

**Full Length Research Paper**

## Apple Cultivation in Himachal Pradesh: SWOT Analysis and Identified Issues for the Sector Development – A Case Study

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**Abstract**

Apple is the lifeline of Himachal Pradesh. In this state it emerges as a potential cash crop for the local orchardists. For sustainable development and growth of Apple, there is an urgent need to efforts should be carried out on time to time SWOT analysis and vision development of the sector.

**Key Words:** Apple, Himachal, SWOT, Sector Development, Economic Potential, Management, Vision Development

**Introduction**

Apples originated in the Middle East more than 4000 years ago. Spreading across Europe to France, the fruit arrived in England at around the time of the Norman Conquest in 1066. Apple is considered as king of delicious fruits. It can be grown in a wide range of soil and climate and its propagation is made through various methods. (Muhammad *et al.*, 2002). Apple (*Malus pumila*) is commercially the most important temperate fruit and is fourth among the most widely produced fruits in the world after banana, orange and grape. China is the largest apple producing country in the world. Latest Production – 29.91 Lakh Tonnes (2011). In north-western region the major apple growing regions are Shimla, Kullu, Sirmour, Mandi, Chamba, Kinnaur at Himachal Pradesh. The major varieties of Apple are as follows at Himachal Pradesh which is growing by growers.

**Table 1.** Major Apple Varieties of Himachal Pradesh

Season	Himachal Pradesh
Early Season	Tydemens' early (P), Michael Molies, Delicious, Schlotmit
Mid Season	Starking Delicious, Red Delicious Richared, Vance Delicious, Top Red Chief, Oregon Spur, Red spur and Red Gold (P)
Late Season	Golden Delicious (P), Yellow Newton (P), Winter Banana and Granny Smith (P) <i>P- Pollinator</i>

Source: National Horticulture Mission.

The year wise scenario of Apple Production, area and productivity is as follows. In 2010-11 the area under Apple Production was 289.1 thousand ha. The total production was 2891 thousand MT and the productivity was 10 MT/ Ha however the productivity is less than other apple growing countries.

**Table 2.** Year wise Scenario of Apple Production

Year	Area (000 Ha)	Production (000 MT)	Productivity (MT/Ha)
1991 - 92	194.5	1147.7	5.9
2000-01	239.8	1226.6	5.1
2001-02	241.6	1158.4	4.8
2002-03	193.1	1348.4	7
2003-04	201.2	1521.6	7.6
2004-05	230.7	1739	7.5
2005-06	226.6	1814	8
2006-07	252	1624	6.4
2007-08	264	2001	7.6
2008-09	274	1985	7.2
2009-10	282.9	1772.2	6.3
2010-11	289.1	2891	10

Source: National Horticulture Mission.

On the basis apple production area Jammu and Kashmir is the largest apple growing state at India. Himachal Pradesh contributes 35.11 % area for Apple Cultivation while Uttarakhand, Arunachal Pradesh and others contributes only 15.87 %. (Source: National Horticulture Mission).

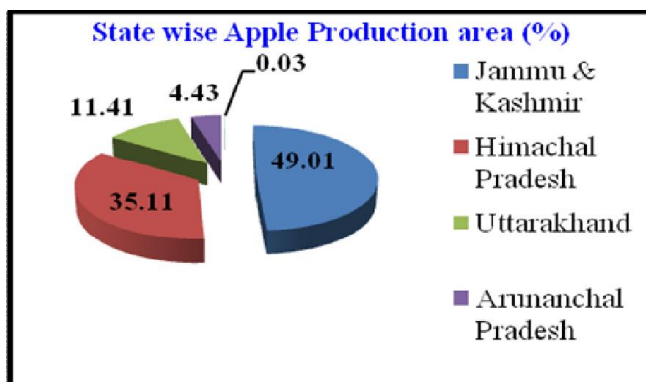


Fig. 1. State wise scenario of Apple Production Area

**Material and Methods**

**Study Area**

Located at elevation of 23, 00 meter above sea level, Village Kandaghai is beautiful destination in District – Kullu, Himachal Pradesh. To know the demographic, social, geographical and Apple Orchard Management practices we have done detail survey at Kandaghai area. On the basis of primary survey there are 86 male, 81 female and 32 children at Kandaghai area. Based on our primary survey the villagers are keeping Jersey Cows. The average livestock holding of Kandaghai village is 1.46 Cattle per family. The cow dung is the main traditional source of compost for their orchards. The educational status of village Kandaghai is as follows.

- ✓ Below High –School – 28.14 %
- ✓ High- School – 22.11 %
- ✓ Intermediate – 20.6 %
- ✓ Graduate – 16.58 %
- ✓ Post Graduate – 12.56 %

**Land Holdings of Village Kandaghai:** - The total horticulture land of Kandaghai area is near about 831.5 Bigha. The average land holding of per person is 18.47 Bigha. All the land is fragmented only few are consolidated.

Table 3. Land Holding

Land Holdings (Bigha)	Total Land Holdings (Bigha)	No. of Holders
1- 5	41	9
6- 10	73	9
11- 15	123	10
16- 20	260.5	9
21- 25	119	5
Above 25	215	3
<b>Total</b>	<b>831.5</b>	<b>45</b>

**Status of Apple Orchards:** The growers are mainly growing two varieties of Apples namely Royal Delicious and Golden Delicious. The commercial variety is Royal Delicious. Golden Delicious is mainly pollinator.

- ✓ Total Productive plants of Royal Delicious- 17725 (No.)
- ✓ Total No. of New Plantation – 1600 (No.)
- ✓ Total Production of Royal Delicious – 45475 Boxes (1000450 Kg. near about)

**Selection Criteria of Study Site:**

- ✓ Poor Apple Orchard Management Practices
- ✓ Crises of water availability in the orchards
- ✓ Lack of advance technology and lack of modern communication and education facilities in the villages of targeted area.

**SWOT analysis for Sector Development:**

SWOT analysis (alternatively SWOT matrix) is a structured planning method used to evaluate the strengths, weaknesses, opportunities, and threats involved in a project or in a sector. SWOT analysis is very useful tool for community vision development (Singh, N, 2010).

Aims of the study were to know the strength, weakness, opportunity and threats of Apple cultivation sector at village Kandaghai. Again this analysis will be helpful for the development of shared vision for sector development.

#### Strength

- ✓ Large scale cultivation of Apples from last 60- 80 years
- ✓ Good technical knowledge about cultivation practices
- ✓ Naturally best suited sites for Apple cultivation
- ✓ Easy supply of good planting material
- ✓ Occurrence of good registered nurseries
- ✓ Easy availability of different farm inputs from nearby markets
- ✓ Continuous increasing demand of Apple
- ✓ Sound and effective marketing system of Govt. and Private sector
- ✓ Sound Marketing Policy

#### Weakness

- ✓ Improper and less know- how about Apple Orchard Management
- ✓ Improper use of spray, chemicals, insecticides & pesticides
- ✓ Degradation of old Apple Gardens
- ✓ Lack of proper dialogue with Govt. agencies, research organization, universities and others

#### Opportunities

- ✓ Organized and multi- optional marketing options e.g. Govt. Agencies, ADANI, FHEL, ALL FRESH and other different agencies
- ✓ Marketing through self help groups corporation, different sameti & other corporations
- ✓ Value addition by private sector for Apple orchard management
- ✓ Opportunities for re – establishment of Apple orchards

#### Threats

- ✓ Degradation of old orchards
- ✓ Infestation of Woolly Apple Aphids, San Jose Scale & Other Scale Paste, Apple Root Borer, Apple Thrips, Phytophthora Mites, Diseases e.g. Leaf Fall, Alternate Blight & Core Root, Cankers, Powdery Mildew, Root Rot and Collar Rot
- ✓ Absence of adequate Post Harvest Management
- ✓ Absence of adequate Nutrition Management

#### Shared Vision for the Apple Cultivation- Sector Development

After SWOT analysis of the villages an excessive exercise was done to develop a shared community vision for the sector development and strengthen of Apple. The basic approach used was to visualize the major areas that are key factor for the development of Apple cultivation and have a futuristic viewpoint of that area so, each villager was asked to identify opportunities and constraints they face to in day to day life. All such priorities were grouped in to different categories/ themes. Based on the exercise the following issues were identified for the sector development of Apple.

##### 1. Training, Pruning and Pollinizers Management, Establishment of New Orchard and Rejuvenation of Old Orchards

#### Components should be covered:

- ✓ Training on knowhow for Trimming of Low and High Density Plantation
- ✓ Management of Dense Canopies (Low Light and Air Penetration)
- ✓ Management of Excessive Spurs at Undesired Locations on Standard Trees
- ✓ Pruning Management according to Crop Years to Regulate crop
- ✓ Management of Rejuvenation Technology followed to Renew Old Trees
- ✓ Improper Placement of Pollinizers, Causing excessive growth in Top work
- ✓ Lack of diversity in Pollinizers production
- ✓ Insurance of Pollinizers proportion – should be 25 % at Kandagai, Kathar and Kuther Area
- ✓ Alternate bearing in pollinizing varieties – No regulation Practices
- ✓ Lack of natural Pollinators according to New and Propitiation of Pollinizers
- ✓ Lack of Layout of Orchards
- ✓ Improper Digging and Filling of Pits
- ✓ Lack of Pollinizers placement and their diversity
- ✓ In HDP (High Density Plantation) Spur Plantation and Planting of Non – Spur Pollinizers on seedlings
- ✓ Lack of Follow-up of Area Specific Recommendation
- ✓ Non Follow – up of Technology for replanting old site
- ✓ Lack of mulching and stacking in new plantation

## 2. Nursery Management

### Components should be covered:

- ✓ *Standard Procedure for Healthy Nursery Raising*
- ✓ *Commercial Varieties and Pollinizers for Nursery Production*
- ✓ *Creation and Importance of Bud – wood/ Root stock / Rootstock Banks and Mother Orchard and their management*
- ✓ *Nursery production Methodologies through seeds and Clonal methods*
- ✓ *Seed Treatment Techniques, Seed Stratification*
- ✓ *Preparation of Nursery Beds and Procedure of Seed raising*
- ✓ *Procedure of Budding and Grafting*
- ✓ *Procedure of Clonal Root Stock Production*
- ✓ *Important Disease and Pest of apple Nurseries and Their Management*
- ✓ *Importance and Methods of Virus free Nursery Plants*
- ✓ *Nutrition Management in Apple Nurseries specially Organic and inorganic Nutrient Requirement and Applications*
- ✓ *Lack of Pollinizers Placement and their Diversity*
- ✓ *In HDP (High Density Plantation) Spur Plantation and Planting of Non- Spur Pollinizers on seedling*
- ✓ *Lack of Follow-up of Area Specific Recommendation*
- ✓ *Non Follow- up of Technology for replanting at old site*
- ✓ *Post Harvest Uprooting Management of nursery plants e.g. Plant Distribution, Topping and Root pruning, Culling of Under – Sized sub Standard Plants, Labeling, Packing and Storage*

## 3. Pest and Disease Management

### Components should be covered:

- ✓ *Incidence of Pest and Disease Pests*
  1. *Wooly Apple Aphid*
  2. *San Jose Scale & Other Scale Pests*
  3. *Apple Root Borders*
  4. *Apple Thrips*
  5. *Other Insect Pests*
  6. *Phytopthera Mites*

#### • Disease

1. *Leaf Fall*
2. *Alternate Blight and Core –Root*
3. *Cankers*
4. *Powdery Mildew*
5. *Root Rot and Collar Rot*

## 4. Post Harvest Management (PHM) and Fruit Handling During Harvesting and Transportation

- *Absence of Adequate PHM Infrastructure*
  - *Pre Harvest Practices*
    - *Spray of CaCl<sub>2</sub>*
    - *Spray of Ethereal (Dependency upon Market Condition)*
  - *Harvesting at Optimum Maturity Stage*
    - *Determination of suitable Maturity Stages*
    - *Ease of Separation*
- *Absence of Adequate PHM Infrastructure*
  - *Pre Harvest Practices*
    - *Spray of CaCl<sub>2</sub>*
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  - *Harvesting at Optimum Maturity Stage*
    - *Determination of suitable Maturity Stages*
    - *Ease of Separation*

- Post Harvest Handling
  - Pre Cooling (Field Heat Removal)
  - Air Cooling
  - Hydro cooling
  - Ice Cooling
  - Vacuum Cooling
- Grading
  - Manual Grading
  - Mechanical Grading : Through Censors ( Colour, Weight and Size)
- Pre-treatment
  - Waxing and Etheral Dip
- Packing
  - Universal Cartons
- Post Harvest Handling
  - Pre Cooling (Field Heat Removal)
  - Air Cooling
  - Hydro cooling
  - Ice Cooling
  - Vacuum Cooling
- Grading
  - Manual Grading
  - Mechanical Grading : Through Censors ( Colour, Weight and Size)
- Pre-treatment
  - Waxing and Etheral Dip
- Packing
  - Universal Cartons
  - Crates
  - Consumer Gift Pack & Shrink Wrapping
  - Crates
  - Consumer Gift Pack & Shrink Wrapping
- Transportation
  - Cool Chain Concept
  - Refrigerated Trucks
  - Congenial Warehousing in Market Yard
- Storage
  - Adequate Storage Facilities
  - Up-gradation of Conventional Cold Storage into CA Storage
  - Storage under Modified Atmosphere (MA Storage)
  - Low Cost Storage e.g. ZECC, Air Cool Storage etc
- Commodity Based Funding
  - Easy Funding under Warehouse Receipts
- Gainful Utilization of Culled Fruits
  - Primary processing
  - Pulping
  - Buy – Back Arrangements
  - Secondary Processing- Cottage Scale Fruit Processing Units For Value Added Products
  - Home Scale Preparation

##### 5. Nutrition Management

- Importance of Nutrients In Apple Farming
- Application of Soil and Leaf/Tissue Analysis
- Role of Balanced Nutrition
- Methods of Soil and Leaf Sampling
- Soil Health Cards
  - Soil and Tissue Test Based Nutrient Management
    - Soil Sampling Techniques : When, Where, What and How

- Organic Application of Nutrient

### Conclusion

On the basis of above SWOT analysis and identified issues systematic and scientific steps have to be taken to bring a revolution in the method of Apple Orchard Management, Nursery Management, Pest and Disease Management, Post Harvesting Methods,

- Leaf Sampling Techniques: When, Where, What and How
- Deficiency Symptoms of Different Nutrients
- Result Based Recommendation
- Source of Nutrients (Organic / Inorganic)
- Nutrient Monitoring For Healthy Orchard Management

Organic Application etc work has to be carried out in co- ordination with Apple Growers and Scientists at large scale in the State. It is important to emphasize that a proper interaction between Villagers, Orchardists, Horticulture Department, Non Govt. Organizations, Universities, Research Institutes and Other Government Agencies. A proper and people centered approach should be implement in the area according to area specific needs based. Formulation and implementation of an area specific regional policy should further result better productivity and conservation of that horticulture system.

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