

8. Situation and Trends of Infrastructure

8.1 Transportation

8.1.1 Land Transportation

In 2003, Thailand had a road network of approximately 172,504.4 km, of which 63,982.6 km was under the highway network and 108,521.8 km under the rural road network as well as a network of 1,889 km of four-lane roads leading to all major regions of the country. It is considered that the road network has covered all localities nationwide.

In Bangkok, there are expressways of 171.2 km and another 146.3 km under construction expected to be completed by 2009. One line of electric rail mass transit system has been operational and another four lines are expected to be completed by the end of 2005. This will help ease the traffic problems in Bangkok.

Besides, there is a railway system of 5,356.5 km.

8.1.2 Waterway Transportation

In 2003, Thailand had five principal harbours and 11 ports with an adequate potential for waterway transport of industrial products. However, some improvements in the infrastructure of the ports may be needed to cope with future economic expansion.

8.1.3 Air Transportation

At present Thailand has five international airports: Bangkok, Chiang Mai, Hat Yai, Phuket and Chiang Rai. The Bangkok International Airport is capable of handling 10,143 international passengers per

hour and 8,685 domestic passengers per hour during rush hours, or 36.5 million passengers per year, which is quite crowded. However, the government is building the Suvarnabhumi Airport as a modern air transport hub in this region, expected to be open in 2005 with a capacity to handle 30 million passengers in the first year and up to 100 million passengers when the entire airport is completed. This is considered that Thailand is well-prepared in terms of air transport infrastructure.

8.2 Telecommunications

Thailand's telecommunications have rapidly expanded, especially during the past decade. In 2003, there were 6,305,245 fixed-line telephone numbers and 22,077,858 mobile phones nationwide; a rate of 99.05 fixed-line phones per 1,000 population and 346.8 mobile phones per 1,000 population (Table 4.45). The access to the Internet has increased from 30 persons in 1991 to 6.03 million persons in 2003, a use rate of 9.5%; the rate being twice as many for municipal residents, compared with non-municipal areas. The number of Internet users in Bangkok and the Central Plains is more than half of all users nationwide (Table 4.46). But in comparison with other countries, such as Singapore and Malaysia, Thailand's telecommunication infrastructure and Internet uses are lower (Table 4.47).

Table 4.45 Telecommunication Infrastructure in Some Countries, 1996-2002

Country	No. of fixed-line telephones (per 1,000 population)					No. of mobile phones (per 1,000 population)					No. of computers (per 1,000 population)				
	1996	1997	1998	1999	2002**	1996	1997	1998	1999	2002	1996	1997	1998	1999	2002
Singapore	498.4	529.0	464.6	484.1	472	147.5	229	280.7	381.45	761.1	233	316	344	390.9	596
Malaysia	192.5	192.5	204.7	219.3	206	88.4	101.9	101.5	145.05	372.9	53	65	78	94.5	137
Thailand	78.6	85.5	82.2	101.9	99*	27.8	34.5	39.6	138.6	346.8*	22	28	33	40.4	43
Philippines	30.7	42.7	31.9	37.9	46	12.9	17.7	19.0	36.97	189.1	11	13	16	19.5	25
Indonesia	17.8	24.7	26.7	29.1	34	3.0	5.4	5.2	9.83	48.5	6	9	11	13.4	13
Sweden	684.1	685.4	696.4	694.5	750	281.8	358.1	511.5	590.08	900.3	286	353	444	510.4	687
U.S.A.	636.6	625.6	676.6	709.8	701	161.9	205.6	241.2	314.87	496.9	403	450	499	538.9	739
Norway	564.9	609.1	654.2	711.9	754	296.1	383.0	471.9	627.03	787.0	307	363	437	506.8	657

Source: IMD. The World Competitiveness Yearbooks, 1999 and 2003.

Notes: 1. * Data for 2003.

2. ** Data on fixed-line telephones per 1,000 population are data for 2001.

Table 4.46 Internet Access by Administrative Jurisdiction and Region Thailand, 2001 and 2003

Administrative jurisdiction and region	Internet users, 2001 ⁽¹⁾		Internet users, 2003 ⁽²⁾		Increase (Percent)
	No.	Percent	No.	Percent	
Whole Kingdom	3,536,001	100.0	6,031,300	100.0	+70.6
- Municipal areas	2,341,433	66.2	3,807,900	63.1	+62.6
- Non-municipal areas	1,194,568	33.8	2,223,400	36.9	+86.1
Bangkok Metropolis	1,234,542	34.9	2,005,700	33.3	+62.5
Central Plains	830,389	23.5	1,336,300	22.2	+60.9
North	516,114	14.6	1,003,200	16.6	+94.4
Northeast	559,193	15.8	1,070,100	17.7	+91.4
South	395,763	11.2	616,000	10.2	+55.6
Internet use rate (%)	5.7		9.5		

Source: Surveys on Household's Usage of Information Technology Equipment and Appliances, 2001 and 2003. National Statistical Office.

Notes: ⁽¹⁾ Population aged 11 years and older.

⁽²⁾ Population aged 6 years and older.

Table 4.47 Comparison of the Internet Usage in Asia-Pacific Countries, 1998, 2000 and 2002

Country	No. of Internet users (millions)			Internet use rate (percent)		
	1998	2000	2002	1998	2000	2002
Australia	4.0	8.42	10.63	22.2	43.9	54.4
Singapore	0.55	1.85	2.31	18.3	44.6	51.9
Hong Kong	1.1	3.46	4.35	18.3	48.7	59.6
New Zealand	0.55	1.49	2.06	15.3	39.0	52.7
Taiwan	3.0	6.4	11.6*	14.3	28.8	51.8
Japan	14.0	47.08	56	10.8	37.2	44.1
Korea	2.0	16.4	25.6	4.6	34.5	53.8
Thailand	0.67	2.3	4.8	1.1	3.7	7.7
Malaysia	0.4	3.7	5.7*	2.0	16.9	25.1
Philippines	0.2	2.0	4.5	0.3	2.4	7.7
China	1.5	22.5	45.8	0.1	1.7	3.5
Indonesia	0.1	1.45	4.4	0.1	0.6	1.9
India	0.4	5.0	7.0*	< 0.1	0.5	0.6
Vietnam	0.15	0.04	0.4*	< 0.1	< 0.1	0.5

Source: Internet Users Worldwide, 2001

Notes: 1. Internet use rate = $\frac{\text{No. of Internet users}}{\text{Total population}} \times 100$
 2. * Data for 2001.

Besides, Thailand has got its own Thaicom satellites, cable TV systems, and free TV systems, making the communication system more expansive. However, the access to various media is still inequitable, but the trends are getting better (Table 4.48).

Table 4.48 Percentage of Households with Radios, TV Sets and Telephones, 1990-2002

Area	Radios				TV sets				Telephones			
	1990	1994	1998	2002	1990	1994	1998	2002	1990	1994	1998	2002
Whole Kingdom	72.6	70.8	75.5	68.9	61.3	80.3	88.7	91.6	5.8	10.1	21.9	29.2
Bangkok and peripheral provinces	79.4	80.3	86.6	80.8	80.7	83.8	90.4	92.5	24.5	33.1	59.2	59.6
Municipal areas	81.2	81.1	85.5	76.2	84.6	89.3	92.9	94.0	16.5	29.4	49.8	40.8
Sanitary districts	76.0	74.6	78.5	-	70.8	86.3	90.5	-	4.2	12.2	28.7	-
Outside municipal and sanitary districts	69.8	67.0	71.4	64.1	53.6	77.6	87.6	90.6	0.9	2.4	9.3	11.0

Source: Reports on Household Socio-Economic Surveys, 1990, 1994, 1998 and 2002. NSO.

Note: Since 2000, sanitary districts were upgraded to municipalities; thus, there are no data for sanitary districts.

The expansion of communication networks in Thailand is related to global development and part of the “globalization” evolution era.

In addition, advertisement business expansion through various media is annually worth tens of billions of baht. This intensive business sector has strongly affected Thai people’s consumption behaviours. New sales patterns have been created, **especially direct sales**, through regular shops or outlets.

People’s behaviours in accepting information have also shifted from radio to television sources. The 2003 media survey conducted by NSO revealed that there were as many as 54.7 million TV viewers (94.5%), compared with only 24.8 million radio listeners (24.8%). Urban people are more interested in information about economic, social, political and health conditions than, previously, in entertainment programmes. In particular, new programme patterns such as live phone-in and discourse programmes, resulting in the emergence of new communities using media as a means for interaction, for example, Jo So 100 community, TV game show communities, and various other radio programme communities.

8.3 Public Utilities

8.3.1 Electricity. In 2003, 98.9% (67,709 villages) of all villages across the country have a moderate or good level of electricity. Only 787 villages (1.1%) have not yet had access to the electricity system (Table 4.49).

Table 4.49 Villages with Electricity, 1992-2003

Year	No. of villages with available information	Villages with electricity				Villages without electricity	
		Good level ¹		Moderate level ²		No.	Percent
		No.	Percent	No.	Percent		
1992	59,354	54,719	92.2	2,466	4.2	2,169	3.6
1994	59,059	55,590	94.1	1,675	2.8	1,794	3.0
1996	60,215	57,523	95.5	1,198	2.0	1,494	2.5
1999	63,230	56,483	89.3	5,678	9.0	1,069	1.7
2001	66,193	60,128	90.8	4,698	7.1	1,367	2.1
2003	68,496	60,613	88.5	7,096	10.4	787	1.1

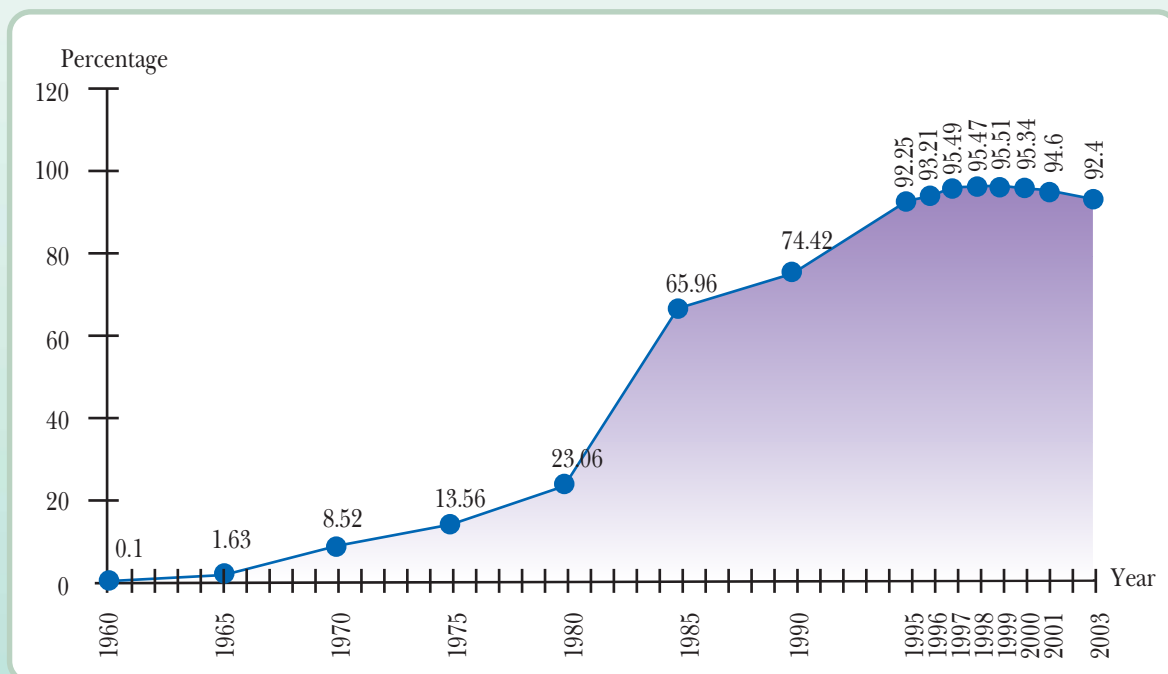
Source: Thai Rural Villages, 1992-2003, from Ko Cho Cho 2 Kho Database. Information Centre for Rural Development, Ministry of Interior.

Notes: ¹ Good level: more than half of households in the village have electricity.

² Moderate level: less than half of households in the village have electricity.

8.3.2 Drinking Water. In 2003, 92.4% of households had adequate and safe drinking water (Figure 4.37) and 92.8% of them had adequate water for domestic use all year round.

Figure 4.37 Proportion of Households with Adequate and Safe Drinking Water, 1960-2003



Sources: Data for 1960-2000 were derived from the Department of Health, MoPH.

Data for 2001 and 2003 were derived from Thai Rural Villages 2001 and 2003. Ko Cho Cho 2 Kho Database. Information Centre for Rural Development, Ministry of Interior.

Such changes in infrastructure have an impact on Thai people's health as follows:

(1) **More road traffic injuries.** As the road transportation system expands with more roads and vehicles - the number of motor vehicles registered has increased from 9,595,191 in 1992 to 26,378,862 in 2003 or a 2.7-fold increase, coupled with inappropriate driving behaviours – more road traffic accidents occur. The death rate from road traffic injury per 100,000 population has increased from 5.74 in 1984 to 20.97 in 2002, resulting in injuries, deaths and property losses. The Thailand Development Research Institute estimated that in 2000 the economic loss from road traffic accidents was 115,337 million baht or 2.3% of GDP (see Chapter 5, section 3.4.5 on accident-related injuries).

(2) **Disparities in access to health information.** As the Thai communication infrastructure is inferior to those in other countries, certain segments of the population may not have access to health information, particularly those living in rural areas, compared with those in urban areas.

9. Situations and Trends of Technology Development

For health science advancements, new technologies have been freely deployed as follows:

9.1 Biotechnology has advanced rapidly, for example, in the areas of recombinant DNA, polymerase chain reaction (PCR) and genomics for developing new vaccines, drugs and diagnostic and curative procedures for hard-to-cure diseases, such as cancer and HIV/AIDS. Besides, DNA testing has been applied in the justice system, while its utilization relevant to controlling the hazards from genetically modified food will be problematic.

9.2 Electronics and computer technologies, including digital imaging, multimedia computer, telemedicine, Wide Area Network, and Advanced Expert System, have resulted in wider educational opportunities and innovations, including public health education, exchanges of medical and health information, health counselling and new approaches to diagnostic and therapeutic procedures.

Such technological changes have an impact on the Thai health system as follows:

(1) **New technologies are costly and have to be patented; and their use is complex, requiring protection from unknown hazards and resulting in high costs of health care.** If such technologies are inappropriately used, a wastage will occur. Besides, an investment in personnel development is required; and danger from their use will have to be prevented.

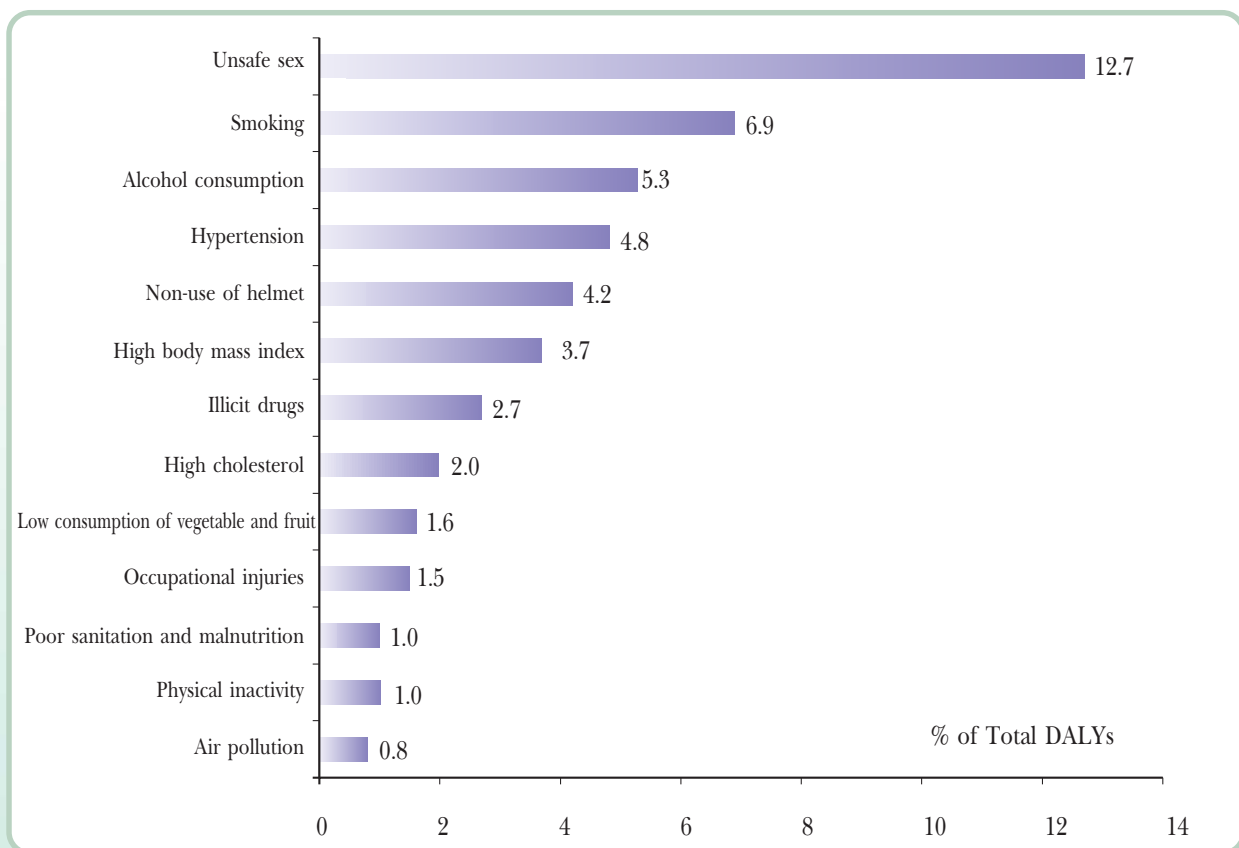
In the future, more genetically modified organisms (GMOs) or foods will be produced such as soybeans, corn, and tomatoes. Studies on such technology is still underway regarding its safety for human consumption and the environment. Therefore, the government should urgently carry out studies on the impact of production and consumption of genetically modified foods; then set up policies and measures for consumer protection purposes.

(2) **The poor in urban and rural areas do not have access to health services that deploy new, high-cost technologies.** For example, the poor with final stage chronic kidney failure cannot receive kidney dialysis under the universal healthcare coverage scheme, while the insured under the social security system and the medical benefit scheme for civil servants or state enterprise employees are entitled to receiving such service.

10. Health Behaviours

Risk factors of Thai people have an impact on their lives and are a national level problem affecting the country's economic and social security. In 1999, the MoPH's Bureau of Policy and Strategy conducted a study on burden of disease based on Thai people's 13 common risk factors of several diseases.¹³ It was found that major risk factors are unsafe sex, smoking, alcohol consumption, hypertension, non-use of helmet among motorcyclists, overweight/obesity, malnutrition, elevated blood cholesterol, minimal consumption of vegetables and fruit, and physical inactivity (Figure 4.38).

Figure 4.38 Percentage of Burden of Disease* from Risk Factors of Thai People, 1999



* As a percentage of overall burden of disease for 1999 (9.5 million DALYs).

An analysis of burden of disease by sex revealed that unsafe sex is the risk with the highest burden of disease (in terms of “disability-adjusted life years” or DALYs) in both males and females, followed by smoking, alcohol use, helmet non-use among motorcyclists, and high blood pressure in males. Among females, the high risks are high body mass index (overweight and obesity), high blood pressure, smoking and high blood cholesterol (Table 4.50).

¹³ The study used the attributable burden determination method for each factor according to WHO guidelines.