

## **SOUTHERN CALIFORNIA**

### **THE DEVELOPMENT OF A SEMI-ARID REGION**

It lies on longitude 115°W to 125°W and latitude 33°N and 42°N. San Francisco is the largest city in the state, while cities like Los Angeles and San Diego are very important cities with varied functions.

#### **THE RELIEF OF CALIFORNIA**

The relief of California can be divided into three broad divisions.

1. **The Coastal ranges.**

These are low folded mountains running parallel to the Pacific Coast the lower slopes and valleys which support growth grapes for producing wine.

2. **The Sierra Nevada ranges (mnts)**

These are Mountains that run from North to South in the East. They are deeply dissected by rivers on the Western side.

3. **The Central Valley**

This is a Synclinal depression closed by Mt. Shasta in the North and Mt. Tehachapi in the South.

It lies between the coastal ranges and Sierra Nevada Mountains. The Valley floor is generally flat until thick deposits of silt and gravel washed down the Sierra Nevada Mountains.

It is drained by R. Sacramento in the North and R. San Joaquin in the South.

It is important for growing of potatoes, sugar beet, Cotton Orchard fruits in the North.

In the South of the valley cotton, peaches, grapes, citrus fruits are grown.

Diary and truck farming also takes place here.

4. **The Desert Region**

The south East of California consists of desert regions with parts below sea level e.g. Majore and Colorado deserts, the death valley, scales lake and salton depression from part of the boundary.

#### **CROSS – SECTION/PROFILE OF CALIFORNIA RELIEF**

### **CLIMATE IN CALIFORNIA**

California is generally a semi –arid region. It has three types of Climate.

1. The North Part has a temperate (wet and cold). It experiences heavy rainfall and the region is dominated by highlands covered by snow throughout the year.

The North is sparsely populated because it is too cold for human settlement.

### **EUREKA: COOL TEMPERATURE CLIMATE (WET AND COLD)**

Months	<b>J</b>	<b>F</b>	<b>M</b>	<b>A</b>	<b>M</b>	<b>J</b>	<b>J</b>	<b>A</b>	<b>S</b>	<b>O</b>	<b>N</b>	<b>D</b>
Temp°C	8	9	10	10	12	13	13	14	13	13	11	10
R/F (mm)	170	141	136	69	58	17	3	3	15	82	118	170

2. The Central Valley experiences the Mediterranean type of climate. The area has cool – wet winters and warm-dry summers. R.F. is low because of the rain shadow.

### **MODESTO: MEDITERRANEAN CLIMATE**

Months	<b>J</b>	<b>F</b>	<b>M</b>	<b>A</b>	<b>M</b>	<b>J</b>	<b>J</b>	<b>A</b>	<b>S</b>	<b>O</b>	<b>N</b>	<b>D</b>
Temp°C	7	10	14	16	19	21	25	24	21	16	10	8
R/F (mm)	58	51	51	26	20	0	0	0	7	17	26	66

### **3. Desert Climate**

Desert Climate is experienced in the Southern part of the state and this region receives less or no rainfall at all. It supports heavy population.

### **SAN DIEGO: DESERT CLIMATE**

Months	<b>J</b>	<b>F</b>	<b>M</b>	<b>A</b>	<b>M</b>	<b>J</b>	<b>J</b>	<b>A</b>	<b>S</b>	<b>O</b>	<b>N</b>	<b>D</b>
Temp°C	12	13	14	15	16	18	19	20	19	17	15	13
R/F (mm)	46	49	38	15	7	3	3	3	3	10	23	46

In Summary, temperature increase South wards towards the hot tropical region, the rainfall totals. Increase northwards towards the region of heavy rainfall throughout the year and decreases towards Mexico. Summers are hot and dry while winters are mild and rainy.

#### 4. **The soils of California**

The soils in the state of California vary from place to place. The upper slopes of the Mountains have thin soils due to the effect of erosion (denudation) while the soils in the central valley are very fertile because of the alluvial deposited by the rivers give rise to fertile alluvium soils.

#### 5. **The Vegetation in California**

California has a variety of vegetation types. The Western slopes of the Mountains have dense Coniferous forests while on the lee-ward side of the coastal ranges, desert vegetation predominates particularly cactus and shrub.

In the Central and Imperial Valley the original vegetation was grassland which has been cleared for agriculture.

#### 6. **Drainage in California**

California is drained by two major rivers and these are;  
R. Sacramento in the North and R. San Joaquin in the South. However, the Southern part of California is joined by R. Colorado. The two rivers i.e. join before flowing in the San Francisco bay. The waters of these two rivers plus R. Colorado together with other small ones in California that flow from provide water for irrigation and HEP generation.

#### 7. **The Central Valley**

The Central Valley is a vast, long and narrow depression lying between Sierra Nevada and the Coastal ranges. Its soils are fertile and rich due to the streams that have been flowing down from the Sierra Nevada ranges depositing alluvial soils.

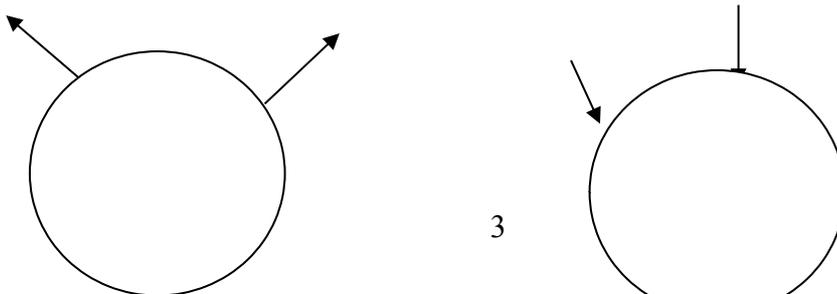
Below the surface, underground water flows slowly the year. This water can be underground wells for irrigation.

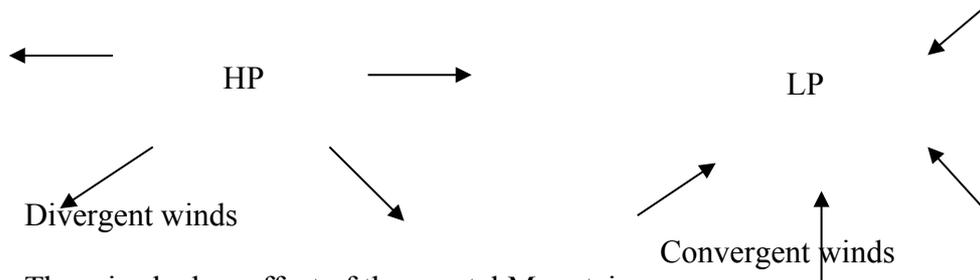
The physical environment of California is hostile yet many people live there even problem faced in California results from.

1. Low rainfall amounts and distribution.
2. Low volume of water in the rivers.

### **WHY THE CENTRAL VALLEY AND SOUTHERN CALIFORNIA RECEIVE LESS RAINFALL.**

1. These regions lie in the high pressure belts. This means that the rain bearing winds move away from centres of high pressure hence causing no rainfall in the high pressure centres. So the air currents are divergent.





2. The rain shadow effect of the coastal Mountains.

Winds blowing from the Pacific Ocean meet the coastal ranges and cause rainfall on the ranges while those blowing from the East meet the Sierra Nevada Mountains causing rainfall on the Mountains.

The descending winds to the central valley are dry winds having no moisture and therefore causing no rainfall in the central valley which lies in the rain shadow.

The hot temperatures cause high evaporation rates especially during summer. Rains come in winter.

**POPULATION DISTRIBUTION IN CALIFORNIA**

Most people are settle in the Southern drier parts of the state while few people are distributed in the Northern parts of the state.

Urban areas such as San Francisco, San Diego, Los Angeles, and Sacramento are densely populated. California has a high degree of urban development majority of the population living in cities.

**WATER PROBLEM IN THE CENTRAL VALLEY**

Water is the biggest problem in the Central Valley. Most of the land in the Central Valley is under Irrigation.

$\frac{1}{4}$  of the total rainfall in California occurs in the densely populated South, where as  $\frac{3}{4}$  of total rainfall occur in the most sparsely populated North.

Even the little that occurs in the densely populated South comes in winter when the farming activities are not taking place.

River Sacramento carries more water than whereby it has its origin in the North where there is heavy rainfall in the highlands.

To satisfy the huge demands of farmers, industrialists, and domestic use, water transfer scheme. This is because water is mostly needed in the Southern parts of the state and it is plenty in the North part of the state.

### **WATER TRANSFER SCHEME (SOLUTION TO THE WATER PROBLEM IN THE CENTRAL VALLEY)**

The water transfer scheme involves the transportation of large amounts of water from the Northern parts to the Southern parts of California. The scheme also involves storage of water during winter for use during summer.

#### **THE PROJECT WAS BASED ON**

1. Two large water dams
  2. Two major canals
  3. A giant conservation pumping plant
- Shasta Dam on R. Sacramento in the North.
  - Friant Dam on R. San Joaquin in the South.

#### **The two major canals are;**

- Delta – Mendota Canal
- Delta –Cross Canal

#### **1. Construction of Dams**

Dams have been constructed to store water during winter which can later be released in summer time.

The Shasta Dam was particularly built to store water in the upper Sacramento Basin. The water was later pumped using power from the Shasta HEP station via the Delta-Mendota Canal to the upper San Joaquin Basin which has a low and unreliable flow during summer.

This water is then used to irrigate fruit and vegetable gardens in the Central Valley. Other dams constructed include Parker dam, Hoover, Fresno dam on River San Joaquin, Crocker dam on Feather River tributary of R. Sacramento.

#### **2. Construction of Canals.**

Canals have been constructed to transfer water from Northern region to the Southern region. Much of the water is got from River Sacramento because it carries more water than River San Joaquin. These canals lead to farms making irrigation possible e.g. Delta Cross – Canal, Delta – Mendota Canal, Friant – Kern Canal, East Side and Coachella Canals.

#### **3. Construction of aqueducts.**

An aqueduct is a water pipeline which transfer water over a long distance. These were constructed to supply water to cities for domestic purposes e.g. Los Angeles Aqueduct, Colorado, Aqueduct, San Diego Aqueduct, California aqueduct.

## **MAP SHOWING WATER SUPPLY SCHEMES IN CALIFORNIA**

### **PROBLEMS INVOLVED IN THE WATER TRANSFER SCHEME**

1. **High costs**

Supplying water for both irrigation and urban use is an expensive venture and yet the costs have to be shared by the farmers which created problems for them yet they use large amounts of water in their day to day activities.

2. **High demand for water**

Water is needed for irrigation, industrial and domestic use. The amount supplied, however is not enough to satisfy the demand. There is need for more water in the central valley.

3. **Silting of the reservoirs**

The water flowing into dams carries a lot of silt. This slowly fills up the reservoirs making them shallow.

4. **Salinity/ Accumulation of salty content**

The water transferred by the Canals is salty due to the high evaporation rate. In addition, the water draining back from the fields into the canals also adds salt to the water.

5. **Hydro-policies**

Large amounts of water are transported from the Northern part to the Southern part. This has led to a change in the physical conditions of Northern California and the people there are not happy.

6. **Increased flood risk.**

The water transferred from the Sacramento delta region has caused the ground to subside by several metres. Today some parts are below sea level which has increased the risk of flooding in the area.

**7. The water project has upset the breeding of Salmon.**

The construction of the dams along the river has affected the breeding of salmon fish and the volume of water that is removed creates harsh conditions.

**CALIFORNIA'S IRRIGATED AREAS THE CENTRAL VALLEY IRRIGATION PROJECT.**

Irrigation farming is a very important activity in the central valley. Artificial transfer of water is very pronounced and in this way irrigation farming takes place. This is the largest irrigation project in USA.

R. Sacramento and R. San Joaquin provide water for irrigation. Delta Mendota Canal also carries water to various parts from the North to the South. Giant dams (water reservoirs) e.g. constructed to store water for irrigation on purposes.

The Sierra Nevada ranges to the East is a catchment area for many rivers that facilitate irrigation. Many of the farms belonging to big companies aiming at large scale production through use of the best technology and scientific ways of farming.

**MAP OF CENTRAL VALLEY SHOWING IRRIGATION PROJECT/LAND**

## **CROPS GROWN UNDER IRRIGATION IN THE CENTRAL VALLEY**

In the Northern part of the valley cereals like rice, Sorghum as well as pasture i.e. alfalfa for cattle are grown.

In the Delta there is the growing of vegetables e.g. Cabbages, onions, tomatoes, carrots and flowers.

In the South very many fruits are grown on very large ranches owned by co-operatives e.g. lemons, grapes, oranges, peaches, plums and also cotton is grown in the area.

## **FACTORS /CONDITIONS WHICH HAVE FAVOURED IRRIGATION FARMING IN THE CENTRAL VALLEY IN CALIFORNIA.**

### **PHYSICAL FACTORS**

1. The gentle sloping relief/relatively flat landscape in the central valley, Yucca valley, Death valley in the South allows the gravitational flow of water making irrigation easy and favouring use of machines like tractors for a high output.
2. Availability of water for irrigation supplied by two main permanent rivers i.e. R. Sacramento and R. San Joaquin. In addition, heavy rainfall in the highlands to feed the rivers and the Delta Mendota Canal which transfers the water to the south.
3. The Snow capped Sierra Nevada Mountains provide a constant supply of melt water to rivers Sacramento and San Joaquin which is stored in the Shasta and Friant Dams.
4. Presence of fertile deep well-drained alluvial soils deposited by R. Sacramento and R. San Joaquin plus other small rivers washed down from Sierra Nevada Mountains favoured growth of crops like oranges, vegetables etc.
5. The fine, sunny, dry climate characterized by hot temperatures of up to 30°C during summer encourages the growth maturity, ripening and harvesting fruits such as oranges, lemons, plums, peaches, dates, almonds, grapes, tomatoes etc.
6. The Mediterranean and desert climate characterized by unreliable rainfall and hot temperatures discourages the spread of pests like boli worms and diseases.
7. The arid Mediterranean and desert climate in the Central Valley and Southern California respectively characterized by low and un reliable rainfall rarely exceeding 400mm and high temperatures above 30°C during summer making agriculture difficult without irrigation.
8. Availability of vast land for mechanization and irrigation due to the sparse population e.g. areas around Chico, Cacavilles, merced etc.
9. Presence of steady flow of underground water that is pumped to the surface for irrigation.

10. The central valley has within the rain shadow zone, receiving limited rainfall thus calling for irrigation.

### **HUMAN FACTORS**

1. Government policy to reclaim an arid and semi arid areas to provide food for the population, train food for the population, train man power in irrigation activities, construct dams etc.  
In addition supportive government policy on tax incentives to irrigation co-operatives, fruit processing factories, allocation of land for irrigation purposes and also construction of canals like All-American Canal and Coachella Canal for irrigation purposes.
2. Application of modern advanced irrigation technology which allows for more water harvesting in the surrounding mountain ranges. Involving construction of Canal, dams like Shasta dam, Hoover dam which controls the flooding of the Colorado River, and aqueducts, all have made irrigation a success.
3. Availability of a large and reliable market for the crops grown on the irrigation scheme provided by both internal market e.g. the California Citizens and external market by USA, Canada, European countries like UK, Norway etc.
4. Availability of skilled labour which is good in soil testing and manuring and also semi-skilled and unskilled labour to attend and harvest the crops, search for market. The labour is provided by the Red Indians, migrant labour from poor European countries and Asia.
5. Presence of many on site processing factories and textiles in Sacramento, Concord, Stockton ensures no wastage the produce until required by the consumer, hence a success.
6. Political stability of the California state and USA in general allowed large scale investment in the irrigation project.
7. Presence of a well developed transport network e.g. Delta Mendota Canal that link Oakland Canal that link to River side in the South imperial, Coachella irrigation projects.
8. There was a great desire for California to increase food production for the ever expanding state population due to an increase in numbers of migrants in the region.

### **PROJECTS FACED BY IRRIGATION FARMING IN CALIFORNIA**

1. Excessive evaporation due to irrigation and hot temperatures have led to increased soil salinity in the central valley, Yucca valley and Majore desert.
2. Irrigation has encouraged spread of water borne diseases such as bilihazia in the Central valley, Majore desert, Merced etc.
3. The Irrigation project has led to increased siltation of R. Sacramento, San Joaquin, All – American Canal, Delta Mendota Canal, Coachella Canal river beds and aqueducts hence chocking fish to death and limiting navigation.

4. Dams with hold valuable alluvial soils, and there is over use of soils in the central valley, Majore desert, Sacramento which have led to soil exhaustion and reduced land productivity resorting to the use of artificial fertilizers.
5. Over use of farm chemicals, fertilizers and pesticides have led to pollution of R. Sacramento, San Joaquin and soils in the Central valley creating health problems.
6. The irrigation project has led to the displacement of people in the Central valley e.g. when R. Colorado flooded the salton lake was formed by the flooded waters displacing thousands of people in the South Imperial Valley.
7. Over all costs of maintaining and running the irrigation projects is expensive, constant dredging of canals to remove the silt, treatment of water to remove toxic chemicals required a lot of expenditure.
8. Irrigation has encouraged the spread of water weeds such as Rhizomes in the Central Valley they compete with cotton, citrus fruits and alfalfa for soil nutrients this has led to reduction of the land productivity.
9. Fluctuation in water flow along R. Sacramento and San Joaquin during the dry season leads to crop failure resulting into low yields. This discouraged the farmers.
10. Competition for irrigation waters from other regions.
11. Frost/low temperature in winter.
12. Shortage of skilled labour during harvest.
13. Shortage of water for irrigation.
14. Perishability of the crops
15. Competition for market
16. Price fluctuation

#### **BENEFITS OF IRRIGATION FARMING TO THE CALIFORNIA ECONOMY**

1. Irrigation farming has converted waste/marginal/land e.g. the Central Valley, Death Valley, Yucca Valley in the South into productive use.
2. Irrigation farming has controlled flooding of rivers e.g. Friant dam controls R. Sacramento while Hoover dam controls flooding of R. Colorado in the South.
3. Hoover dam reduced farmer dependence on climate agriculture hence a steady and reliable food supply Vacaville, modesto, Chico and other towns.
4. The Central valley irrigation project provides employment opportunities to the people in the central valley towns such as Chico, Sacramento, and Concorde. These either do plant crops, harvest or engaged in marketing and processing into packed fruit juice, textile etc.

5. Irrigation farming has stimulated growth of agro-based industries such as fruit jam, fruit juice, ginneries and textiles at Sacramento, Stockton, and Oakland etc.
6. Irrigation farming has stimulated development of infrastructure such as SANTAFE railway that links Los Angeles to Chicago, Delta Mendota Canal, roads, ware houses etc.
7. Both the imperial Coachella valley irrigation project provide training to farmers concerning modern farming methods such as pruning, use of fertilizers, intensive cultivation etc.
8. The Central valley irrigation project is a source of government revenue through taxes paid to the federal state of California. This is used to develop schools, health centres etc.
9. Exportation of crops like oranges, lemons and textiles to Canada Germany and Saudi Arabia brings in foreign exchange to the country.
10. Irrigation farming has encouraged growth of towns along the schemes e.g. Chico, Sacramento, Vacaville, Redding and Merced. These provide accommodation, education and health services to people.
11. Irrigation farming encouraged permanent settlement along the previously flooded or arid region such as Death Valley, Chico, Fresno etc.
12. Irrigation farming has provided water for domestic and industrial use through extension of the Delta Mendota Canal to arid and Semi-arid region of the South, to river side, San Bernadino etc.
13. Irrigation farming has encouraged afforestation in the South around the outskirts of riverside, Fresno, Santa Clarita, and in Majore desert to control desertification.
14. The Canals i.e. Delta Mendata Dams i.e. Shasta, Friant, Hoover established by the irrigation projects acts as tourist attraction hence fetching foreign exchange to the state.
15. The Central Valley irrigation project acts as a research centre for future development of such schemes all over the arid areas of USA.

*N.B. Soon after its success, the Imperial Valley and its extension the Coachella valley were established.*

16. Irrigation farming has promoted international cooperation between California and the States that import its citrus fruits e.g. Nevada, Arizona, Canada etc.

#### **IMPERIAL VALLEY**

The Imperial Valley is located in the desert of Southern California. The rainfall in this area is low and unreliable at only 76mm most of it falling in the months of November – March which is why irrigation takes place.

Temperatures are hot 44° – 52°C and the rate of evaporation is so high that sometimes rain water evaporates before it reaches the ground.

The area under irrigation is about 320,000 hactres making it the largest single irrigated district in North America.

The water for irrigation is provided by the R. Colorado although it is subjected to a lot of evaporation during summer.

The imperial valley has very fertile alluvial soils for agriculture enabling it to produce a variety of fruits and vegetables (market – gardening crops)

Lettuce is the most dominant crop grown other crops include carrots, cabbages, and tomatoes.

In addition alfalfa and long stapled cotton are also important crops grown.

The imperial valley is also important for its cattle fattening ranches situated in Brawley the largest town in the valley.

In summary the types of farming conducted in the Imperial Valley are

- Arable farming
- Ranching
- Horticulture

### **COACHELLA VALLEY**

This is located in the Southern California desert. It has low and unreliable rain fall, where by necessitating irrigation.

Irrigation water is also got from the Colorado river via the Au – American Canal serving an area of about 21,000 hactres (Revised).

The crops grown include dates and different types of vegetation.

### **SALTON TROUGH**

This is another irrigated area in the far South of California. It is the area souring the man – made Salton Sea. The Salton Sea was caused by an engineering mistake during the opening of the banks of R. Colorado above the Imperial Valley. However, the water in the sea is not used for irrigation because it is highly saline but the sea maintains its level from the underground water springs.

A variety of fruits and vegetables are grown in the Salton trough.

### **SUMMARY OF CALIFORNIA’S AGRICULTURE**

Agriculture is an important activity in California and much of it is under irrigation. It is interdependent with a large non-farm economy.

The agriculture sector is connected in various ways to other economic sector e.g. supervisors have to be connected to the manufacturing sector, Agricultural experimental stations, transport and marketing agencies, marketing brokers, weather stations etc.

Agriculture is especially carried out in the central valley, the Los Angeles low lands and the Salton trough.

## **CHARACTERISTICS OF CALIFORNIA'S AGRICULTURE**

### **1. Family operated farms.**

Many of the farms are owned by families, although industrial farms do exist. However, many of the farms have become very large that managers are lined to manage them.

### **2. Farms are very large**

Farms range from huge family operated farms to very large manager operated holdings.

### **3. High investment of capital and technology**

Almost all farming activities are mechanized which has led to high productivity. The high cost of irrigation requires the use of a lot of capital and relevant technology.

### **4. Specialization by farm and region.**

The farms specialize in the production of particular crops to do in different regions e.g. the Central Valley specializes in fruit growing. The Los Angeles lowlands specialize in Viticulture (Grapes & Vines) and other market gardening crops while the Imperial Valley specializes in beef cattle.

## **TYPES OF CROPS GROWN IN CALIFORNIA**

Fruits – Lemons, grapes, oranges, apples, plums, peaches, pears, straw berry, pineapple, figs, olives, apricots, vine vegetables:- Cabbages, Carrots, tomatoes, onions, lattice etc.

Cereals – Wheat, rice, maize, barley sugar beet.

Fodder crops – Hay and Alfalfa

Fibres: - Cotton.

## **PROBLEMS FACING AGRICULTURE IN CALIFORNIA (CENTRAL VALLEY)**

1. Constant silting dams and Canal.
2. The growth of weeds is very rapid and costly to remove.
3. Occurrence of pests and diseases which affect the crops.
4. Perishability of the products due to delay in transport.

5. Shortage of labour during harvesting season being a labour intensive venture.
6. Salinity of the soils caused by excessive vaporation.
7. Price fluctuation in summer when fruits are in abundance.
8. Competition from other producers.
9. Shortage of rainfall which necessitates irrigation.
10. The arid climate leads to excessive irrigation.
11. Soil erosion and soil exhaustion.
12. The cost of building dams, canals and aqueducts are high.

### **MARKET GARDENING (TRUCK FARMING)**

Farming in California is referred to as market gardening or truck farming.

Truck farming is an American term for market gardening which means an intensive production or growing of fruits, vegetables and flowers for which are taken fresh by trucks over night to nearby towns for commercial purposes. This type of farming requires high inputs but usually yields good profits.

It is practiced in California and other big cities like Florida, Baltimore, and Philadelphia etc.

California has some of the most well developed market garden farms in the world. The farms are located in the San Joaquin valley in the South and Sacramento valley in the North. The major market gardening centres are;

San Francisco, Sacramento, Fresno, Stockton, Oakland, Concord and Santa Rosa in the Central valley, Los Angeles, San Diego, Fremont, Sunnyvale and Modesto.

### **CONDITIONS WHICH HAVE FAVOURED MARKET GARDENING IN CALIFORNIA.**

1. Favourable climate i.e. fine sunny climate which is dry in summer and can allow fruits to ripen.
2. Availability of fertile soils.
3. Presence of ideal managerial skills.
4. Existence of ready market for the various urban centres)
5. Presence of flat land for mechanization.
6. High investment of capital and technology.

### **CHARACTERISTICS OF MARKET GARDENING IN CALIFORNIA.**

1. It involves high capital input.
2. There is high level of specialization.
3. There is use of fertilizers and other agricultural chemicals to improve soil fertility.
4. The farms are highly mechanized.
5. There is high investment of technology i.e. skilled labour is required.
6. The products are sold fresh or processed.

7. There is ready market for the products in urban centres (demand)
8. It involves growing of fruits and vegetables for sale.
9. There is use of irrigation to avoid crop failure.
10. Land is intensively cultivated
11. There is use of co-operatives.

### **FRUIT GROWING IN THE CENTRAL VALLEY (CALIFORNIA)**

The central valley is important for fruit growing and it produces fruits for sale in the nearby urban centres.

The farms in the central valley are very large and are referred to as fruit ranches.

### **CONDITIONS THAT HAVE FAVOURED FRUIT GROWING IN THE CENTRAL VALLEY (MARKET GARDENING IN CALIFORNIA)**

#### **1. Availability of water for irrigation.**

The irrigation project provided farmers with the water they needed for their crops. The water for irrigation is got from River Sacramento, River San Joaquin and the Delta Mendota Canal.

#### **2. Favourable climate**

The Mediterranean climate experienced in the Central Valley of hot and very sunny summers support crop ripening and mild warm and wet winters for crop growth.

In addition the summers in some parts of the Central Valley hinder the multiplication of pests and diseases.

The Sierra Nevada Highlands protect the Central Valley from the cold continental air which could be a problem for the fruit growers.

#### **3. The soils in the Central Valley**

Are deep and fertile enriched with alluvium deposited from the Sierra Nevada ranges. This makes the area suitable for fruit growing and market crops.

#### **4. Favourable relief**

The land in the Central Valley where marketed gardening is established is flat and extensive. This type of landscape allows irrigation under gravity and allows use of machines like tractors on the farms.

#### **5. Presence of capital**

The capital needed for the different farming activities was available and this capital has been invested in technology especially irrigation and the purchase of pesticides, Herbicides, fertilizers and farm machinery.

#### **6. Ready market**

The nearby urban areas on the west coast i.e. Los Angeles, San Francisco, Fresno offer ready market for the products from the fruit ranches.

In addition the fruit products are sold to distant states in the rest of USA and Canada e.g. Tennessee, Arkansas, Texas.

7. **Skilled labour**

The presence of highly skilled farmers in fruit farming as they have ideal managerial skills which have greatly led to the high productivity and maintenance of the farms.

8. **Research**

The farmers through research gain access to improved varieties of fruits and new farming techniques. This has helped to improve on production.

9. **Transport**

There is modern and efficient transport network in the area which ensures quick transportation of fruits to the market. The Central Valley has an efficient network of roads as well as air transport, railway, Delta Mendota Canal which allows marketing and distribution of crops to market centres.

10. **Advanced technology**

Presence of high level of modern technology based on mechanization and irrigation and refrigerated trucks transport products to ensure cold rooms, construction of Canals, transfer water.

11. **Presence of co-operatives**

Most of the farmers are organized into co-operatives which help in marketing, transportation on their products as well as providing other facilities like financial aid, fertilizers etc.

12. **Political stability**

There has been relative political stability enabling large scale investments in the market gardening farms.

13. **There has been a supportive government policy.**

That supports market gardening throughout giving them tax incentives and holidays.

**FARMING ACTIVITIES**

During winter the following activities take place on the fruit ranches.

1. Spraying

2. Pruning

Pruning is carried out to control the height of the trees, the shape and ensures larger and more regular fruits or yields. It is also done in order to control the spread of diseases to other parts of the fruit tree.

Pruning is done in the months of February and March. After pruning and spraying, discing takes place. This is the deep ploughing followed by planting of cover crops to increase the nitrogen content in the soil.

Fertilizers are also applied in the same period in the time for the spring rains. The rains help to carry the fertilizers down into the soils.

In April irrigation of the fruits begins until September.

In May more spraying is done in the fields to ensure control of pests and diseases.

In July fruit picking begins especially the peaches. Some of the picking is done by machines, but it most causes manual labour is used.

The fruit pickers climb ladders, pick the peaches and put them in the bag on their backs.

The bags after filling, are their emptied into boxes and taken by lorries to the grading shades where they are inspected, weighed and graded quickly as possible and then put into refrigeration plants ready for sale.

Most fruit ranches are self sufficient i.e. after harvesting all the processing, canning and packing take place on the ranches.

The products are then transported to the marketing and collecting centres.

Fresno is the major collecting centre for the fruit products.....the ranches.

The fruits are sold whole, sliced or processed into juice, wine or powder.

## **PROBLEMS FACING MARKET GARDENING IN CALIFORNIA (PROBLEMS FACED BY FARMERS IN THE CENTRAL VALLEY) OR FRUIT RANCHES**

### **1. Pest and Diseases**

The twig borer, the leaf and shoot disease disturbs the farmers in the central valley. This problem is much more serious during the sunny season.

### **2. Labour shortage**

This is common during summer when much of the harvesting is being done.

### **3. High costs of water supply**

The demand for water in California is still high and yet it is not readily available. This discourages farmers.

### **4. Soil exhaustion**

This result from the continued growing of fruits on the same piece of land over and over again (Monoculture) which leads to low crop yields.

### **5. Price fluctuations**

This is especially common during summer when there is an abundant supply of fruits. This discourages farmers.

### **6. High costs of production**

Irrigation and mechanization employed by the farmers are very expensive to maintain and this discourages farmers.

7. **Stiff competition**  
Competition comes from other fruit growing areas which limit the market in the different areas of the world and also competition with organically cultivated crops affect the profit margin.
8. **High evaporation rates**  
High evaporation in the region is felt mostly in summer making irrigation more expensive.
9. **Salination**  
Salinity of the irrigation water makes soils saline and this reduces land productivity.
10. **Perishability of products**  
Products are highly perishable leading to losses.
11. **Drought**  
Limited land for expansion limits production.
12. Frost especially during winter affects the fruits.
13. High rate of silting in Canals

#### **STEPS TAKEN TO SOLVE THE PROBLEMS.**

1. Pests and diseases have been controlled by;
  - Spraying using pesticides.
  - Pruning has been done to reduce spread of diseases.
  - Regulating the amount of water for irrigation.
2. Labour shortage has been solved by use of migrant labour specially the Mexicans, house wives and holiday makers.
3. High costs of water supply has been handled in such a way that there are plans to transfer water from the arctic Occam to supplement the water in the Central Valley.
4. Soil exhaustion has been solved by application of fertilizers especially organic manure i.e. cow dung, fish meal to only organically produced crops.
5. Price fluctuation has been solved by encouraging crop diversification.
6. High cost of production has been solved by forming co-operatives to help in giving loans and hiring of machines e.g. tractors.
7. Competition can be solved by;
  - Improving on the quality of the product through processing.
  - Diversification of the economy.
8. High evaporation can be solved by continued irrigation.
9. Frost is solved by spraying warm air.

10. Silting of Canal is solved by reguladredging.
11. Salination of soils has been solved.
  - By use of fresh water to flesh out the salts.
  - Use of glass houses to control temperature and avoiding salination.
12. Perishability of products has been solved by applying better storage facilities e.g. cool rooms, refrigerated trucks.

**BENEFITS OF MARKET GARDENING TO CALIFORNIA (IMPORTANCE OF AGRICULTURE IN CALIFORNIA) OR CONTRIBUTION.**

1. Market gardening provides fruits and vegetables like tomatoes, onions, oranges etc to the people of California hence improving their health.
2. Market gardening (Agric) is a source of government revenue through taxation of farms in Oakland, Sacramento, etc.
3. Products from market gardening farms are exported to Canada, France, Norway earning foreign exchange to the country.
4. Market gardening (Agric) has facilitated development of transport network e.g. Delta Mendota Canal and other infrastructure like HEP stations, aqueducts, railway lines.
5. Market gardening (Agric) has promoted the economic diversification reducing reliance on fishing and tourism
6. Market gardening (Agric) has promoted international co-operation between California and the importing countries such as Canada, UK, Norway, Japan, Belgium, France, Spain, Netherlands, Italy, Portugal, and Poland.
7. Market gardening has provided raw materials (fruits) for agro-based industries such as fruit canning, factories at Fresno, textiles, wine processing.
8. Market gardening (Agric) has provided employment opportunities to farmers hence a source of income to improve their standards of living.

Fruits like oranges, peaches, plums, grapes, are mostly picked by hand. In addition, people are employed for administrative work, operation of machines and repair.

9. Market gardening (Agric) has created market for industrial products e.g. fertilizers, chemicals and farm machinery e.g. tractors.
10. Market gardening has encouraged urbanization through provision of constant fruit and vegetable supply e.g. Fresno, Sacramento, San Francisco.
11. Market gardening is a source of income especially to farmers who sell their fruits and vegetables leading to improved standards of living.
12. Due to irrigation the people of California have made use of land which would have been agriculturally unproductive.

## **DISADVANTAGES OF MARKET GARDENING IN CALIFORNIA**

1. Over use of fertilizers and farm chemicals led to land degradation or pollution.
2. Over use of irrigation has led to salination of soils hence decline in land productivity.
3. Market gardening has promoted urbanization with their related evils such as congestion, slum development.
4. Use of farm chemicals and pesticides contaminates the crops grown causing health problems to the people.
5. Often market gardening farms have led to reclamation or utilization of marginal lands e.g. swamps near urban centres hence causing ecological problems.

## **CONDITIONS WHICH HAVE FAVOURED AGRICULTURE ACTIVITIES IN CALIFORNIA (FACTORS THAT HAVE LED TO THE SUCCESS OF AGRICULTURE IN THE CENTRAL VALLEY)**

1. Presence of fertile alluvial soils in the central valley eroded from the Sierra Nevada highlands supporting the growth of a variety of crops.
2. Presence of numerous rivers which provide water for irrigation e.g. Sacramento, R.San Joaquin etc.
3. Availability of extensive land in the Central Valley for crops growing.
4. Presence of a cool temperature climate which allows the growth of temperate crops e.g. wheat and barley. Some areas have a modified Mediterranean climate i.e. warm sunny summer and mild wet winter climate which favours the growth of citrus fruits.
5. Use of high level technology involving irrigation, canning of agricultural products, mechanized agriculture, refrigeration to perishable products.
6. Existence of research leading to improved variety of crops like fruits Cereals and vegetables.
7. Availability of skilled labour to operate the machines to carryout scientific methods of agriculture e.g. truck products.
8. Presence of market for the agricultural products.
9. There is flat land in the Central Valley which allows irrigation farming and use of machines.
10. Availability of capital to invest in farming activities.
11. Presence of power (HEP) which is used for heating and lighting agricultural green houses and processing.
12. There is low incidence of pests and diseases favouring the growing of crops.

13. Practice of mixed farming which offers complementary benefits like providing manure.
14. Presence of efficient transport and communication for transporting agricultural products.
15. Supportive government policy which supports the agricultural sector.

**STEPS TAKEN TO PROMOTE THE AGRICULTURAL ACTIVITIES I.E. GROWING OF CROPS AND REARING ANIMALS.**

1. Diversification of Agricultural activities i.e. growing of crops and rearing animals.
2. Use of mechanized agriculture to cultivate extensive land area.
3. Specializing in high value crops.
4. Constant dredging of rivers, Canals and aqueducts.
5. Use of green houses to protect plants from frost and harsh weather.
6. Research in new crop varieties and animal species which are more resistant to pests and diseases.
7. Extension of Canals and aqueducts for transfer water from well watered hilly areas to those with low amounts of water (land reclamation)
8. Application of fertilizers or manure or practice organic farming
9. Construction of water reservoirs
10. Spraying of crops with pesticides
11. Application of fertilizers or manure or practice organic farming.
12. Construction of water reservoirs.
13. Spraying of crops with pesticides.
14. Application of herbicides to control weeds.

**MAP OF CALIFORNIA SHOWING MAJOR AGRICULTURAL AREAS AND COLLECTING CENTRES**

## **INDUSTRY IN CALIFORNIA**

Apart from cultural, industrialization also plays an important role in the economy of California. A wide range of industries exist and these include.

### **TYPES OF INDUSTRIES FOUND IN CALIFORNIA**

#### **1. Food processing industry**

These are industries that have developed as a result of the agricultural sector practiced in California. They depend on agriculture for their raw materials. They include;

- Fruit canning for making fruit juice.
- Meat packing
- Wine bottling
- Manufacture of dairy products like cheese, butter.

#### **2. Textile industry**

This industry is based on cotton grown locally in the Central Valley and others imported as a raw material.

#### **3. Oil refining**

This branch of industry is based on the many oil fields scattered around Southern California and it has led to the development of other associated industries i.e. those that rely on the bi-products of oil to produce things like detergents, paint, synthetic, fibres etc.

#### **4. Chemical and pharmaceutical**

This industry specializes in the production of Agro-chemicals, e.g. Pesticides, herbicide, medicine, Veterinary drugs, fertilizers for crops, plastics; pipes used in house

construction, dye stuff for the textile industry, cosmetics, perfumes, acids and salts, laboratory, compounds like chlorates, phosphates, etc.

**5. Printing and publishing**

This industry uses raw materials from the coniferous forests of the Sierra Nevada Mountains and coastal ranges. It specializes in the production of newsprint, magazine, so it boards newsletters etc.

**6. Machinery and metal products manufacturing industry (Engineering)**

This branch relies on imported steel as a raw material and deals in the manufacture of agricultural machinery like grain millers. Combine harvesters, irrigation machinery, disseeders, motor and marine engines, turbines, textile machinery, railway locomotives and wagons, ship building, motor vehicles.

**7. Arid and space craft.**

It is located at San Diego and Los Angeles because of the following.

- Availability of raw materials such as aluminium, diamond, copper.
- Flat relief
- Far away from built up areas.
- Strategic location for testing
- High levels of technology
- Presence of skilled labour.

**The products include**

- **Jet Helicopters**

8. Electrical engineering industry. This deals with electrical appliances e.g. flat irons, transformers, transistors like radios, T.Vs.

**9. Aerospace engineering**

Billion of dollars have been spent by the US government on space projects carried out by the engineering firms especially in Southern California, Florida, Houston and Boston and have been important since the 1930's. It is popularly important in Los Angeles and employs almost 1/10 of the labour force in California.

Other industries are Agro-processing, film making, ship building and repair mining industry, fish processing, Bio-technology, electronics and electrical equipments.

**CONDITIONS/FACTORS WHICH HAVE FAVOURED GROWTH AND DEVELOPMENT OF INDUSTRIES IN CALIFORNIA.**

1. Availability of agricultural raw materials e.g. cotton for textile and milk for dairies, hides and skin for leather and foot wear industry for leather and foot wear industry and mineral raw materials e.g. for iron and steel industry.
2. Existence of energy source e.g. rivers which generate HEP like R. Sacramento, oil for thermal power, Nuclear power.

3. Presence of a ready and reliable foreign market e.g. Europe, Africa, Germany and domestic market for the industrial goods.
4. Availability of well developed transport and communication network in form of electrified railways, roads that radiate in the major industrial centres which facilitate distribution of raw materials and industrial goods, air transport.
5. Availability of Semi-skilled and skilled labour force e.g. electrical, mechanical, chemical engineers, laboratory assistants to work in good electrical textile, engineering, chemical and pharmaceutical industries.
6. Plenty of reliable water supply from R. Sacramento and R. Colorado for processing purposes as a raw material for brewery and soft drinks industry like Coca cola, Pepsi Cola and for cooling machines, and the textile industries.
7. Availability of cheap land for industrial establishment and expansion in Los Angeles and San Diego which has led to the development of locomotives, automobiles, textile and electrical industries.
8. Availability of capital to invest in the industrial sector.
9. Favourable government policy to support industrialization.
10. California being politically neutral state foreign investors from USA, Germany e.g. Mobile, Shell, Uniliver, General Motors have invested a lot of money in California.
11. Advanced technology for Aeromatic, engineering, electronic to product quality products
12. Intensive research is carried out at Los Angeles to develop the California industrial sector, it involves invention of high quality goods such as Bio – technology, visual equipment e.g. night vision gadgets.
13. Industrial inertia in San Diego and San Francisco has led to industrial establishment.

### **CONTRIBUTION/BENEFITS OF THE INDUSTRIAL SECTOR TO THE DEVELOPMENT OF CALIFORNIA (EFFECTS OF INDUSTRIALIZATION)**

1. Development of urban centres, towns, ports e.g. San Francisco such towns offer business opportunities, accommodation etc.
2. Development of socio-economic infrastructure e.g. roads, water, electricity, Airports, electrified railways, tunnels, bridges, power stations in towns of San Diego, San Francisco. These facilitate mobility, trade and movement of industrial raw materials and finished commodities.
3. Facilitated diversification of the economy reducing reliance on agriculture, tourism and international trade.

4. Promotion of bi – lateral relations between California, USA, Africa and European countries. Such good relations have promoted security, political stability and business opportunities.
5. Employment opportunities have been created by the ship building industry, oil refinery, petro chemical industry from this employed workers obtain increased income to improve their standards of living.
6. Foreign exchange is earned through export of manufactured goods e.g. electronics like Sony TVs, radios, automobiles.
7. Provision of consumer goods.
8. Source of government revenue through taxation.
9. Agro-based industries e.g. fruit canning, meat packing, leather tanning, and foot wear, textile industry at San Francisco have provided market for agricultural products like fruits, cotton silk worm, hides and skins beef.
10. Industry has promoted self sufficiency reducing foreign exchange outflow on importation of manufactured goods from USA, Europe, Asia.
11. Acquisition of skill to workers employed in the automobiles, Air craft, oil refineries and petro-chemical industries such skills include;
  - Welding
  - Modern engineering techniques, motor mechanics.

These are acquired through on job training or short courses offered to the employees by the industries.
12. Industrial sector has led to industrial flow through foreign investors which is used to develop infrastructure.
13. Acts as a tourist attraction hence fetching foreign exchange.

**PROBLEMS RESULTING /ARISING FROM THE DEVELOPMENT OF INDUSTRIES IN CALIFORNIA (NEGATIVE EFFECTS)**

1. Pollution of air, water, land and noise pollution due to industrial smog and wastes e.g. oil leading to respiratory diseases.
2. Traffic congestion in the city leads to delays in the distribution of industrial raw material and finished goods.
3. Urbanization leading to overcrowding and shortage of accommodation leading to slum development and poor living conditions with other associated problems like high crime rate.

4. High cost of living which has led to low standards of living.
5. Displacement of people or migration of labour disrupts social set up of the population.
6. Competition of land with other forms of land use like Agriculture leading to land shortage.
7. Increased pressure on social amenities e.g. over use of water resource has led to scarcity of water for domestic use.
8. There is destruction of vegetation cover where industries are constructed.
9. There is high level of unemployment.
10. There is poor visibility due to fog and smog.

**MEASURES TO IMPROVE INDUSTRIAL SECTOR.**

1. Harvesting more water via aqueducts from the Sierra Nevada Mountains.
2. Diversification of energy sources like HEP, Nuclear, thermal.
3. Diversification of industrial activities e.g. films, electronics, heavy machinery and engineering Aeronautics.
4. Land reclamation from the desert.
5. Education and training of the labour force.
6. Introduction of modern advanced technology to increase efficiency/Automation.
7. Air cleanup campaign against pollution, like treatment of waste, recycling of pollutants.
8. Relocation or dispersal of some industries.

**MAJOR INDUSTRIAL CENTRES**

**These include**

- Los Angeles
- San Francisco
- San Diego

**TYPES OF INDUSTRIES FOUND IN EACH INDUSTRIAL CENTRE**

<b>San Francisco</b>	<ul style="list-style-type: none"> <li>- Aeronautic space industry</li> <li>- Ship building</li> </ul>
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	<ul style="list-style-type: none"> <li>- Film making</li> <li>- Food processing</li> <li>- Agricultural machinery</li> <li>- Motor vehicle manufacture – grain milling.</li> <li>- Iron &amp; steel industry.</li> <li>- Textile industry</li> <li>- Oil refining</li> <li>- Air craft</li> <li>- Electronics</li> <li>- Fish processing</li> <li>- Chemicals and pharmaceuticals</li> <li>- Tourism</li> </ul>
<p><b>Los Angeles.</b> This is a very developed city and all forms of Industrial are found here.</p>	<ul style="list-style-type: none"> <li>- Film making</li> <li>- Tourism</li> <li>- Ship building</li> <li>- Electrical equipment</li> <li>- Machinery</li> <li>- Automobiles</li> <li>- Food processing</li> <li>- Aeronautical space</li> <li>- Oil refinery</li> <li>- Chemicals &amp; pharmaceuticals.</li> <li>- Engineering</li> <li>- Iron and steel</li> <li>- Tyres.</li> </ul>
<p><b>San Diego.</b> This is located in the South West of California</p>	<ul style="list-style-type: none"> <li>- Aeronautic/space.</li> <li>- Food processing</li> <li>- Ship building</li> <li>- Repair</li> <li>- Armaments</li> <li>- Electronics</li> <li>- Chemicals &amp; pharmaceuticals</li> <li>- Textile</li> <li>- Automobiles</li> <li>- Oil Refineries</li> <li>- Aircraft engineering</li> <li>- Fish canning</li> <li>- Electrical equipment</li> </ul>

### **THE FILM INDUSTRY IN CALIFORNIA**

California is the World's most important source of films (movies) and much of the World's films are produced here at a region called Hollywood.

Hollywood is a suburb of Los Angeles and it has been the film capital and it has been the film capital of the world. (Patent film industry)

Nearly all the chief Cinema and TV films companies have their studio in Hollywood e.g. Disney, warner, paramount, 20<sup>th</sup> Century, fox, Columbia.

The film industry is the most important industry in Hollywood because of the landscape diversity.

The film industry was established in Hollywood in 1911.

### **FACTORS /CONDITIONS WHICH HAVE FAVOURED THE DEVELOPMENT OF THE FILM INDUSTRY IN CALIFORNIA.**

#### **1. Climate for the film makers**

The sunny arid dry climate provides plenty of sunshine that ensures clear pictures. The varied amount of rainfall results into varied vegetation types e.g. forests, scrub, which offers good back ground for filming.

The mild climate encourages out day activities all the year. Heavy rainfall in the North and low rainfall in the South and bright sunny weather in the South, summer and winter seasons offer good scenery for films.

#### **2. Relief**

Landscape diversity such as the desert, snow capped Mountains, plains, basins, highlands, glacial features from Sierra Nevada Mountains which offer beautiful scenery for filming.

3. Diversity of vegetation such as thick forests in the north, scrub in the central, desert vegetation and green agricultural farms.
4. Presence of drainage systems e.g. R. Colorado, Sacramento, San Joaquin, lakes, Pacific Ocean plays a part in film making.
5. Presence of skilled labour to directly act in movies and film making.
6. Availability of large sums of capital to inject in the development of the film industry provided by individual investors and companies.
7. Availability of a large market for films both internal and external due to the rich population.
8. Presence of a high level of technology e.g. use of Cameras, planes, robotod etc.
9. Supportive government policy towards developing the film industry.
10. Presence of well developed transport network, air, water, railway, road.
11. Presence of extensive area suitable for the industry.
12. Existence of some of the industries especially those dealing in manufacture of machinery provide model objects that can be used in film objects that can be used in film making e.g. modes cars, ships, aircraft etc.

### **BENEFITS OF THE FILM INDUSTRY**

1. Entertainment

2. Commercial
3. Tourism
4. Employment
5. Educational purposes
6. Urbanization

## **MAJOR CITIES /TOWNS IN CALIFORNIA**

### **LOS ANGELES**

Los Angeles has grown into a conurbation sprawling over 600km<sup>2</sup> covering the towns of Hollywood, long beach, Huntington Beach and Santa and over 99 other separate municipalities.

It has over taken Chicago as USA's 2<sup>nd</sup> largest Conurbation. It is expanding South and soon will be connected to San Diego. The city enjoys a very attractive numerous people to the area.

### **FACTORS THAT LED TO THE GROWTH OF LOS ANGELES CITY**

1. Presence of the many industrial establishment based in the sunny climate e.g. textile, fruit canning, film, tourism, aerospace etc which has drawn a large number of people to the city for employment.
2. Presence of the oil fields discovered in 1892 in the region led to the development of oil refining which attracted people to the area.
3. Its coastal location ensures imports and exports facilitating trade and commerce.
4. The relatively/flat relief favours construction of high raised buildings and road strategic.
5. Abundant water supply to supply water to millions of people in the semi-desert.
6. Presence of abundant power (HEP) supply from R. Colorado to light the city and work in industries.
7. Supportive government policy of developing the city.
8. A large population in the city which would provide for labour. Los Angeles grew so rapidly in population overtaking Chicago as the USA's 2<sup>nd</sup> largest conurbation.

### **PROBLEMS FACING LOS ANGELES AS A CITY**

1. Severe air pollution (smog) from oil refineries, factories, carex haust pipes being too many in the city.
2. Traffic congestion in the city due to too many vehicles and people leading to delay of goods, raw material distribution etc.
3. Shortage of water since it is located in an arid region.

4. Limited land for expansion has led to construction of sky crappers which may be prone to earthquakes.
5. Rapid population growth and its related problems e.g. unemployment, slum development, over use of resources etc.
6. Fog at the city causes accidents to both ships and Aeroplanes.
7. Increasing threat of terrorism by migrants and tourists.

**STEPS BEING TAKEN TO SOLVE THE PROBLEMS.**

1. Use of aqueducts from R. Colorado and Owen valley to solve the water problem.
2. Development of subways, flyovers and widen roads to solve the problem of traffic congestion.
3. Construction of skyscrapers to create space for accommodation.
4. Strengthen the local police by training to control crime in the city.
5. Limit the number of .....to reduce congestion in the city.
6. Industries to treat their waste to control pollution and building of Chimneys.

**SAN FRANCISCO**

This is the capital city of California. It is a port with a vast natural harbour. The city is a major communication centre with well developed roads, railway and air routes.

Study the table below showing the percentage of the population employed in the various sectors in BIC and answer the questions that follow;

British Columbia: Percentage of population engaged in various sectors.

<b>TYPES OF SECTOR</b>	<b>PERCENTAGE OF POPULATION EMPLOYED.</b>
Fishing	04
Agriculture	06
Forestry	35
Mining	11
Others	44
<b>TOTAL</b>	<b>100</b>

*Adapted from: Monkhouse, F.J and Cain, H.R. North America: A certificate Series: Longman P – 142.*

- (a) Draw a pie-chart to show the relative importance of the different employment sectors.

- (b) (i) Identify the relative importance of the mining sector in BIC.  
(ii) Describe the factors which have favoured the development of the mining industry in BIC.
- (c) Explain the contribution of the mining sector to the development of BIC.
- (d) Outline the problems faced by the mining sector in BIC.

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