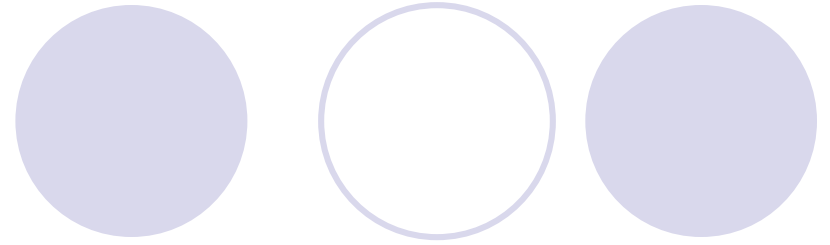
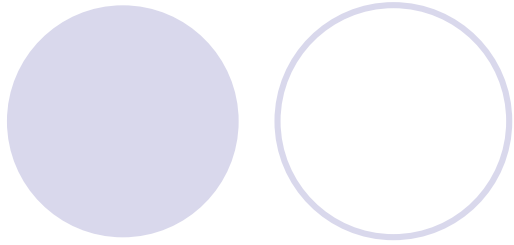
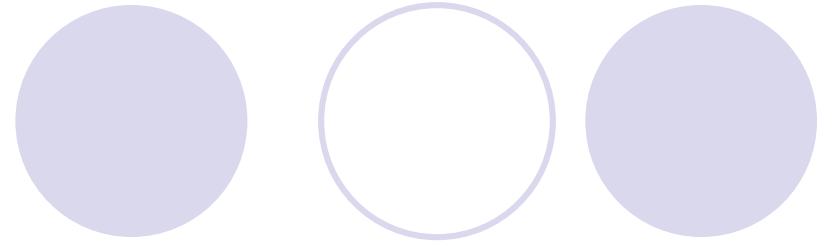
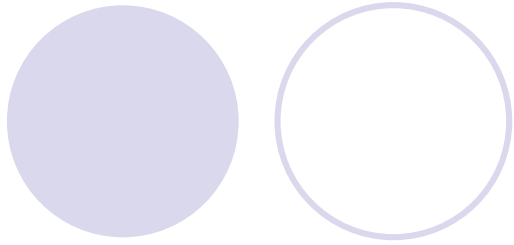


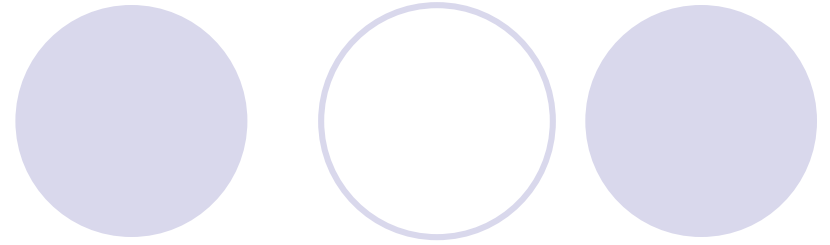
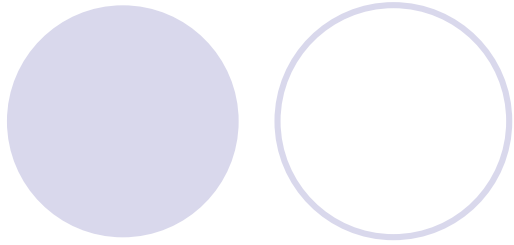
**Horticultural crops in Human
nutrition???**



- 1. Minerals
- 2. Vitamins
- 3. Phenolic compounds (Antioxidants)
- 4. Lower calorie
- 5. Higher water
- 6. Carbohydrates
- 7. Nitrogenous organic compounds (Proteins)



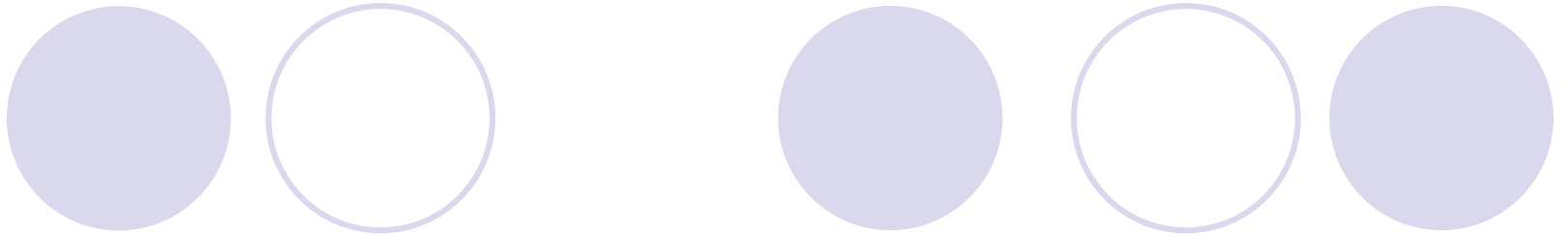
- Minerals:
- Ca, P, Fe, K,



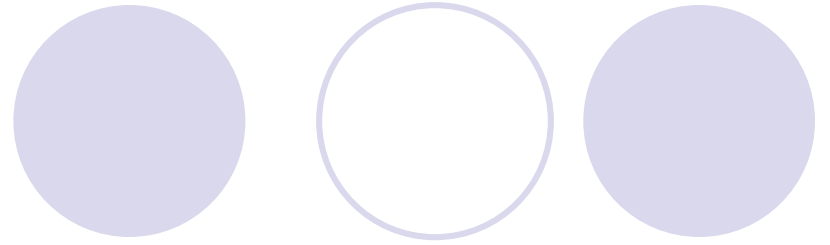
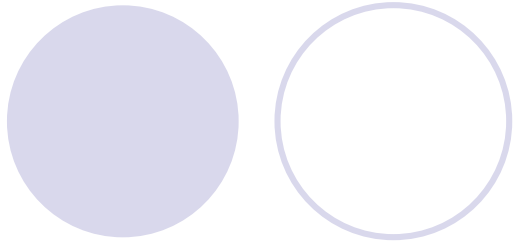
- Vitamins;
- A, B, C, D, E,
- Soluble vitamins (B, C)
- Insoluble vitamins (A,D,E,K)

Vitamins in horticultural crops

Vitamin A	Vitamin B	Vitamin C	Vitamin E
Orange	Okra	Rosehip	Pistachio nut
Apricot	Pea	Citrus fruit	Hazelnut
Peach	Bean	Berries	Okra
Fig	cress	Straberry	Celery
Carrot	Tomato	Parsley	Pea
Spinach	Spinach	Spinach	Carrot
Parsley	Potato	Tomato	Lettuce
Lettuce	Hazelnut	Pepper	Spinach
Herbs	Pistachio nut	Kiwifruit	
	Walnut		



Relationship between horticultural plants and industry??



HOW ABOUT THE WORLD???

Apple Production (Ton)	2012 YILI	2013 YILI	2014 YILI	2016 YILI	2017 YILI	2018 YILI
China	37.001.600	39.682.618	40.923.200	40.394.483	41.391.500	39.233.400
USA	4.110.050	4.081.608	5.185.078	5.160.750	5.173.670	4.652.500
Poland	2.877.340	3.085.074	3.195.299	3.604.271	2.441.393	3.999.523
Türkiye	2.889.000	3.128.450	2.480.444	2.925.828	3.032.164	3.625.960
Iran	1.700.000	1.693.370	1.572.844	2.470.028	2.096.749	2.519.249
Italy	1.991.310	2.216.963	2.473.608	2.455.616	1.921.272	2.414.921
India	2.203.400	1.915.000	2.497.680	2.521.000	2.265.000	2.327.000
Russia	1.403.000	1.572.000	1.624.000	1.843.544	1.639.421	1.859.400
France	1.382.900	1.737.482	1.531.625	1.819.762	1.710.755	1.737.412
Chilie	1.625.000	1.709.589	1.757.225	1.743.172	1.766.210	1.727.277
World	76.378.700	80.822.521	84.630.275	85.204.410	83.139.326	86.142.197





Pear Production (Ton)	2013 YILI	2014 YILI	2016 YILI	2017 YILI	2018 YILI
China	17.300.751	18.098.949	15.963.000	16.410.000	16.078.000
USA	795.557	754.415	682.061	677.891	730.740
Italy	743.029	701.558	701.928	772.577	716.821
Argentina	722.324	771.271	905.605	930.340	565.697
Turkey	461.826	462.336	472.250	503.004	519.451
Netherland	327.000	349.000	374.000	330.000	402.000
South Africa	364.854	404.260	423.128	414.879	397.555
Belgium	305.000	374.300	331.550	301.818	369.506
Spain	425.700	429.548	349.247	360.957	332.319
India	340.000	316.700	323.000	346.000	318.000
Chilie	226.118	244.950	307.166	309.189	280.867
Japan	294.400	295.100	278.100	274.500	258.700
World	25.203.754	25.798.644	23.676.110	24.168.309	23.733.772





Cherry production (ton)	2015 Yılı	2016 Yılı	2017 Yılı	2018 Yılı	2019 Yılı
Türkiye	535.600	599.650	627.132	639.564	664.224
USA	306.991	315.454	396.940	312.430	321.420
Chile	117.000	155.000	120.000	228.000	233.929
Uzbekistan	90.000	110.337	136.609	172.035	175.861
Iran	36.000	140.081	135.723	88.906	128.354
Spain	94.145	100.503	114.433	106.580	118.380
Italy	111.119	94.888	118.259	114.800	98.600
Greece	75.191	83.194	80.510	89.380	81.600
Ukrain	76.640	63.320	70.860	84.640	68.640
Syria	54.200	54.200	68.106	61.117	66.039
Bulgaria	49.423	38.496	48.391	55.310	54.960
World	2.246.577	2.328.758	2.455.479	2.568.446	2.595.812





Sour Cherry Production (Ton)	2015 Yılı	2016 Yılı	2017 Yılı	2018 Yılı	2019 Yılı
Russia	192.000	221.500	186.500	232.200	243.600
TÜRKİYE	183.500	192.500	181.874	184.167	182.165
Ukrain	192.880	156.450	172.270	218.700	167.490
Poland	179.360	194.817	71.598	200.630	151.930
Iran	91.000	104.766	113.263	124.807	124.807
USA	114.577	145.424	117.700	135.310	118.840
Serbia	105.150	96.769	91.659	128.023	96.965
Uzbekistan	50.000	53.025	57.069	56.665	65.023
Hungary	76.792	73.591	69.757	83.570	62.700
Azerbaijan	31.208	34.856	36.089	38.853	40.637
World	1.342.821	1.405.355	1.186.506	1.582.391	1.411.608

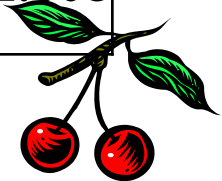




Fig production (Ton)	2013 YILI	2014 YILI	2016 YILI	2017 YILI	2018 YILI
TÜRKİYE	298.914	300.282	305.450	305.689	306.499
Egypt	153.089	176.105	183.794	177.135	189.339
Morocco	101.989	126.554	59.881	137.934	128.380
Algeria	117.100	128.620	120.348	128.684	109.214
Iran	78.392	72.672	69.914	70.730	59.339
Spain	30.400	28.896	45.718	36.380	47.750
Syria	46.443	35.301	43.091	43.084	35.300
USA	26.212	30.300	29.660	28.300	28.874
Tunusia	23.500	27.000	22.500	22.529	25.696
Albania	16.914	19.350	20.902	20.077	24.448
Brasil	28.253	28.053	26.910	25.883	23.674
World	1.117.452	1.137.730	1.081.405	1.152.799	1.135.316

Apricot production (Ton)	2015	2016	2017	2018	2019
	Yılı	Yılı	Yılı	Yılı	Yılı
TÜRKİYE	696.100	730.000	985.000	750.000	846.606
Uzbekistan	606.000	569.000	532.565	493.842	536.544
Iran	252.000	239.712	330.553	314.012	329.638
Italy	217.569	237.021	266.372	229.020	272.990
Algeria	293.486	256.771	256.890	242.243	209.204
Spain	153.667	139.605	162.872	176.290	145.830
France	159.375	603.268	654.938	112.890	134.800
Afganistan	87.686	17.894	131.816	109.086	129.363
Greece	94.799	94.630	113.782	108.600	118.340
Morocco	103.955	71.156	112.538	101.612	109.795
Pakistan	172.933	165.918	141.721	107.986	104.743
Egypt	94.831	89.792	96.357	94.203	98.295
Japan	97.900	92.700	86.800	112.400	88.100
Ukraine	64.900	81.290	86.680	111.670	83.660
Russia	60.000	60.700	53.300	66.300	69.600
Armenia	116.328	62.054	87.320	104.035	68.113
China	54.158	55.634	57.332	59.030	60.728
World	3.944.940	4.186.243	4.796.280	3.901.256	4.083.861

Plum Production (Ton)	2015 Yılı	2016 Yılı	2017 Yılı	2018 Yılı	2019 Yılı
China	6.434.012	6.568.326	6.710.796	6.853.267	6.995.738
Romania	496.468	512.975	444.922	830.060	692.670
Serbia	354.890	471.442	330.582	430.199	558.930
Chilie	312.000	353.000	357.600	359.000	465.280
Iran	285.000	298.893	355.416	305.617	359.176
USA	434.680	240.770	402.250	345.000	340.010
Türkiye	279.761	297.589	291.934	296.878	317.946
Italy	199.964	220.729	206.966	197.730	215.020
France	165.123	229.990	211.142	175.440	205.110
Ukraine	183.990	178.320	200.470	198.070	181.140
Spain	217.291	193.598	172.325	152.980	179.840
Russia	135.700	151.700	133.200	165.800	174.000
Morocco	123.211	123.577	179.387	205.222	151.488
Argentina	161.000	150.229	39.110	176.000	150.716
Uzbekisatn	130.000	121.547	115.966	134.869	133.078
World	11.618.168	11.850.227	11.494.447	12.528.048	12.601.312

Walnut Production (Ton)	2020
China	1100000
USA	707604
Iran	356666
Türkiye	286706
Mexico	164652
Chilie	158000
Ukraine	113320
Romania	48350
Uzbekistan	47374
France	35700
DÜNYA	3323964

Almond Production (Ton)	2020
USA	2370021
Spain	416950
Australia	221886
Iran	164348
Türkiye	159187
Morocco	134436
Italy	80520
Tunusia	62000
Algeria	60832
China	45000
World	4140043

Pistachio nut Production (ton)	2020
USA	474004
Türkiye	296376
Iran	190000
China	80227
Syria	69403
Madagaskar	5113
Afganistan	2774
DÜNYA TOPLAM	1125305

Vegetables

TOP TEN WORLD TOMATO PRODUCTION QUANTITY (TONNES)						
	2015	2016	2017	2018	2019	2020
China	55.465.999	57.313.103	59.179.382	60.919.328	62.869.502	64.768.158
India	16.385.000	18.732.000	20.708.000	19.759.000	19.007.000	20.573.000
Turkey	12.615.000	12.600.000	12.750.000	12.150.000	12.841.990	13.204.015
USA	14.580.440	12.877.049	11.138.620	12.613.090	12.162.045	12.227.402
Italy	6.410.249	6.437.572	6.015.868	5.798.100	5.777.610	6.247.910
Egypt	7.737.827	7.320.714	6.729.004	6.777.754	6.814.460	6.731.220
Iran	6.013.142	5.828.557	4.894.956	4.930.169	5.457.855	5.787.094
Spain	4.832.700	5.233.542	5.163.466	4.768.600	5.000.560	4.312.900
Mexico	3.782.314	4.047.171	4.243.058	4.559.375	4.271.914	4.137.342
Brazil	4.187.729	4.166.789	4.225.414	4.126.988	3.920.997	3.753.595
World	176.508.179	177.382.876	178.024.027	180.231.376	183.014.805	186.821.216

TOP TEN WORLD POTATO PRODUCTION QUANTITY (TONNES)						
	2015	2016	2017	2018	2019	2020
China	82.828.957	84.928.500	88.481.500	90.259.155	75.595.403	78.183.874
India	48.009.000	43.417.000	48.605.000	51.310.000	50.190.000	51.300.000
Ukraine	20.839.270	21.750.290	22.208.220	22.503.970	20.269.190	20.837.990
Russia	33.645.799	22.463.487	21.707.645	22.394.960	22.074.874	19.607.361
USA	20.012.720	20.426.359	20.453.430	20.421.560	19.251.320	18.789.970
Germany	10.370.200	10.772.100	11.720.000	8.920.800	10.602.200	11.715.100
Bangladesh	9.254.285	9.474.099	10.215.957	9.744.412	9.655.082	9.606.000
France	7.119.837	6.954.983	8.547.354	7.860.380	8.560.410	8.691.900
Poland	6.313.669	8.872.445	9.171.733	7.311.960	6.481.620	7.848.600
Netherlands	6.651.692	6.534.338	7.391.881	6.025.370	6.961.230	7.020.060
World	366.058.316	353.987.204	370.113.980	365.666.172	354.812.093	359.071.403

TOP TEN WORLD DRY ONION PRODUCTION QUANTITY (TONNES)

	2015	2016	2017	2018	2019	2020
India	18.927.000	20.931.000	22.427.000	23.262.000	22.819.000	26.738.000
China	23.384.254	23.727.276	23.699.011	23.603.514	23.676.600	23.659.708
USA	3.413.100	3.800.670	3.737.100	3.284.420	3.550.700	3.821.044
Egypt	3.049.607	2.458.618	2.965.218	3.067.214	3.077.316	3.155.649
Turkey	1.879.189	2.120.581	2.175.911	1.930.695	2.200.000	2.280.000
Pakistan	1.671.012	1.736.361	1.833.160	2.119.675	2.079.593	2.122.000
Iran	2.426.050	2.400.585	1.700.943	1.517.677	1.807.129	2.064.317
Bangladesh	1.704.402	1.735.334	1.866.502	1.737.714	1.802.868	1.953.800
Sudan	1.583.400	1.583.900	1.599.736	1.717.247	1.919.365	1.949.811
Russia	2.101.543	1.633.752	1.794.417	1.642.106	1.669.992	1.738.165
World	91.348.795	94.948.864	96.780.284	96.878.757	99.521.435	104.554.458

Horticulture vs. Agriculture

- **What is horticulture?**

- “Hortus” = “garden”

- “Culturae” = “cultivate”

- “Science and art of cultivating, processing and marketing of fruits, nuts, vegetables and ornamental plants



Classifications

- **Horticultural crop** = a crop which is labor-intensive, has high costs to produce, and is typically one that is eaten fresh



Classification of Fruit Species

- **Edible crops**

- **Fruits**

- **Tropical**

- Tree fruits

- Small fruits



- **Subtropical**

- Tree fruits

- Small fruits

- **Temperate**

- Tree fruits

- Small fruits



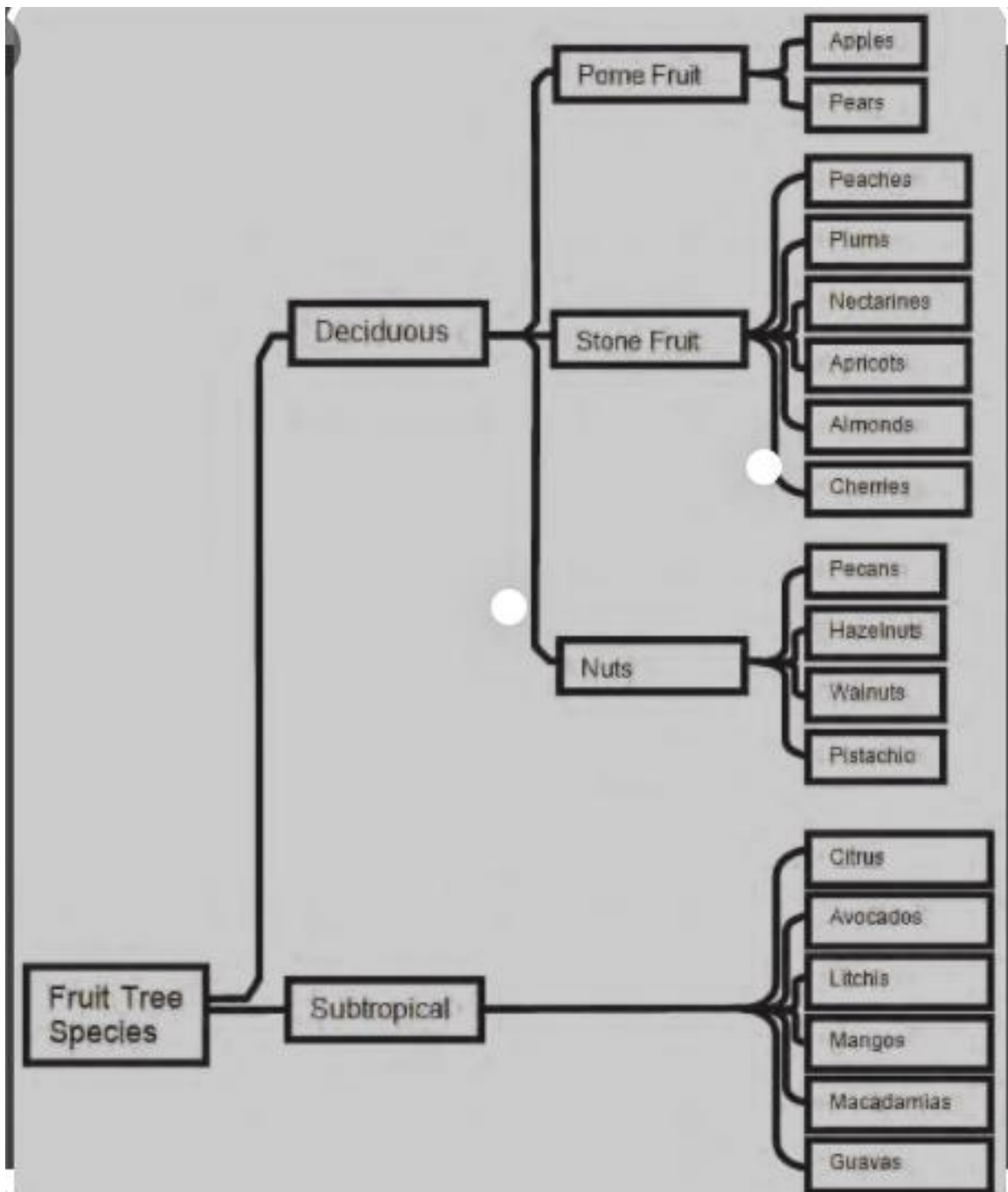
Classification of Fruit Species based on their ecological requirements

<u>Tropical</u>	<u>Sub-tropical</u>	<u>Temperate</u>
Acerola	Avocado	Apple
Banana	Fig	Apricot
Cashew apple	Dates	Blackberry
Cherimoya	Grapes	Blackcurrant
Custard Apple	Grape fruit	Blueberry
Dragon fruit	Lime	Cherry
Durian	Litchi	Gooseberry
Elephant apple	Olive	Grapes
Guava	Orange	Kiwi Fruit
Indian gooseberry	Mandarin	Nectarine
Jackfruit	Passion Fruit	Mulberry
Mango	Pomegranate	Peach
Papaya	Loquat	Pear
Pineapple	Longan	Melon
Sapote		Plum
Star apple		Quince
Sweetsop		Raspberry
Water melon		Strawberry



Classification of Fruit Species based on their fruit characteristics

- **a) Pome fruits (apple, pear, quince, kaki etc.)**
- **b) Stone fruits (plum, apricot, cherries, cornelian cherry etc.)**
- **c) Nut fruits (walnut, hazelnut, pistachio nut etc.)**
- **d) Berry fruits**
- **e) Citrus fruits**



Classification of Vegetables based on their ecological requirements

- **Edible crops**

- **Vegetables**

- **Cool - season**
 - **Warm - season**



Classification of Vegetables based on edible organs



Bulb: Garlic and Onion

- **Flower:** Artichoke, broccoli, cauliflower



- **Fruits:** tomatoes, cucumbers, eggplant, okra, peppers, pumpkin, squash



- **Stems:** asparagus, celery



Leaves: Brussels sprout, cabbage, lettuce, spinach



- **Seeds:** pea, corn, bean



Tubers: potatoes, Jerusalem artichoke



- **Roots:** beets, carrots, parsnip, radish, rutabaga, sweet potato, turnip



Classification of Vegetables based on Edible Parts



Leaves



Fruits



Pods



Flowers



Seeds



Roots



Rhizomes



Tubers



Bulbs



Stems

Note: vegetables are not shown to scale

Classification of Ornamentals Plants

- Flower and foliage plants
 - Indoor use
 - Outside use
- Shrubs and Trees

