



INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ



Inovace studijních programů AF a ZF MENDELU  
směřující k vytvoření mezioborové integrace  
CZ.1.07/2.2.00/28.0302

**Tato prezentace je spolufinancovaná z Evropského sociálního fondu  
a státního rozpočtu České republiky**

# Literature

- **Petříková, Hlušek a kol.:** Zelenina, pěstování, výživa, ochrana a ekonomika, Profi Press, Praha 2012, ISBN 978-80-86726-50-2
- **Petříková a kol.:** Zelenina, pěstování, ekonomika, prodej, Profi Press, Praha 2006
- **Malý a kol.:** Polní zelinářství, Agrospoj Praha 1998

# Nutritional Value of Vegetables (mg.kg<sup>-1</sup>)

Main source of vitamins, minerals, and fibre

Antioxidants

Citron 400 mg/kg C

| vitamin mg.kg <sup>-1</sup> | A - karotén | B1 - thiamin | B2 - riboflavin | B6 - pyridoxin | PP - niacin | B9 - k. listová | kys. pantotenová | C - kys. askorbová | E - tokoferol | H - biotin | K - fylochinon | P a bioflavonoidy | S-methylmethionii |
|-----------------------------|-------------|--------------|-----------------|----------------|-------------|-----------------|------------------|--------------------|---------------|------------|----------------|-------------------|-------------------|
| plodina                     |             |              |                 |                |             |                 |                  |                    |               |            |                |                   |                   |
| Brokolice                   | 19,00       | 0,90         | 2,10            | 1,40           | 10,00       | 2,00            | 12,9             | 1 100              | 13,00         |            |                | 40                |                   |
| Kadeřávek                   | 41,00       | 1,00         | 2,50            | 2,60           | 21,00       | 1,20            | 0,9              | 1 050              | 17,00         | 0,005      |                | 130               | 94,0              |
| Kapusta hláv.               | 12,62       | 1,17         | 1,04            | 2,18           | 6,40        | 0,80            | 11,3             | 344                | 17,90         | 0,080      | 32             | 80                | 60,0              |
| Kapusta růž.                | 1,99        | 1,07         | 1,50            | 2,80           | 6,70        | 0,20            | 10,0             | 1 150              | 20,00         | 0,200      |                |                   | 60,0              |
| Kedlubna                    | 0,34        | 0,53         | 0,75            | 1,20           | 5,30        | 0,10            | 1,0              | 448                | st            | 0,080      |                | 110               | 90,1              |
| Květák                      | 0,38        | 1,17         | 0,89            | 2,00           | 4,00        | 0,40            | 10,1             | 383                | 1,80          | 0,406      |                | 30                | 26,0              |
| Zelí bílé                   | 1,43        | 0,63         | 0,68            | 1,40           | 3,20        | 0,20            | 2,3              | 330                | 4,20          | 0,200      |                |                   | 74,0              |
| Zelí červené                | 0,54        | 0,60         | 0,71            | 1,50           | 4,30        | 0,31            | 3,2              | 518                | 19,90         | 0,310      |                |                   | 75,0              |
| Celer bul.                  | 0,36        | 0,45         | 0,49            | 1,22           | 3,00        | 0,27            |                  | 85                 | 0,27          |            |                | 110               | 60,7              |
| Černý kořen                 | 0,20        | 1,10         | 0,35            | 0,70           | 3,50        | 0,57            |                  | 40                 | 60,00         |            |                |                   |                   |
| Červená řepa                | 0,20        | 0,35         | 0,50            | 2,24           | 3,10        | 1,50            | 1,2              | 114                | st            | st         |                |                   | 26,2              |
| Mrkev                       | 35,38       | 0,70         | 0,65            | 0,00           | 8,10        | 0,30            | 2,7              | 49                 | 26,00         | 0,840      |                | 1 020             |                   |
| Křen                        | 0,08        | 1,33         | 1,45            | 1,80           | 6,00        |                 |                  | 1 125              | st            |            |                |                   |                   |
| Pastinák                    | 1,26        | 0,80         | 0,90            | 1,10           | 3,40        | 0,87            | 5,0              | 180                | 10,00         | 0,001      |                |                   |                   |
| Petržel                     | 5,26        | 1,10         | 1,00            | 1,60           | 11,70       | 0,27            |                  | 340                | 20,00         | 0,260      |                |                   | 45,2              |
| Ředkev                      | 0,09        | 0,30         | 0,30            | 0,70           | 4,00        | 0,38            | 1,8              | 175                | 0,00          |            |                |                   |                   |
| Ředkvička                   | 0,10        | 0,39         | 0,22            | 0,43           | 2,50        | 2,37            | 1,8              | 226                |               | 0,270      |                |                   | 11,8              |
| Tuřín                       | 3,50        | 1,50         |                 | 2,10           | 12,00       | 0,31            | 1,1              | 310                | st            | 0,010      |                |                   |                   |
| Vodnice                     | 0,20        | 0,50         | 0,10            | 0,80           | 4,00        | 0,14            | 2,0              | 170                | st            | 0,001      |                |                   |                   |
| Celer řapíkatý              | 1,00        | 0,50         | 0,40            | 0,30           | 4,00        | 0,76            | 4,0              | 700                | 27,00         | 0,001      |                |                   |                   |

**Vegetable salads** – rich source of fibre: cancer prevention, satiation, fill up the stomach, prevent the feeling of hunger and unnecessary getting fat

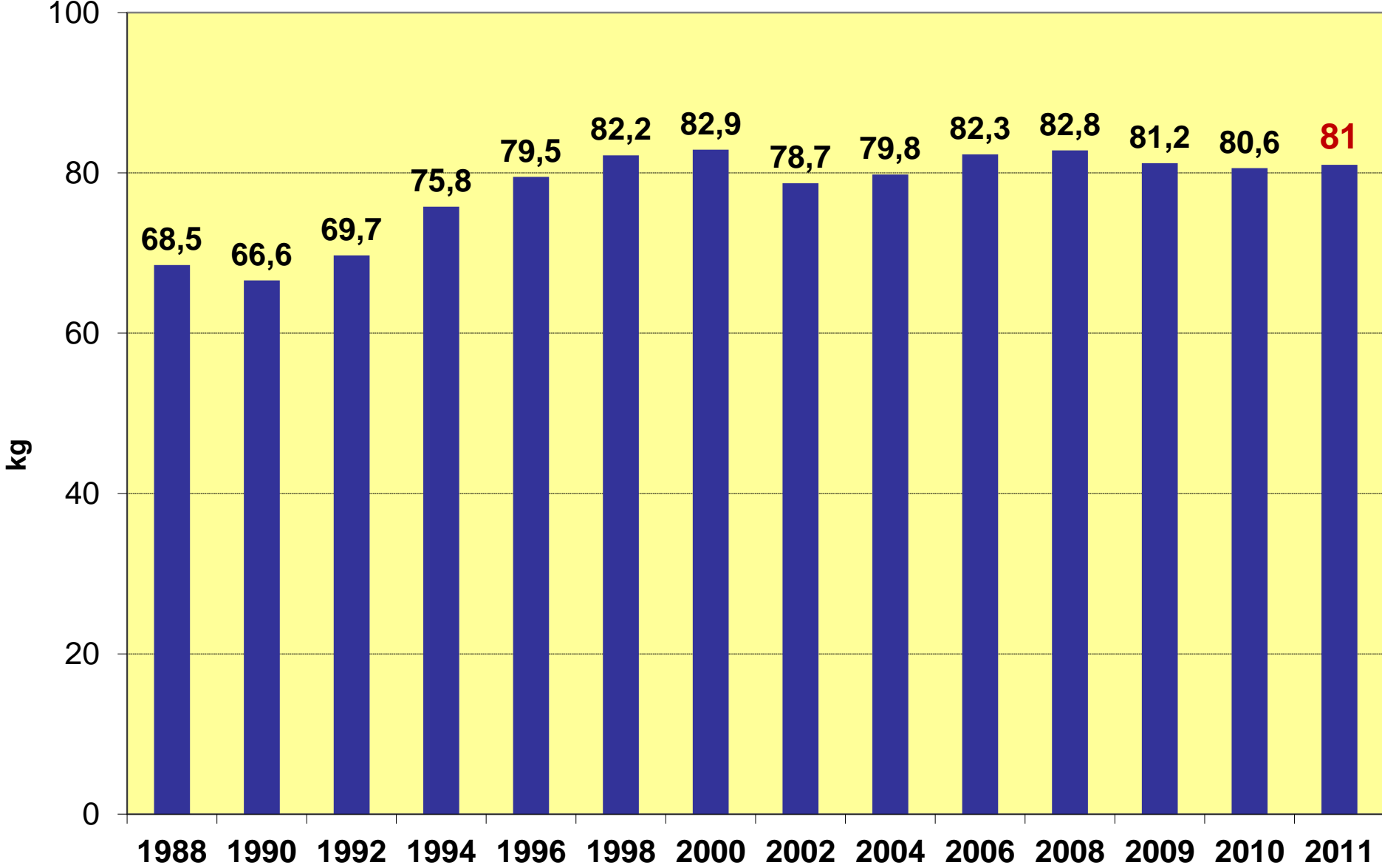
**Vegetable processing** – pre-processed vegetables (durability of 4 days)

| vitamin mg.kg <sup>-1</sup> | A - karotén | B1 - thiamin | B2 - riboflavin | B6 - pyridoxin | PP - niacin | B9 - k. listová | kys. pantotenová | C - kys. askorbová | E - tokoferol | H - biotin | K - fylochinon | P a bioflavonoidy | S-methylmethionin |
|-----------------------------|-------------|--------------|-----------------|----------------|-------------|-----------------|------------------|--------------------|---------------|------------|----------------|-------------------|-------------------|
|                             |             |              |                 |                |             |                 |                  |                    |               |            |                |                   |                   |
| Mangold                     | 35,30       | 1,00         | 1,60            |                | 6,50        | 1,65            | 1,7              | 390                |               |            |                | 127               |                   |
| Pekingské zelí              | 0,78        | 0,30         | 0,40            | 1,10           | 4,00        | 0,77            | 1,1              | 360                |               | st         | 44             |                   |                   |
| Polníček                    | 39,00       | 0,65         | 0,80            |                | 3,80        |                 |                  | 350                |               |            |                |                   |                   |
| Reveň                       | 0,26        | 0,17         | 0,30            | 0,35           | 1,00        | 0,25            | 0,7              | 108                | 2,00          |            |                |                   |                   |
| Špenát                      | 27,98       | 1,47         | 2,53            | 2,60           | 6,20        | 1,90            | 2,7              | 512                | 26,00         | 0,001      |                |                   | 41,4              |
| Salát hláv.                 | 5,53        | 0,72         | 0,88            | 0,89           | 3,70        | 0,55            | 1,8              | 81                 | 5,70          | 0,007      |                | 496               |                   |
| Salát římský                | 2,90        | 1,20         | 0,20            | 0,30           | 6,00        | 0,55            | 1,8              | 50                 | 5,70          | 0,007      |                |                   |                   |
| Salát ledový                | 0,50        | 1,10         | 0,10            | 0,30           | 3,00        | 0,53            | 1,8              | 30                 | 5,70          |            |                |                   |                   |
| Štěrbák                     | 11,40       | 0,52         | 1,20            | 0,20           | 4,00        | 1,40            | 9,0              | 120                |               | 0,007      | 380            | 225               |                   |
| Řeřicha                     | 12,80       | 0,40         | 0,40            | 1,50           | 10,00       | 0,60            |                  | 330                | 7,00          |            |                | 108               |                   |
| Celer nat'ový               | 8,86        | 0,40         | 0,78            |                |             |                 |                  | 890                |               |            |                |                   | 56,0              |
| Petržel nat'ový             | 20,09       | 1,10         | 2,82            | 1,70           | 13,50       | 0,34            | 3,0              | 1 369              | 31,00         | 0,340      |                | 579               | 54,0              |
| Fazole lusky                | 1,56        | 1,18         | 1,14            | 1,40           | 5,00        | 0,80            | 2,0              | 120                | 2,00          | 0,010      |                |                   |                   |
| Hrášek                      | 1,76        | 2,64         | 1,68            | 1,77           | 13,80       | 0,18            | 1,5              | 240                | 2,10          | 0,005      |                | 2                 |                   |
| Lilek jedlý                 | 0,03        | 0,48         | 0,55            | 0,80           | 5,00        | 0,18            | 0,8              | 50                 | 0,30          |            |                |                   |                   |
| Meloun cukrový              | 2,23        | 0,50         | 0,30            | 0,90           | 5,00        | 0,03            | 1,7              | 147                | 1,00          |            |                |                   |                   |
| Meloun vodní                | 0,88        | 0,50         | 0,60            | 1,40           | 0,12        | 0,02            | 1,7              | 80                 | 1,00          | 0,010      |                |                   |                   |
| Okurka salát.               | 0,41        | 0,44         | 0,43            | 0,40           | 2,00        | 0,09            | 2,4              | 59                 | 0,90          | 0,009      |                |                   |                   |
| Okurka nakl.                | 0,40        | 0,30         | 0,50            |                | 2,00        | 0,18            |                  | 110                |               |            |                |                   |                   |
| Paprika zelená              | 2,65        | 0,40         | 0,30            | 3,00           | 2,00        | 0,36            | 0,8              | 1 200              | 8,00          |            |                |                   |                   |
| Rajče                       | 3,59        | 0,29         | 0,76            | 1,16           | 5,30        | 0,37            | 3,0              | 224                | 12,20         | 0,015      |                | 47                | 44,6              |

# Vegetable in Czech Republic



# ANNUAL CONSUMPTION OF VEGETABLES IN THE CZECH REPUBLIC PER CAPITA (kg)



Vegetable consumption **in the Czech Republic** is considerably lower than in the other EU countries:

|                        |               |
|------------------------|---------------|
| Czech Republic         | <b>81 kg</b>  |
| France, Denmark, Italy | 150 kg        |
| Greece                 | 230 kg        |
| <b>EU</b>              | <b>137 kg</b> |

\*\*\*\*\*

|                     |       |
|---------------------|-------|
| Slovakia, Sweden    | 70 kg |
| Lithuania, Bulgaria | 40 kg |

Health-benefiting consumption recommended by the **World Health Organization (WHO)**:

**400 g of fruit and vegetables**/person/**DAY** = **146 kg**/person/**YEAR**

Efforts to approximate these figures

# Vegetable Growing in the Czech Republic

## CURRENT STATE

- **Low production intensity** – 70% of the intensity in the EU  
(Small yields except for top-class growers)
- **Narrow assortment** of vegetables compared with developed countries
  - 45 vegetables in the mass production in the Czech Republic
  - 65 vegetables in Germany and the Netherlands  
(Leaf lettuces, savoy, etc.)
  - Indifference on the part of growers, “fear” of new cultivars  
(Iceberg lettuce, broccoli)



## •High costs of labour

- Insufficient technical equipment
- Lack of harvesting machinery – expensive hand harvesting

## •Issue of product sales in **supermarkets**

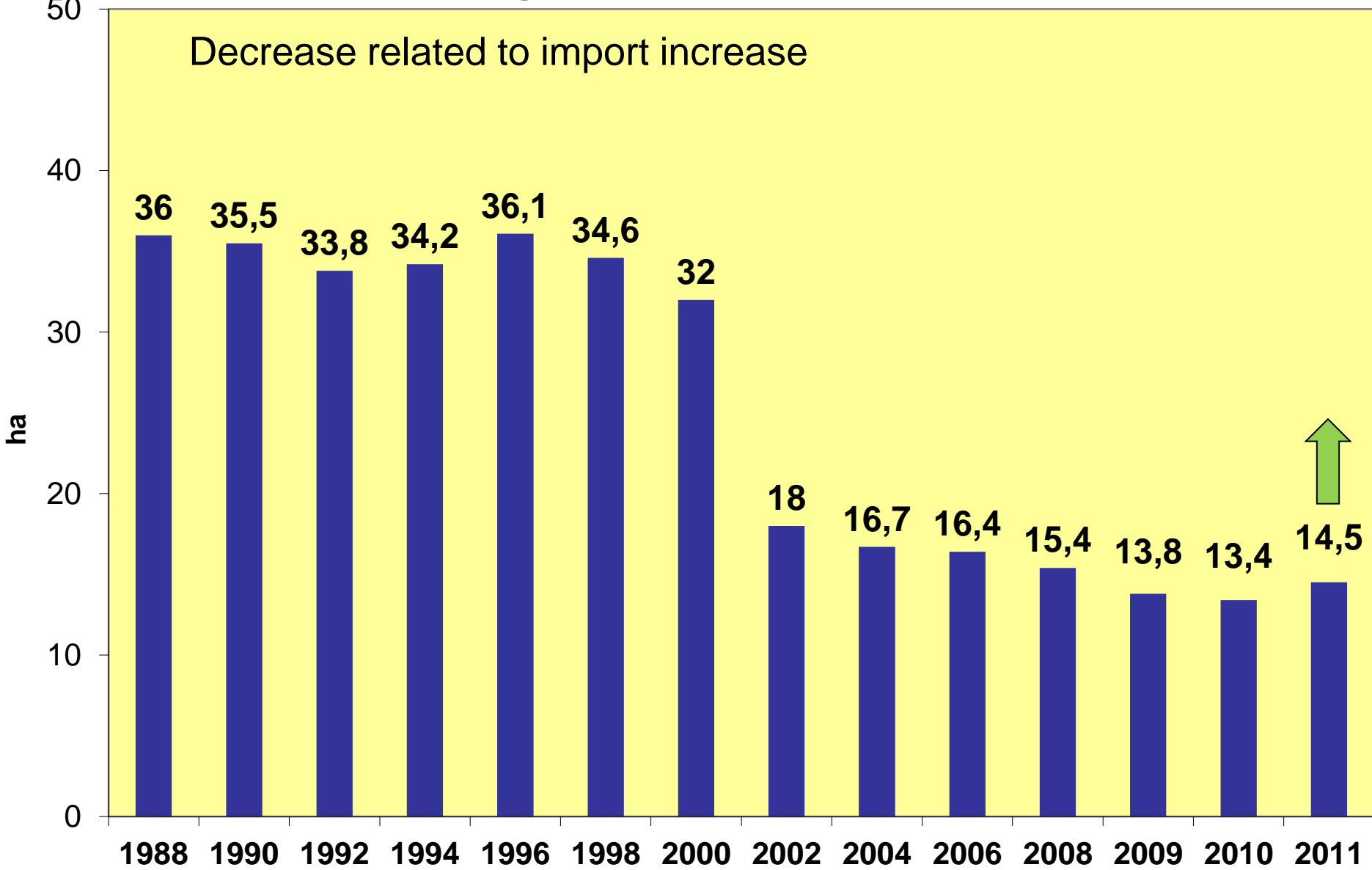
- Foreign companies
- They prefer imports from countries such as Germany, the Netherlands, etc.

□ Even the prices of vegetables from abroad are lower:

- Mechanical harvesting
- Well-established facilities operating for 40-50 years (Freezing plants, packing plants, and processing plants)

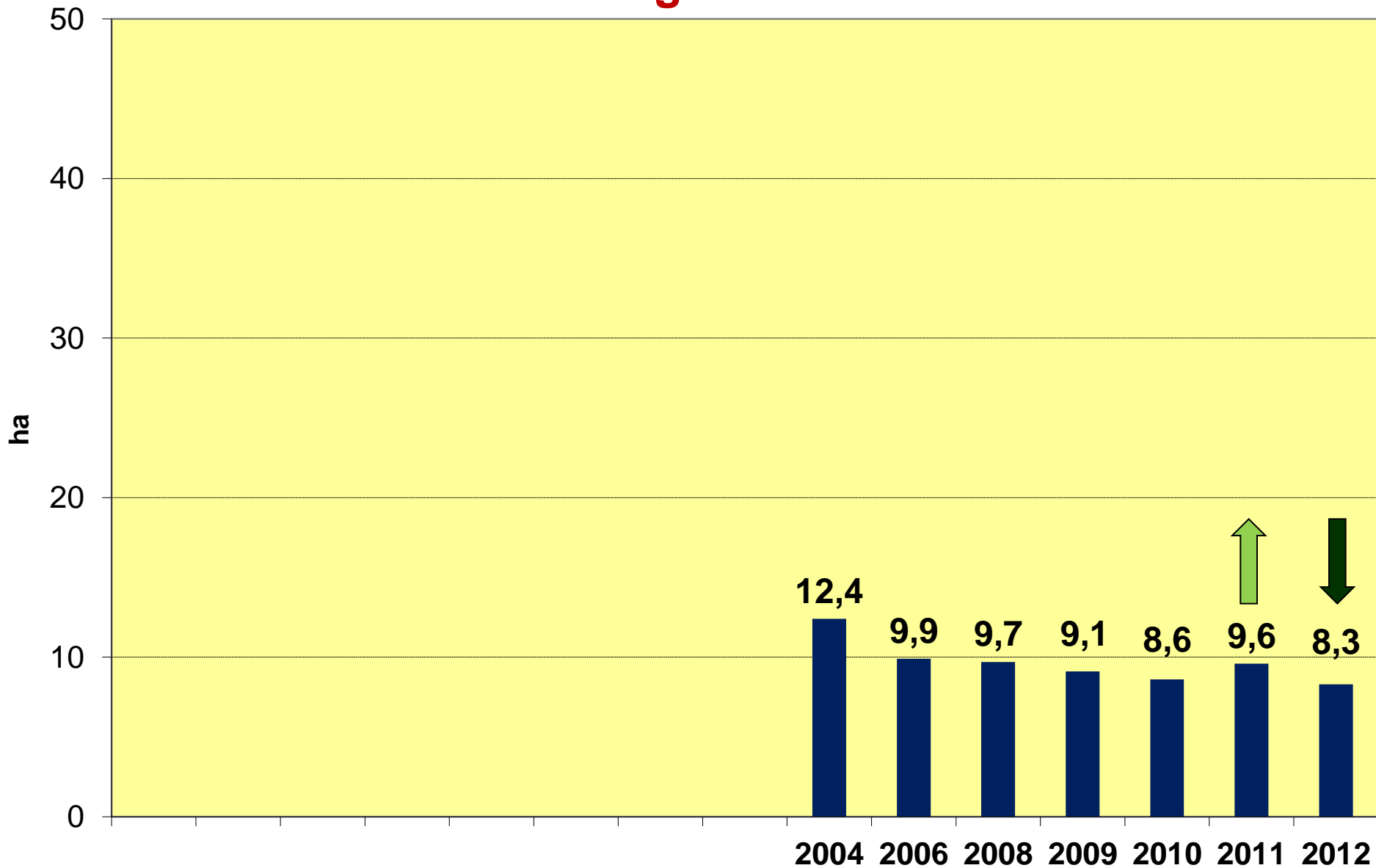
•The existence of the **middleman** – "wholesale associations,, (Surplus of fruit and vegetable wholesalers)

# VEGETABLE HARVEST AREA IN THE CZECH REPUBLIC (Thousand ha) Including Households (Gardens)



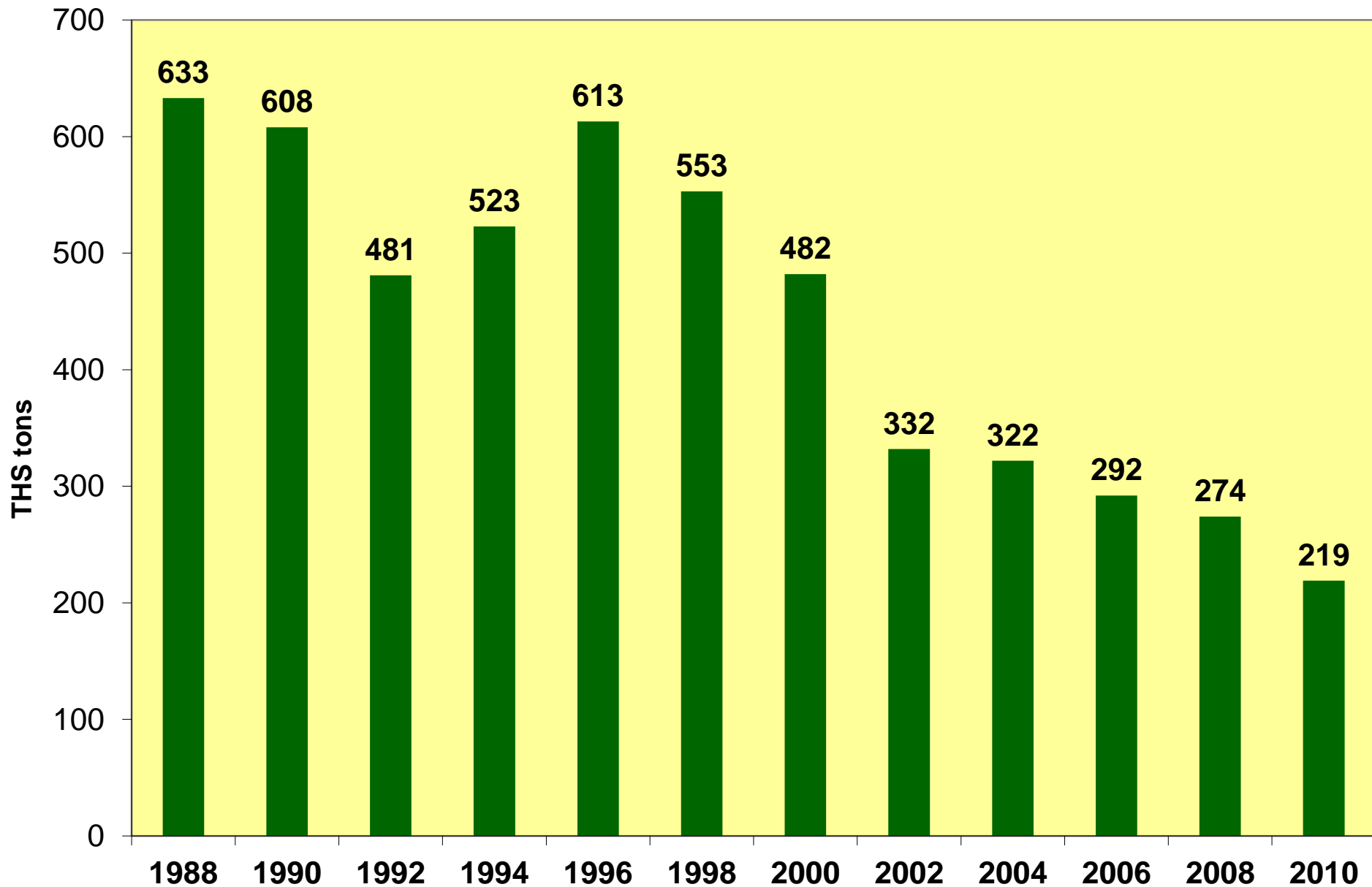
# VEGETABLE HARVEST AREA IN THE CZECH REPUBLIC (Thousand ha)

## Excluding Households

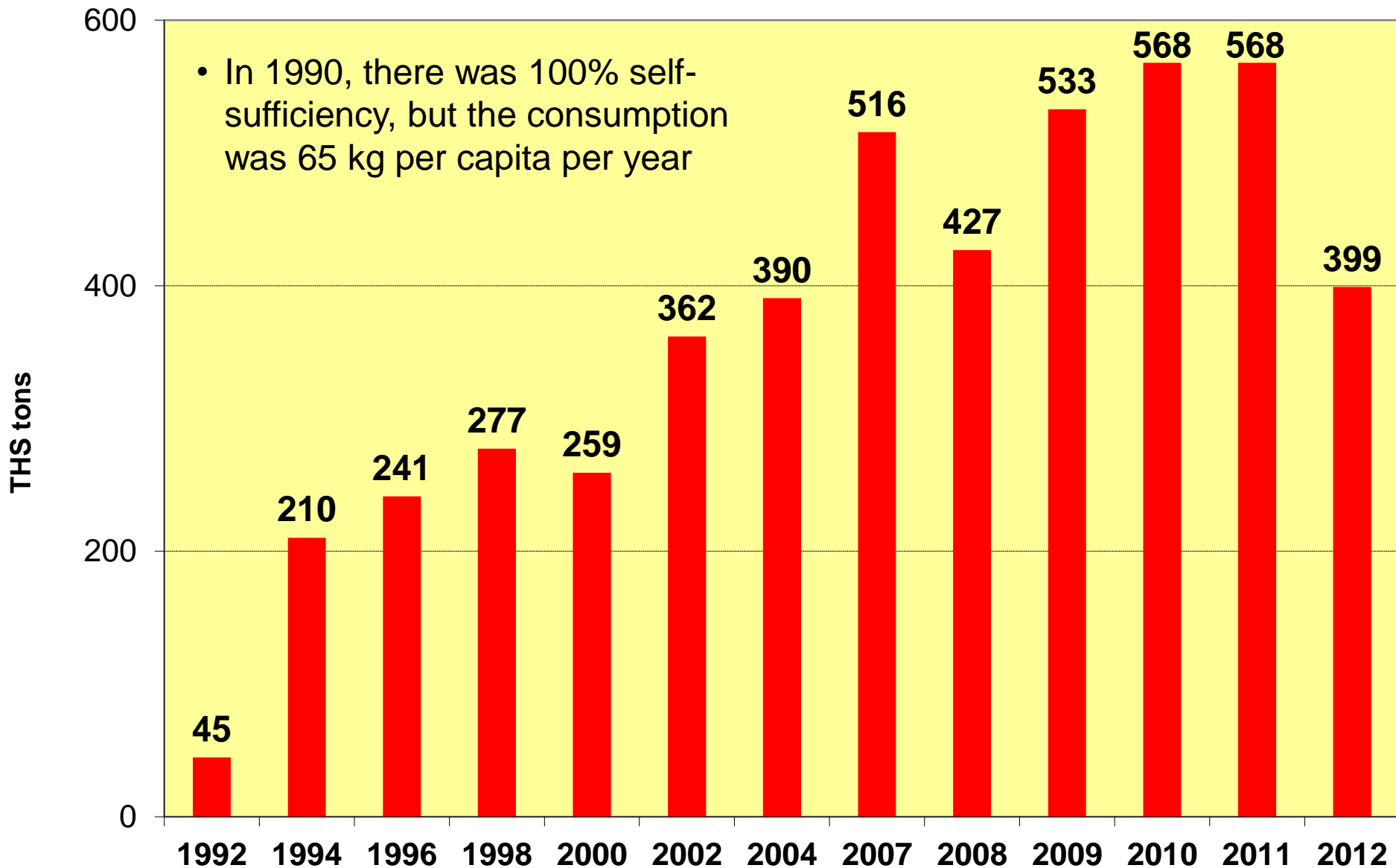


# VEGETABLE PRODUCTION IN THE CZECH REPUBLIC

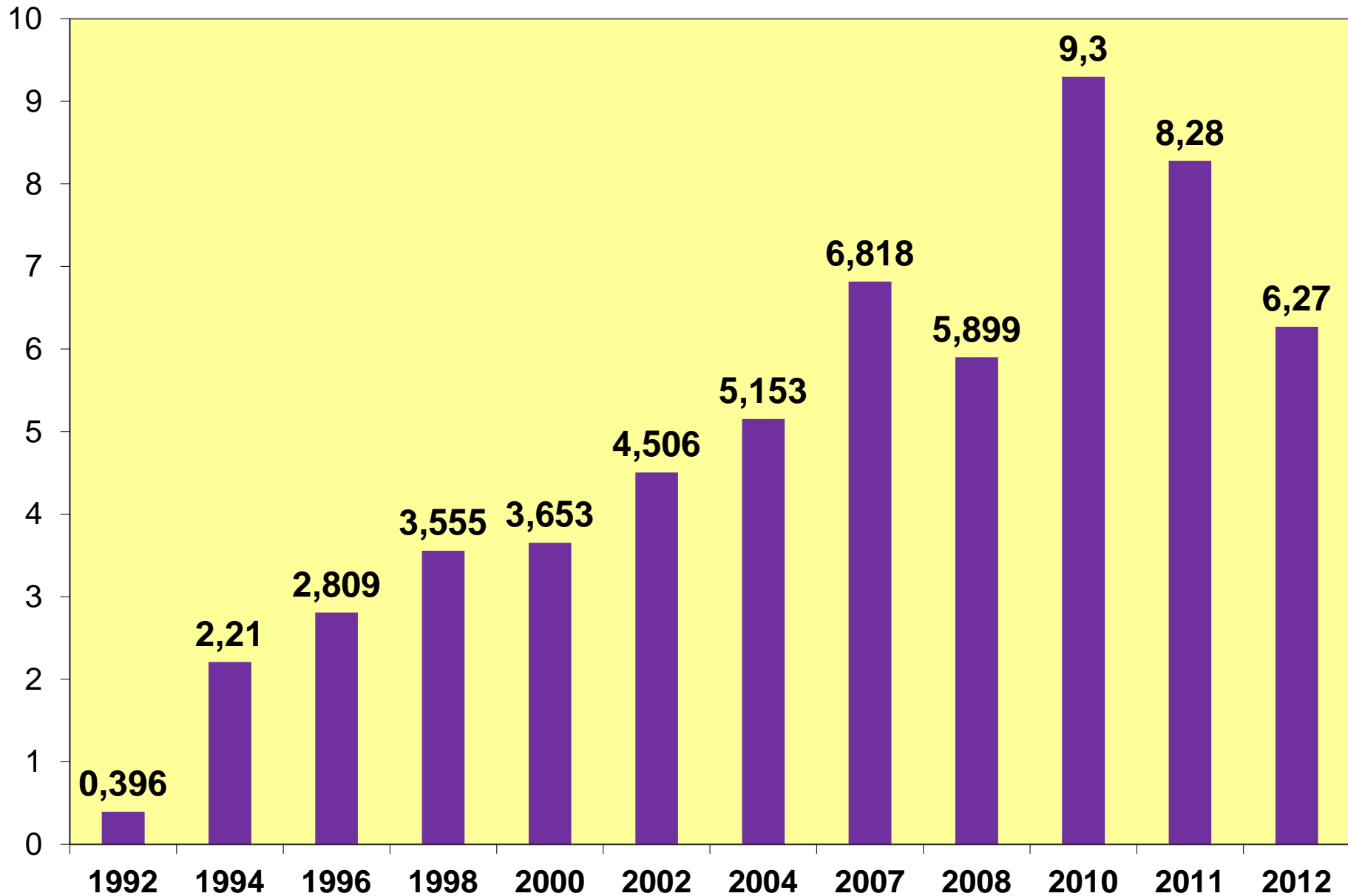
Including Households (Thousand Tonnes)



# IMPORT OF VEGETABLES INTO THE CZECH REPUBLIC (Thousand Tonnes)



# IMPORT OF VEGETABLES INTO THE CZECH REPUBLIC (Billion CZK)



# Imports constitute 76% of vegetables in shops

(thousand t)

## The Netherlands

125

(Tomatoes, onions, slicing cucumbers, peppers, carrots, cabbage)

## Spain

93

(Tomatoes, slicing cucumbers, melons, peppers, lettuces, cauliflower, broccoli)

## Germany

91

(onions, cabbage, **cucumbers** (*E. coli*), cauliflower, melons, peppers)

## Italy

44

## Poland

39

## Hungary

31

## Carrots:

Consumption per capita of **6.1 kg/year**

**4.2 kg imported**

1.9 kg of domestic production

## Onions:

Consumption per capita of **10.5 kg/year**

**6.5 kg imported**

4 kg of domestic production



The freezing plant has been shut down in the Czech Republic –  
vegetables are taken to Austria

Fruta: Lednice, Modřice, Znojmo – not in existence

Hamé Babice – foreign

..... *Frozen or processed vegetables are from Poland,  
Hungary, Austria, Germany, etc.*

# **Marketing and Selling of Vegetables Produced by Growers in the Czech Republic**

- **Supermarkets and hypermarkets** **78%**
- **Wholesalers** **8.5%**  
(Supplies for retailers, export)
- **For processing** **10%**  
(Canning factories, cabbage processing plants, freezing plants, drying plants)
- **Other** **3.5%**  
(Export, hotels, restaurants, zoos, direct sales “from the yard”, farmers’ markets, local centres for buying products from farmers)

# Average and Achievable Yield of Individual Vegetables (A)

| Vegetable                 | Yield of 2011 | Achieve yield | 2009  |        | 2011  |        |
|---------------------------|---------------|---------------|-------|--------|-------|--------|
|                           | t/ha          | t/ha          | ha    | t      | ha    | t      |
| <b>Broccoli</b>           | 9,5           | 28            | 52    | 486    | 50    | 475    |
| <b>Celeri</b>             | 26            | 35            | 294   | 8 747  | 344   | 8 944  |
| <b>Onions</b>             | 32            | 60            | 1 732 | 47 110 | 1 728 | 55 296 |
| <b>Garlic</b>             | 7,5           | 11            | 56    | 428    | 138   | 1 035  |
| <b>Bean pods</b>          | 8             | 8             | 46    | 391    | 82    | 656    |
| <b>Eating peas</b>        | 5             | 7,5           | 930   | 3 636  | 1101  | 5 505  |
| <b>Aspara</b>             | 5,6           | 8             | 129   | 768    | 145   | 812    |
| <b>Savoy cabbage</b>      | 25            | 28            | 156   | 3 851  | 115   | 2 875  |
| <b>Kohlrabi</b>           | 32            | 40            | 188   | 7 031  | 192   | 6 144  |
| <b>Sweet corn</b>         | 4             | 5             | 251   | 4 267  | 294   | 4 998  |
| <b>Cauliflower</b>        | 14            | 25            | 317   | 4 042  | 294   | 4 116  |
| <b>Carrots</b>            | 37            | 60 (80)       | 720   | 26 316 | 688   | 25 456 |
| <b>Pickling cucumbers</b> | 30            | 35            | 331   | 5 627  | 287   | 12 915 |
| <b>Slicing cucumbers</b>  | 34            | 45            | 131   | 2 895  | 117   | 3 978  |

# Average and Achievable Yield of Individual Vegetables (B)

| Vegetable        | Yield of 2011 | Achieve yield | 2009         |                | 2011         |                |
|------------------|---------------|---------------|--------------|----------------|--------------|----------------|
|                  | t/ha          | t/ha          | ha           | t              | ha           | t              |
| Peppers          | 40            | 50            | 269          | 11 661         | 244          | 9 760          |
| Parsnips         | 20            | 40            | 48           | 1 020          | 52           | 1 040          |
| Parsley          | 17            | 25            | 270          | 3 902          | 296          | 5 032          |
| Lee              | 23            | 25            | 43           | 877            | 23           | 529            |
| Tomatoe          | 40            | 80            | 462          | 20 420         | 377          | 15 080         |
| Radish           | 20            | 22            | 296          | 6 542          | 325          | 6 500          |
| Garden - beets   | 33            | 50            | 94           | 3 116          | 72           | 2 376          |
| Lettuces         | 20            | 20            | 585          | 11 934         | 644          | 12 880         |
| Spinach          | 15            | 18            | 310          | 3 426          | 361          | 5 415          |
| Head cabbage     | 68            | 90            | 1 088        | 49 721         | 1 417        | 96 356         |
| Peking cabbage   | 20            | 60            | 139          | 3 190          | 123          | 2 460          |
| Other vegetables |               |               | 154          | 4 286          | 187          | 3558           |
| <b>Total</b>     |               |               | <b>9 091</b> | <b>235 690</b> | <b>9 696</b> | <b>294 186</b> |

## It is essential to keep discipline concerning technology – inadequately prepared soil

- Problematic: **carrots, cabbage, onions, parsley** – **1/2 yield**
- Vegetables have fine seeds
- Good growers
  - Get the land ready for vegetables **as early as in the autumn:**
    - No more preparation of beds is done in the autumn
    - In the spring, it is only necessary to break the soil crust with a network harrow and do the sowing into the soil
  - Achieve a yield of
    - **80 t with carrots**
    - **80-90 t with cabbage**
      - Need to prepare the land properly and have a low interspace  
(JZD Ratiškovice (a collective farm) achieved 80 t/ha for 5 years in a row – they mastered the techniques)

A grower near the town of Nymburk cultivates an area of land of 430 ha, and the yield from 1 ha is **380,000 CZK (!)**

# 10 Vegetables Most Frequently Grown in the Czech Republic (Excluding Households)

| Vegetable                  |       |        |
|----------------------------|-------|--------|
|                            | ha    | t      |
| Onions                     | 1,728 | 55,296 |
| White and red head cabbage | 1,417 | 96,356 |
| Eating peas                | 1,101 | 5,505  |
| Carrots                    | 688   | 25,456 |
| Lettuces                   | 644   | 12,880 |
| Tomatoes                   | 377   | 15,080 |
| Spinach                    | 361   | 5,415  |
| Celeriac                   | 344   | 8,944  |
| Small radishes             | 325   | 6,500  |
| Parsley                    | 296   | 5,032  |

# Harvest of Selected Vegetables in the Czech Republic incl. Household Figures

| Druh              | Plocha (ha)            |                         |               | Průměrný výnos (t/ha)<br>ZS + D | Celková sklizeň (t)<br>ZS+ D |
|-------------------|------------------------|-------------------------|---------------|---------------------------------|------------------------------|
|                   | Zemědělský sektor (ZS) | Odhad za domácnosti (D) | ZS + D celkem |                                 |                              |
| Celer bulvový     | 294                    | 154                     | 448           | 22,84                           | 10 223                       |
| Mrkev             | 638                    | 414                     | 1 052         | 26,36                           | 27 735                       |
| Petržel           | 244                    | 207                     | 451           | 11,42                           | 5 152                        |
| Kedlubny          | 180                    | 260                     | 440           | 15,01                           | 6 604                        |
| Kapusta           | 118                    | 53                      | 171           | 17,51                           | 2 994                        |
| Květák            | 316                    | 58                      | 374           | 14,56                           | 5 441                        |
| Zelí              | 1 077                  | 149                     | 1 226         | 33,18                           | 40 664                       |
| Okurky nakládačky | 296                    | 852 3x                  | 1 148         | 14,58                           | 16 731                       |
| Okurky salátové   | 118                    | 294 3x                  | 402           | 21,48                           | 8 625                        |
| Rajčata           | 389                    | 770 2x                  | 1 159         | 17,87                           | 20 721                       |
| Cibule            | 1 832                  | 544                     | 2 376         | 18,2                            | 43 248                       |
| Česnek            | 67                     | 221 3x                  | 288           | 5,06                            | 1 457                        |
| Hrách dřeňový     | 1 020                  | 241                     | 1 261         | 3,27                            | 4 130                        |
| ostatní zelenina  | 1 995                  | 606                     | 2 601         | 9,57                            | 24 898                       |
| <b>Celkem</b>     | <b>8 583</b>           | <b>4 813</b>            | <b>13 396</b> | -                               | <b>218 623</b>               |

| Crop               | hrs / ha    |
|--------------------|-------------|
| Garlic             | 1,300-1,600 |
| Early kohlrabi     | 1,000-1,100 |
| Cauliflower        | 500-550     |
| Carrots            | 400-440     |
| Late cabbage       | 300-330     |
| Celeriac           | 360-380     |
| Onions             | 350-400     |
| Pickling cucumbers | 1,200       |
| Tomatoes           | 450-480     |
| Spinach            | 40-45       |
| <b>Field crops</b> |             |
| Winter wheat       | 22-26       |
| Oilseed rape       | 20-24       |
| Sugar beets        | 170-200     |

## Labour Needed per 1 ha

**In average, total costs per 1 ha of vegetables amount to 120,000 CZK**

**Kohlrabi** – hand harvesting

**Carrots** – mechanical harvesting

**Cucumbers** – only hand harvesting

Temporary workers get 100 CZK/hr = 120,000 CZK only per harvest!

**Spinach** – mowing, high-capacity trailers

Many growers have abandoned vegetable growing and grow grain instead but it is not possible to achieve as high takings as with vegetable growing:

Peking cabbage – 50 t of cash crop + 30 t of green manure,  
50,000 by 8 CZK/kg = 400,000 CZK of profit



## Garlic

- Hand harvesting
- Mechanical harvesting also possible but it requires an area concentration of at least 10 ha (!), otherwise it is harvested mechanically
- The area in Bánov was 80 ha, Slavkov near Uherský Brod, Horní Němčí
- At one grower, garlic grown on 8-10 ha

## Cauliflower

- Manually and by thinning – expensive

**It is more convenient to grow courgettes** – harvested once in 10 days  
**than pickling cucumbers** – harvested 2-3 times per week

**Prices of Vegetables: Purchase Price – Achieved by the  
Producer, Consumer Price – Selling Price for the Consumer  
(CZK/kg)**

| <b>normální marže<br/>je max 50 %<br/>ne 300 % (!)</b> | <b>1996</b>  |              | <b>1997</b>  |              | <b>1998</b>  |              | <b>1999</b>  |              | <b>2008</b> |              |
|--|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|--------------|
|  | nákup. cena  | spotř.cena   | nákup. cena  | spotř.cena   | nákup. cena  | spotř.cena   | nákup. cena  | spotř.cena   | nákup. cena | spotř.cena   |
| <b>Cibule</b>  | <b>4,82</b>  | <b>10,7</b>  | <b>6,84</b>  | <b>14,72</b> | <b>8,52</b>  | <b>21,39</b> | <b>5,31</b>  | <b>11,67</b> | <b>5,59</b> | <b>13,11</b> |
| <b>Česnek</b>  | 29,33        | 58,98        | 39,83        | 70,05        | 38,5         | 63,15        | 37,55        | 53,72        |             |              |
| <b>Květák</b>  | 10,29        | 25,92        | 11,89        | 28,32        | 10,43        | 27,49        | 11,78        | 29,56        | 11,51       | 29,05        |
| <b>Mrkev</b>   | <b>5,42</b>  | <b>15,38</b> | <b>5,36</b>  | <b>14,67</b> | <b>5,55</b>  | <b>16,64</b> | <b>6</b>     | <b>17,57</b> | <b>7,4</b>  | <b>17,17</b> |
| <b>Okurky salátové</b>                                 | 17,17        | 32,73        | 18,99        | 34,7         | 21,46        | 39,44        | 13,37        | 34,71        | 19,3        | 35,45        |
| <b>Paprika</b>   | <b>26,75</b> | <b>57,65</b> | <b>32,29</b> | <b>71,04</b> | <b>28,93</b> | <b>63,67</b> | <b>31,04</b> | <b>61,19</b> | <b>18,2</b> | <b>63,5</b>  |
| <b>Rajčata</b>   | <b>20,92</b> | <b>42,18</b> | <b>19,34</b> | <b>37,99</b> | <b>18,83</b> | <b>39,91</b> | <b>19,15</b> | <b>39,14</b> | <b>18,6</b> | <b>35,86</b> |
| <b>Zelí bílé</b>                                       | <b>4,08</b>  | <b>11,27</b> | <b>3,65</b>  | <b>9,51</b>  | <b>2,91</b>  | <b>10,13</b> | <b>3,03</b>  | <b>9,61</b>  | <b>5,5</b>  | <b>12,74</b> |

**Prices of Vegetables: Purchase Price – Achieved by the Producer,  
Consumer Price – Selling Price for the Consumer (CZK/kg)**

| <b>normální marže<br/>je max 50 %<br/>ne 300 % (!)</b> | <b>1996</b>  |              | <b>1997</b>  |              | <b>1998</b>  |              | <b>1999</b>  |              | <b>2008</b> |              |
|--|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|--------------|
|  | nákup. cena  | spotř.cena   | nákup. cena  | spotř.cena   | nákup. cena  | spotř.cena   | nákup. cena  | spotř.cena   | nákup. cena | spotř.cena   |
| <b>Celer</b>   | 7,97         |              | 8,77         |              | 8,4          |              | 9,36         |              |             |              |
| <b>Cibule</b>  | <b>4,82</b>  | <b>10,7</b>  | <b>6,84</b>  | <b>14,72</b> | <b>8,52</b>  | <b>21,39</b> | <b>5,31</b>  | <b>11,67</b> | <b>5,59</b> | <b>13,11</b> |
| <b>Česnek</b>  | 29,33        | <b>58,98</b> | 39,83        | <b>70,05</b> | 38,5         | <b>63,15</b> | 37,55        | <b>53,72</b> |             |              |
| <b>Kapusta hlávková</b>                                | 7,03         |              | 6,83         |              | 6,07         |              | 5,67         |              | 6,68        |              |
| <b>Květák</b>  | 10,29        | <b>25,92</b> | 11,89        | <b>28,32</b> | 10,43        | <b>27,49</b> | 11,78        | <b>29,56</b> | 11,51       | <b>29,05</b> |
| <b>Mrkev</b>   | <b>5,42</b>  | <b>15,38</b> | <b>5,36</b>  | <b>14,67</b> | <b>5,55</b>  | <b>16,64</b> | <b>6</b>     | <b>17,57</b> | <b>7,4</b>  | <b>17,17</b> |
| <b>Okurky salátové</b>                                 | 17,17        | <b>32,73</b> | 18,99        | <b>34,7</b>  | 21,46        | <b>39,44</b> | 13,37        | <b>34,71</b> | 19,3        | <b>35,45</b> |
| <b>Paprika</b>   | <b>26,75</b> | <b>57,65</b> | <b>32,29</b> | <b>71,04</b> | <b>28,93</b> | <b>63,67</b> | <b>31,04</b> | <b>61,19</b> | <b>18,2</b> | <b>63,5</b>  |
| <b>Petržel</b>   | 10,36        |              | 10,41        |              | 11,68        |              | 11,57        |              | 12,9        | <b>22,6</b>  |
| <b>Pór</b>   | 14,5         |              | 14,11        |              | 14,61        |              | 13,81        |              | 12,93       | <b>30,5</b>  |
| <b>Rajčata</b>   | <b>20,92</b> | <b>42,18</b> | <b>19,34</b> | <b>37,99</b> | <b>18,83</b> | <b>39,91</b> | <b>19,15</b> | <b>39,14</b> | <b>18,6</b> | <b>35,86</b> |
| <b>Salát hlávkový</b>                                  | 4,01         |              | 2,97         |              | 3,85         |              | 4,17         |              |             |              |
| <b>Zelí bílé</b>                                       | <b>4,08</b>  | <b>11,27</b> | <b>3,65</b>  | <b>9,51</b>  | <b>2,91</b>  | <b>10,13</b> | <b>3,03</b>  | <b>9,61</b>  | <b>5,5</b>  | <b>12,74</b> |

# TENDENCIES

- Decreasing the proportion of the "heavy-duty" vegetables
    - **Reduction in areas with onions, cabbage for canning**
    - Restaurants offer also other dishes than goulash or roast pork with sauerkraut and dumplings = not so many onions and so much sauerkraut are needed
  - **More storage cabbage** is going to be grown
- 
- Increasing the proportion of salad vegetables, vegetable tops
    - **fresh lettuces**
      - Iceberg lettuce, Peking cabbage
    - Increasing the values with **vegetable tops**
      - Parsley, Welsh onion, cress, common chives, etc.

- Changing the preparation for the market
  - Packing, cleaning, portioning
  - Endeavour to deliver vegetables ready for cooking
    - Grated carrots, onions, etc.
      - Disadvantage of the maximum **durability of 4 days**

# FUTURE SOLUTIONS

- Growing individual vegetables in **optimum conditions**
  - it is undesirable to grow **celeriac in the Břeclav region** – dry area – hollow, spongy tubers
  - **Carrots** on gravel soils, etc.
- **Concentrating** larger areas in traditional regions
  - Reducing production costs
  - In Austria, **a minimum of 130-150 ha** at one business, only 5-30 ha in the Czech Republic
  - Concentration = a greater chance of sales, mechanisation
- Expanding the **assortment** of fresh vegetables in particular
  - Iceberg lettuce, broccoli, etc.

- Increasing fresh vegetable **consumption**
  - **Advertising:** 25-30% of the costs going to advertising  
(Common practice with medicines or detergents)
- Increasing production **quality**
- Changing the organisation of **import**  
(By legislative measures – it is of no use to import vegetables that we can produce)
- Pushing distribution in **supermarkets**
- Ceasing to use **middlemen**
  - Focusing more on supplies from growers or their marketing co-operatives (so far displeasure at growers' cooperation)

- **Farmers' markets**

- It is impossible to engage enough growers in them – there are a small number of growers
- In small towns as well

- **Community-supported agriculture**

- Distribution within 7-14 days, seasonal vegetables (drop off)

- **“Fruit and vegetables into schools” project**

- 100 m CZK, a limit of 240 CZK per pupil, 3,141 schools engaged

- **Promotion: regional vegetables**

- The South Bohemia Region – sauerkraut
- The South Moravia Region – garlic



## •Marketing associations

- A great asset, lack of financial means
  - JIHOFRUKT, družstvo (co-operative), Velké Bílovice
  - CZ FRUIT, odbytové družstvo (marketing co-operative), Praha
  - Odbytové družstvo LITÓZEL (Marketing co-operative LITÓZEL), Bohušovice n. Ohří
  - Jihomoravská zelenina, družstvo (co-operative), Velké Bílovice
  - EB Fruit, odbytové družstvo ovocnářů (marketing co-operative of fruit growers), Holovousy
  - Družstvo producentů rajčat (Co-operative of tomato producers), Podivín
  - Východočeská zelenina – družstvo producentů zeleniny (Eastern Bohemia vegetables – co-operative of vegetable producers), Synk
  - EKO-ODBYT, Slaný
  - Odbytové družstvo Polabí (Marketing co-operative Polabí), Přerov n/Labem
  - OZC Jizera, Předměřice n/Jizerou
  - Družstvo BRAMKO CZ (BRAMKO CZ co-operative), Semice

# **Botanical and Commercial**

# **Classification of Vegetables**

# Botanical Classification of Vegetables

## BRASSICAS – *Brassicaceae*

- Head cabbage (white, red)
- Peking cabbage
- Chinese cabbage
- Savoy cabbage
- Brussels sprouts
- Savoy
- Cauliflower
- Broccoli
- Small radishes
- Radishes
- Horseradish
- Garden cress
- Stubble turnip
- Swedish turni



**Brassicas** is a much wider term than cole crops, also root vegetables and others belong to the group.

**Cole crops** form a cabbage-stalk, their common characteristics include storage, vitamin C content, etc.

## LEGUMES – Fabaceae

- Peas
- French garden beans
- Scarlet runner beans  
A climbing plant, colourful seeds, not suitable for production
- Broad beans



## CHENOPOD FAMILY – Chenopodiaceae

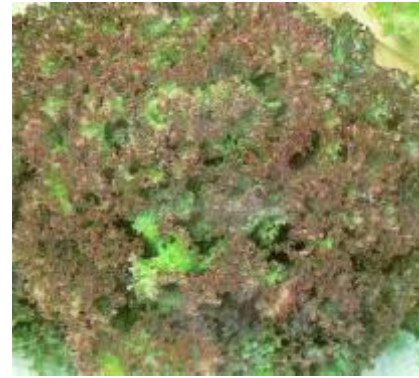
- Spinach
- Garden beetroots
- Silver beets
  - for cultivation in gardens, only 3-4 leaves get tied together and placed into a cold store, silver beets contain less oxalic acid – instead of spinach



# ASTER FAMILY – Asteraceae

- Head lettuce
- Leaf lettuce
- Iceberg lettuce
- Roman lettuce
- Winter endive
- Chickory
- Black salsif

Leaf lettuce



Roman lettuce



Iceberg lettuce

Green chicory



Endive



Witloof chicory – chicons



Black salsify



Red chicory

## LILY FAMILY – Liliaceae

- Onions
- Shallots Leeks
- Welsh onions
- Garlic
- Leeks
- Common chives
- Asparagus



Leek

Green  
asparagus



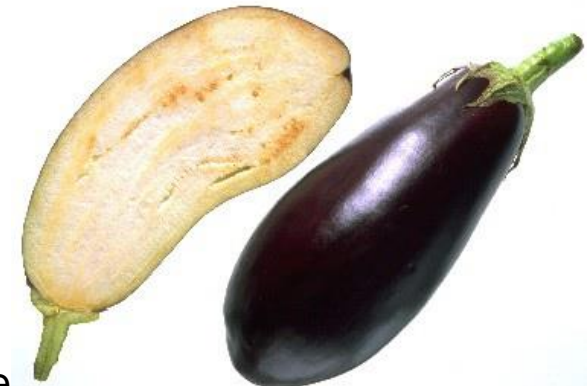
Shallot



Welsh  
onion

## NIGHTSHADE FAMILY – Solanaceae

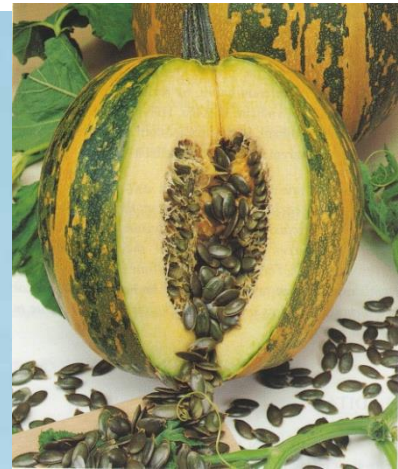
- Tomatoes
- Peppers
- Aubergines



Aubergine

# CUCURBITS FAMILY – Cucurbitaceae

- Cucumbers
- Marrows
  - Gourds – courgettes, pattypan squash, oil marrows
  - oil marrows
  - Honeydew melon
- Muskmelons
- Watermelons



# APIACEAE FAMILY – *Apiaceae*

- Carrots
- Parsley
- Parsnips
- Celeriac
- Pascal celery
- Leaf celery
- Dill
- Fennel



parsnip



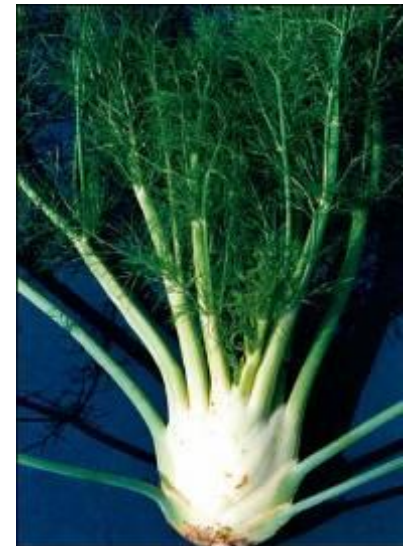
Celeriac



Pascal celery



Leaf celery



Fennel



## CE PLANT FAMILY – *Mezybryanthaceae*

- New Zealand spinach

For gardeners only, separate leaves are torn off, 1 plant delivers 0.5 kg at one harvest (5-6 kg in a growing period), new leaves grow from axillary buds, 3 kg of leaves per growing period, a low content of oxalic acid, a spreading stalk takes up 1.5 m<sup>2</sup>

## GRASSES – *Poaceae*

- Sweet corn

Harvesting at the soft dough stage, processing at freezing plants, small height of 1.2 – 1.5 m, the company Moravská Nová Ves has 500 ha of this crop

## VALERIAN FAMILY – *Valerianaceae*

- Corn-salad

Imported from Austria, aromatic greenstuff, an ingredient for salads, spreads, soups, etc

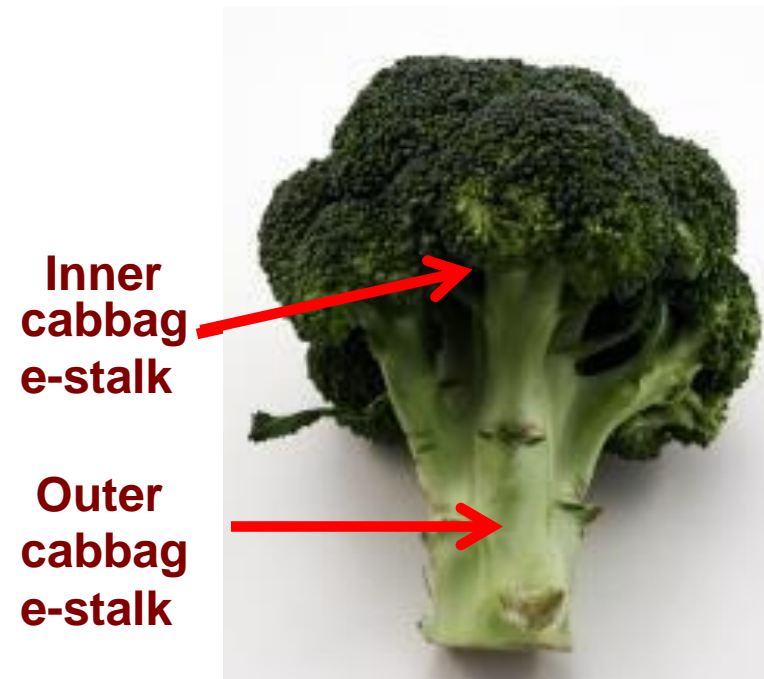


# COMMERCIAL CLASSIFICATION OF VEGETABLES

## COLE CROPS

*Vegetables forming a cabbage-stalk (hypocotyls and part of epicotyl)  
Outer and inner cabbage-stalks are distinguished, cultivars having  
short inner cabbage-stalks are desired, higher efficiency*

- Head cabbage (white, red)
- Savoy cabbage
- Brussels sprouts
- Borecole greens (savoy)
- Cauliflower
- Broccoli
- Kohlrabi



# ROOT VEGETABLES

- Celeriac
- Carrots
- Parsley
- Parsnips
- Horseradish
- Black salsify
- Garden-beets
- Radishes
- Small radishes
- Stubble turnip
- Swedish turnip



## FRUIT BEARING VEGETABLES

- Peppers
- Tomatoes
- Cucumbers
- Aubergines
- Watermelons (green peel of the fruit, red pulp, seeds as a cultivar characteristic (purple, yellow, brown, black), considerably ragged leaves)
- Muskmelons - leaves are similar to those of cucumbers, yellow or brown fruits, orange, yellow or pale green pulp, fruits weighing 1 kg
- Gourds (a dendritic stalk: courgettes, pattypan squash)
- Winter squash (a creeping stalk, weight of 1 fruit 20-50 kg)



# ONION VEGETABLES

- Onions
- Shallots
- Garlic
- Leeks



# LEGUMINOUS VEGETABLES

- Bush beans
- Sugar peas
- Broad beans



## SALAD VEGETABLES

- Head lettuce
- Leaf lettuce
- Iceberg lettuce
- Roman lettuce
- Green witloof chicory (Zuckerhut type)
- Red witloof chicory (Radicchio type)
- Chickory for forcing (chicons)
- Winter endive
- Sweet fennel
- Pascal celery
- Peking cabbage
- Chinese cabbage



# GREENSTUFF

- Leaf celery
- Crisped parsley
- Common chives
- Garden cress
- Corn-salad
- Welsh onions
- Rocket
- Rokula





# GREEN VEGETABLES

- spinach
- New Zealand spinach
- Silver roots



## PERENNIAL VEGETABLES

- Horseradish
- Asparagus
- Rhubarb



## Others

- Sweet corn

