Identification of Water Saving Measures for Policy Design

- Case Study on Water Consumption Analysis in Beijing

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1 Introduction

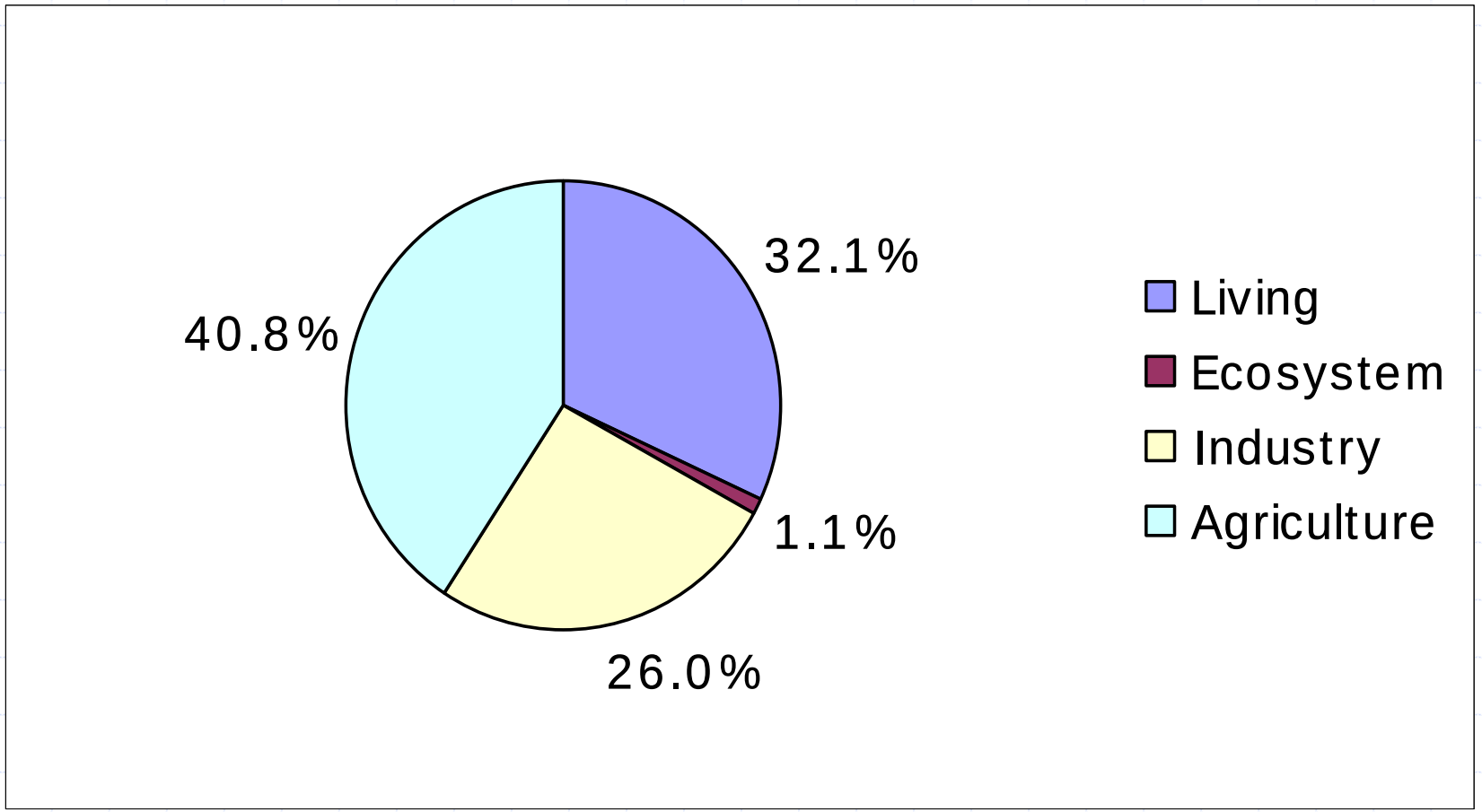
Precipitation

- Mean:626 mm
- Maximum:1406 mm, occurred in 1959
- Min:242 mm, occurred in 1890
- June-July-August: 85%
- 20 days (21/7-10/8):60%

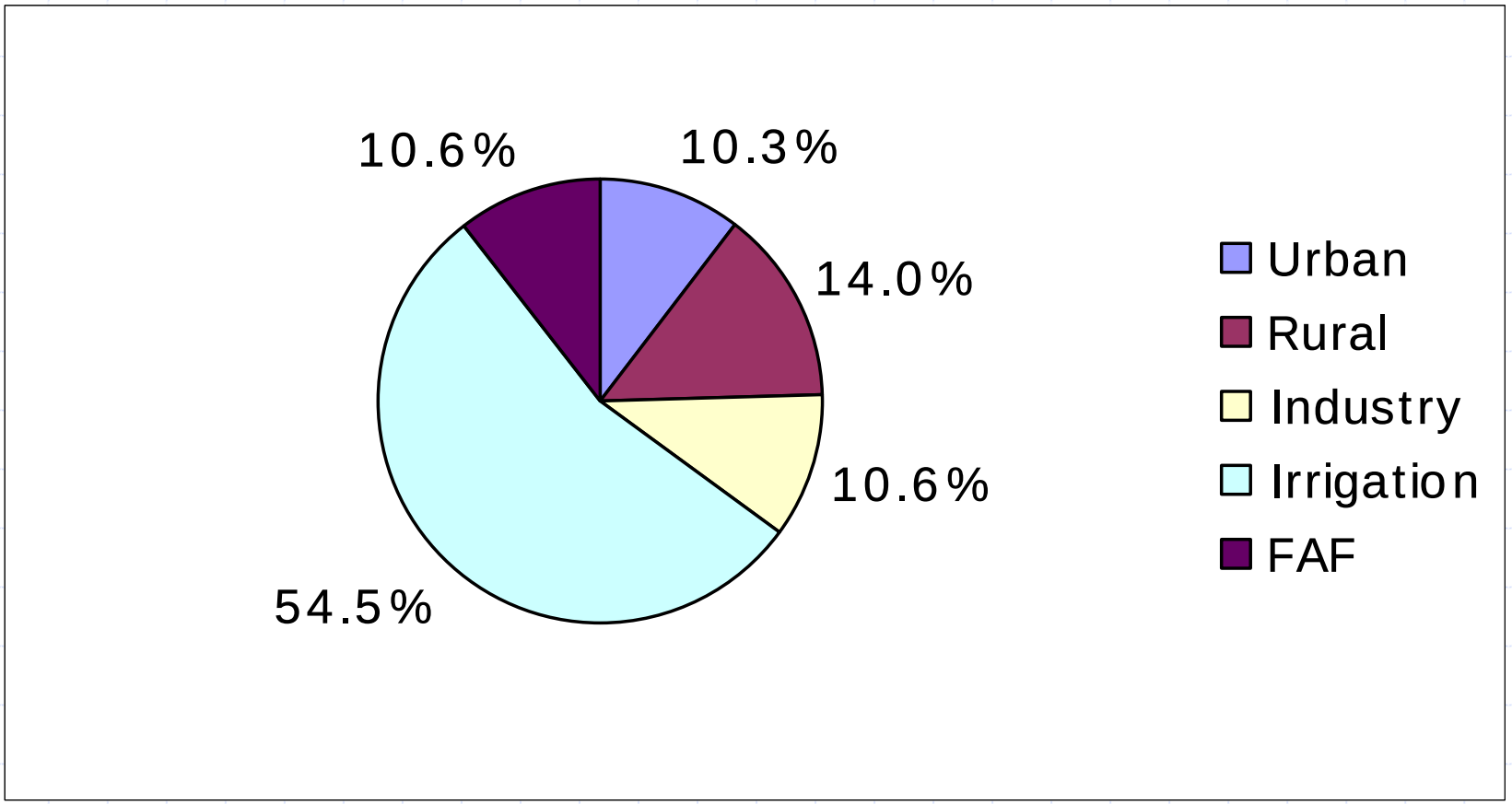
Water Resource

- 325 m^3 per capita
- 1/8 of national average
- 1/30 of world average

2 Water Consumption:Water Use



2 Water Consumption:Water Loss



2 Water Consumption:Water Pollution

Wastewater

- Daily:2.6 million m^3
- Annual:1.355 billion m^3

  ** Industry sector: 0.579 billion m^3

  ** Living sector: 0.776 billion m^3
- Wastewater processing:40%
- Water pollution:2.017 billion m^3 ,60% unprocessed wastewater+water in river systems
- Amount of water resource qualified for drinking (1.352 billion)

2 Water Consumption: Increasing Demand

Change from 1949 to 2000

- Population: 3×
- Industry sector: 31×
- Water demand: >>>… water supply

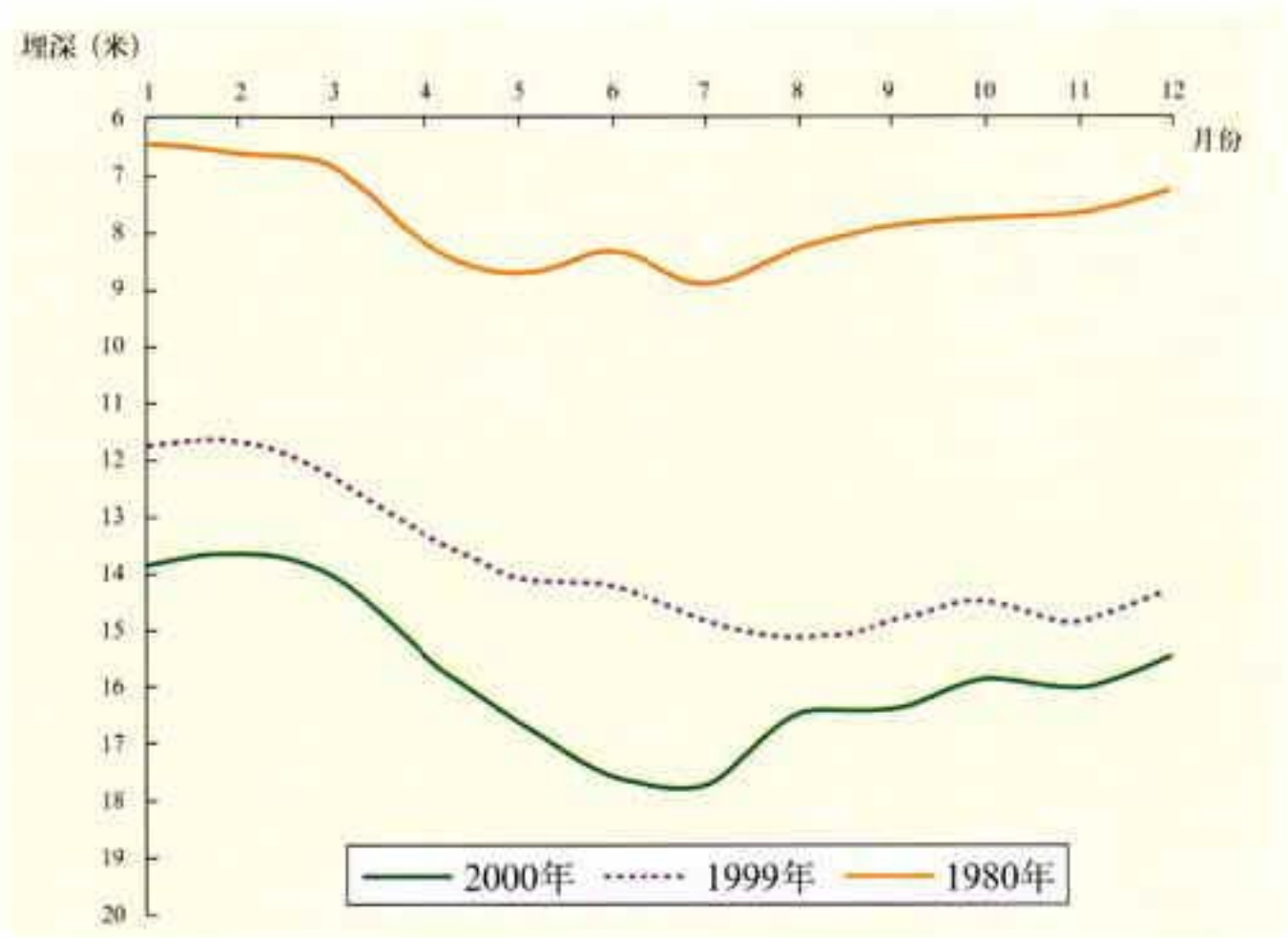
Estimation

- 2000-2005: 0.794 ~ 1.65 billion m^3
- 2000-2010: 1.182 ~ 1.996 billion m^3

2 Water Consumption:Over-Exploitation of Underground Water

- Disaster
  - * Land sinking
  - * Ecosystem degradation
- Over-exploitation
  - * 4.5 billion m^3, baseline, 1960
  - * 2.5 billion m^3, baseline, 1980

2 Water Consumption:Over-Exploitation of Underground Water



北京市平原区地下水埋深过程线

2 Water Consumption:Over-Exploitation of Underground Water

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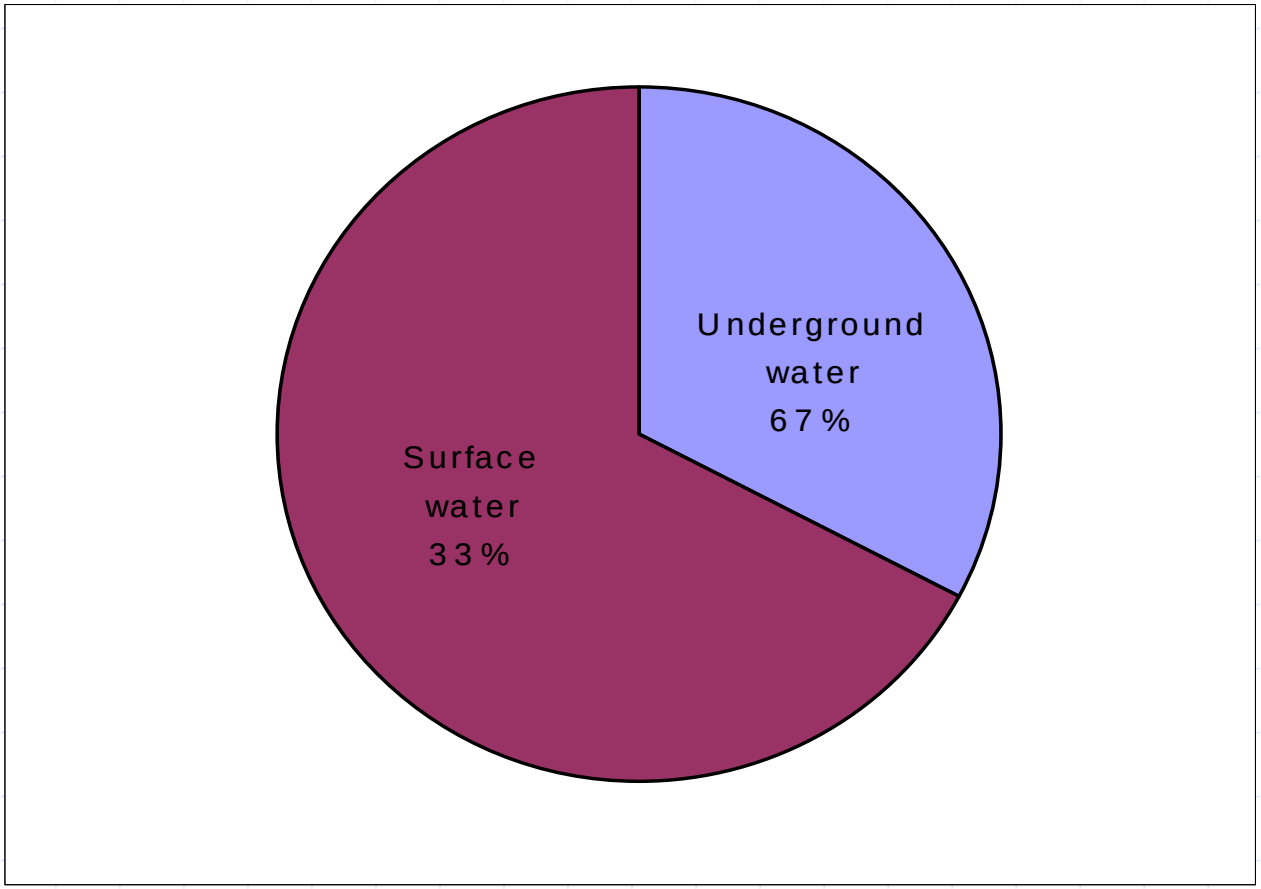


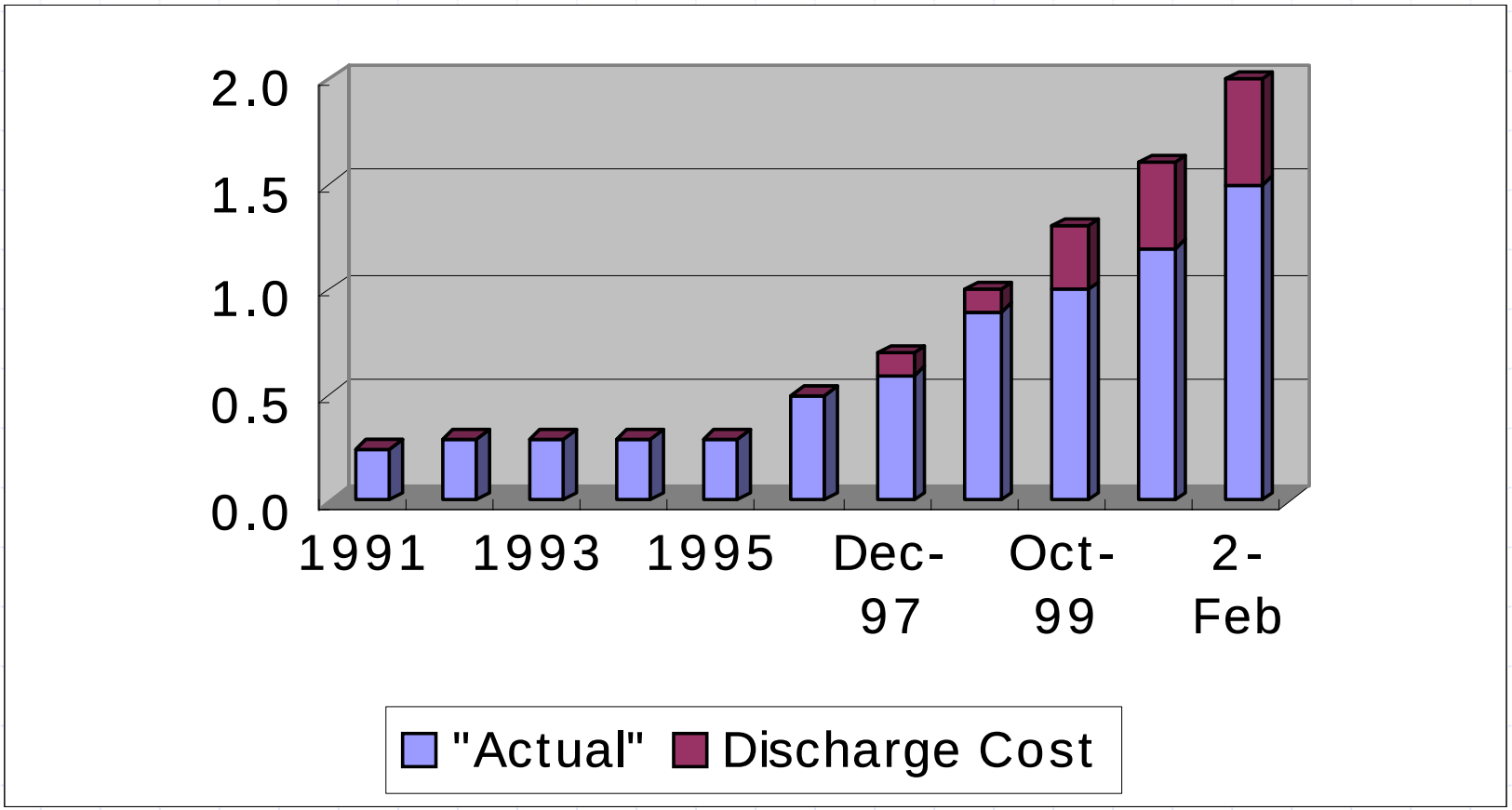
2 Water Consumption:Over-Exploitation of Underground Water

	Irrigation	Industry in Rural area	Rural Living	FAF	Urban Industry*	Urban Living
Water use (Billion m^3)	1.56	0.219	0.229	0.179	0.865	0.995
Percentage from underground water	71.1	95.9	96.9	80.4	39.2	53.1

2 Water Consumption:Over-Exploitation of Underground Water

District	1998	1980	Change
Chaoyang	23.94	16.66	-7.28
Fengtai	15.16	9.37	-5.79
Haidian	12.97	6.46	-6.51
Shijingshan	28.96	22.27	-6.69
Tongzhou	4.48	2.44	-2.04
Daxing	8.92	2.45	-6.47
Fangshan	8.97	7.40	-1.57
Mengtougou	14.35	9.88	-4.47
Changping	15.46	6.69	-8.77
Shunyi	11.18	5.78	-5.40
Yanqing	7.55	8.63	1.08
Huairou	4.40	3.79	-0.61
Miyun	14.96	9.41	-5.55
Pinggu	10.25	9.23	-1.02
Average	11.88	7.24	-4.64

2 Water Consumption:Water Price Analysis



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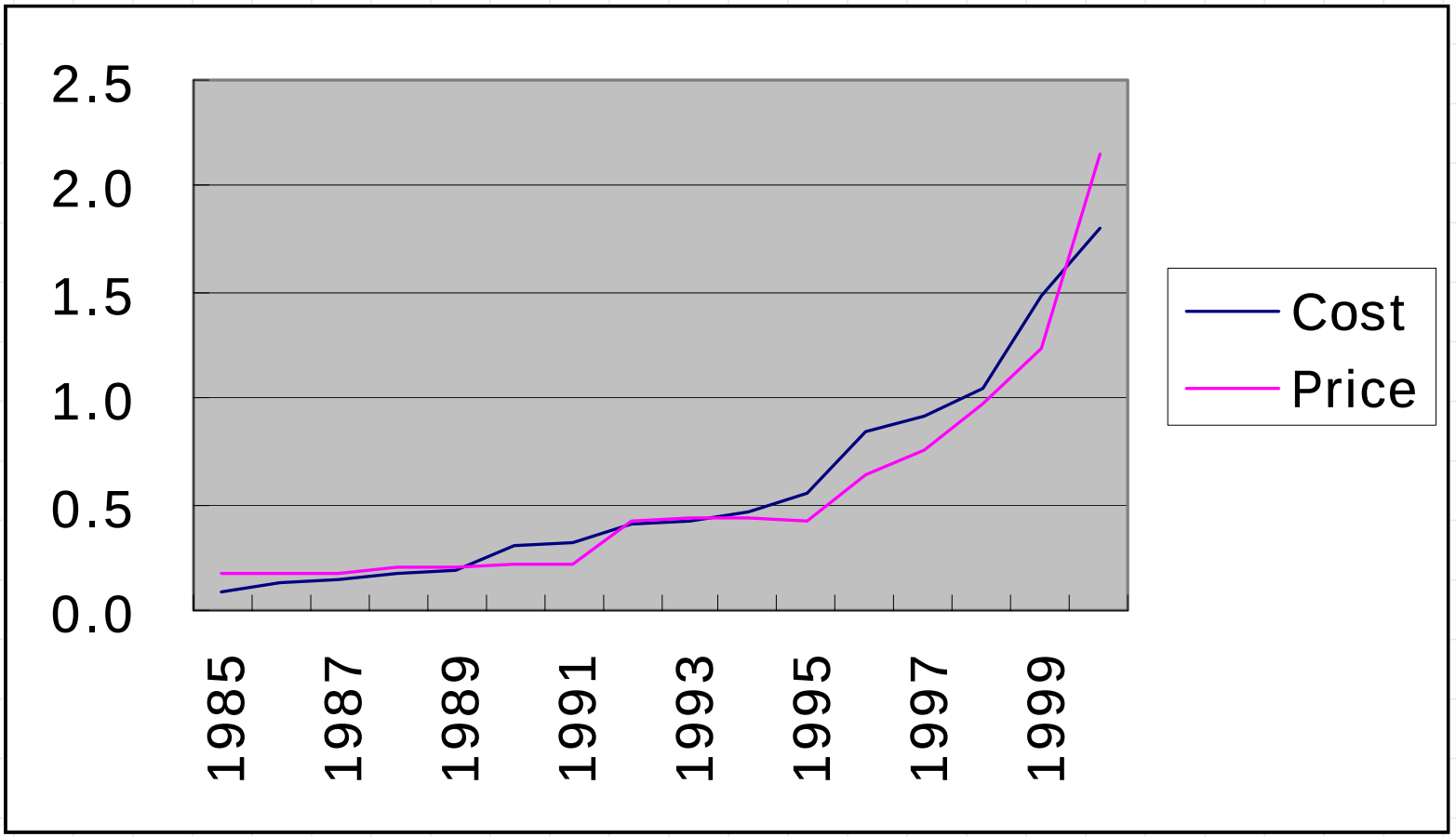

3 Case Study in Urban Area

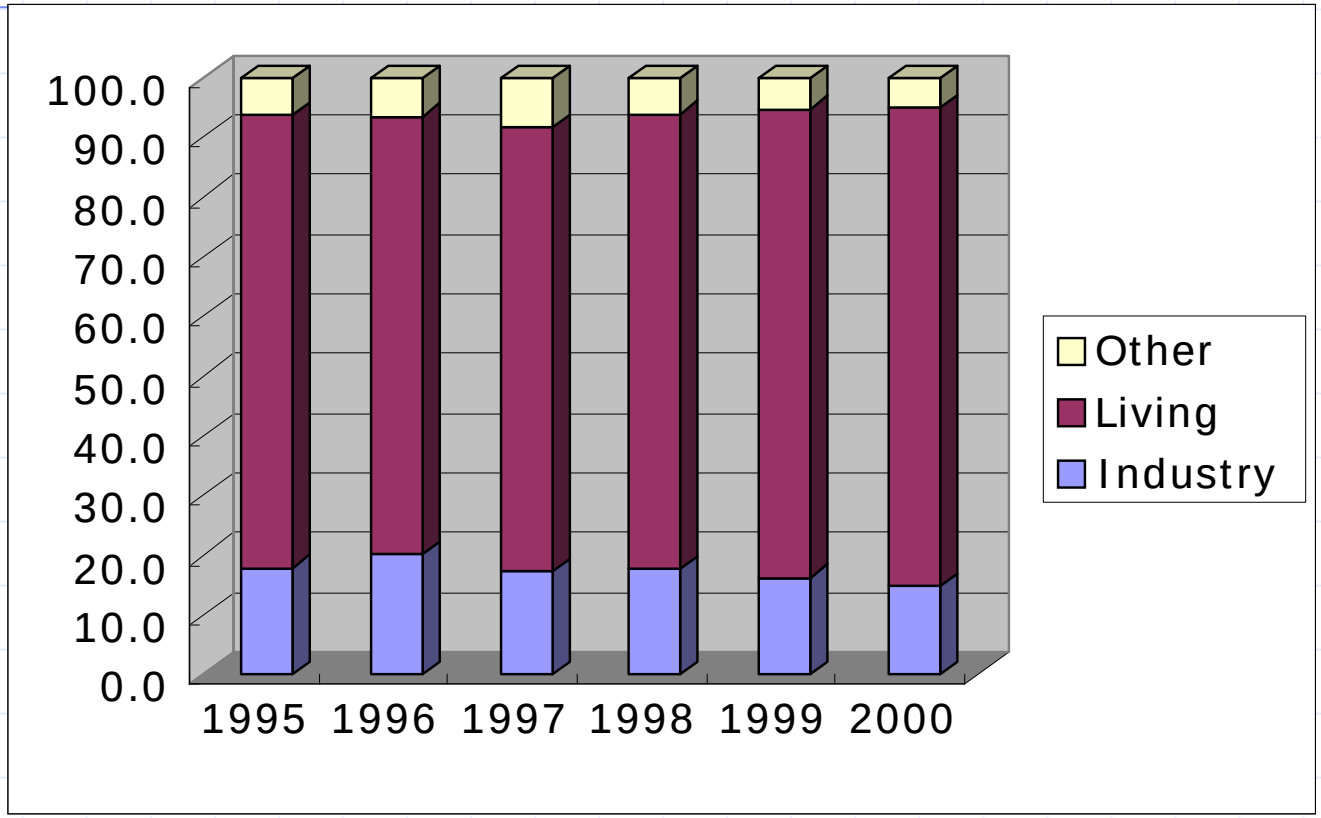

Figure 8 Consumption of water supply by waterworks

3 Case Study in Urban Area

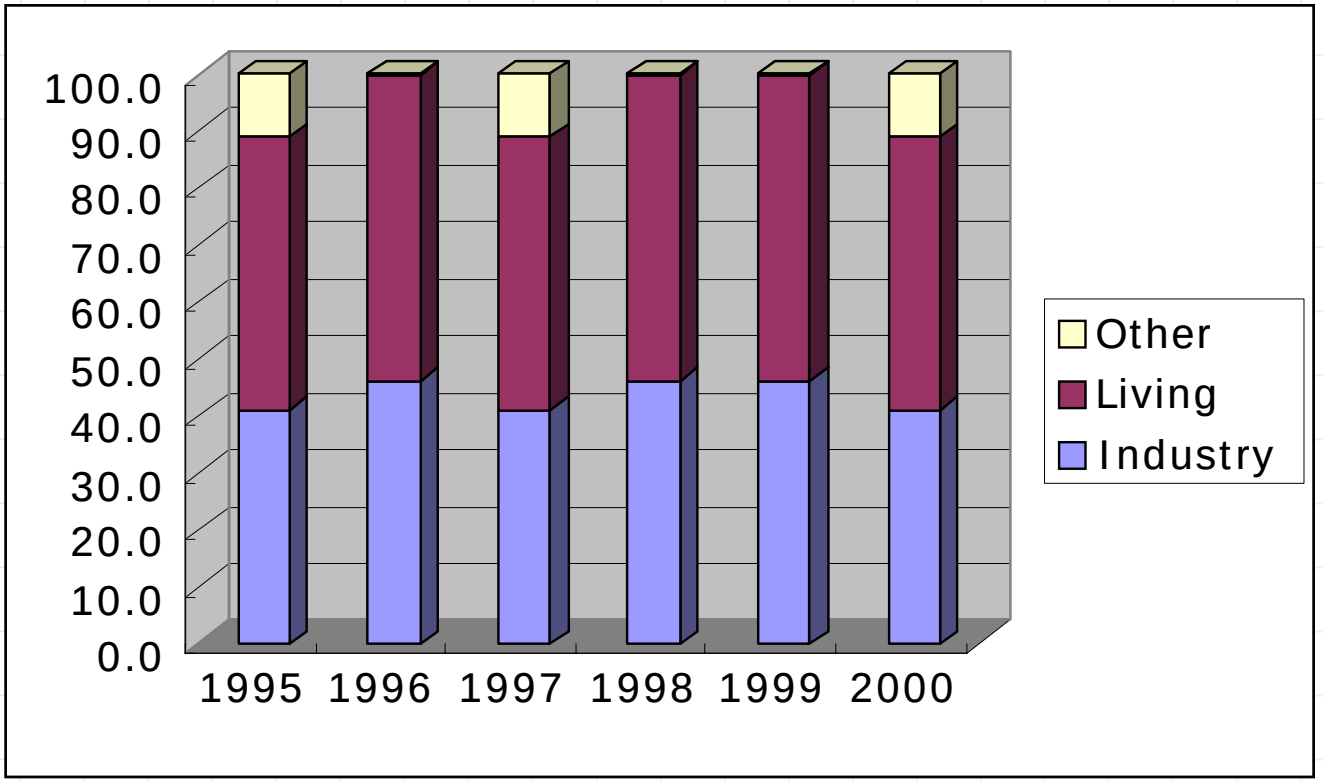

Figure 9 Consumption of water supply by self-maintaining well

3 Case Study in Urban Area

$$\ln(Wp) = -1.715 + 0.754 \times \ln(Ip) + 0.027 \times \ln(Pw)$$

t-test	4.491	10.799	0.632

$R^2 = 0.976$
$F = 332.309$

Here *Wp* is Water consumption (ton per capita)
Ip is income per capita (Yuan per capita)
Pw is water price (Yuan/ton)

3 Case Study in Urban Area

Table 6 Income and Payment for water consumption in 2000

	Average	Low	Low to medium	Medium	Medium to high	High
Income (Yuan per capita)	10416.4	5824.6	7972.4	9685.3	11932.4	17931.4
Payment for water consumption (Yuan/year)	48.7	38.5	46.7	47.8	52.5	60.1
Percentage of payment to water use (%)	0.47	0.66	0.59	0.49	0.44	0.34
Water Consumption (Ton Per Capita)	24.3	19.3	23.4	23.9	26.2	30.1

3 Case Study in Urban Area

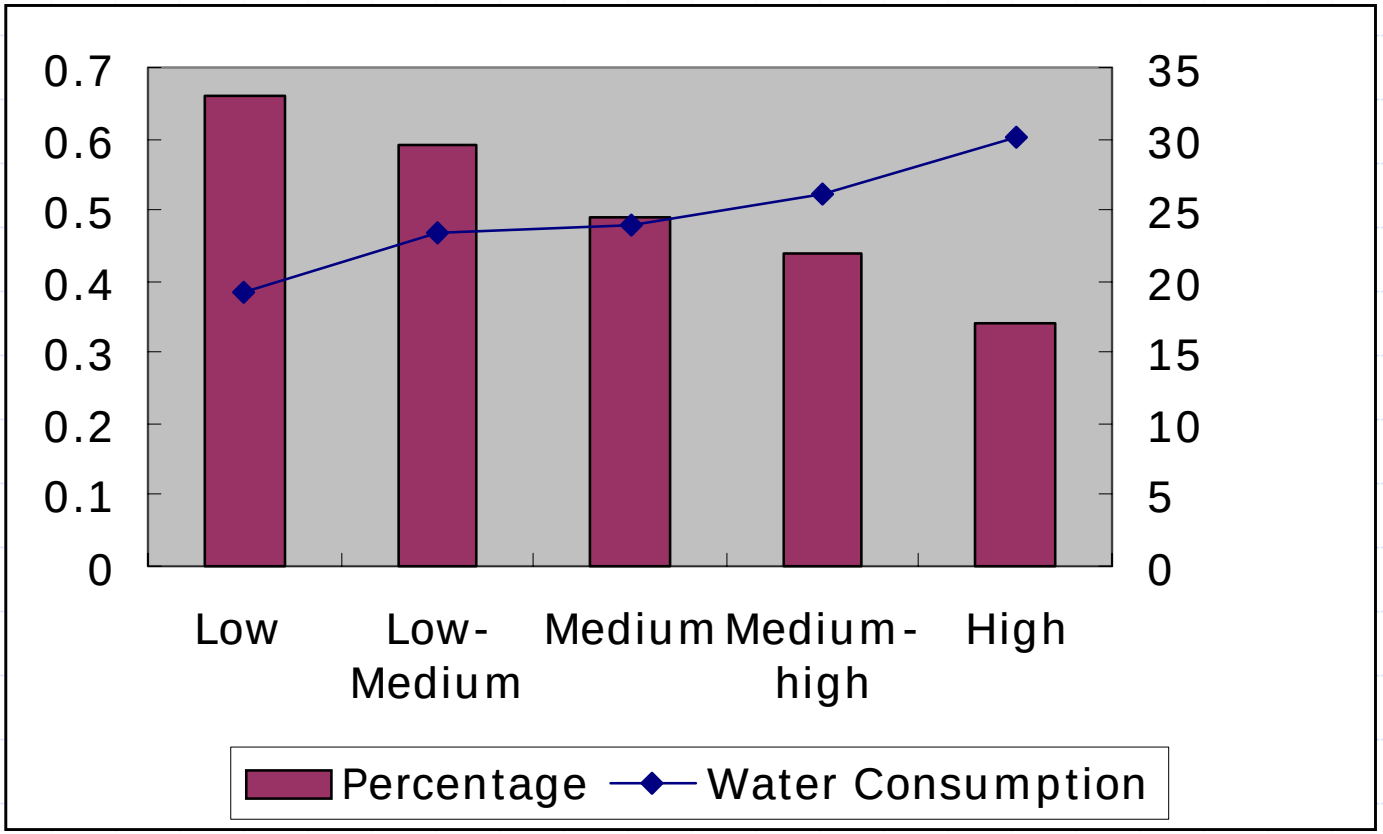

Figure 10 Income and Payment to water consumption in 2000

4 Conclusions

- Decreasing Irrigation area
- Increasing waterworks ability
- Increasing water price and wastewater discharge charge


END