

# Overview of potato production in China

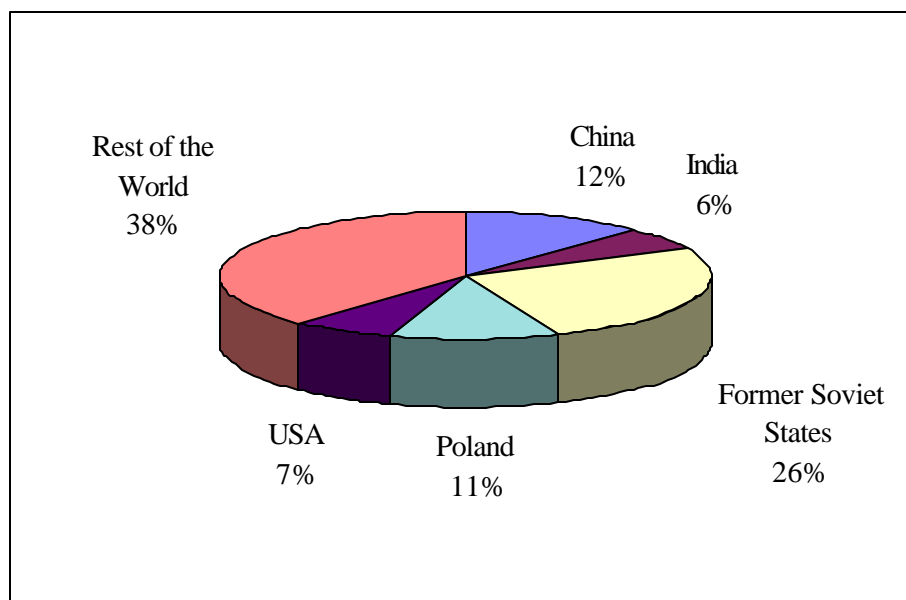
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## Summary

- Potato production in China
- Potato consumption in China
- Major constraints for potato production and use in China
- Research institutional work in China
- CIP MTP and its potential contributions to Chinese potato production

## 1. Potato production in China

China is the second largest potato producer in the world. According to FAO, some 12% of the world potato production is Chinese. In fact, Chinese potato production trends have a significant effect on the world potato production trends. The following figure show Chinese potato general production in relation to world production.



**Figure 1. World share of potato output of the largest producers, 1991.**  
FAO/CIP 1996

Potato yields in China are low relative to world levels, but slow and steady growth has occurred since 1950, first attributable to improved agronomic practice in the 1950s, then to the succeeding generations of good-quality cultivars in 1960s and 1970s (Mira in the south; Kexin 1 in the north; And many other cultivars). The

escalating rate of growth in yield trends from the late 1970s to the present is primarily a result of increased inputs, such as chemical fertilizer. The following table shows the potato production, harvested area, and yield for selected countries and years, places Chinese potato production within an international context.

**Table 1. Production, harvested area and yield of potato in selected countries**

Major potato-producing countries	1991-1993			Average annual growth rate		
	Production (000t)	Area (000ha)	Yield (t/ha)	Production (%)	Area (%)	Yield (%)
World	275,355	18,133	15	0.1	-0.7	0.8
Developed countries	190,398	11,456	17	-0.7	-1.6	0.9
Developing countries	84,957	6,677	13	3.6	2.1	1.5
<b>China</b>	<b>34,435</b>	<b>2,960</b>	<b>12</b>	<b>3.3</b>	<b>2.4</b>	<b>0.9</b>
India	15,771	1,014	16	5.9	3.3	2.5
Turkey	4,617	195	24	3.8	1.1	2.7
Iran	2,847	149	19	7.6	5.4	2.0
Egypt	1,702	82	21	5.0	4.2	0.9
Algeria	1,135	114	10	5.4	5.4	0.0
Morocco	957	60	16	5.4	3.6	1.8
Colombia	2,456	161	15	4.5	3.1	1.3
Brazil	2,353	165	14	2.5	-0.6	3.1
Argentina	2,015	111	18	0.8	-1.4	2.3
Ex-USSR	72,893	6,392	11	-0.1	-1.0	0.9
Poland	29,565	1,750	17	-1.2	-1.6	0.4
Germany	11,247	338	33	-3.8	-5.2	1.5
USA	19,227	540	36	1.4	-0.1	1.6

Source: FAO / CIP (1996)

**Table 2. The potato production in China in recent years (1982-1996)**

Year	Planting area (1000 ha)	Production (10000 ton)	Yield (ton/ha)
1982	2454.4	2382.5	9.7
1983	2562.1	2527.5	9.9
1984	2561.6	2840.0	11.1
1985	2477.5	2675.0	10.8
1986	2509.9	2652.0	10.6
1987	2589.8	2668.5	10.3
1988	2747.3	3162.0	11.5
1989	2822.5	3105.5	11.0
1990	2865.2	3455.0	12.1
1991	2879.3	3156.5	11.0
1992	2994.9	3743.5	12.5
1993	3087.1	4604.0	14.9
1994	3207.6	4873.0	15.2

1995	3434.1	4573.5	13.3
1996	3736.3	5299.5	14.2

Source: Yearbook of China Agricultural Statistic 1983-1997.

Chinese potato yields average 14 t/ha, but regional average varies from less than 5t/ha to as high as 30 t/ha. Such large variability implies potential for large output increases in low-yield areas. Production and sown areas for potato grew at an average annual rate of 3.3% and 2.4% respectively during the last three decades (FAO 1995 ). Some data on potato production in China are listed as follow.

**Table 3. The potato production in different regions in China in 1996**

Region	Planting area		Total Production		Yield	
	x 1000 ha	Rank	x 10000 ton	Rank	ton/ha	Rank
Sichuan	584.60	1	812.5	1	13.90	13
Inner Mongolia	410.40	2	602.5	2	14.68	10
Guizhou	367.60	3	468.5	4	12.74	16
Gansu	342.20	4	383.5	5	11.21	19
Shaanxi	305.94	5	312.0	8	10.20	20
Shanxi	286.30	6	347.5	6	12.14	17
Heilongjiang	232.10	7	485.0	3	20.90	5
Yunnan	226.40	8	325.5	7	14.38	11
Hubei	207.50	9	279.0	9	13.45	15
Hebei	166.00	10	193.5	10	11.66	18
Hunan	83.60	11	116.5	14	13.94	12
Jilin	79.00	12	185.0	11	23.42	4
Fujian	73.70	13	109.5	15	14.86	9
Ningxia	73.10	14	73.5	18	10.05	21
Liaoning	66.74	15	126.1	13	18.89	7
Shandong	64.20	16	183.5	12	28.58	1
Zhejiang	62.10	17	85.0	17	13.69	14
Guangdong	47.10	18	91.5	16	19.43	6
Qinghai	37.91	19	69.1	19	18.21	8
Xinjiang	11.90	20	31.5	20	26.47	2
Anhui	7.10	21	18.5	21	26.06	3
Tibet	0.80	22	0.5	22	6.25	22
Total	3736.29		5299.7		14.18*	

Source: Yearbook of China Agricultural Statistic 1983 -1997.

\*The average yield of potato in China in 1996

## 2. Potato consumption in China

Potato is consumed as food, as an industrial raw material, and as a livestock feed in China. Historically potato has been staple food or security crop in production areas, On-farm consumption has always been very high. Even today in China it is still the same in poor remote areas. Quite a portion of potato production areas is likely to be low-income, nutritionally poor areas. Because potato like other root crops yield high

food value per area sown, they are favored in the areas where food security is a primary concern. This can be enforced by a record high tuber sown area during and after the famines of 1959 to 1961. More recently, as production of fine grains has developed rapidly in most regions, the role of potato has changed, and it is becoming less important as a main food source in general, but it remains a major energy source for the very poor people who are malnourished or undernourished. This is particularly true of those who live in the impoverished mountain regions.

Most potato is used for direct or indirect human consumption. Recent trends for potato consumption indicate that in urban and suburban areas, and in other areas with rapidly rising incomes, potato consumption is shifting from staple to vegetable consumption. Feed use is small, mainly low-quality tubers and plant tops. Trends in processing indicate that most will be for food products, with some light industrial uses. Composition of utilisation is difficult to assess because of fragmentary data. Available data suggest that staple use is high and stable in rural and poor areas, whereas vegetable use is high and growing in wealthier areas. Feed use is locally important, but generally small. Seed use probably underestimated at 10%. Processing utilisation will continue to grow, driven by greater demand caused by increasing incomes. Waste and losses can be as high as 10-20%.

### **3. Major constraints for potato production and use in China**

The major constraints for potato production and utilization in general are biotic, agronomic and socio-economic constraints.

The main biotic constraints in China include fungal diseases (the major one is late blight, the detail on LB will be reported by Prof. J Wang), bacterial diseases (the major one is bacterial wilt, the research on BW in China will reported by Prof. LY He), viral diseases (mainly PVX, PXY, PVM, PVS, PRLV, PSTV this will be reported by Dr. KY Xie), insects (aphids, worms, beetles, moth, Flies), nematodes. The first three contributes most of biotic damages to potato in China. Another very important biotic factor that constrains potato production is potato itself -- seed potato quality, this will be explained in detail by Drs ZG Yan, W He (TPS), CH Xie (south China), XW Song (north China), and ZB Lin (north China).

Agronomic constraints in China are mainly poor soil fertility, unfavorable climate conditions and unfavorable cropping system. Some of these constraints could be overcome or alleviated by fit agronomic practices and managements such as intercropping, relay cropping, crop rotation, weeding, fertilizer application and irrigation, as well as by breeding tolerant cultivars. In areas where conditions are not as good for potato growth, and where agronomic practices do not control poor conditions, new varieties with different tolerances of various environmental conditions are needed. For such case, introduction of germplasm with desirable characteristics will hasten the breeding of new, more suitable cultivars.

Socioeconomic constraints include unfavorable government policy, low commodity prices, poor input availability and poor marketing infrastructure. Some of these issues will be addressed by RT Zhang.

In addition to the constraints above, some other special constraints in China today are: lack of well-trained scientific personnel at different levels, lack of efficient extension service, very low efficiency of research institutes, and limited support from government. Since local expertise often is lacking and equipment for training in many techniques is rare. Thus the co-operative training programs with CIP and other international research centers are of great importance.

#### 4. Research institutional work

Potato research has been focusing on breeding, TPS, virus-free seed potato production, and cropping system. Even a lot of progress, the production is still lower than expected. Success has been achieved in developing new cultivars by conventional breeding and germplasm introduction. The research on TPS is in difficult period, since the applied research output of a many-year-long research program supported by both government and CIP is low. On the other hand, virus-free seed production is very successful, the output and impact are great. Yields from virus-free seed are 30% to 50% higher than those of ordinary seed stock. Cropping system study looks promising, especially for the rice-potato system in south China. This will be reported by RT Zhang and CX Wei .

There are quite a few institutes and many groups across China working on potato. The key ones are: Vegetable Research Institute, CAAS in Beijing; Keshan Potato Research Institute in Heilongjiang Province; Inner Mongolia Academy of Agricultural Sciences; Enshi ARI in Hubei province. Of them, Keshan ARI is the most productive one with quite a few very good cultivars released in the past decades. IVF is playing a more and more important role in co-ordination of potato program of national scope.

#### 5. CIP MTP and its potential contributions to Chinese potato production

The introduction to CIP project priority setting is listed in the appendix. Following is the priority projects for potato and involvement of Chinese scientists in the projects. The priorities for potato set by CIP are also the very important issues for potato research in China. Please pay your attention to the goals of the researches, that is the emphasis on concrete, measurable outputs. This is the goals for the subprojects in China too.

**Table 4. CIP priority projects for potato R&D and subprojects in China**

Priority	Projects	Subprojects in China
1	Integrated Control of Late Blight	+
2	Integrated Control of Bacterial Wilt	+
3	Control of Potato Viruses	+

4	Integrated Management of Potato Pests	-
5	Propagation of Clonal Potato Planting Materials	-
6	Sexual Potato Propagation (TPS)	?
7	Global-Sector Commodity Analysis & Impact Assessment for Potato	-
13	Potato Production in Rice-Wheat Systems	+
15	Conservation and Characterisation of Potato Genetic Resources	-
17	Conservation and Characterisation of Andean Root and Tuber Crops	-

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