crops and Organic Farming for the XI Five Year Plan: 2007-12, 2012).

In mid eighties the Govt. of India identified horticulture crops as a means of diversification for making agriculture more profitable. The cultivation of such crops offered number of advantages such as efficient land use, production of higher biomass than field crops per unit area resulting in efficient utilization of natural resources (soil, water and environment), highly remunerative for replacing subsistence farming and thus alleviate poverty in varied agro-ecosystems like rainfed, dryland, hilly, arid and coastal, creating skilled employment for rural masses especially women folk, potential for value addition and resulted in environment friendliness (Report on Horticulture Development, 2001). Further, the horticulture sector is supplier of large number of agro based industries which has high avenues for generation of skill, full employment and self employment opportunities both in rural and urban areas (National Horticulture Mission Revised Action Plan for Gujarat, 2005).

The horticulture sector has been a driving force in stimulating a healthy growth trend in Indian agriculture. Focused attention to horticultural research and development has resulted into increased production and productivity and enhanced exports. As per the report on State of Indian Agriculture: 2012-13, India is producing 257.2 million tonnes of horticulture produce from an area of 23 million hectare. The higher growth rate in horticulture was brought about by improvement in productivity of horticulture crops, which increased by about 28% between 2001-02 and 2011-12. Not only have these impressive production figures ensured a steady supply for the domestic market, but they have also made Indian horticulture exports globally competitive. Over the last decade, there has been a significant improvement in export earnings in horticulture from Rs. 5677.50 crores in 2001-02 to Rs. 13792.20 crores in 2010-11, registering a growth of 142.9%. The horticulture division is working closely with Agricultural & Processed Food Export Development (APEDA) and State Governments to ensure that infrastructure and institutional support for export is available so that farmers' can leverage export markets for higher incomes. Of the 60 agri export zones in India 52 are focusing on horticultural crops.

With the increase in the growth of production of horticulture crops, the 'demand' side is also keeping a pace. As the increase in income level and health consciousness, households are spending significantly higher amounts of their expenditure on fruits and vegetables. The availability of fruits and vegetables has kept pace with the growing demand. In the case of fruits, the per capita availability increased from 114 grams/day in 2001-02 to 172 grams/day in 2011-12. Similarly, the per capita availability of vegetables increased from 236 grams/day to 350 gram/day during this period (State of Indian Agriculture: 2012-13, 2013).

Realising the importance of horticulture as a means of diversification, National Horticulture Board (NHB) was set up by the Government of India in 1984 as an autonomous society. The Central Government has started National Horticulture Mission from the year 2005-06 for the holistic growth of horticulture. NHB provides a plethora of incentives for establishing of infrastructure and facilitate integrated development of horticulture. Various such schemes have been highlighted briefly in Table 3.

The Gujarat Government has also registered "Gujarat Horticulture Mission" under the Chairmanship of Principal Secretary of Agriculture. The work of Horticulture Mission is being done in the State by this registered Mission. Gujarat has 69,84,000 registered farmers which is (12%) of the State's total population of 57 million. For horticulture, there are 6,50,000 farmers registered of which 2,80,000 (43%) received Government subsidies in 2009 10 (Domadiya, 2010). The State has strong cooperative credit and marketing structure, alongwith 213 cold storages having 9.50 lakh mt. storage capacity. About 42 fruit and vegetable co-operative marketing societies and 197 Agriculture Produce Market Committees (APMCs) are dealing with selling and buying of horticulture produce in the State. The area & production of horticulture crop was 5.89 lakh ha (5 %of total cropped area) & 59.49 lakh tons in 1998-1999 which increased up to 14.04 lakh ha. and 180.16 lakh tons respectively in 2010-11. Agriculture Export Zone for dehydrated onion and zone for fruits - vegetables has been established, which will be the back bone to boost horticultural development in the state (Official Gujarat State Portal: Horticulture, n.d.).

Gujarat has a wide variety of soils, rainfall pattern, temperature regimes, and irrigation availability. This diverse agro-climatic situation across the state holds promise for development of the horticulture sector in a big way. As per the report on horticulture in Gujarat 2010-11, state occupies prominent position in fruits and vegetables in terms of productivity. The average productivity of onions and potatoes is highest then the national average. Further, state enjoys a monopoly in processing of Isabgol and is well known for "Kesar" and "Alphonso" brands of mangoes. Date Palm (kharek) production has come up rapidly in Kutch. The spices like cumin, fennel and garlic are having an excellent potential for export. As per the data on official webportal of Gujarat State for Horticulture, Gujarat is one the major banana growing states and ranks 2nd in exports of bananas in India with exports of 1430 tonnes to Middle East in April-June 2009.

7. Findings of Secondary Data Analysis

The findings of the secondary data are divided into three sections viz., Section I describes the descriptive statistics details. Section II describes the inferential statistics. Section III describes the entrepreneurial opportunities in horticulture sector.

7.1 Section I

Descriptive Statistics

The descriptive statistics details of fruits, vegetables, spices and flowers are described as under.

7.1.1 Fruits

Considering the details of Table 4 of Exhibit, it may be inferred that in the all the seven years, the highest average production was of Banana at 3,85,502 (MTs). Starting from the year 2005-06 to 2011-12, an exponential mean increase in the production of Papaya was found from 28,089 (MTs) to 81,605 (MTs). Mean production of Mango stood highest at 71,552 (MTs). Average production of Citrus was found to be marginally low from 34,095 (MTs) for the year 2010-11 to 34,008 (MTs) for the year 2011-12. Mean production of Chicku in the seven years period, hovered in the range of 18,129 (MTs) to 22,867 (MTs). The highest mean production (28,381 MTs) of Dates was for the year 2007-08. Around 13% reduction in mean production of Ber was noticed in the tenure of seven years. 17% increase in Guava's mean production was noticed. Mean production for fruits like Pomegranate, Custard, Cashew-Nut, Coconut and others improved gradually over the period of seven years. Fluctuation in mean production was noticed in the case of only Aonla fruit.

As per Table 5 of Exhibit, Amerli, Dang, Junagadh, Panchmahal, Dahod, Rajkot, Valsad and Navsari were leading districts producing Mango. Production of Citrus was found highest in Ahmedabad, Banaskantha, Gandhinagar, Mehsana and Patan. Maximum amount of Banana was grown in Bharuch, Narmada, Surat, Baroda and Tapi. Jamnagar, Porbandar and Rajkot were largest producer of Papaya. Farmers of districts like Bhavnagar, Kutch, Kheda, Anand, Sabarkantha kept on experimenting by growing different fruit crops. So consistency in production was difficult to observe. Surendranagar was the sole highest producer of Ber. Lowest production was depicted for Cashew crop, may be due to climatic condition, issue of appropriate soil, or yield reasons. Tapi district was formed in 2007-08, so none of the production data was found for that district of preceding years.

7.1.2 Vegetables

Table 6 of exhibit depicts that highest average production of Potato had increased from 1,55,504 (MTs) to 4,79,107 (MTs) in the duration of seven years. Mean production of Onion was found 2,60,367 (MTs) in the year 2011-12. 24% and 56%, respective, increase in average production of Brinjal and Tomato was found during the seven years tenure. Cultivation of Okra and Cucurbit steadily increased to reach the average amount of 53,130 (MTs) and 68,677 (MTs) respectively. Mean increase in production of Cabbage was 64% in the time phase of seven years. Absolute average increase in production of other vegetables, during seven years, stood at 8,333 (MTs). An incremental, mean rise in the production of Cauliflower (30%), cluster bean (based on 2006-07-2011-12's data) (55%) and Cow Pea (39%) was depicted in the seven years duration.

From Table 7 of exhibit, it may be inferred that Amerli, Bhavnagar, Jamnagar, Junagadh, Porbandar, Panchmahal and Rajkot were highest producer of Onion. Potato was produced by Banaskantha, Gandhinagar, Kheda, Anand, Mehsana and Sabarkantha. Dual crop rotation pattern was seen in Ahmedabad district (Tomato and Cucurbits) and Bharuch (Brinjal and Cucurbits). Respective largest producer of Cucurbits and Brinjal were found for districts like Narmada, Valsad, Navsari, Surat, Surendranagar, Baroda and Tapi. Farmers of Dang, Kutch and Dahod grew variety of vegetables like Brinjal, Cucurbit, Okra, Tomato, Onion and Cabbage. Patan was the only district to grow other vegetables. In order to derive remunerative prices and to meet the changing demand, farmers changed the vegetable cropping pattern leading to minimum production of different variety of vegetable crop in different districts.

7.1.3 Spices

From table 8 of exhibit, the average production of Garlic in the year 2005-06 was 21,219(MTs) which rose to highest 46,243 (MTs) in the year 2011-12. Mean production of Cumin and Fennel in the duration of seven years was in the range of 14,761 (MTs) to 33,330 (MTs) and 8,806 (MTs) to 10,535 (MTs) respectively. An excessive rise in the average production of Chilly and Turmeric was found at 706% and 104%, respectively, in the span of seven years. With a considerable level of ups and downs Coriander's mean production in the year 2011-12 stood at 2,693 (MTs). 35% rise in the mean production of Ginger was noticed in the seven years duration. For the year 2011-12, the highest mean production for Fennel, Isabgul, Ajawan and Suva was 1,269 (MTs), 4,854 (MTs), 769 (MTs) and 8,453 (MTs) respectively. Lot of rise and fall in the production of other spices was noticed in the span of seven years, finally the latest production for 2011-12 for spices stood at a meager level of 50 (MTs).

From Table 9 of exhibit, it was noticed that during the entire seven years a consistent highest production in spices was noticed for district like Ahmedabad, Porbandar and Surendranagar for producing Cumin; Bharuch, Narmada, Dang, Gandhinagar, Anand and Tapi for production of Chilly; Amerli, Jamnagar, Junagadh and Rajkot stood ahead in production of Garlic; Mehsana, Patan, Dahod, Navsari and Kutch were highest in the production of Fennel, Cumin, Ginger, Turmeric and Coriander respectively. Different varieties of highest production were witnessed for Banaskantha (Fennel and Cumin), Bhavnagar (Cumin and Chilly), Kheda (Fennel and Chilly), Panchmahal (Garlic and Ginger), Sabarkantha (Fennel and Chilly), Surat (Ginger and Chilly) and Baroda (Ginger and Chilly). For the consistent seven years, different varieties of spices like Turmeric, Chilly and Ajawan was found only for Valsad district.

7.1.4 Flowers

From Table 10 of exhibit, the average production of Marigold was noticed highest for the year 2011-12 at 4,374 (MTs). Respective 144% and 613% rise in mean production of Rose and Lily was noticed from 2005-06 to 2011-12. The average production of Mogra was found lowest at 70 (MTs) in the year 2005-06 and highest stood at 266 (MTs) in the year 2011-12. The range of other flowers cultivated were 350 (MTs) in the year 2006-07 and 1,322 (MTs) for the year 2010-11. Starting from the year 2005-06 to 2011-12, approximately, 125% rise was noticed in the production of other flowers.

From Table 11 of exhibit, it was noticed that consistently highest production of Rose was found in Amerli, Bhavnagar, Junagadh and Kutch. Consistent larget

producer of Marigold was Ahmedabad, Banaskantha, Narmada, Gandhinagar, Jamnagar, Panchamal, Rajkot, Sabarkantha, Baroda and Tapi. Bharuch, Mehsana, Patan, Dahod and Surat were found as largest growers of Rose and Marigold flowers in different years. As bracketed, district like Dang (Rose, Marigold and Lily), Porbandar (Others and Marigold), Kheda (Marigold, Lily and Rose), Anand (Rose, Lily and Marigold), Surendranagar (Marigold and Rose) and Valsad (Rose, Marigold and Lily) grew different maximum number of flowers in different years. Navsari was the only district which grew the maximum amount of Lily.

7.2 Section II

Hypotheses Testing

In order to run the ANOVA, the data file was bifurcated year wise. ANOVA test was applied on two parameters viz., total area available for cultivation and total production cultivated in all the 26 districts. Total area consisted of that area available for cultivation of various crops in the specific district in particular and across all 26 districts. Total production referred to the output of various types of crops produced to together in specific district in particular and across all 26 districts.

$H_0$1: There is no significant difference between the total cultivable areas of fruit, vegetable, spices and flower production across all 26 districts. $H_1$1: There is a significant difference between the total cultivable areas of fruit, vegetable, spices and flower production across all 26 districts.

From Table 12 of exhibit, it could be inferred that H_0 is rejected for Sig. p-values less than or equal to 0.05, which implies that there is a significant difference between the total cultivable areas of fruit, vegetable, spices and flower production across all 26 districts. For the Sig. p-values greater than 0.05, H_0 is not rejected, which implies that there is no significant difference between the total cultivable areas of fruit, vegetable, spices and flower production across all 26 districts. A significant difference may arise due to two reasons either there is a barren land which is brought into cultivation or there is sale of agricultural land for non-agricultural purpose, which means there will be shrinkage in the cultivable area.

$H_0$2: There is no significant difference between the total production of fruit, vegetable, spices and flower output across all 26 districts. $H_1$2: There is a significant difference between the total production of fruit, vegetable, spices and flower output across all 26 districts.

From Table 13 of Exhibit, it could be inferred that H_0 is rejected for Sig. p-values less than or equal to 0.05, which implies that there is a significant difference between the total production of fruit, vegetable, spices and flower output across all 26 districts. For the Sig. p-values greater than 0.05, H0 is not rejected, which implies that there is no significant difference between the total production of fruit, vegetable, spices and flower output across all 26 districts. A significant difference may arise i.e. increase in output might have risen due to usage of good quality fertilizer and seeds which lead to increase in the yield of the output. The output might have fallen due to improper care of the plant or poor quality seeds and fertilizers.

7.3 Section III

Entrepreneurial Opportunities in Horticulture Sector

All the horticulture crops have a lower shelf life. The biggest problem associated with such crop is the spoilage and rotten state of product after a considerable time. Such agricultural wastage can be curtailed by adopting proper food processing technique. Moreover, the money received by farmers by selling the produce in existing state is meager, when compared to produce sold after value addition. Thus, value addition in the farm produce not only ensures curtailment of agro-wastage, spoilage but also guarantees remunerative prices for farm-gate products. Value addition to raw food material in India is only 7 per cent while it is 23, 45 and 188 per cent in China, Philippines and UK, respectively (National Academy of Agricultural Sciences, 2002). A summary of the various entrepreneurial opportunities which can be ventured through food processing technique is listed in Table 14.

Thus, considering Gujarat, with respect to the trend study of horticultural crops cultivated over the period of seven years, the best entrepreneurial opportunity is described in the table 15.

8. Conclusion

The paper presents the sectoral overview of horticulture in the state along with some entrepreneurial opportunities for farmers. The analysis of secondary data on cultivation of vegetables, fruits, spices and flowers across 26 districts of Gujarat highlighted that there is a significant increase in the production of all the horticulture crops over a period of seven years. In consonance with increase in horticulture production, sustaining the growth rate will be a challenge. It requires various interventions aimed at productivity enhancement, availability of quality planting material of improved high yielding varieties, reducing post harvest losses of perishable commodities, particularly fruits and vegetables and creation of effective supply chain.

The study suggests that value addition for horticultural crops is essential as it reduces post harvest losses, increases the availability of food, benefits the farmers and consumers, better nutrition, generates high employment opportunities, increases export trade and foreign exchange etc. Hence, the paper concludes with the scope of value addition through adoption of food processing technique and thereby some entrepreneurial opportunities for various such crops in the state.

References

1. Agribusiness, (n.d.). Retrieved June 2014 from http:/ /www.oxforddictionaries.com /definition/english/ agribusiness.
2. Alsos, G., Ljunggren, E., Pettersen, L. (2003). Farm-based entrepreneurs: What triggers the start-up of new business activities? *Journal of Small Business and Enterprise Development*.10 (4). 435-443. Retrieved August 22, 2014 from, http://www.emeraldinsight.com/doi/full/10.1108/146 26000 310504747.

3. Baruah, B.K. (n.d.). Agribusiness Management, its meaning, nature and scope, types of management tasks and responsibilities. Retrieved June 5, 2014 from, http://assam agribusiness.nic.in /agriclinics/ agribusiness %20management.pdf
4. Campos-Climent, V., Apetrei, A., Chaves-Avila, R. (2012). Delphi method applied to horticultural cooperatives. *Management Decision*. 50(7). 1266-1284. Retrieved August 22, 2014 from, http:// www.emeraldinsight.com/doi/full/10.1108/0025174 1211247003
5. Domadiya,A.(2010). Online electronic applications to support agriculture in Gujarat. Retrieved December 29, 2014 from, file:///E:/Horticulture/ govt%20benefit/Online-Subsidy-Application-for-Agriculture_Akash %20Domadiya_24Nov10.pdf
6. Entrepreneurship in Agriculture and allied sectors. (n.d). http://business.gov.in/ agriculture/hortic ulture.php
7. Horticulture in Gujarat 2010-11 Directorate of Economics and Statistics Government of Gujarat Gandhinagar. (2011). Retrieved October 10, 2014 from, http://gujecostat. gujarat.gov.in /wp-conte nt/ uploads/Irrigation/Horticulture_2010_11.pdf
9. Mishra, D., Singh, R. K., Srivastava, R.K. (2013). Agribusiness and Entrepreneurship Development through Medicinal and Aromatic Plants: An Indian State of Affairs. *International Journal of Food, Agriculture and Veterinary Sciences.* 3(1). 238-246, Retrieved June 2014 from http://www.cibtech.org / J%20FOOD%20AGRI%20 VETERINARY%20 SCIENCES/ PUBLICATIONS/2013/Vol_3_No_1/ 48003... General_ Article _ Mishra _et_al.pdf.
10. Mulder, M., Lans, T., Verstegen, J., Biemans, H., Meijer, Y. (2007). Competence development of entrepreneurs in innovative horticulture. *Journal of Workplace Learning*. 19(1). 32-44 Retrieved August 22, 2014 from, http:/www.emeraldinsight.com / doi/ full/10.1108/13665620710719330.
11. National Academy of Agricultural Sciences (2002), Agriculture-Industry Interface: Value Added Farm Products, Policy paper 16, Retrieved January 3, 2015 from http://naasindia.org / Policy%20Papers/ pp16.pdf.
12. National Horticulture Mission Revised Action Plan for Gujarat. (2005). Retrieved December 29, 2014 from http://nhm.nic.in/ActionPlan/ActionPlan _Gujarat.pdf .
13. NHB Schemes. (n.d.). Retrieved December 29, 2014 from, http://agri.gujarat.gov.in/nhb-schemes.htm.
14. Official Gujarat State Portal: Horticulture. (n.d.). Retrieved December 29, 2014 from http:// www.gujaratindia.com /initiatives/initiatives. htm? enc=TEnmkal8rLd9cWRBUEX85lswwfZZ+o8b +w+YfQPy7dU93tk/rntr0H+OnwOK0bubU/5kzexyi +JTm2rA12QenK3wnOMJgYTOqvtf ZeqRdaaFE5 dh5rbDG2NUzRJa12on+xN1tLzJGwc CVbF2Gvgk PA ==#Horticulture.
15. Pyysiainen, J., Anderson, A., McElwee, G., Vesala, K. (2006). Developing the entrepreneurial skills of farmers: some myths explored. *International Journal of Entrepreneurial Behaviour & Research*, 12(1). 21-39. Retrieved August 22, 2014 from, http:// www.emeraldinsight.com/doi/full /10.1108/ 13552550610644463.
16. Report of the Working Group on Horticulture Development. (2001). Retrieved October 10, 2014 from http://planningcommission.gov.in/aboutus/ committee / wrkgrp/ horticulture.pdf.
17. Report of the Working Group on Horticulture, Plantation Crops and Organic Farming for the XI Five Year Plan: 2007-12. (2012). Retrieved October 5, 2014 from http://planningcommission.nic.in/ aboutus/committee/wrkgrp11/wg11_aghorti.pdf.
18. State of Indian Agriculture 2012-13 by Government of India, Ministry of Agriculture, Department of Agriculture & Cooperation, New Delhi. (2013). Retrieved October 10, 2014 from, file:///E:/ Horticulture/statistics/ARE2012-13.pdf.
19. Vesala, K. Peura, J., McElwee, G. (2007). The split entrepreneurial identity of the farmer. *Journal of Small Business and Enterprise Development*. 14(1). 48-63. Retrieved August 22, 2014 from, http:// www.emeraldinsight.com/doi/full/10.1108/14626000 710727881.

EXHIBITS

Table 1: Types of Farming and their Characteristics

Arable farming	Ploughing of the land and the growing of crops
Pastoral farming	Rearing animals
Mixed Farming	Raising crops and rearing animals, Arable and Pastoral farming together, Subtypes: Dairy farming, Hill Sheep farming, Horticulture
Subsistence Farming	Farming for own consumption, entire production is largely consumed by the farmers and their family and they do not have any surplus to sell in the market, small and fragmented landholdings, simple and primitive cultivation techniques, absence of use of modern equipments and farm inputs
Commercial Farming	Opposite of subsistence farming, most of the produce is sold in the market for earning money, use of high yielding varieties of seeds.
Extensive Farming	Low inputs and low yields (large areas), Use of use large patch of land for cultivation
Intensive Farming	High inputs and high yields per unit area, availability of land is limited.
Nomadic Farming	Farmers move seasonally with their herds
Sedentary Farming	Farmers remain at the same place
Plantation Farming	A single cash crop is grown for sale.
Organic Farming	Relies on crop rotation, green manure, compost, biological pest control, and mechanical cultivation to maintain soil productivity and control pests, excluding or strictly limiting the use of synthetic fertilizers
Poly house Farming	Cultivating crops under protected conditions. It can provide higher temperature and/or humidity than are available in the environment.

Source: The Young Farmer, (n.d.) Retrieved June 2014 from http://www.theyoungfarmer.com/farm Types.php, Agriculture, (n.d.) Retrieved June 2014 from http://www.ssag.sk/SSAG%20study /GEO/Agriculture, %20 farming %20as%20a%20system,%20types%20of%20farming.pdf,Agriculture in India, (n.d.) Retrieved June 2014 from www.nios.ac.in/media/documents/SecSocSciCour/English/Lesson-12.pdf

Table-2 : Details of Data Collection

Details of	Number	Description	Short Nomenclature
Year	07	2005-06, 2006-07, 2007-08, 2008-09, 2009-10, 2010-11, 2011-12	A, B, C, D, E, F, G
District	26	Ahmedabad, Amreli, Banaskantha, Bharuch, Narmada, Bhavnagar, Dang, Gandhinagar, Jamnagar, Junagadh, Porbandar, Kutch, Kheda, Anand, Mehsana, Patan, Panchmahal, Dahod, Rajkot, Sabarkantha, Surat, Surendranagar, Baroda, Valsad, Navsari and Tapi	Ahd, Amr, Ban, Bha, Nar, Bhav, Dan, Gan, Jam, Jun, Por, Kut, Khe, Ana, Meh, Pat, Pan, Dah, Raj, Sab, Sur, Sure, Bar, Val, Nav and Tap
Fruits	14	Mango, Chiku, Citrus, Ber, Banana, Guava, Pomegranate, Dates, Papaya, Custard, Aonla, Cashew-nut, Coconut and Others	Man, Chi, Cit, Ber, Ban, Gua, Pom, Dat, Pap, Cus, Aon, Cas, Coc, Oth
Vegetables	11	Potato, Onion, Brinjal, Cabbage, Okr, Tomato, Cauliflower, Clusterbean, Cowpea, Cucurbit and Others	Pot, Oni, Bri, Cab, Okr, Tom, Cau, Clu, Cow, Cuc, Oth
Spices	12	Cumin, Fennel, Chilly, Garlic, Coriander, Ginger, Turmeric, Fenugreek, Isabgul, Ajawan, Suva and Others	Cum, Fen, Chi, Gar, Cor, Gin, Tur, Fen, Isa, Aja, Suv, Oth
Flowers	05	Rose, Marigold, Mogra, Lily and Others	Ros, Mar, Mog, Lil, Oth
Total Data Cells		**15,288** (26 districts* 42 Crops*2 Parameters *7 years)	

Source: Author's Compilation

Table 3: A Summary of various schemes of NHB

Sl.	Scheme	Financial Assistance
1	Development of horticulture through production, post harvest management The NHB schemes are varied and depend upon whether the project is production/ processing/ marketing related and range from bee-keeping to Bio technology, horticulture covering a vast spectrum of components (such as herbs, aromatic, medicinal plants, biotechnology tissue culture, bio pesticides, organic foods, pre-cooling units / cool stores, reefer vans, containers, retail outlets, auction platform, Horticulture ancillary units etc)	Back-ended subsidy varies from 20 % of the project cost with a maximum of Rs 25 lacs.
2	Capital investment subsidy for construction/ modernization/ expansion of cold storage and other storages for horticulture produce.	In collaboration with NABARD&NCDC projects up to 5000 MT capacity and not exceeding Rs. 2 crore with 25% promoter's contribution, 50% term loan & 25% capital investment subsidy.
3	Technology development and transfer. This includes introduction of new technologies, expert services from abroad, seminars, study tours etc.	100 % financial assistance up-to Rs. 10 lacs/ project for production related and Rs. 25 lacs to R&D efforts and actual/ limited reimbursement of expenses.
4	Establishment of nutritional garden, Natural areas, Distribution of fruit plant & vegetable seeds in mini kits etc.	Rs. 250 fee per mini kit per family
5	Market Information Service for Horticulture crops. Information of wholesale prices, arrivals, trends.	100% financial assistance.
6	Horticulture promotion service. Techno economic feasibility studies, develop strategies etc.	100 % financial assistance and studies through professional consultants.

Source: NHB Schemes. (n.d.). Retrieved December 29, 204 from, http://agri.gujarat.gov.in/nhb-schemes.htm

Table 4 Mean Production of Fruits in all Districts (Production in MTs)

	Year	Man	Chi	Cit	Ber	Ban	Gua	Pom	Dat	Pap	Cus	Aon	Cas	Coc	Oth
	A	59395	18129	26377	13452	263029	11613	4242	26537	28089	3432	9206	6453	14122	3090
	B	64176	19227	28491	14682	264780	11375	5584	26968	34853	3442	9894	4677	14249	3203
	C	68899	19176	30019	14030	300737	13109	5960	28381	37615	4502	10890	4206	14631	2521
	C	22209	18918	28208	11458	324691	14421	4138	26988	55515	4217	9919	2872	14992	2734
	D	63462	20194	32436	18441	359362	14246	4797	27442	64069	4610	10054	3195	16425	2936
	E	67504	21383	34095	12241	378859	13704	6351	24993	74921	4450	10126	3558	19693	3179
	F	71552	22867	34008	11679	385502	13595	6971	25069	84605	4628	9768	4156	20751	5168
	Change%	20	26	29	-13	47	17	64	-6	191	35	6	-36	47	67
	Rank	*8*	*7*	*6*	*12*	*4*	*9*	*3*	*10*	*1*	*5*	*11*	*13*	*4*	*2*

Source: Computation from Secondary Data

Table 5 Maximum & Minimum Production of Fruits in all Districts (2005-06 to 2011-12)

(Production in MTs)

District	A		B		C		D		E		F		G	
	Maxi	Mini	Maxi	Mini	Maxi	Mini	Maxi	Mini	Maxi	Mini	Maxi	Mini	Maxi	Mini
Aho	Aon	Dat	Ber	Coc	Ber	Dat	Cit	Dat	Cit	Dat	Cit	Dat	Cit	Dat
	7618	51	18365	50	21760	10	9668	5	12980	5	13555	10	13770	8
Am	Man	Pom	Man	Pom	Man	Cas	Man	Cas	Man	Oth	Man	Pom	Man	Pom
	35520	18	36186	18	36606	1	18441	1	37290	84	40,500	81	43647	62
Ban	Cit	Gua	Cit	Coc	Cit	Coc	Cit	Cas	Cit	Cas	Cit	Cas	Pap	Cas
	15188	70	17500	35	17829	55	18018	2	19000	2	19357	3	21620	3
Bha	Ban	Cas	Ban	Cas	Ban	Cas	Ban	Cas	Ban	Cas	Ban	Cas	Ban	Cas
	701800	6	818940	10	855138	40	882222	60	936288	60	990280	68	1042423	74
Nar	Ban	Oth	Ban	Gua	Ban	Cus	Ban	Cus	Ban	Cus	Ban	Coc	Ban	Cus
	270000	55	278400	50	301350	6	337900	12	362250	13	384000	15	488400	20
Bhav	Gua	Aon	Gua	Oth	Pap	Aon	Pap	Aon	Pap	Pom	Pap	Pom	Ban	Pom
	43856	1976	52061	2185	65580	2302	90,000	2390	96100	3280	85250	2700	93968	2760
Dan	Man	Aon	Man	Aon	Man	Aon	Man	Aon	Man	Aon	Man	Aon	Man	Aon
	6600	35	9200	49	13310	49	8310	70	18000	77	19800	77	22260	77
Gan	Cit	Dat	Cit	Dat	Cit	Dat	Cit	Dat	Cit	Dat	Cit	Dat	Cit	Dat
	21690	5	21678	5	22885	5	23080	5	24192	5	24,360	5	24516	5
Jam	Pap	Aon	Pap	Cas	Pap	Gua	Pap	Cas	Pap	Cas	Pap	Cas	Pap	Cas
	21420	240	26036	2	24012	32	25484	1	27800	2	27385	2	26595	2

District	A		B		C		D		E		F		G	
	Maxi	Mini	Maxi	Mini	Maxi	Mini	Maxi	Mini	Maxi	Mini	Maxi	Mini	Maxi	Mini
Jun	Man	Oth	Man	Oth	Man	Pom	Ban	Pom	Man	Cas	Man	Cas	Man	Cas
	79149	504	103545	1140	112840	165	77400	165	139744	2	157700	2	156020	2
Por	Chi	Aon	Pap	Aon	Pap	Aon	Pap	Aon	Pap	Aon	Pap	Dat	Pap	Dat
	1404	20	6600	41	7000	41	8200	41	8385	40	7871	8	6900	10
Kut	Dat	Pom	Dat	Pom	Dat	Oth	Pap	Cus	Pap	Cus	Pap	Cus	Man	Cus
	92197	135	93597	450	98623	1385	123000	16	167724	18	221040	18	59338	18
Khe	Cit	Coc	Aon	Coc	Aon	Coc	Ban	Coc	Ban	Coc	Pap	Coc	Pap	Coc
	24119	30	27630	30	30440	42	35100	48	35820	48	37754	48	41838	36
Ana	Ban	Pom	Ban	Pom	Ban	Pom	Ban	Pom	Ban	Pom	Pap	Coc	Pap	Pom
	454750	102	526185	140	585360	240	796500	312	860220	336	130865	533	106863	348
Meh	Cit	Pom	Cit	Cus	Cit	Cus	Cit	Cus	Cit	Cus	Cit	Cus	Cit	Cus
	71820	320	78866	50	78930	60	80,190	60	83510	60	91000	70	93393	70
Pat	Cit	Coc	Cit	Coc	Cit	Coc	Cit	Coc	Cit	Coc	Cit	Coc	Cit	Coc
	5220	30	5852	40	5832	40	6058	43	6,160	52	6578	68	8344	70
Pan	Man	Oth	Man	Oth	Man	Pom	Ban	Pom	Man	Pom	Man	Pom	Man	Pom
	10938	377	11898	445	12420	500	6900	475	13200	400	13800	405	14558	525
Dah	Man	Chi	Man	Ban	Man	Ban	Aon	Cas, Chi	Man	Chi	Man	Cas	Man	Gua
	3713	51	5213	75	16350	75	12050	95	11400	125	13158	189	13965	765
Raj	Man	Coc	Man	Coc	Pap	Coc	Pap	Dat	Pap	Dat	Pap	Dat	Pap	Dat
	3036	24	3050	24	5500	30	14000	21	17600	21	9240	21	20900	21
Sab	Pom	Ban	Pom	Gua	Pom	Gua	Pap	Oth	Pap	Oth	Pap	Oth	Pap	Oth
	27482	2250	32218	260	33840	3900	40000	426	53340	613	80,600	682	89040	1073
Sur	Ban	Cus	Ban	Anola	Ban	Aon	Ban	Cas	Ban	Aon	Ban	Cas	Man	Oth
	572825	60	651000	49	622200	42	631440	40	670530	70	719040	75	63200	362
Sure	Pap	Coc	Ber	Coc	Ber	Cas	Ber	Cas	Ber	Coc	Ber	Cus	Ber	Cus
	20000	53	21795	30	23805	49	24242	49	24481	52	26174	30	25899	30
Bar	Ban	Oth	Ban	Coc	Ban	Coc	Ban	Coc	Ban	Coc	Ban	Coc	Ban	Coc
	365196	130	414018	790	459702	800	516200	850	553758	905	74259	925	583598	932
Val	Man	Cus	Man	Cus	Man	Cus	Man	Cus	Man	Cus	Man	Cus	Man	Cus
	196000	105	203112	140	219830	140	48480	105	150840	105	154875	142	168000	179
Nav	Man	Cus	Man	Oth	Man	Oth	Chi	Cas	Man	Cas	Man	Cas	Man	Gua
	137038	25	140060	441	158365	451	45520	132	152480	240	177837	403	201600	22
Tap	NA	NA	NA	NA	Ban	Aon	Ban	Aon	Ban	Cas	Ban	Cas	Pap	Aon
	NA	NA	NA	NA	83800	28	78400	28	77500	60	88000	64	105400	64

Source: Computation from Secondary Data

Table 6 Mean Production of Vegetables in all Districts (Production in MTs)

Year	Pot	Oni	Bri	Cab	Okr	Tom	Cau	Clu	Cow	Cuc	Oth
A	155504	170600	75586	26339	26950	52001	23149	-	15427		31188
B	191384	112937	71832	27202	28163	54092	23675	15684	14469	31354	10627
C	186738	179064	73167	30474	27101	54782	26184	13317	13483	30457	8973
D	181103	112766	77501	31120	30155	55274	25692	14452	13291	38898	10313
E	207126	86287	84714	36443	34537	62319	28540	16240	14429	49120	13421
F	221389	121127	91575	42581	43890	72477	29801	20997	18360	56767	72131
G	479107	260367	94116	43134	53130	80925	30016	24445	21475	68677	39521
% Change	208	53	25	64	97	56	30	NA	39	NA	27
Rank	*1*	*5*	*9*	*3*	*2*	*4*	*7*	*NA*	*6*	*NA*	*8*

Source: Computation from Secondary Data

Table 7 Maximum & Minimum Production of Vegetables in all Districts (2005-06 to 2011-12) (Production in MTs)

District	A Maxi	A Mini	B Maxi	B Mini	C Maxi	C Mini	D Maxi	D Mini	E Maxi	E Mini	F Maxi	F Mini	G Maxi	G Mini
Ahd	Tom	Pot	Tom	Cow	Cuc	Cow	Cuc	Cow	Cuc	Cow	Oth	Cow	Cuc	Clu
	29239	60	32481	410	37848	440	33149	392	41520	554	109692	670	98600	14050
Amr	Oni	Cow	Oni	Oth	Oni	Oth	Oni	Oth	Oni	Oth	Oni	Cau	Oni	Oth
	61200	2100	38850	120	182300	1278	110500	1944	82350	1950	195000	4750	138000	3784
Ban	Pot	Oni	Pot	Oth	Pot	Oth	Pot	Oth	Pot	Oth	Pot	Oni	Pot	Oth
	470250	4158	613620	2240	1002000	1610	784000	2170	826500	2734	923800	7125	1260630	6556
Bha	Bri	Cau	Cuc	Cau	Bri	Cau	Cuc	Cau	Cuc	Cau	Cuc	Cau	Cuc	Cau
	14245	1750	22720	1246	15939	210	24251	213	25092	229	30531	290	31588	319
Nar	Oth	Cau	Cuc	Cau	Cuc	Pot	Cuc	Pot	Cuc	Pot	Cuc	Pot	Cuc	Cau
	10962	1040	14835	1260	17870	300	23334	200	24840	126	28500	198	31815	2576
Bhav	Oni	Cow	Oni	Cowpea	Oni	Oth	Oni	Oth	Oni	Cow	Oni	Cow	Oni	Cow
	1059057	1545	499112	2184	1173900	2275	782600	1748	444600	3200	655600	3280	462000	4240
Dan	Bri	Okr	Bri	Oth	Bri	Oth	Bri	Oth	Cuc	Oth	Cuc	Cow	Okr	Cow
	3900	2100	4550	120	4680	270	4650	198	7432	250	8598	510	11100	595
Gan	Pot	Tom	Pot	Tom	Pot	Oth	Pot	Oth	Pot	Oth	Pot	Clu	Pot	Clu
	99472	2891	101220	2050	131502	551	132060	766	145431	1006	160819	2418	263406	3136
Jam	Oni	Oth	Oni	Oth	Oni	Cow	Oni	Cow	Oni	Cow	Oni	Oth	Oni	Oth
	49640	2000	43049	48	55878	2296	50832	3268	57603	3219	66740	1264	119850	1046
Jun	Oni	Cab	Oni	Oth	Oni	Oth	Bri	Cau	Bri	Cau	Bri	Cau	Oni	Cau
	194625	8320	199625	2400	182850	5030	116088	3150	125391	3411	124662	6708	294000	6724
Por	Oni	Cow	Oni	Cow	Oni	Cau	Oni	Cab	Oni	Cau	Oni	Cau	Oni	Cau
	59640	575	70000	710	212400	260	34400	80	36900	87	37213	54	79600	87
Kut	Bri	Oni	Tom	Oni	Tom	Oth	Cuc	Cow	Cuc	Cow	Tom	Cow	Oni	Cow
	12288	2000	14554	2000	14906	2100	15096	60	16302	65	21574	325	83031	1118
Khe	Pot	Okr	Pot	Oth	Bri	Oni	Pot	Oni	Pot	Oni	Pot	Oni	Pot	Oth
	147780	17281	165000	8000	50240	2800	97335	3000	136260	3160	153216	3240	84400	12133
Ana	Pot	Okr	Pot	Clu	Tom	Pot	Pot	Clu	Pot	Clu	Pot	Clu	Pot	Clu
	166260	7182	188940	3879	53400	2178	145000	4702	198000	4840	193600	4400	131610	4968
Meh	Tom	Oth	Pot	Oni	Pot	Cow	Pot	Cow	Pot	Cow	Pot	Cow	Pot	Oni
	73625	3250	83600	3800	116600	4880	101300	5440	107948	6337	115500	6497	149455	3880
Pat	Oth	Okr	Oth	Cucs	Oth	Oni	Oth	Oni	Oth	Oni	Oth	Oni	Oth	Tom
	21000	240	25500	450	26660	120	26160	220	21615	276	68340	220	32281	784
Pan	Oni	Pot	Oni	Oth	Oni	Oth	Oni	Oth	Oni	Oth	Oni	Cow	Bri	Oth
	11317	1300	12540	440	14000	656	13500	113	14220	187	15300	1076	7150	950
Dah	Bri	Okr	Bri	Cow	Bri	Pot	Cab	Pot	Bri	Pot	Bri	Pot	Oni	Cow
	16796	3572	20016	2034	16290	500	18405	640	21600	600	19250	738	26860	1300
Raj	Oni	Okr	Oni	Oth	Oni	Oth	Oni	Cow	Oni	Cow	Oth	Cow	Oni	Cow
	322850	4575	273218	1800	307700	1800	232080	80	221208	1104	322980	6760	325128	6880
Sab	Cau	Oni	Pot	Clu	Pot	Oth	Pot	Oth	Pot	Oth	Pot	Cow	Pot	Cow
	105000	1940	125875	240	159000	1000	150000	1400	189630	1518	272335	1862	462496	1312
Sur	Bri	Cau	Bri	Clu	Bri	Oni	Bri	Oni	Bri	Oni	Bri	Oni	Okr	Clu
	130150	900	93990	3575	114075	450	90356	1132	97887	1200	102959	4385	122271	10121
Sure	Bri	Cau	Bri	Cau	Bri	Pot	Bri	Pot	Bri	Pot	Bri	Pot	Bri	Cow
	73064	1500	36012	5460	34857	270	37693	630	59180	1080	56062	1300	57200	5797
Bar	Bri	Oni	Bri	Oth	Bri	Oth	Bri	Oth	Bri	Oth	Bri	Pot	Bri	Oth
	111600	8800	117826	4500	126502	4800	130055	4820	145120	4960	163590	16500	164500	12431
Val	Oth	Cau	Cuc	Cab	Cuc	Cab	Cuc	Cab	Cuc	Cau	Cuc	Cau	Cuc	Cau
	44100	100	47960	200	52910	170	54230	180	56896	158	63473	170	70400	200
Nav	Bri	Oni	Cuc	Cab	Cuc	Clu	Cuc	Clu	Cuc	Clu	Cuc	Cow	Cuc	Cau
	48025	2000	70596	300	64328	50	110528	120	112200	150	124890	508	132250	2090
Tap	NA	NA	NA	NA	Bri	Oni	Bri	Oni	Bri	Oni	Bri	Pot	Okr	Cab
	NA	NA	NA	NA	76275	150	57192	366	58800	1550	60800	250	80400	3520

Source: Computation from Secondary Data

Table 8 Mean Production of Spices in all Districts (Production in MTs)

Year	Cum	Fen	Chi	Gar	Cor	Gin	Tur	Fen	Isa	Aja	Suv	Oth
A	14761	8806	3153	21219	1842	6528	2751	625	3031	235	764	165
B	15285	12047	3738	23586	1799	5867	2255	524	4925	612	1425	182
C	19850	18118	12376	31211	1724	6512	2192	1535	5056	718	2771	1325
D	23880	15220	12904	21313	3202	6601	2453	937	4349	406	1769	76
E	22191	10875	17391	22284	3554	6813	2943	784	3956	538	1492	51
F	21922	12188	20079	22735	2720	9277	3349	1210	4002	619	4118	57
G	33330	10535	25427	46243	2693	8831	5610	1260	4854	796	8453	50
% Change	126	20	706	118	46	35	104	103	60	239	1006	-70
Rank	*5*	*11*	*3*	*4*	*9*	*10*	*6*	*7*	*8*	*2*	*1*	*12*

Source: Computation from Secondary Data

Table 9 Maximum & Minimum Production of Spices in all Districts (2005-06 to 2011-12) (Production in MTs)

District	A		B		C		D		E		F		G	
	Maxi	Mini	Maxi	Mini	Maxi	Mini	Maxi	Mini	Maxi	Mini	Maxi	Mini	Maxi	Mini
Ahd	Cum	Fen	Cum	Fen	Cum	Fen	Cum	Gar	Cum	Gar	Cum	Gar	Cum	Fen
	11298	3	12116	22	8109	30	10581	25	5508	20	6472	22	9044	85
Amr	Gar	Isa	Gar	Isa	Gar	Isa	Gar	Isa	Gar	Suv	Gar	Suv	Gar	Tur
	12995	7	5765	7	23733	8	13775	3	6600	10	20124	3	13460	36
Ban	Fen	Aja	Fen	Aja	Fen	Tur	Fen	Tur	Cum	Tur	Cum	Tur	Cum	Tur
	20160	14	27710	16	58625	16	55250	24	30150	24	34960	24	57812	40
Bha	Chi	Fen	Chi	Cor	Chi	Aja	Chi	Aja	Chi	Aja	Chi	Aja	Chi	Aja
	741	46	1056	10	11533	20	6892	35	7057	39	8063	43	6583	50
Nar	Chi	Cum	Chi	Aja	Chi	Aja	Chi	Aja	Chi	Aja	Chi	Aja, Suv	Chi	Aja
	610	4	710	1	7245	1	9125	2	10640	3	12000	8	13892	10
Bhav	Cum	Suv	Cum	Fen	Chi	Fen	Cum	Fen	Chi	Fen	Chi	Fen	Chi	Aja
	5923	8	4506	9	9787	35	7104	18	9750	20	10400	24	12155	79
Dan	Chi	Tur	Tur	Gar	Chi	Gar	Chi	Gar	Chi	Gar	Chi	Gar	Chi	Gin
	396	200	480	80	1092	100	1082	120	10350	200	11655	210	11670	519
Gan	Chi	Cor	Chi	Cor	Chi	Cor	Chi	Cor	Chi	Cor	Chi	Aja	Chi	Aja
	2666	13	3275	13	8330	13	8393	14	29302	16	31275	11	32681	13
Jam	Cum	Aja	Gar	Chi	Gar	Isa	Gar	Tur	Gar	Suv	Gar	Suv	Gar	Gin
	8885	168	52920	1188	50715	45	56620	21	56874	243	68434	239	62450	4
Jun	Gar	Fen	Gar	Fen	Gar	Fen	Gar	Isa	Gar	Fen	Gar	Fen	Gar	Isa
	62300	401	77190	480	106366	405	57488	295	62067	180	57770	30	70505	90
Por	Cum	Fen	Gar	Fen	Cum	Fen	Cum	Fen	Cum	Fen	Cum	Fen	Cum	Fen
	4475	108	4810	180	13153	502	18000	130	23760	150	20460	431	22428	461
Kut	Cor	Fen	Cor	Fen	Cor	Fen	Cor	Fen	Cor	Fen	Cor	Fen	Cum	Fen
	7061	75	10591	114	10640	137	10104	180	10914	195	11480	469	14040	500
Khe	Fen	Aja	Fen	Cor	Chi	Aja	Chi	Aja	Chi	Aja	Chi	Aja	Chi	Aja
	3614	25	3800	25	4880	10	4880	8	6500	8	7475	1	7625	1
Ana	Chi	Cor	Chi	Cor	Chi	Cor	Chi	Cum	Chi	Cum	Chi	Cum	Chi	Oth
	4470	120	4279	62	15691	78	4830	25	16625	28	16870	26	17500	50
Meh	Fen	Oth	Fen	Oth	Fen	Suv	Fen	Suv	Fen	Suv	Fen	Suv	Fen	Cor
	16668	75	30435	10	31500	240	31875	260	39060	260	43750	364	23232	350
Pat	Cum	Chi	Cum	Aja	Cum	Aja	Cum	Aja	Cum	Aja	Suv	Aja	Cum	Cor
	24038	100	25740	30	17311	56	14500	74	15472	85	25060	72	29190	20
Pan	Gar	Oth	Gar	Aja, Suv	Gin	Cor	Gin	Cor	Gin	Cor	Gin	Cum	Gin	Cor
	4530	5	4560	2	12000	15	13000	16	14200	20	30600	42	32500	87
Dah	Gin	Oth	Gin	Fen	Gin	Fen	Gin	Fen	Gin	Fen	Gin	Fen	Gin	Fen
	15660	103	15000	11	16115	8	15752	10	13200	12	16125	20	17740	215
Raj	Gar	Gin	Gar	Isa	Gar	Isa	Gar	Isa	Gar	Tur	Gar	Fen	Gar	Fen
	56850	10	60630	21	120435	27	85505	9	96040	200	70200	437	94580	420
Sab	Fen	Cor	Fen	Gar	Fen	Aja	Chi	Aja	Chi	Aja	Fen	Aja	Chi	Aja
	11338	63	13200	16	14170	25	6840	24	7388	28	10578	34	21120	12
Sur	Gin	Aja	Gin	Oth	Chi	Aja	Chi	Oth	Chi	Oth	Chi	Oth	Chi	Fen
	5600	90	5920	30	6877	30	6785	8	9088	16	9929	25	13266	62
Sure	Cum	Fen	Cum	Fen	Cum	Fen	Cum	Aja	Cum	Aja	Cum	Aja	Cum	Aja
	19635	19	21344	13	44175	22	83805	18	58050	8	59017	11	65739	20
Bar	Gin	Fen	Gin	Cor	Chi	Cor	Chi	Cor	Chi	Cor	Chi	Cor	Chi	Cor
	7568	197	5368	71	19350	100	21875	63	26357	69	30261	172	30530	185
Val	Tur	Corainder	Chi	Cor	Chi	Cor	Chi	Cor	Chi	Cor	Chi	Cor	Aja	Cor
	780	25	887	24	4294	25	903	25	998	25	1121	28	1680	50
Nav	Tur	Gin	Tur	Oth	Tur	Cor	Tur	Cor	Tur	Cor	Tur	Cor	Tur	Aja
	2887	1125	2100	387	2175	8	2432	21	2464	24	2864	32	13000	21
Tap	NA	NA	NA	NA	Chi	Gar	Chi	Gar	Chi	Suv	Chi	Suv	Chi	Aja
	NA	NA	NA	NA	20317	48	22942	50	18270	20	22470	30	45375	66

Source: Computation from Secondary Data

Table 10 Mean Production of Flowers in all Districts (Production in MTs)

Source: Computation from Secondary Data

Table 11 Maximum & Minimum Production of Flowers in all Districts (2005-06 to 2011-12) (Production in MTs)

District	A		B		C		D		E		F		G	
	Maxi	Mini	Maxi	Mini	Maxi	Mini	Maxi	Mini	Maxi	Mini	Maxi	Mini	Maxi	Mini
Ahd	Mar	Lil	Mar	Lil	Ros	Oth	Mar	Oth	Mar	Oth	Mar	Oth	Mar	Oth
	2086	130	1896	187	2360	291	2070	292	2085	303	2704	390	2900	425
Amr	Ros	Mar	Mar	Oth	Ros	Lil	Ros	Mog	Ros	Mog	Ros	Oth	Ros	
	32	12	44	28	170	16	210	21	184	24	211	32	223	
Ban	Mar	Lil	Mar	Lil	Mar	Mog	Mar	Lil	Mar	Lil	Mar	Lil	Mar	Lil
	377	4	765	4	900	15	1100	24	1200	16	1480	24	1838	20
Bha	Ros	Mog	Mar	Oth	Oth	Lil	Oth	Mog	Oth	Mog	Oth	Mog	Ros	Mog
	1470	287	1750	500	3348	36	3800	598	4053	640	8190	787	6157	1579
Nar	Mar	Mog	Mar	Oth	Mar	Mog	Mar	Lil	Mar	Lil	Mar	Lil	Mar	Lil
	390	50	366	16	432	40	585	20	840	18	875	23	1028	30
Bhav	Ros	Oth	Ros	Lil	Ros	Mog	Ros	Mog	Ros	Lil	Ros	Lil	Ros	Mog
	632	75	912	2	1840	35	1235	34	1152	6	1216	6	1382	26
Dan	Ros	No	Ros	Mar	Mar	Ros	Mar	Lil	Lil	Oth	Mar	Oth	Mar	Oth
	113	No	161	130	260	160	195	65	476	78	384	8	536	17
Gan	Mar	Lil	Mar	Mog	Mar	Mog	Mar	Mog	Mar	Mog	Mar	Mog	Mar	Mog
	3480	16	3680	18	3888	28	4090	30	4050	30	4293	30	4577	30
Jam	Mar	Lil	Mar	Lil	Mar	Lil	Mar	Lil	Mar	Lil	Mar	Mog	Mar	Mog
	324	2	242	2	354	8	465	144	712	334	877	350	1030	3
Jun	Oth	Ros	Ros	Mog	Ros	Mar	Ros	Mar	Ros	Mar	Ros	Lil	Ros	Lil
	124	36	436	80	280	132	288	132	272	132	608	70	644	90
Por	Oth	Mar	Oth	Ros	Oth	Ros	Oth	Mar	Oth	Mar	Mar	Mar	Oth	Ros
	77	32	145	76	200	56	256	77	268	86	348	102	290	128
Kut	Ros	Lil	Ros	Lil	Ros	Oth	Ros	Oth	Ros	Oth	Ros	Oth	Ros	Oth
	336	64	394	64	600	110	680	189	734	197	755	322	830	146
Khe	Mar	Mog	Mar	Mog	Lil	Mog	Ros	Mog	Ros	Mog	Ros	Mog	Mar	Mog
	5178	35	4200	35	3069	74	3720	74	3904	74	4184	21	4260	21
Ana	Ros	Mog	Ros	Mog	Lil	Mog	Ros	Mog	Ros	Mog	Mar	Mog	Mar	Mog
	2358	50	3031	75	4740	53	3816	59	4150	65	5685	54	6179	54
Meh	Ros	Oth	Ros	Oth	Ros	Oth	Ros	Oth	Ros	Oth	Mar	Oth	Mar	Oth
	120	28	144	42	200	63	126	63	139	70	178	70	189	93
Pat	Mar	Ros	Mar	Lil	Ros, Mar		Ros	Mar	Ros	Mar	Ros	Mar	Ros	Mog
	59	8	54	2	40		63	24	150	54	140	71	172	16
Pan	Mar	Lil	Mar	Lil	Mar	Lil	Mar	Lil	Mar	Lil	Mar	Lil	Mar	Mog
	115	2	127	12	400	18	560	16	720	40	805	56	1200	30
Dah	Ros	Mog	Ros	Mog	Ros	Mog	Ros	Lil	Ros	Lil	Mar	Lil	Mar	Lil
	460	72	632	18	1600	48	880	23	460	12	870	10	1150	11
Raj	Mar	Lil	Mar	Lil	Mar	Lil	Mar	Oth	Mar	Oth	Mar	Oth	Mar	Oth
	288	4	312	6	420	40	456	40	1728	120	2064	176	2280	203
Sab	Mar	Ros	Mar	Ros	Mar	Ros	Mar	Oth	Mar	Oth	Mar	Oth	Mar	Oth
	52	8	210	8	240	50	330	4	356	10	455	21	476	54
Sur	Ros	Oth	Mar	Lil	Mar	Oth	Mar	Lil	Ros	Lil	Oth	Lil	Mar	Lil
	2106	1986	2244	140	1650	92	2094	405	2958	129	4050	150	5027	264
Sure	No	No	Mar	No	Ros, Oth		Mar	Ros	Mar	Ros	Mar	Ros	Mar	Ros
	No	No	12	No	16		16	13	32	25	40	35	128	48
Bar	Mar	Lil	Mar	Lil	Mar	Mog	Mar	Lil	Mar	Lil	Mar	Lil	Mar	Lil
	2718	150	4610	240	5450	700	5750	230	5830	288	6121	312	6410	315
Val	Ros	Oth	Ros	Oth	Ros	Oth	Mar	Oth	Mar	Oth	Lil	Oth	Lil	Oth
	604	14	1226	40	2328	48	2240	48	2800	60	10126	103	10045	250
Nav	Lil	Ros	Lil	Oth	Lil	Oth	Lil	Oth	Lil	Oth	Lil	Oth	Lil	Mog
	3000	375	3250	80	8040	100	8184	140	9768	162	11270	233	12152	20
Tap	NA	NA	NA	NA	Mar	Lil	Mar	Lil	Mar	Mog	Mar	Mog	Mar	Mog
	NA	NA	NA	NA	858	280	896	378	1232	12	1792	16	3105	20

Year	Ros	Mar	Mog	Lil	Oth
A	975	1521	70	275	422
B	242	1858	144	334	350
C	614	2042	132	1485	590
D	708	2576	134	978	742
E	982	2900	152	1054	712
F	2284	3671	189	1897	1322
G	2328	4374	268	1960	951
% Change	144	88	180	613	125
Rank	4	3	2	1	5

Source: Computation from Secondary Data

Table 12 Test Statistic for ANOVA (Area)

Fruits						
Year		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
2005-06	Between Groups	1300	24	54.17	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1300	24			
2006-07	Between Groups	1288	23	55.98	4.48	0.36
	Within Groups	13	1	12.50		
	Total	1300	24			
2007-08	Between Groups	1488	25	59.54	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1488	25			
2008-09	Between Groups	1488	25	59.54	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1488	25			
2009-10	Between Groups	1488	25	59.54	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1488	25			
2010-11	Between Groups	1488	25	59.54	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1488	25			
2011-12	Between Groups	1488	25	59.54	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1488	25			
Vegetables, Spices						
Year		Sum of Squares	df	Mean Square	F	Sig.
2005-06	Between Groups	1300	24	54.17	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1300	24			
2006-07	Between Groups	1300	24	54.17	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1300	24			
2007-08	Between Groups	1488.462	25	59.54	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1488.462	25			
2008-09	Between Groups	1300	24	54.17	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1300	24			
2009-10	Between Groups	1488.462	25	59.54	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1488.462	25			
2010-11	Between Groups	1488.462	25	59.54	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1488.462	25			
2011-12	Between Groups	1488.462	25	59.54	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1488.462	25			

Source: SPSS Output

Table 13 Test Statistic for ANOVA (Output)

Year		Flowers Sum of Squares	df	Mean Square	F	Sig.
2005-06	Between Groups	1314	23	57.13	0.66	0.76
	Within Groups	175	2	87.25		
	Total	1488	25			
2006-07	Between Groups	1456	24	60.69	1.90	0.53
	Within Groups	32	1	32.00		
	Total	1488	25			
2007-08	Between Groups	1488	25	59.54	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1488	25			
2008-09	Between Groups	1404	24	58.50	0.69	0.76
	Within Groups	85	1	84.50		
	Total	1488	25			
2009-10	Between Groups	1488	25	59.54	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1488	25			
2010-11	Between Groups	1410	23	61.30	1.56	0.46
	Within Groups	79	2	39.25		
	Total	1488	25			
2011-12	Between Groups	1488	25	59.54	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1488	25			

Year		Fruits Sum of Squares	df	Mean Square	F	Sig.
2005-06	Between Groups	1300	24	54.17	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1300	24			
2006-07	Between Groups	1300	24	54.17	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1300	24			
2007-08	Between Groups	1488	25	59.54	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1488	25			
2008-09	Between Groups	1488	25	59.54	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1488	25			
2009-10	Between Groups	1488	25	59.54	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1488	25			
2010-11	Between Groups	1488	25	59.54	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1488	25			
2011-12	Between Groups	1488	25	59.54	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1488	25			

Vegetables, Spices						
Year		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
2005-06	Between Groups	1300	24	54.17	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1300	24			
2006-07	Between Groups	1300	24	54.17	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1300	24			
2007-08	Between Groups	1488	25	59.54	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1488	25			
2008-09	Between Groups	1300	24	54.17	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1300	24			
2009-10	Between Groups	1488	25	59.54	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1488	25			
2010-11	Between Groups	1488	25	59.54	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1488	25			
2011-12	Between Groups	1488	25	59.54	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1488	25			
Flowers						
Year		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
2005-06	Between Groups	1314	23	57.13	0.66	0.76
	Within Groups	175	2	87.25		
	Total	1488	25			
2006-07	Between Groups	1488	25	59.54	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1488	25			
2007-08	Between Groups	1488	25	59.54	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1488	25			
2008-09	Between Groups	1488	25	59.54	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1488	25			
2009-10	Between Groups	1488	25	59.54	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1488	25			
2010-11	Between Groups	1488	25	59.54	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1488	25			
2011-12	Between Groups	1488	25	59.54	0.00	0.00
	Within Groups	0	0	0.00		
	Total	1488	25			

Source: SPSS Output

Table 14: Entrepreneurial Opportunities in Horticulture Products Processed Through Food Processing

Item	Value Added-Products and By-Products
Fruits	
Mango	Fruit leather (fruit roll, papad), pulp, pudding, beverages (nectar), mango slice, canned slices, jam, chutney, puree, juice, particulates (additives in dairies and bakery), pickles, frozen mango, dried mango product, jelly, syrup, canned mango, powder, murabba, aam papri, milkshake, toffee, amchur, chutney, squash, ready-to-serve drink, starch from mango kernel, mango concentrate, dehydrated mango, alcoholic beverage.
Chiku	Blend mashed in bread, muffins, pancake, sweet sauce, jam, milkshake, pulp, powder, juice, squash, syrup, toffee, candy, dried fruit scrap, ice-cream
Citrus	It includes lemon, lime, orange and grapes. Juice, cooking ingredient, carbonated beverages, canned fruit, frozen fruit, lemon puree, lemon juice concentrate, lemon pickle, orange juice concentrate, orange puree, orange wine, cold pressed lemon oil, cold pressed orange oil, dried lemon peel, dried orange peel, grapes wine, raisin, grape jam, vinegar, marmalade, cordial, peel waste as cattle food.
Ber	Pickle, dehydrated, fermented products of ber, candy, juice, pulp, preserve, canned ber, jam.
Banana	Chips, juice, milkshake, powder, baby food, biscuits, cake, flavor, puree, jelly, sweet coat banana, flour, concentrate, pulp, wine, beer, wafers (chips), pickles from flower, powder, juice, candy from centre core stem, sauce, drink, vinegar, root juice, canned banana, dried banana, brandy, chutney, jam, toffee, banana cake, banana fiber products like saree, cloth etc.
Guava	Pectin, jam, jelly, pickle, powder, puree, peru khand, beverages, ethanol, cheese, toffee, nectar, canned guava, squash, vinegar, juice, pulp, production, wine, paste.
Pomegranate	Juice, jelly, syrup, squash, nectar, anar rub, anar crush, dried pomegranate (anar dana), powder, wine.
Dates	Dried dates, sweets, dates sugar, dates paste, syrup, vinegar, cull dates, terminal buds as tasty additions to vegetable salads, products from date leaves like mats, screens, baskets, crates and fans.
Papaya	Papain from papaya latex, jam, marmalade, tutty-fruity (candy), pickle, wafers (papad), chocolate, canned papaya, fridge dried papaya, candy, nectar, sauce, jelly slices.
Custard	Powder, pulp.
Aonla	Powder, squash, jam, in ayurvedic medicine, aonla candy, juice, amla supari, jelly, murabba, chutney, pickle, dehydrated aonla.
Cashew-Nut	Roasted cashew nut, salted cashew nut.
Coconut	Coconut oil (cooking oil, body oil, hair oil and soap), desiccated coconut (dry coconut, sweetened coconut, toasted coconut, creamed coconut), dried coconut (copra), kernel (chips, cream, milk powder, cheese, yoghurt), coconut water into vinegar, coconut sugar, coconut leaflets (toothpicks, brooms).
Vegetables	
Potato	In fast food, staple food, french fries, chips, flakes, flour, starch, dehydrated potato products like slices, shreds, papads, extruded potato products, liquid glucose, frozen potatoes.
Onion	Powder, paste, staple food, dehydrated onion, onion salt, onion juice, natural dye, onion pickle.
Brinjal	Staple food, canned, pickle, frozen.
Cabbage	Staple food, vegetable soup mix, leaf powders, frozen.
Okra	Staple food.
Tomato	Paste, juice, puree, dried flakes, sauce, dehydrated, frozen.
Cauliflower	Staple food, dehydrated, frozen.
Cluster Bean	Staple food, cattle food, green manure, guar gum.
Cow Pea	Staple food, dehydrated, frozen.
Cucurbit	Staple food, salad, feed for cosmetics.
Spices & Flowers	
All Spices	As main ingredient in cooking food. Dehydrated spices are converted in powder form and packaged as ready to use masalas in preparation of cuisines. Purees and paste are also made of coriander and ginger.
All Flowers	Garlands, bouquets, as decorative items for home and temples. Extracted nectar from flowers like rose, mogra, lily, and marigold is used as cooking flavours (essence). It is also used for fragrance in soap, cosmetics and perfumes.

Source: Authors' Compilation

Table 15:
Snapshot on Entrepreneurial Opportunity based on Horticulture Trend in Gujarat

Crop	Top Five Crops for Entrepreneurial Venture
Fruits	Papaya, Others, Pomegranate, Banana & Coconut
Vegetables	Potato, Okra, Cabbage, Tomato & Onion
Spices	Suva, Ajawan, Chilly, Garlic & Cumin
Flowers	Lily, Mogra, Marigold, Rose & Others

Source: Secondary Data