

# **DISAPPEARANCE OF THE CITRUS INDUSTRY IN SINDH BETWEEN 1955 TO 1960 AND ITS REHABILITATION**

**By  
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Sindh had vast Citrus Industry developed after opening of Sukkur Barrage in 1932. The Government farms at Dokri, Sakrand and Mirpurkhas were growing grape fruit and other citrus varieties. Limes and lemons were grown in the most of Sukkur Barrage area. Mandarin specially Narangi was very popular and grown on a large scale in Nawabshah and Naushero districts. It was at its climax in 1947 at the time of Independence of India and Pakistan, but after 1955 it started its decline and by 1960 it virtually ceased to exist.

## **Causes of decline of the Citrus Industry.**

The causes of decline were many, except the commonly believed enemy, the weather. Our investigations based on local inquiries are:

- Plants were raised from seedling and unbudded seedlings besides producing inferior fruits, are prone to many viral and fungal diseases, causing sudden decline and death.
- In flood irrigation, root-rot is common problem, unless small three feet diameter and ten to twelve inches high mounds about six feet diameter are made around trunk of each plant so that roots are soaked rather than wetted by water.
- No chemical fertilisers existed and farm yard manure was the only fertiliser used. Applied over many years on the same crop, it created dis-balance between N, P and K, at time plant needed the most, and also between micro-nutrients. For example in its growth cycles at times plant needs only nitrogen and other times Phosphorus and Potash and all these are not available in manure, in required proportions.
- No plant protection chemicals were available and even if some chemicals were available, sprayers were not available. The whole job of plant protection was left to harmful insects and their natural predators.

- There was gradual rise of water table in Larkana, Dadu, Khairpur and Naushero Feroz districts which took the final toll. Water logging caused Root Rot and death of trees.
- Use of micro-nutrients to control some diseases was known but sprayers were not available. Hand operated knapsack sprayers or barrel sprayers became available in mid fifties on a very minor scale, but these kitchen-garden devices had no place or capability to spray large trees.
- Instead of proper weed control, the only method resorted was inter-cultivation by ploughing, spade or hoe, killing top roots many times a year and year after year, causing decline in production and tree vigour.
- Greening virus host plants are common in Sindh and this disease does exist even today. It may be the cause.
- Economic life of citrus trees is 30 years. Plants lived almost 20-30 years, before they were removed in early sixties.
- It is now known that Sindh soils are deficient in zinc and this deficiency will cause decline and death of citrus tree. It may have played its role.

Thus an early and premature death of citrus industry was caused in Sindh. The lime industry has lived until recently and we have witnessed with our own eye, its final death caused by water logging in Dadu and Naushero districts.

### **Climate of India, Florida, California, Arizona (USA) and Australia comparison with Sindh.**

The suitability of Sindh for citrus can also be verified from heat indices of other citrus growing areas of the India, and the World:

- Patna (Bihar) an important citrus area on 25°-30'N which is the same parallel as Tando Jam and Mirpurkhas has heat Index 3928 and Sindh could be equally important citrus producer.
- Dibrugarh another citrus area in Asam India on 27°N like Larkana and Khairpur, has Heat Index of 5019.
- Allahabad India has 5700 Heat Index and provides more heat than Sindh and yet it is a citrus centre.

- In India famous Nagpur Santra grows around Nagpur having maximum temperature of 46°C (like Dadu and Moro) and minimum coming down to 7°C.
- Mosambi grows in Khandesh and Poona (Pune) area of Maharashtra, having temperature range of 3°-46°C and is the principle sweet orange growing area. Acid lime is next important crops of this area.
- Sweet oranges and successfully raised in Deccan Plateau of India upto temperatures of 46°C. Citrus is raised upto temperature of 52° in Northern Rajasthan and Western U.P.
- Imperial Valley (California) has heat index of 3377 and most of grape fruit of California is grown there. St. Louis (Florida) on 28°N, the Citrus centre of the state has Heat Index of 3468.
- Sindh's dry winter (humidity as low as 25-35%) can help in initiation of flowering buds the incidence of fungal growth, scab and other pests will be reduced.
- We have visited Allis Spring in northern Territory in the centre of Australian Desert. It is as warm as any place in Sindh and here they raise grape fruits, oranges, lemon, and Kumquats. Some varieties of mandarins are also raised. The Agriculture Extension Service of Northern Territory Australia promotes these crops.
- The average highest temperature<sup>4s</sup> of Indio (Calif) and Citrus Research Station in Yuma and Tempe (Arizona) respectively are 41.6, 41.4 and 40.2°C and these temperatures are comparable to those of Larkana, Mehar and Nawabshah respectively.
- "In Cochlea and Yuma Valleys of U.S., various Eureka strains of lemons are grown fairly successfully on a commercial scale as are oranges. "In case of lemons only one bloom is produced in these hot desert areas and fruits ripens in September to December period."
- Growth temperature for citrus are within 13-40°C, though best growth occurs between 29-35°C.
- Heat indices of some of fruits in USA are calculated as under:

Grape fruit.            3,120 - 3,732

Washington Naval. 2,706 - 3,462

Valencia oranges. 2,672

- Various stations of Sindh have heat indices between 4000-4500 except Karachi, Mirpur Sakro and Ghora Bari which have less than 4000 heat indices. Only Jacobabad has an average 4700 Heat Index. The Heat Indices of Sindh are between heat indices of Patna and Dibrugarh (India). The 3770 to 4000 Heat Indices of Sakro, Karachi and Ghorabari are within acceptable range.
- Besides the Heat Indices and Chill Units also play role, the citrus needs average monthly mean temperatures over 13°C and below 38°C during the growing months. Larkana the coldest place in Sindh in number of Chill Units, has average temperature 13.3°C in January and Jacobabad the warmest place has average temperature of 38°C for June. It is true that high heat of the day hours may create partial dormancy in the hottest month in Sindh, but effect is only temporary and as observed profuse, flush occurs in citrus in Tando Jam area at the end of June, after high heat of May. Bearas or Tahiti or Persian lime which flowers each month and fruits all year around has no flower flush in May in Tando Jam but end June flower flush is extremely profuse compensating for non-flushing in May.
- One of redeeming factors of warm weather of Sindh is some 12-15°C difference in day and night temperatures expected throughout the World deserts. In the whole World no other vastly irrigated areas have this advantage and in those areas with low day and night temperature differences in warm months, there is a serious problem of:
  - \* High rates of respiration and transpiration at night.
  - \* Pigmentation of fruit does not take place and on the contrary coloured fruit may re-green.
- The most recent findings on growth temperature of citrus are that; at temperatures over 40°C (104°F) to 54.4°C (130°F) and under 13.2 to 0°C, the metabolic activity is very low in the plant and no active growth is present, but no damages are also observed.
- Larger Fruit size is associated with high temperatures and specially the spring temperatures. High spring temperatures of Sindh can increase fruit size. Total Soluble solids and low

sugar/acid ratio are also associated with high solar radiation. These special advantages of high temperature during the fruit set and its early growth were for the first time brought out by these authors.

It is true that there is limited scorching of lemons and oranges directly exposed to sun, under those temperatures, but not those un-exposed or within the tree canopy.

### **Conclusion.**

- Sindh has wider daily temperature fluctuations, so citrus fruit produced will generally be brighter in colour and should have better flavour and sweetness.
- Cool climate of lower Sindh can allow virtually continuous harvest of lemons.
- Grape fruit can be grown the highest quality throughout Sindh.
- Red blush grape fruits will develop red skin blush, under high heat of Sindh.
- It is possible to raise citrus under shade of date trees in Sindh as heat and light are sufficiently intense, to allow citrus to be raised as inter crop.
- Fruit of most varieties of citrus will be larger size in the Sindh's heat and light, with exception of "Washington" Naval and "Satsuma" mandarin. The latter is not recommended for Sindh.
- The citrus is mostly sensitive tender to frost. The order of sensitivity to frost is: Limes, lemons, grape fruits, pummelos and tangelos. All these can safely be raised in Sindh, where frosts are a rare occurrence.
- In the hottest part of California, the Imperial and Coachila Valleys, grape fruits of high quality, Valencia oranges, many varieties of mandarins, lemons and tangelos are raised, but during occasional extreme cold in winter, citrus in these areas of California lose its colour. In Sindh the winter temperatures do not reach such extreme. These crops have very bright future in Sindh. alleys, grape fruits of high quality, Valencia oranges, many varieties of mandarins, lemons and tangelos are raised. Since last two years their parts get too cold in winter, citrus in these areas of California lose its colour. In Sindh the winter temperatures do

not reach such extreme. These crops have very bright future in Sindh.

Having understood these factors, the new citrus farmer of Sindh will be ready to raise following citrus varieties:

- Grape fruit (all varieties).
- Oranges (Naval and Valencia).
- Limes (Some varieties).
- Pummelos (all varieties).
- Mandarins (some varieties).
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- Tangelo (all varieties).