

Changwon's Health Profile

Chapter 1. The People of Changwon

Changwon, with a population of 528,152 people in 2001, is capital city of Gyungnam Province. As the city combined with its sub-urban and rural areas in 1989 and the industrialization has going on rapidly, its population has grown as fast as nearly five times compared to 128,095 in 1981. However, population growth became dull and stagnated since 1995(Table 1-1). While overall Changwon is a thriving, prosperous city, the social character and make-up are changing, which has a significant impact on the public health issues. Moreover, the combination of urban and rural areas leads to a combination of issues related to both urban areas(e.g., traffic congestion, personal safety concerns) and rural areas(e.g., access to health services, pesticide use in agricultural settings).

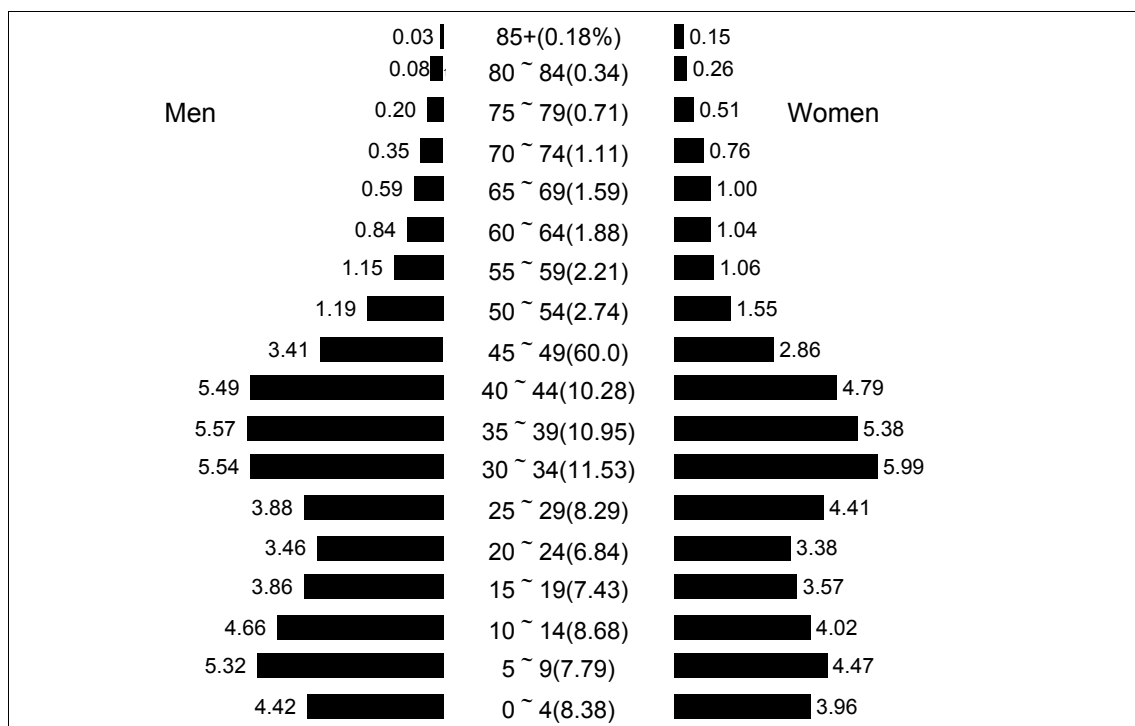
The statistics below give us a better picture of Changwon's demographic profile.

- The conspicuous trend toward nuclear families has forwarded from 4.3 people per household in 1981 to 3.3 people per household in 2001(Table 1-1).
- The sexual composition has stabilized from 1.15 in 1981 to 1.04 in 2001(Table 1.1).
- The population structure has a shape of bell, a typical population type of industrialized city(Figure 1-1).
- The population structure has changed(Table 1-2). People age 65 and older is the fastest growing population group in the city, increasing 30% annually in recent years. The next fastest growing population group is ages 45 to 64, growing by 25% annually in recent years. Rapid growth of aged group is projected to continue.
- In 2001, the vulnerable groups of the city are 2,279 seniors(age 65 and older) living alone, 2,385 seniors only families, 5,291 lone-parent families, 131 seniors and grandchildren only families, 485 youth living on their own families, 9,630 handicapped persons, and 5,719 low-income persons.

Table 1-1. Population Profile, Changwon City, 1981-2001

Year	Population		Household		Sex Ratio
	Number	Annual Growth Rate	Number	People per Household	
1981	128,095	12.82%	29,577	4.3	1.15
1986	188,961	9.05%	46,568	4.1	1.12
1991	367,226	13.66%	101,638	3.6	1.08
1996	497,089	3.20%	150,934	3.3	1.05
2001	528,152	2.08%	161,029	3.3	1.04

Data Sources: Chagwon, Annual Statistics of Changwon City, Each Year.



Data Sources: Chagwon, Annual Statistics of Changwon City, Each Year.

Figure 1-1. Population Structure by Age and Sex, Changwon City, 2001

Table 1-2. Trends of Population Structure by Age Group, Changwon City, 1997-2001

Age Group	2001		2000		1999		1998		1997	
	Number (%)	Growth Rate	Number (%)	Growth Rate	Number (%)	Growth Rate	Number (%)	Growth Rate	Number (%)	Growth Rate
Total	524,068 (100.00)	0.82%	519,798 (100.00)	0.94%	514,935 (100.00)	2.18%	503,938 (100.00)	0.01%	503,899 (100.00)	1.98%
0-14	140,697 (26.85)	-2.51%	142,170 (27.35)	-1.40%	143,036 (27.78)	2.67%	142,015 (28.18)	-7.00%	145,862 (28.95)	-0.88%
15-19	38,896 (7.42)	-1.99%	39,685 (7.63)	-0.41%	39,848 (7.74)	0.86%	39,507 (7.84)	5.15%	37,573 (7.46)	6.92%
20-44	250,899 (47.88)	2.54%	250,489 (48.19)	1.89%	250,957 (48.74)	10.46%	247,065 (49.03)	-1.23%	248,964 (49.41)	9.27%
45-64	72,911 (13.91)	24.15%	67,799 (13.04)	24.76%	62,528 (12.14)	26.29%	58,068 (11.52)	20.95%	54,922 (10.90)	26.99%
65+	20,665 (3.94)	33.90%	19,655 (3.78)	31.53%	18,566 (3.61)	30.19%	17,283 (3.43)	24.01%	16,578 (3.29)	29.77%

Data Sources: Chagwon, Annual Statistics of Changwon City, Each Year.

Chapter 2. General Health Status

1. Vital Statistics

Births

In Korea, crude birth rate was 10.3 births per 1000 population in 2002, decreasing steadily from 15.3 in 1996. The crude birth rate of Changwon City also has dramatically decreased from 22.42 births per 1000 population in 1996 to 12.64 in 2002. However, these rates are much higher than the national figures by about 1.5 times. This is because residents of Changwon are younger as compared to other area or the nation.

Table 2-1. Crude Birth Rates per 1,000 Population, Changwon City, 1996 ~ 2002

Year	Population	No. of Birth	Crude Birth Rate, Changwon	Crude Birth Rate, National
1996	497,089	11,145	22.42	15.3
1997	508,148	10,569	20.80	14.8
1998	506,330	9,742	19.24	13.8
1999	518,091	9,105	17.57	13.2
2000	517,410	9,260	17.90	13.4
2001	528,152	7,989	15.13	11.6
2002	517,577	6,542	12.64	10.3

Source: Changwon City, Changwon City Statistical Yearbook, 2002
Korea National Statistical Office, Korea Statistical Yearbook, 2002

Mortality

The crude death rate of Changwon City was 3.30 deaths per 1000 population in 2002, lower than the national death rate(5.12), and this rate fluctuated slightly from 1996 to 2002, with the lowest rate of 3.04 in 1997 and the highest rate of 3.30 in 2002. This low death rate is also due to the age structure of population with more younger and less older population groups in Changwon. If age specific death rates were adjusted to the age structure of the nation, the age-adjusted death rate of Changwon was 5.33 deaths per 100,000 population for 2002. This rate is much higher than crude death rate of Changwon and slightly more than the comparable national rate.

Table 2-2. Crude Death Rates per 1000 Population, Changwon City, 1996 ~ 2002

Year	Population	No. of Death	Crude Death Rate, Changwon	Crude Death Rate, National
1996	497,089	1,557	3.13	5.16
1997	508,148	1,545	3.04	5.18
1998	506,330	1,585	3.13	5.17
1999	518,091	1,587	3.06	5.22
2000	517,410	1,697	3.28	5.20
2001	528,152	1,635	3.10	5.07
2002	517,577	1,693	3.30 ¹⁾	5.12

Source: Changwon City, Changwon City Statistical Yearbook, 2002

Korea National Statistical Office, Annual Report on the Cause of Death Statistics, 2002 (Raw Data)

1) The adjusted death rate was calculated as 5.33 deaths per 1,000 population.

Cause of Death

Changwon City had the highest death rate for cancers(86.0 per 100,000 population), followed by diseases of the circulatory system(80.6 per 1000,000 population), external cause of mortality(45.2 per 1000,000 population), respiratory diseases(19.5 per 1000,000 population), Endocrine diseases(17.6 per 1000,000 population), diseases of the digestive system(17.4 per 1000,000 population) and so on. On the other hand, the highest crude death rate for the whole nation is 131.9 deaths per 100,000 population also for cancers, followed by 127.8 for circulatory diseases, 59.9 for external causes of mortality such as accidents, falls, drowning, intentional self-harm, etc., 49.1 for symptoms, signs and abdominal clinical and laboratory findings, 34.5 for respiratory diseases, and so on.

Some of the leading causes of the death for Changwon City have different figures in the ranks, especially for 4th and 5th leading causes, compared to the whole nation. Further, most rates of leading causes of deaths are much lower than the corresponding national rates because age structure plays a strong role in the differences of the rates, and, that is, residents of Changwon are younger.

Table 2-3. Leading Causes of Death, Changwon City and Whole Nation, 2002

Cause of Death	Changwon		Whole Nation	
	No. of Deaths(%)	Death Rate ¹⁾	No. of Deaths(%)	Death Rate ¹⁾
1. Neoplasms	445(26.3)	86.0	63,489	131.9
2. Diseases of the circulatory system	417(24.6)	80.6	61,522	127.8
3. External causes of morbidity & mortality	234(13.8)	45.2	28,834	59.9
4. Diseases of the respiratory system	101(6.0)	19.5	16,622	34.5
5. Endocrine, nutritional & metabolic diseases	91(5.4)	17.6	12,883	26.8
6. Diseases of the digestive system	90(5.3)	17.4	14,130	29.4
7. Symptoms, signs & abnormal clinical & laboratory findings, NEC	63(3.7)	12.2	23,615	49.1
8. Certain conditions originating in the perinatal period	58(3.4)	11.2	1,301	2.7
9. Diseases of the nervous system	36(2.1)	7.0	4,021	8.4
10 Mental and behavioral disorders	34(2.0)	6.0	5,586	11.6
11 Congenital malformations, deformations & chromosomal abnormalities	31(1.8)	6.0	974	2.0
12 Certain infectious & parasitic Diseases	25(1.5)	4.8	5,746	11.9
13 Diseases of the genitourinary System	23(1.4)	4.4	3,239	6.7
14 Diseases of the musculoskeletal system & connective tissue	22(1.3)	4.3	2,464	5.1
15 Diseases of the blood & blood-forming organs & certain disorders involving the immune mechanism	7(0.4)	1.4	455	0.9
16 Diseases of the skin & subcutaneous tissue	-	-	430	0.9
17 Pregnancy, childbirth & the Puerperium	1(0.1)	0.2	71	0.5
18 Diseases of the eye & adnexa	-	-	2	0.0
19 Diseases of the ear & mastoid Process	-	-	-	-
20 Cause unknown	15(0.9)	2.9	1,131	2.4
All cause	1693(100.0)	327.10	246,515	512.2

Source: Korea National Statistical Office, Annual Report on the Cause of Death Statistics, 2002 (Raw Data)

Korea National Statistical Office, the Cause of Death Statistics, 1983 ~ 2002

1) Rate is per 100,000 population

In addition, liver cancer(17.4 deaths per 100,000 population), cancer of trachea, bronchus and lung(16.4), and stomach cancer(15.1) were the three leading causes of death due to cancer in Changwon, 2002, while cancer of trachea, bronchus and lung(26.2) was the first leading cause, followed by stomach cancer(24.5), liver cancer(23.1) and so on nationwide. Those rates for Changwon also were significantly lower than corresponding national rates because of the difference in age structure.

On the other hand, cerebrovascular diseases were the most common leading causes of death(49.7 deaths per 100,000 population), followed by ischemic heart diseases(18.2), among the deaths due to circulatory disease in Changwon. as similar with the rank of corresponding causes of death nationwide, although those rates were significantly lower than corresponding national rates.

Among the deaths due to external cause of morbidity and mortality, transport accidents(14.4 deaths per 100,000 population) and suicides(13.3) were the two leading causes of death, which were lower than comparable national rates.

Table 2-4. Detailed Leading Causes of Death Due to Three Leading Causes, Changwon City and Whole Nation, 2002

Cause of Death	Changwon		Whole Nation	
	Rank	Death Rate ¹⁾	Rank	Death Rate ¹⁾
<u>Neoplasms</u>				
Malignant neoplasm of liver and intrahepatic bile ducts	1	17.4	3	23.1
Malignant neoplasm of trachea, bronchus and lung	2	16.4	1	26.2
Malignant neoplasm of stomach	3	15.1	2	24.5
Remainder of malignant neoplasms	4	11.2	4	14.8
Malignant neoplasm of colon, rectum and anus	5	4.4	5	10.6
Malignant neoplasm of pancreas	6	3.5	6	6.0
<u>Diseases of the circulatory system</u>				
Cerebrovascular diseases	1	49.7	1	77.2
Ischemic heart diseases	2	18.2	2	25.2
Other heart diseases	3	5.6	3	12.0
Hypertensive diseases	4	5.2	4	10.6
<u>External causes of morbidity & mortality</u>				
Transport accident	1	14.5	1	19.1
Intentional self-harm	2	13.3	2	19.1
Falls	3	5.4	3	6.5

Source: Korea National Statistical Office, Annual Report on the Cause of Death Statistics, 2002 (Raw Data)

Korea National Statistical Office, the Cause of Death Statistics, 1983 ~ 2002

1) Rate is per 100,000 population

In Chanwon City, the leading causes of death for males was cancers(97.2 deaths per 100,000 male population), followed by circulatory disease(63.2), external cause of mortality(62.4), diseases of the digestive systems(23.8), respiratory diseases(18.9), and so on. While circulatory diseases were the most common cause of death for the females(98.7 per 100,000 female population), followed by cancers(74.6), external cause of mortality(27.3), respiratory diseases(20.1), endocrine and metabolic diseases(20.1), and so on.

The males in Changwon had a significantly higher death rate than the female for cancers, diseases of the digestive system, while the females had a significantly higher death rate than the male for circulatory diseases, endocrine, nutritional and metabolic diseases, symptoms, signs and abnormal clinical and laboratory findings, and mental and behavioral disorders.

Table 2-5. Leading Causes of Death by Gender, Changwon City, 2002

Cause of Death	Male			Female		
	Rank	No. of Deaths(%)	Death Rate ¹⁾	Rank	No. of Deaths(%)	Death Rate ¹⁾
Neoplasms	1	257(29.8)	97.2	2	189(30.6)	74.6
Diseases of the circulatory system	2	167(19.4)	63.2	1	250(23.1)	98.7
External causes of morbidity & mortality	3	165(19.0)	62.4	3	69(8.3)	27.3
Diseases of the digestive system	4	63(7.3)	23.8	7	27(3.3)	10.7
Diseases of the respiratory system	5	50(5.8)	18.9	4	51(6.2)	20.1
Endocrine, nutritional & metabolic diseases	6	40(4.6)	15.1	4	51(6.2)	20.1
Certain conditions originating in the perinatal period	7	37(4.3)	11.2	10	21(2.6)	8.3
Symptoms, signs & abnormal clinical & laboratory findings, NEC	8	18(2.1)	6.8	6	45(5.5)	17.8
Diseases of the nervous system	9	15(1.7)	5.7	10	21(2.6)	8.3
Certain infectious & parasitic Diseases	10	12(1.4)	4.5	13	13(1.6)	5.1
Diseases of the genitourinary System	11	10(1.2)	3.8	13	13(1.6)	5.1
Congenital malformations, deformations & chromosomal abnormalities	12	9(1.0)	3.4	9	22(2.7)	8.7
Mental and behavioral disorders	13	7(0.8)	6.0	7	27(3.3)	10.7
Diseases of the musculoskeletal system & connective tissue	14	6(0.7)	4.3	12	16(2.0)	6.3
Diseases of the blood & blood-forming organs & certain disorders involving the immune mechanism	15	5(0.6)	1.9	15	2(0.2)	0.8
Diseases of the skin & subcutaneous tissue	16	-	-	-	-	-
Pregnancy, childbirth & the Puerperium	17			16	1(0.1)	0.2
Diseases of the eye & adnexa	18	-	-	-	-	-
Diseases of the ear & mastoid Process	19	-	-	-	-	-
Cause unknown		6(0.7)	2.3		9(1.1)	3.6
All cause		867 (100.0)	327.9		826 (100.0)	326.6

Source: Korea National Statistical Office, Annual Report on the Cause of Death Statistics, 2002 (Raw Data)

Korea National Statistical Office, the Cause of Death Statistics, 1983 ~ 2002

1) Rate is per 100,000 population

Among the deaths due to cancer, liver cancer was the most common leading causes of death (63.2 deaths per 100,000 population) for the males, followed by stomach cancer(20.1) and cancer of trachea, bronchus and lung(19.3), while cancer of trachea, bronchus and lung(13.4) was the first leading cause for the females, followed by stomach cancer(9.9) and liver cancer(9.9), colon cancer(4.7) and cervix cancer(4.7), etc. The males had significantly higher death rate than the females for most cancers, and especially, men had a more than six times higher death rate than women for liver cancer.

On the other hand, cerebrovascular diseases were the most common leading causes of death, followed by ischemic heart diseases, among the deaths due to circulatory disease for both gender in Changwon City. However, Both of the death rates for the males, 38.2 for cerebrovascular diseases and 16.6 for ischemic heart diseases, are significantly lower than the comparable rates for the females(61.6 and 19.8). Especially, the death rate for hypertensive diseases was 8.7 deaths per 100,000 female population, more than four time higher than the males.

For the deaths due to external cause of morbidity and mortality, transport accidents(21.2 deaths per 100,000 male population) and suicides(18.9) were the two leading causes of death, and the rates were significantly higher than comparable rates for the females.

Table 2-6. Detailed Leading Causes of Death due to Three Leading Causes by Gender, Changwon City, 2002

Cause of Death	Male		Female	
	Rank	Death Rate ¹⁾	Rank	Death Rate ¹⁾
<u>Neoplasms</u>				
Malignant neoplasm of liver and intrahepatic bile ducts	1	63.2	2	9.9
Malignant neoplasm of stomach	2	20.1	2	9.9
Malignant neoplasm of trachea, bronchus and lung	3	19.3	1	13.4
Malignant neoplasm of colon, rectum and anus	4	4.2	4	4.7
Malignant neoplasm of pancreas	4	4.2	7	2.8
Malignant neoplasm of cervix uteri	-	-	4	4.7
Malignant neoplasm of breast	-	-	6	4.3
<u>Diseases of the circulatory system</u>				
Cerebrovascular diseases	1	38.2	1	61.6
Ischemic heart diseases	2	16.6	2	19.8
Other heart diseases	3	3.8	4	7.5
Hypertensive diseases	4	1.9	3	8.7
<u>External causes of morbidity & mortality</u>				
Transport accident	1	21.2	1	7.5
Intentional self-harm	2	18.9	1	7.5
Falls	3	2.1	3	4.0

Source: Korea National Statistical Office, Annual Report on the Cause of Death Statistics, 2002 (Raw Data)
Korea National Statistical Office, the Cause of Death Statistics, 1983 ~ 2002

1) Rate is per 100,000 population

Maternal Mortality Rate

Maternal death represents the death of mother caused by certain diseases or disorders due to pregnancy, childbirth and puerperium, and does not include the death due to infectious diseases, chronic diseases, accidents, etc..during pregnancy. According to Maternal Mortality Survey Report in 1888 ~ 2000 by Korea Institute for Health and Social Affairs, 2002, it was estimated to be 15 maternal deaths per 100,000 birth in 2000, 18 in 1999, and 20 in 1996 and 1995 nationwide. However, the periodical and specific data for maternal mortality of Changwon City are not available, but, according to 1999 survey by City Health Center, it was estimated to be 26 maternal deaths per 100,000 birth.

Rate of Low Birth Weight

Premature infants have been used as a same meaning with low birth weight(LBW) infants. However, WHO defined the premature as the infants born within 37 weeks of gestation period, while LBW infants as infants born with weight of less than 2500g. LBW is a significant factor associated with infant mortality, and linked to maternal smoking, alcohol and other drug use and some socio-economical factors. LBW infants are more likely to experience long-term disabilities or die during the first year of life than infants of normal birth weight.

There are no periodic or systemic data to estimate the rate of LBW infants, and however, according to the survey conducted by Changwon city Health Center, it was carefully estimated to be 3.6% of all births in 2002(Table 2-7), .

Table 2-7. The rates of Low Birth Weight Infants, Changwon City, 1998 ~ 2002

Year	Male		Female		Total	
	Number	%	Number	%	Number	%
1998	124	2.38	158	3.31	282	2.82
1999	151	3.21	160	3.79	314	3.48
2000	151	3.06	180	4.16	331	3.57

Source: Changwon City Health Center, the 3rd Changwon Local Health Care Plan, 2002

2. Measure of Morbidity

Although morbidity data can be obtained from a particular epidemiological survey, or disease registration, or medical care service data, there are no data available for the morbidity specific to Changwon City. However, it was possible to obtain medical care utilization data of the residents in Changwon City from National Health Insurance Corporation, and to reproduce the data pertinent to the number of patients or case utilizing medical care services by the leading causes of diseases.

Leading Causes of Utilizing Medical Care Services

There are three types of medical care service utilization in the data from National Health Insurance Corporation, such as outpatient service, inpatient service and pharmacy visit. However, inpatient and outpatient service data were used to approximate the morbidity of the residents in Changwon City.

In Changwon City, it was estimated that total 1,297,000 people utilized the outpatient services, while 39,640 people utilized the inpatient services from various medical facilities in 2002. It mean every residents in Changwon utilized the outpatient service 2.5 times and the inpatient service 0.08 times a year in 2002.

In 2002, however, the most common cause of utilizing the outpatient medical care services for Changwon residents was respiratory diseases which accounted for all 25.2% of all causes, followed by diseases of the digestive system(16.9%), infectious and parasitic diseases(8.4%), diseases of skin and subcutaneous diseases(8.4%), damage, poisoning and external causes(7.7%), and so on.

On the other hand, pregnancy, child birth and puerperium and respiratory diseases were the two leading causes of hospitalizations, which accounted 16.4% and 16.0% of all hospitalizations, respectively, and were followed by diseases of the digestive system(9.8%), circulatory disease(9.4%), damage, poisoning and external causes(7.7%), and so on. In addition, the number of hospitalizations due to cancer was 1,956 people, and accounted 4.9% of all hospitalization for the residents of Changwon.

Table 2-8. Leading causes of utilizing medical care services, Changwon City, 2002

Cause	Unit: No. of patients (%)		
	Outpatient	Inpatient	Total
1 Diseases of the respiratory system	327,433 (25.2)	6,350 (16.0)	333,783 (25.0)
2 Diseases of the digestive system	219,075 (16.9)	3,904 (9.8)	222,979 (16.7)
3 Certain infectious & parasitic diseases	109,538 (8.4)	2,445 (6.2)	111,983 (8.4)
4 Diseases of the skin & subcutaneous tissue	108,978 (8.4)	358 (0.9)	109,336 (8.2)
5 Specific and miscellaneous results from damage, poisoning and external causes	99,536 (7.7)	3,629 (9.2)	103,165 (7.7)
6 Diseases of the eye & adnexa	98,698 (7.6)	1,248 (3.1)	99,946 (7.5)
7 Diseases of the musculoskeletal system & connective tissue	67,748 (5.2)	2,065 (5.2)	69,813 (5.2)
8 Diseases of the genitourinary system	67,376 (5.2)	1,726 (4.4)	69,102 (5.2)
9 Diseases of the ear & mastoid process	40,598 (3.1)	427 (1.1)	41,025 (3.1)
10 Symptoms, signs & abnormal clinical & laboratory findings, NEC	35,031 (2.7)	577 (1.5)	35,608 (2.7)
11 Diseases of the circulatory system	29,515 (2.3)	3,721 (9.4)	33,236 (2.5)
12 Diseases of the nervous system	16,866 (1.3)	2,074 (5.2)	18,940 (1.4)
13 Causes affecting health status and health service utilization	16,652 (1.3)	110 (0.3)	16,762 (1.3)
14 Endocrine, nutritional & metabolic Diseases	15,728 (1.2)	628 (1.6)	16,356 (1.2)
15 Cause unknown	13,176 (1.0)	564 (1.4)	13,740 (1.0)
16 Mental and behavioral disorders	11,857 (0.9)	665 (1.7)	12,522 (0.9)
17 Neoplasms	10,035 (0.8)	1,956 (4.9)	11,991 (0.9)
18 Pregnancy, childbirth & the puerperium	3,690 (0.3)	6,487 (16.4)	10,177 (0.8)
19 Diseases of the blood & blood-forming organs & certain disorders involving the immune mechanism	3,255 (0.3)	132 (0.3)	3,387 (0.3)
20 Congenital malformations, deformations & chromosomal abnormalities	1,524 (0.1)	277 (0.7)	1,801 (0.1)
21 Certain conditions originating in the perinatal period	838 (0.1)	297 (0.7)	1,135 (0.1)
All cause	1,297,147 (100.0)	39,640 (100.0)	1,336,787 (100.0)

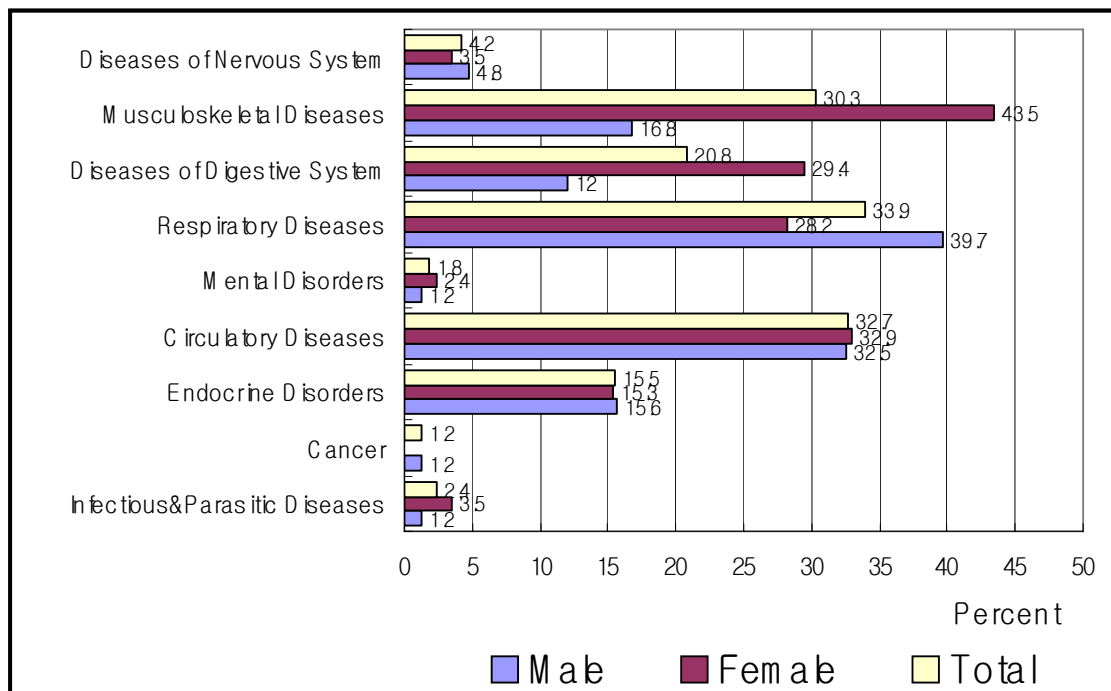
Source: Data from National Health Insurance Corporation(Raw Data, 2002)

Estimation of Morbidity

Based on the results from a survey on health status, utilization of health care services and health behaviors for Changwon City residents in 2002, the morbidity of Changwon City residents was roughly estimated.

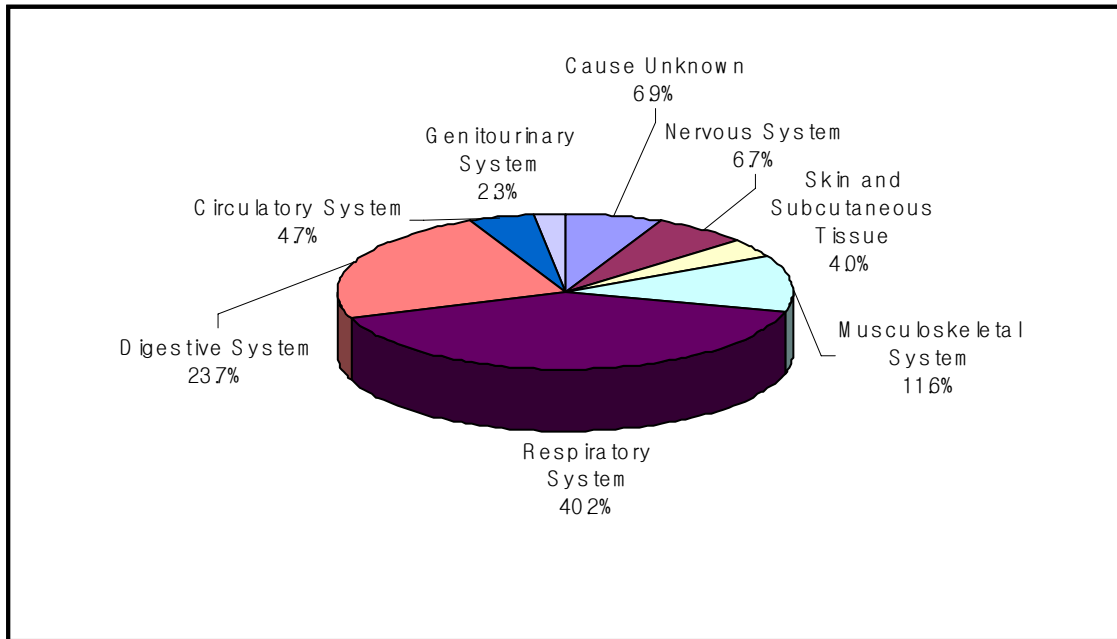
Regarding the morbidity experienced by the residents during the past one year's period, the most common cause was the respiratory diseases which were experienced by 33.9% of the respondents, followed by circulatory diseases(32.7%), musculoskeletal diseases(30.3%), endocrine disorders(15.5%), etc. Respiratory diseases were the most common causes of morbidity(39.7%) for the males, followed by 32.5% of the morbidity for circulatory diseases, 16.8% for musculoskeletal diseases, 15.6% for endocrine disorders, 12.0% for diseases of the digestive system, and so on. While the females had the highest morbidity for musculoskeletal diseases(43.5%), followed by circulatory diseases(32.9%), diseases of the digestive system(29.4%), respiratory diseases (28.2%), endocrine disorders(15.3%), etc.(Figure 2-1).

On the other hand, the morbidity experienced by Changwon residents during the last two weeks' period was the highest for respiratory symptoms(40.2%), followed by digestive symptoms(23.7%) and musculoskeletal symptoms(11.6%)(Figure 2-2).



Source: Changwon City Health Center, A Survey on Health Status, Utilization of Health Care Services and Health Behaviors of Changwon City Residents, 2002

Figure 2-1. Morbidity Experienced During Past One Year, Changwon City, 2002



Source: Changwon City Health Center, A Survey on Health Status, Utilization of Health Care Services and Health Behaviors of Changwon City Residents, 2002

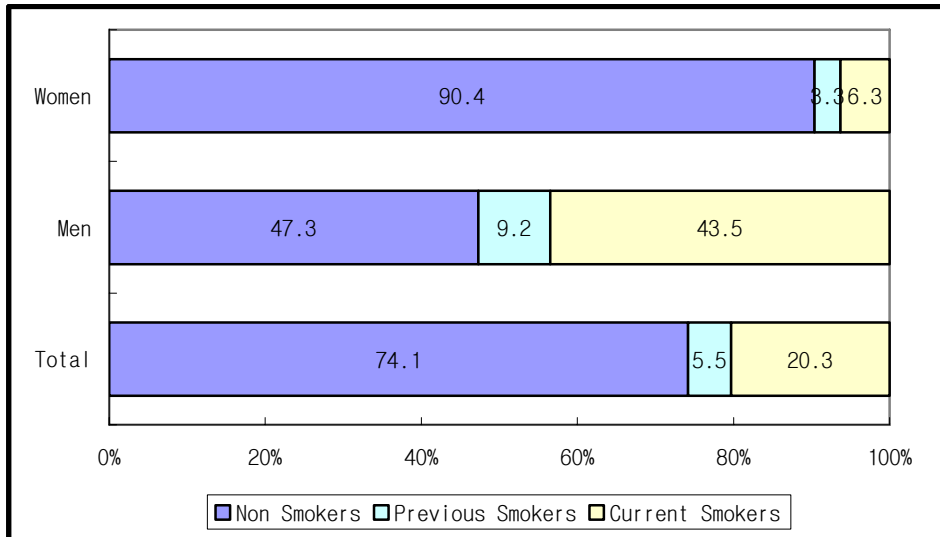
Figure 2-2. Morbidity Experienced During Last Two Weeks, Changwon City, 2002

Chapter 3. Lifestyles

1. Tobacco Use

Smoking Rates

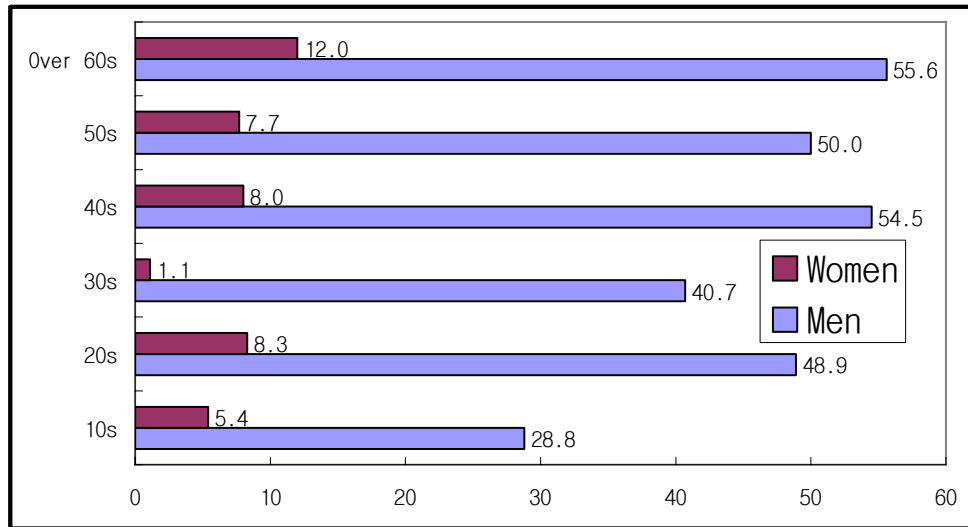
Cigarette smoking is the single most preventable cause of disease and death in Korea. In 2002, 20.3% of all adolescents were current smokers in Changwon City which were slightly lower than national average of Korea. Current smokers were 43.5% of male, compared to 6.3% of female. Previous smokers were 5.5% of all adolescents, compared to 9.2% of male and 3.3% of female(Figure 3-1). Tobacco use prevention and control program should be enhanced to promote tobacco-free living and to reduce morbidity and mortality from tobacco use and exposure to second-hand smoke.



Data Sources: Survey on Health Behaviors of Changwon City Citizens. 2002

Figure 3-1. Smoking Rates by Sex, Changwon, 2002

Smoking rates of over 60s and 40s men and over 60s women were higher than those of other age groups(Figure 3-2). Average starting age of all current and previous smokers were 18.8, whereas 18.4 among male and 20.0 among female.



Data Sources: Survey on Health Behaviors of Changwon City Citizens. 2002

Figure 3-2. Smoking Rates by Sex and Age Groups, Changwon, 2002

Tobacco Sales

In 2001, 37 million packets of cigarette were sold in Changwon. This indicates the citizens of Changwon used 72 packets per person per year. In other words, current smokers, 20.3% of all adults, used one packets per a day.

2. Alcohol Use

Drinking Rates

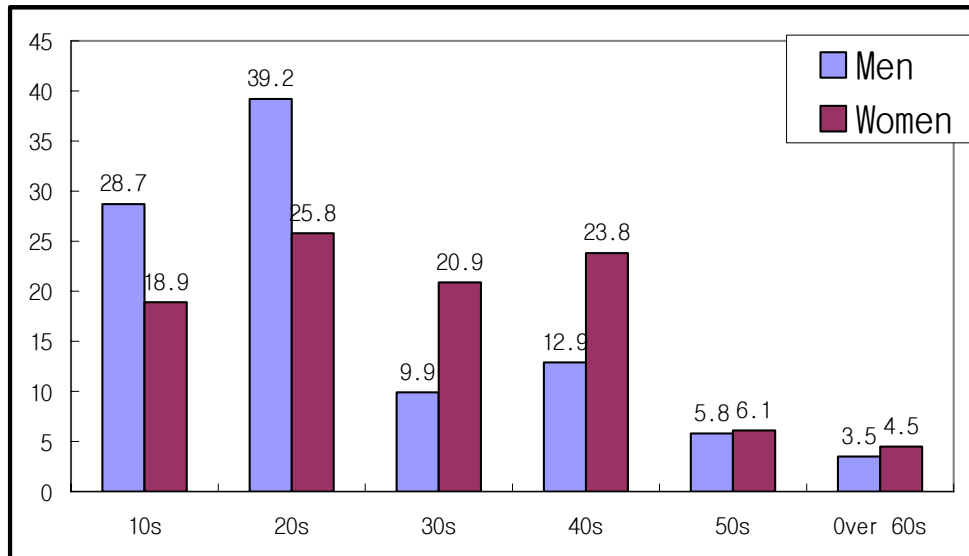
In 2002, based on health behavior survey, approximately two in three(64.7%) Changwon City residents have indulged drinking which were slightly lower than national average(68.4%). More men(70.7%) than women(61.2%) and more urban residents(65.5%) than rural residents(55.3%) were current drinkers(Table 3-1).

Drinking rates among ages of 10s and 20s among men and ages of 20s and 40s among women were higher than other age groups(Figure 3-3).

Table 3-1. Drinking Rate by Sex and Region for Changwon

category	Total	(Unit : %)			
		Sex		Region	
		Men	Women	Urban	Rural
Non drinkers	31.2	23.6	35.8	30.5	40.4
Former drinkers	4.1	5.8	3.0	4.0	4.3
Current drinkers	64.7	70.7	61.2	65.5	55.3
	100.0	100.0	100.0	100.0	100.0

Data Sources: Survey on Health Behaviors of Changwon City Citizens. 2002



Data Sources: Survey on Health Behaviors of Changwon City Citizens. 2002

Figure 3-3. Drinking Rates by Sex and Age Groups, Changwon, 2002

Alcohol-Related Outcomes

There are limited indicators about alcohol-related outcomes except mortality statistics, although the impacts of alcohol on health, social and economic consequences extends beyond mortality statistics. In Kyungnam Province including Changwon city from 1995 to 2000, an average of approximately 9% of all death reported to be directly related to alcohol-related disease.

In 2000, much more men(13.5%) than women(3.9%) died linked to alcohol-related disease(Table 3-2).

Table 3-2. Deaths linked to Alcohol-Related Diseases by Sex and Year, Kyungnam Province, 1995-2000

Year	Total			Men			Women		
	All Deaths	Alcohol-Related Deaths	%	All Deaths	Alcohol-Related Deaths	%	All Deaths	Alcohol-Related Deaths	%
1995	22,852	1,856	8.12	13,095	1,524	11.64	8,868	332	3.74
1996	22,602	1,837	8.13	12,773	1,511	11.83	8,698	326	3.75
1997	19,465	1,348	6.93	11,047	1,084	9.81	8,627	264	3.06
1998	19,605	1,083	5.52	10,978	875	7.97	8,418	208	2.47
1999	19,927	1,380	6.93	11,229	1,054	9.39	9,829	327	3.33
2000	19,981	1,882	9.42	11,113	1,500	13.50	9,757	382	3.92

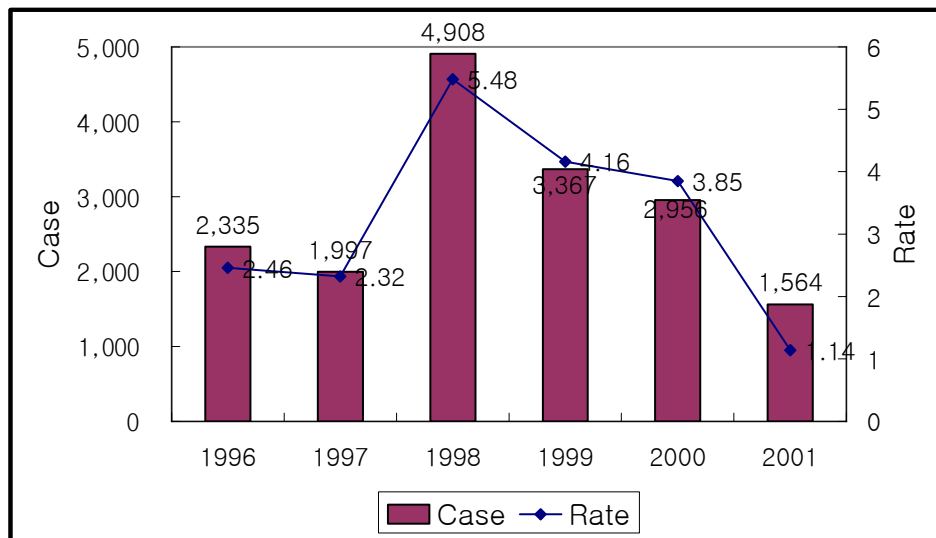
Data Sources: Inje University, A Study for Constructing Information System on Alcohol Consumption and Alcohol-Related Outcome Statistics, Ministry of Health. 2001.

Cost of Alcohol Use

In 2001, based on national statistics, alcohol consumption per capita per year was 119 bottles of beer, 79 bottles of distilled liquor, 1.4 bottles of whisky, and 4.6 bottles of strained rice wine. In 1996, expenditure for alcohol use per household per month was \$5(0.4% of household expenditure) in urban area and \$8(0.6% of household expenditure) in rural area. Socio-economic cost for alcohol use is 2.75% of GNP, compared to 1.89% in Japan and 1.75% in USA. Data about cost of alcohol use for Changwon city are not yet produced.

Drinking and Driving

Adult arrest rate for driving-under-the-influence of Changwon city residents decreased fast due to strengthening the crackdown on drunken driving by police(Figure 3-4).



Data Sources : Changwon City, Annual Statistics, each year.

Figure 3-4. Adult Arrest Rates for Driving-under-the influence, Changwon City, 1996-2001

3. Physical Exercise

In 2002, based on survey on health behaviors of Changwon city residents, 26.1% of residents were reported to exercise at least once per week. However, 50.1% exercised not at all. More women(55.9%) than men(40.4%) and more urban residents(54.2%) than rural residents(49.7%) exercised not at all.

Table 3-3. Physical Exercise by Sex and Region for Changwon City

(unit : person(%))

Category	Total	Sex		Region	
		Men	Women	Urban	Rural
Not at all	307(50.1)	93(40.4)	214(55.9)	26(54.2)	281(49.7)
Occasionally	142(23.2)	56(24.3)	86(22.5)	13(27.1)	129(22.8)
Once a week	35(5.7)	15(6.5)	20(5.2)	2(4.2)	33(5.8)
Twice a week	41(6.7)	20(8.7)	21(5.5)	2(4.2)	39(6.9)
3 times a week	43(7.0)	24(10.4)	19(5.0)	4(8.3)	39(6.9)
4-5 times a week	29(4.7)	15(6.5)	14(3.7)	1(2.1)	28(5.0)
every day	16(2.6)	7(3.0)	9(2.3)	-	16(2.8)
Total	613(100.0)	230(100.0)	383(100.0)	48(100.0)	565(100.0)

Data Sources: Survey on Health Behaviors of Changwon City Citizens. 2002

4. Weight Control

Dietary Habits

Good dietary habits such as having one's meals regularly and keeping within the recommended amount of salt and sugar intake is closely related to good health. In 2002, based on survey on health behaviors of Changwon city residents, 46.3% of residents were reported to fail having their breakfast regularly. This rate was higher as age increased, especially 59.2% of teenagers. Residents with a dietary habits of taking salty food were 21.4% and residents with a dietary habits of taking sugary food were 13.2%.

Weight Control

Average height of Changwon city residents was 173.1cm among men and 161.7cm among women, while weight was 66.2kg among men and 54.3kg among women. Eleven percent of the population was overweight, including 12.4% of men and 6.1% of women according to Body Mass Index(BMI)(Note: The BMI compares body weight in Kilograms over height in meters squared).

5. Drug Use

While data about drug use of Changwon city residents are not yet available, over the last decade, drug use has increased in Korea. Arrested for drug use has increased 83.3%, 4,555 person in 1994 to 8,350 person in 1998 nationwide.

Chapter 4. Physical Environment

Changwon is the capital city of Gyeongnam province, and has the most leading mechanical industry complex in Korea. It should be pursued not only to develop city's economy but also to improve the quality of environments, so as to improve the quality of the life in all areas including welfare, culture, education, housing and society, and to implement sustainable city development.

1. Air Pollution

Air pollution has become the serious problems due to heavy industrialization and increased number of automobiles in Changwon. Air pollutants are the substances that have harmful effects on human health or properties, or on natural environment like harmful effects on growth of animals or plants, such as smoke, dusts, gases and odors.

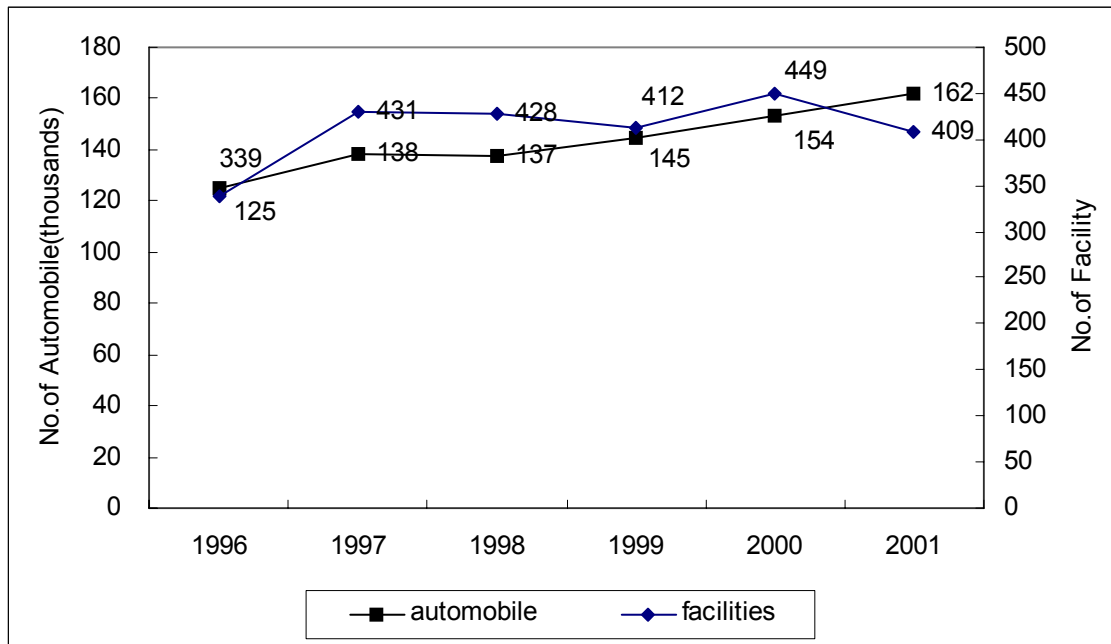
The effects of air pollution on human health varies from mild irritation of eyes to mortality in certain cases, and, however, usually appears to worsen existing diseases or to increase the risk of infection by reducing general health status, and to increase the incidence of respiratory and allergic diseases. Therefore it is important to control air pollution for implementing healthy cities project, and is required to establish action plans able to build the cooperation system with each field and to encourage the participation of the residents from the beginning of planning stage.

Source of Air Pollution

There are two kinds of sources for air pollution, stationary and mobile sources. Either a stationary facility such as power plant or large factory generates a large amount of pollutants, or small scale of sources gathering and generating pollutants in a limited area may create air pollution problem. Mobile sources such as automobile, train and aircraft are another type of air pollution source, which generate pollutants continuously through moving.

Air pollution due to emissions from vehicles occurs around the streets, and creates pollution problems near streets especially during traffic hours. The number of vehicles registered in Changwon City continuously increased to twice as much as that in 1994, and exceeded more than 160 thousands(Figure 4-1).

Facilities discharging air pollutants are classified as type I through Type V according to the amount of fuel use. Those facilities discharging air pollutants continuously had increased to 449 facilities until 2000, but decreased to 409 facilities in 2001.



Source: Changwon City, Changwon City Statistical Yearbook, 2002

Figure 4-1. Number of Vehicle Registration and Facilities Discharging Air Pollutants by Year, Changwon City, 1996 ~ 2001

Air Pollution Level

In 2002, the mean levels of some selected air pollutants such as sulfur dioxide, total suspended particles, ozone, carbon dioxide and carbon mono-oxide, in 3 monitoring sites were far below the air quality standards, and were not concerned at all in Changwon City. However, air pollution should be continuously monitored and controlled due to increasing number of automobiles and emissions from industries in Changwon City (Table 4-1).

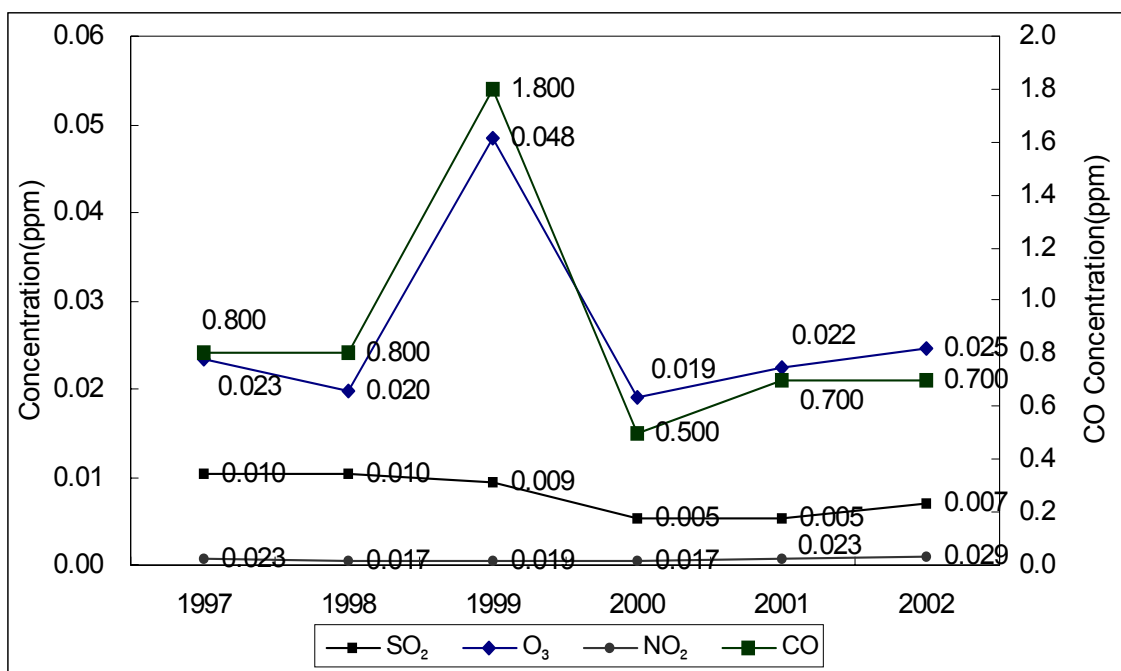
Table 4-1. Annual Mean Levels of Air Pollutants in Selected Area, Changwon City, 2002

Area	SO ₂ (ppm)	TSP($\mu\text{g}/\text{m}^3$)	Ozone(ppm)	NO ₂ (ppm)	CO(ppm)
Myungseo-dong	0.005	69	0.024	0.024	0.50
Ungnam-dong	0.005	52	0.035	0.012	-
Gaumjung-dong	0.009	82	0.025	0.034	0.80
Mean levels	0.006	69	0.028	0.023	0.65
Air Quality Standard	0.03 (year)	150 (year)	0.06 (8 hours)	0.05 (year)	9 (8 hours)

Source: Ministry of Environment, Air Quality Monitoring Data, 2002

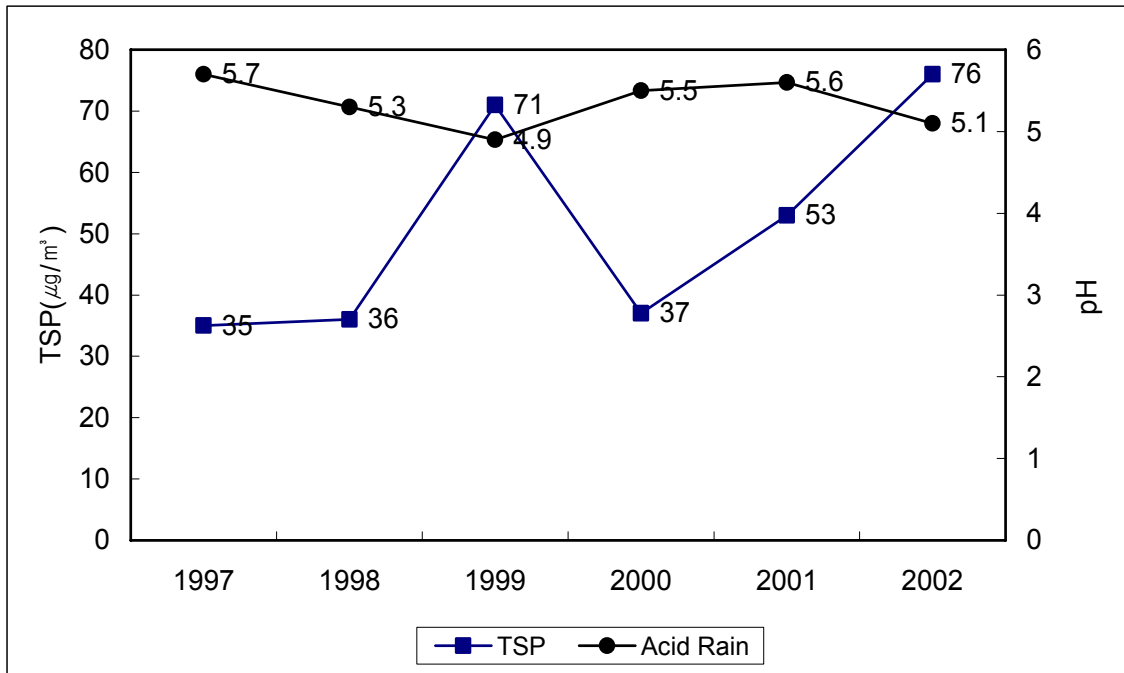
However, the trend of air pollution is shifting from the type of air pollution as seen in developing countries to those types of developed countries, showing decreasing levels of SO₂ and dusts due to air pollution reduction policy of the Government, such as extensive supply of clean and low-sulfur fuels, while steadily increasing in NO₂ and O₃ levels due to increased emissions from automobiles(Figure 4-3, 4-4).

Although Changwon City is located in the basin and topographically vulnerable to air pollution, air quality is not so bad overall as compared with other neighboring cities or other industry complexes. This is mainly due to ventilation effect since the network of roads in Changwon City consisted of straight lines and served as routes for air flows. Moreover the levels of air pollution gradually tend to decrease due to widespread use of low sulfur gasoline and clean fuels.



Source: Ministry of Environment, Air Quality Monitoring Data, 1997 ~ 2002

Figure 4-2. Concentrations of Selected Air Pollutants by Year, Changwon City, 1997 ~ 2002.



Source: Ministry of Environment, Air Quality Monitoring Data, 1997 ~ 2002

Figure 4-3. Concentration of Dusts and Acidity of Rain by Year, Changwon City, 1997 ~ 2002.

2. Water Pollution Control

Due to improvement in living conditions, and accelerating urbanization and industrialization, the need for good quality of water as well as the demand of water dramatically increased, and the water is considered as an important resource. The abundant supply of safe drinking water is essential not only for living a everyday life but also for preventing communicable infectious diseases. Also it is an essential element for healthy cities to provide the measures of controlling used water in a scientific but environmentally friendly ways.

Pollution Level in Water Environment

In Korea, water quality standards have been set to protect the health of the people and to establish pleasant environments. These standards apply to river, lakes and marine water with 8 items related to living environments, such as pH, BOD, COD, SS, DO, total coliforms, total nitrogen and total phosphorus, and 9 items related to human health, such as Cd, AS, CN, Hg, organic phosphorus, Pb, Cr⁺⁶ and ABS. Besides the water quality of rivers or lakes can be classified by 5 levels of the grade(I ~ V).

In Changwon City, there are one national river(Nakdong River, 9.8km), 26 local second level streams(114km), and 103 small streams. Major streams in Changwon City was polluted and had water qualities of less than grade III. Especially, Naedong-chun was heavily polluted with water quality of grade V, and could not function as a stream.

Table 4-3. Water Quality of Major Streams, Annual Mean Values, Changwon City, 2002

Stream	DO (mg/l)	BOD (mg/l)	COD (mg/l)	SS (mg/l)	T-N (mg/l)	T-P (mg/l)	Water Quality Grade
Shinchun	10.3	3.2	6.4	18.8	3.6	0.15	Grade III
Naedong	10.1	19.3	18.3	13.6	14.6	1.4	Grade V
Nam	6.0	11.8	13.8	10.3	12.7	1.7	Grade IV

Source: Ministry of Environment, Water Quality Monitoring Data, 2003

Drinking Water Supply

Most domestic water used in Changwon City is supplied from Chilseo Water Treatment Plant for 120,000m³ a day and Bansong Water Treatment Plant for 20,000m³ a day. For some rural area like Daesan myun, the water is supplied from Daesan Water Treatment Plant treating 2,000m³ of groundwater daily. Industrial water used in industry complex is supplied from Bansong Water Treatment Plant for the amount of 100,000m³ daily by Korea Water Resources Corporation

In 2001, public water supply system supplied total 40,338,000m³ of water (109,042m³ daily) to 462,249 population in Changwon City, which accounted for public supply rate of 87.5%. However, the amount of water supply per capita has been decreasing due to population increase and the lack of water treatment capacity in existing treatment plants.

Table 4-4. Characteristics Related to Water Supply By Year, Changwon City, 1994 ~ 2001

Year	Population	Population Served	Service Rate(%)	Facility Capacity (m ³ /day)	Volume of Water Supply (m ³ /day)	Volme of Water Supply per Capita(ℓ)
1994	419,352	361,000	86.1	140,000	108,341	300
1995	478,007	382,450	80.0	140,500	114,735	300
1996	497,089	404,630	81.4	140,500	108,296	268
1997	508,148	417,697	82.2	140,500	107,697	295
1998	506,330	421,313	83.3	140,500	117,930	280
1999	518,091	437,000	84.3	140,500	103,000	250
2000	523,142	446,540	85.4	145,000	109,958	246
2001	528,152	462,249	87.5	138,820	109,042	236

Source: Changwon City, Changwon City Statistical Yearbook, 2002

Occurrence of Water-born Infection

Most communicable diseases are water-born infections, and it is one of the major tasks for the Ministry of Health and Welfare to control communicable diseases.

In Chanwon, typhoid fever continuously has occurred from a case in 1999 and 2000 to 5 cases in 1997, but there were no cases for paratyphoid since 1999 and for Cholera since 1997. However, shigellosis has been continuously occurred since 1998 with a peak of 87 cases in 2000, but decreased to 5 cases in 2001, and showed the tendency of endemic(Table 4-5).

Table 4-5. Occurrence of Major Water-born Infections by Year, Changwon City, 1994 ~ 2001

Year	Typhoid Fever	Paratyphoid	Shigellosis	Total
1997	2	-	-	2
1998	5	1	23	29
1999	1	-	22	23
2000	1	-	86	87
2001	3	-	5	8

Source: Changwon City, Changwon City Statistical Yearbook, 2002

3. Wastewater Treatment

Sewerage system is one of the essential elements for modern healthy cities to exclude wastewater and rainwater and to protect incoming streams. Since Changwon City is the first planned city in the country, separated sewer system was established and a municipal wastewater treatment plant was operated to protect the water quality of incoming waters since the early city development. Advanced wastewater treatment system was added to existing facility and operated successfully since 2003.

4. Groundwater Control

When Changwon City first developed in early 80's, groundwater was extensively developed and used by most of the residents for domestic water.

By the end of 2000, 2,082 ground water wells have developed and registered for use in Changwon, but 303 wells were abandoned to develop or closed. It is estimated that 36,000,000 tons of ground water is being used in 6704 ground water wells if small unregistered ground water facilities are included in Changwon City.

5. Solid Waste Management

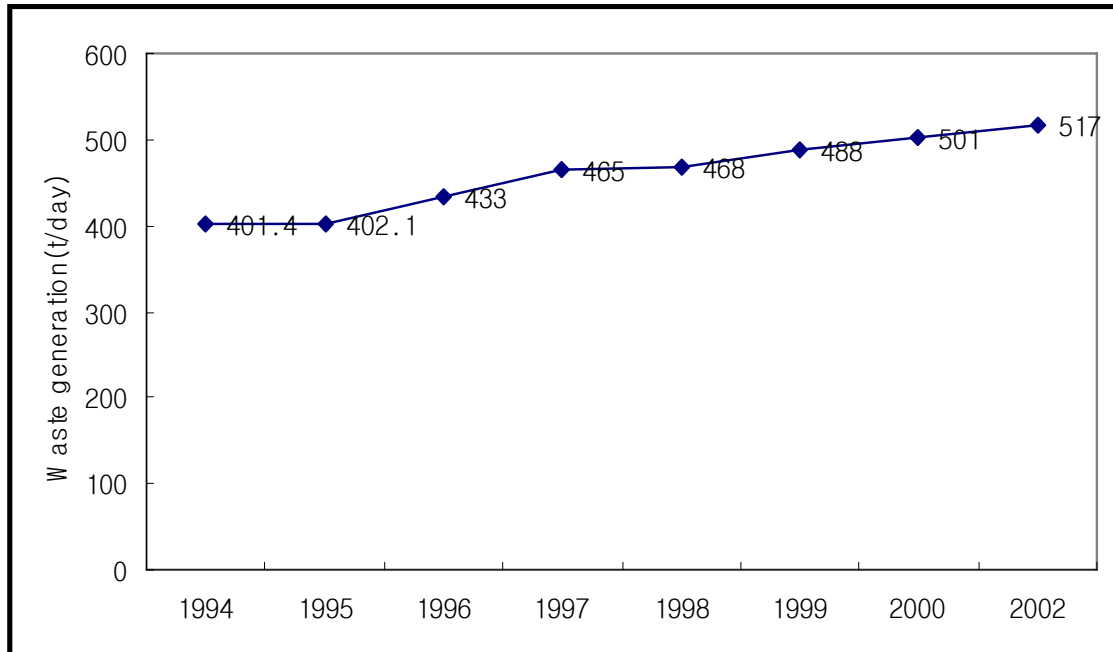
It was estimated that a total of 2,463 tons of solid wastes including all wastes from industries and construction sites was generated in 1996, and increased by year to 3,388 tons in 2001. The proportion of disposing wastes by landfills remarkably reduced to 10.4%, while 78.1% of wastes were recycled, followed by incineration 10.6%, in 2001.

Table 4-6. Generation and Disposal of Solid Wastes by Year, Changwon City, 1996 ~ 2001

Unit: t/day (%)					
Year	Landfill	Incineration	Recycling	Dumping	Total
1996	715(29.0)	228(9.3)	1,520(61.7)	-	2,463(100.0)
1997	640(24.5)	296(11.4)	1,671(64.1)	-	2,607(100.0)
1998	342(13.5)	236(9.3)	1,937(76.6)	14(0.6)	2,529(100.0)
1999	487(14.8)	256(7.8)	2,523(76.9)	16(0.5)	3,282(100.0)
2000	316(9.7)	922(28.3)	1,999(61.3)	24(0.7)	3,261(100.0)
2001	352(10.4)	361(10.6)	2,646(78.1)	29(0.9)	3,388(100.0)

Source: Changwon City, Changwon City Statistical Yearbook, 2002.

Domestic wastes generated from residential area in Changwon has steadily increased to 517 tons or 0.96kg/capita each day in 2001. This figure is similar to the amount of wastes generated per capita for developed countries such as England (0.98kg) and Germany(0.99kg).



Source: Changwon City, Changwon City Statistical Yearbook, 2002.

Figure 4-4. Generation of Domestic Wastes by Year, Changwon City, 1994 ~ 2001

6. Noise

Domestic noise in the city increasingly has become a problem with population increases, urbanization and increased number of vehicles. Domestic noise comes from various sources from the daily life of residents, and it especially has influence on the emotion of residents unlike other types of pollution,.

Domestic noise standards apply differently to the type of areas. The average noise levels have not changed much from 1994 to 2001 for both general area and the vicinity of streets in Changwon City. And the noise levels hardly exceeded the noise standards during the day, but frequently exceeded the standards during the night(Table 4-7).

Table 4-7. Mean Noise Level by Year, Changwon, 1994 ~ 2001

Year	Unit: Leq dB(A)						
	General Area				Vicinity of Street		
	A ¹⁾	B ²⁾	C ³⁾	D ⁴⁾	A ¹⁾ , B ²⁾	C ³⁾	D ⁴⁾
1994	42	50	60	64	62	63	67
1995	40	48	60	67	60	65	68
1996	50	54	60	64	62	66	67
1997	52	54	62	62	62	62	67
1998	48	54	58	62	59	62	66
1999	47	53	58	60	60	63	63
2000	47	53	59	60	61	64	66
2001	49	55	60	63	63	66	68
Domestic Noise Standard							
Day	50	55	65	70	65	70	75
Night	40	45	55	65	55	60	70

Source: Changwon City, Changwon City Statistical Yearbook, 2002

1) Area "A": Green belt, residential, natural preservation areas and areas within 50m from schools and hospitals

Area "B": General residential, semi-residential and semi-downtown areas

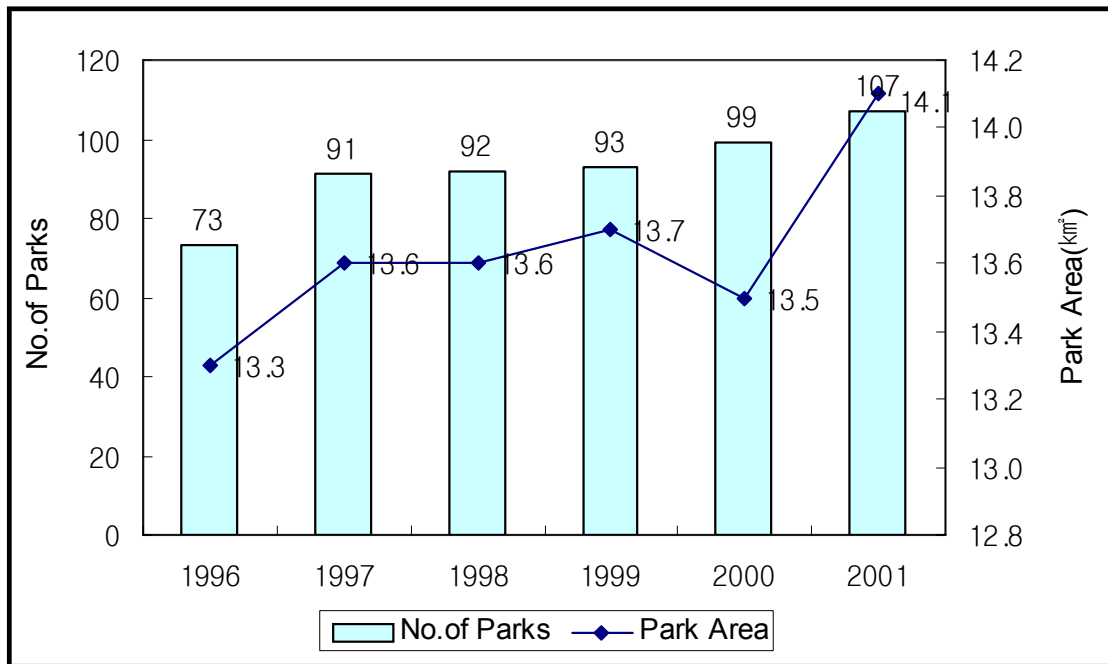
Area "C": Commercial and semi-industrial area

Area "D": General industrial, industry complex, downtown and semi-downtown areas.

7. Open Spaces

Since Changwon City is the first planned city in Korea, the city has more spaces for parks and green areas than any other cities, as a result of endeavoring to build artificial parks and green areas, which results in providing emotional comforts, pleasant living environments and comfortable rest areas for the residents in Changwon City.

The number of parks in Changwon has been increasing gradually from 73 parks in 1996 to 107 parks with the total area of 14.1 km² in 2001. The unit area for park per capita is 27.2 m², three times higher than the national average for cities.



Source: Changwon City, Changwon City Statistical Yearbook, 2002

Figure 4-5. Number and Area of Parks by Year, Changwon, 1996 ~ 2001

8. Food Sanitation

In Korea, health problems related to food or nutrition are rarely due to malnutrition or nutritional unbalance but mainly due to consumption of unsanitary foods or foods containing hazardous substances.

Since Changwon City was developed as a model industrial city, there are many large factories and industrial facilities, and there are high possibilities in the outbreaks of food born diseases. As a matter of facts, food-born incidences such as food poisoning or diseases related to food have occurred every year in Changwon. Especially in 1999, 344 person had suffered from food-borne diseases almost within one month period, and 7 cases with 93 persons were reported to have food-born diseases including food .poisoning..

Table 4-8. Outbreaks of Food Poisoning by Year, Changwon City, 1998 ~ 2002

Year	Salmonellosis		Staphylococcus aureus		Vibrio parahemolyticus		Unknown		Total	
	Case	No.	Case	No.	Case	No.	Case	No.	Case	No.
1998										40
1999	3	37	1	8	1	9	2	290	7	344
2000	2	3	-	-	-	-	3	58	5	61
2001	1	1	1	1	1	6	2	89	5	97
2002	1	2	1	1	1	28	4	62	7	93

Source: Changwon City, Changwon City Statistical Yearbook, 2002

Chapter 5. Physical Infrastructure

1. Topography

Changwon City is located in the middle of Gyeongnam province and at the southeast extreme of Korean peninsular, and is in the center of the industry and economy for the middle Gyeongnam area with Masan Free Export Zone, as the leading machinery industry complex in southeast coastal heavy and chemical industry areas connecting Ulsan, Busan, Masan and Sacheon.

The city is located in the basin surrounded by mountains with 12.6km of seashore connected to neighboring Masan harbor. There are three major streams crossing Changwon City, which flow into Masan Bay. The Changwon Boulevard divides the city into two sections, industrial area in the south and urban area in the north. In 1995, some of the rural area in former Changwon County were incorporated into Changwon City.

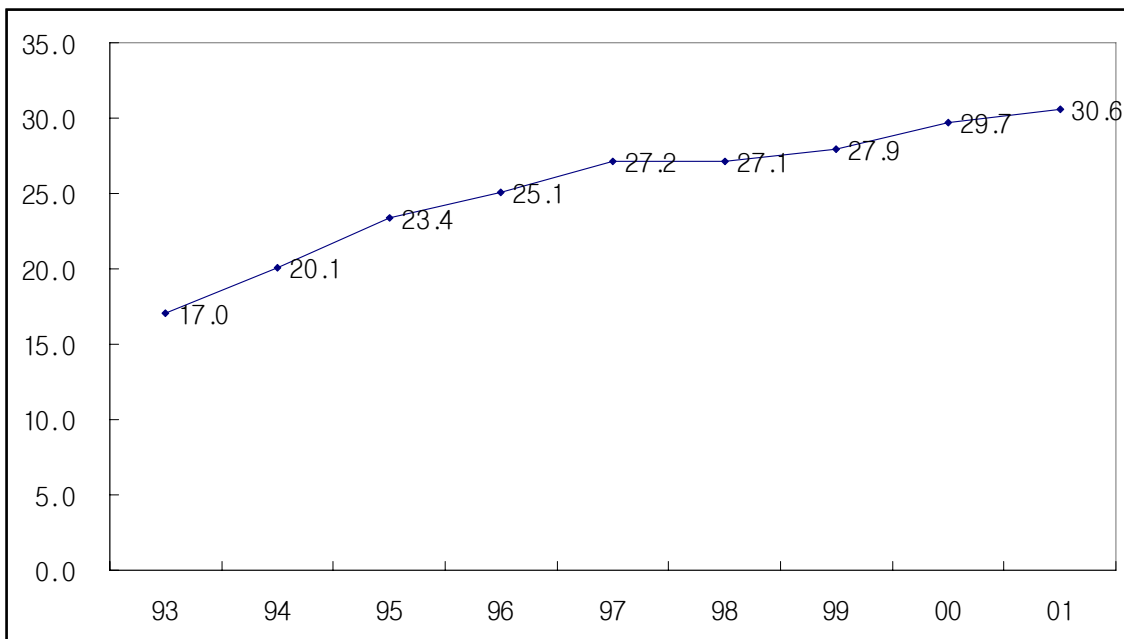
Since Changwon City is located at North latitude 35° in the Eurasian continent, it has distinct four seasons in the temperate zone, and influenced by seasonal winds with less gap between cold and hot weather than continental region. Therefore, it has a warm and good climatic conditions for human activities with nice weather. The average temperature of Changwon City is 15.0°C during 1992~2001 with the average 133 days of fine weather and the average rainfall of 1,395mm annually.

2. Transportation Systems

Traffic network of Changwon is directly connected with Namhae Freeway and Guma Freeway routed to Busan, Deagu and Gwangju in conjunction to railroad with Gyeongjeon line. The Changwon Tunnel shortens the distance to Busan Metropolitan City within 30 minutes and Anmin Tunnel directly connects to Jinhae City.

The roads in Changwon consist of freeway, national road, provincial road and city road, and 95.2% of the roads in the city are paved with the extension of 677km in 2001.

The total number of automobiles registered in Changwon City was 161,661 in 2001, corresponding to 30.6 automobiles per 100 population, which has increased from 17 automobiles per 100 population in 1993.



Source: Changwon City, Changwon City Statistical Yearbook, 2002

Figure 5-1. Number of automobile per 100 population, Changwon City, 1993 ~ 2001

3. Communication System

In 2001, total 164,186 household were registered for telephone services, corresponding to 1.43 telephones per household, and 32% of household had personal computer in Changwon City.

In health care delivery system, it is important to make urgent calls in case of emergency especially for the elders living alone, and, however, 98.7% of the single elders have telephones at their home.

4. Housing

House provision rate of Changwon city has increased annually up to 84.4% in 2000. Major type of house is apartment, followed by independent house and condominium (Table 5-1).

In 2000, 71.1% of the population lived in their own house, compared with 58.5% in 1990. Almost all of houses are equipped with modern kitchen and bathroom except few houses in rural areas. Changwon city residents occupied 3.5 rooms per a household in average, 3.5 rooms per household with 3 persons and 3.8 rooms per household with 4 persons.

Table 5-1 House Possession Rate and Type by Year for Changwon City, 1994-2000

Year	House -hold	House Provided	House Provision Rate	House Type				
				In- dependent	Apartment	Condominium	Multi- household	others
1994	124,985	97,032	77.63	24,409	70,524	1,207	482	410
1995	147,765	101,531	68.71	26,228	70,365	3,692		1,246
1996	144,269	106,252	82.36	29,041	74,363	1,288	849	418
1997	133,749	109,405	81.80	29,849	76,737	1,364	1,045	410
1998	131,877	111,718	84.71	30,258	78,455	1,503	1,092	410
1999	139,666	117,617	84.21	30,633	83,961	1,503	1,104	416
2000	154,214	119,357	84.40	31,062	85,224	1,520	1,135	416

Data Sources : Changwon City, Annual Statistics, each year.

5. Urban Planning

Urban planning is a comprehensive plan including land use, transportation, sanitation, environment, industry, security, defense, welfare and culture in order to encourage sound development of the city and to promote wellbeing, order and welfare of the public. Long term city health policy should be a integrated part of urban planning, It requires the philosophy for development and environment with long term insights. It is also important to establish the cooperation between central government and local government, and to encourage the participation of private organizations and community..

Above all, the concept of naturally friendly ecosystem in harmony of human with city and the nature needs to be reflected to long term city planning and is also related to the concept of healthy cities.

The strategy of city planning developed in 1997 by Changwon City suggested the harmonious development of urban and rural areas, the expansion of city infrastructures, the improvement of living environments and the provision of city scenery, and establishment of spaces for education, information exchange and trading, and so on. However, residential and commercial areas have been expanding, while green area has been decreasing minutely with development of the city.

It has been implemented actively compared to any other cities to conduct downtown reconstruction project and to develop and supply public housing sites, and it is also necessary to reflect ecological consideration to improve the quality of life in harmony of balanced development and pleasant environment of the city.

Chapter 6. Public Health Policies and Services

1. Health Securities

All Koreans have covered by National Health Insurance or Health Aids since 1989. In 2002, 98.9% of residents of Changwon city were insured by National Health Insurance, while 1.1% of residents, poor people, were enrolled in Health Aids. Among insured residents, 40.7% were self-employed, while 58.2% were employees, teachers and government officers(Table 6-1).

Table 6-1. Health Security Status for Changwon City, 2002

Type of Health Security		Number of Residents(%)
National Health Insurance	Self-Employed	213,493(40.7)
	Employees, Teachers and Government Officers	304,861(58.2)
Health Aids		5,714(1.1)
Total		524,068(100.0)

Data Sources : Changwon City, Annual Statistics, 2002

2. Health Services

Public Sectors

Changwon city has one public health center, three public health clinics and two rural public nursing practitioner's offices.

Private Sectors

Almost all medical services are provided by private owned health services facilities in Changwon city, similar to other areas in Korea. Primary care is primarily provided by 151 clinics. Secondary care is provided by nine hospitals and one general hospitals. Tertiary care is not provided within Changwon city.

In 2002, there were 1,890 licensed acute care beds in Changwon city, which translated to a ratio of 3.6 beds per 1,000 population. In 2002, there were 326 physicians and 114 dentists practicing in Changwon city. This translates to a ratio of 1,607 persons per physician and 4,597 persons per dentist(Table 6-2).

In 2002, residents' utilization ratio of health services within Changwon city was 89.1% of outpatient services and 40.3% of inpatient services.

Table 6-2. Health Service Facilities, Changwon City, 2002

Health Services Facilities	Number	Beds	Medical Doctors			Nurses	Pharmacists
Health Services Facilities	Number	Beds	Physicain	Dentists	OMDs ¹⁾	Nurses	Pharmacists
Clinics	119	482	230	-	-	66	-
Hospitals	9	974	63	-	-	309	9
General Hospitals	1	400	23	1	-	114	10
Tertiary Hospitals	-	-	-	-	-	-	-
Psychiatric Hospitals	-	-	-	-	-	-	-
Psychiatric Clinics	2	-	2	-	-	1	-
Dental Clinics	91	-	-	113	-	2	-
Oriental Medical Clinics	73	-	-	-	89	8	-
Drug Stores	141	-	-	-	-	-	155
Industrial Clinics	7	34	8	-	-	11	-
Total	485	1,890	326	114	89	512	174

Note 1) OMD: Oriental Medical Doctors

Data Sources : Changwon City, Annual Statistics, 2002

3. Vaccination

Vaccination services are primarily provided by public health facilities such as public health center. Among the vaccination services provided by public health facilities, MMR has increased recently(Table 6-3).

Overall, vaccine preventable diseases are reported at record low level in Korea, because of high vaccination levels in children. In 2002, DTP, Polio, and MMR vaccination were completed to 100% of children under 6 years, while Hepatitis B were immunized to 98% of children under 6 years old in Changwon city.

Table 6-3. Immunization Services by Public Health Facilities, Changwon City, 1996-2001

Year	DTP	Polio	MMR	Rubella	Japanese Encephalitis	Typhoid	Hepatitis B	B.C.G	Others
1996	24,989	28,743	6,255	...	52,455	7,039	18,903	14,331	-
1997	26,519	27,416	6,201	3,388	53,416	20,545	19,760	6,670	50,104
1998	22,344	18,263	8,459	3,566	49,057	1,016	18,334	8,494	79,660
1999	24,481	19,339	7,833	3,510	47,266	998	16,387	8,228	64,913
2000	30,117	24,321	15,979	3,203	20,203	832	17,496	6,438	164
2001	27,568	21,992	15,605	360	30,181	1,494	20,177	6,395	312

4. Cervical and Breast Screening

Relatively poor residents such as enrollees of Health Aids and lower 20% of insureds of National Health Insurance are provided cervical and breast screening services by government with free of charge. In 2002, 12.9% of women residents were received cervical screening services, while 9.2% of women were breast screened. In 2002, Pap smear screening ratio of adult women residents were 3.9%.

5. Family Planning

Family planning services have rapidly decreased in recent years, because of low birth rate. Family planning services provided by public health facilities are as Table 6-4.

Table 6-4. Family Planning Services by Public Health Facilities, Changwon, 1996-2001

Year	Sterilization		loop
	Men	Women	
1996	171	4	272
1997	53	6	194
1998	30	-	126
1999	25	-	131
2000	20	2	130
2001	18	-	90

Data Sources: Public Health Center, Changwon city

6. Health Education Services

Health education services primarily provided by public health facilities have strengthened recently for health promotion of residents in Changwon city. Health education services provided by public health facilities are as Table 6-5.

Health educations are focused on preventing smoking, drinking and unhealthy diet habits. Anti-smoking policies are broadly conducted on all residents. This policies include broadening smoking free districts, health education for students, and campaign for abstaining smoking.

A campaign for moderation and temperance in drinking is recent principal programme of Health Center of Changwon city. This programme includes strengthening health education and a crackdown on drunken driving, and designating the day of drinking free(first Friday of every month).

Nutrition education includes weaning food education for young mothers, healthy diet habits for students, and special diet education for diabetes.

Table 6-5. Health Education Services by Public Health Facilities, Changwon, 1996-2001

Year	Total	For Groups						For Individual
Year	Total	Preschool Children	Students	Employees	Reserve Army	Aged	Others	For Individual
1996	...	...	...	...	...	...	...	...
1997	...	...	...	...	...	...	...	...
1998	...	...	...	...	...	...	...	...
1999	...	...	...	...	...	...	...	...
2000	20,448	4,679	7,200	649	7,500	240	180	4,005
2001	47,956	7,421	17,378	6,491	6,000	618	1,505	8,543

Data Sources: Public Health Center, Changwon city

City Health Plan

City Health Plan

Regional Health Care Plan in Changwon, which enters into phase 3(phase□, '97-'98; phase□, '99-'02; phase□, '03-'06), has been focussed on establishing process for setting local health goals and strategies to achieve them. The Plan was the product of a process in which departments of the Health Center participated in the identification of both health priorities and solutions.

National Government Act(1997) requires local Health Departments to develop a 4-year corporate plan that identifies objectives, targets and an effective resource management plan.

The Plan of phase□ is developed around three key objectives linked directly to the themes identified in Health Plan 2010 and includes a range of strategies and priorities that Health departments propose to undertake in order to meet those objectives. Importantly, the plan identifies a number of new activities and major project that Health departments will implement over the next four years to provide services and programs to the community.

Three Objectives of The Plan(phase□) are:

- To improve the quality of life of community members;
- To preserve the right of health in entire citizens; and so,
- To concentrate our power to be developed New Paradigm's Works, with the center of Health Center.

In order to do these, while the comprehensive and all-out plans should be progressed, our intention is toward securing the healthy citizens, healthy city and safe city, and then toward the sincere Ecopolis, which city-wide departments have huge responsibility for it.

This document(*Healthy City Changwon*) address the health promotion of whole citizen, which is concerning the health determinants, including water supply, sanitation, nutrition, food safety, health services, housing conditions, working conditions, education, lifestyles, population changes, income, and so on.

Healthy City Changwon is a strategic multi-agency initiative to improve quality of life and health. The plan considers long-term and short-term targets and it seeks to focus attention on the need for action on the underlying causes of issues in the city and also to improve the levels of health.

To select the priority issues for action, two approaches were taken to gathering information on the health needs of Changwon community. These included the collation of health information and an analysis of recent community consultation through regional community diagnosis.

This *Healthy City Changwon* identified ten key themes. These themes focus on issues as considered by Steering Committee and Health Center to be the most significant that Changwon will need to address during a few years. Our commitment has been made to the following:

- Development of Sustainable City
- Improvement of Physical Environment
- Clean Drinking Water Supply
- Transportation
- Housing
- Infectious Disease, Food poisoning and Vaccination
- Improvement of Alcohol Drinking Customs
- Smoking Quit Programs
- Health Promotion of the Foreign workers
- Health Promotion in Young People

In providing Health Center's key strategic direction, Health Plan 2010 directly informs the Healthy City Changwon and, as a consequence, City-wide operations and activities.

Our Changwon City, City Council and many agencies(including NGO's) are committed to solving ten issues in support of the social, cultural, environmental and economic well being of the community. In order to solve these above issues, strategies will be progressively implemented in accordance with the priorities identified in *Healthy City Changwon*.

Development of Sustainable City

Goals

In order to make a pleasant living under clear and clean environments, ecologically sustainable city development should be practiced to a degree not to damage the need of future generation but to satisfy the need of present generation.

Objectives

- To build city environment concerning the living of future generation
- To direct environmentally sustainable development of the city
- To establish environmentally oriented consuming behaviors
- To endeavor the preservation of natural ecosystem
- To prevent environmental damage in advance to minimize the cost of improving environment
- To make the city where every citizens could have comfortable life.
- To endeavor actively for the practice of 'Green-Polis Changwon 21' by each concerned body.

Overview

As the first planned city in Korea, the emphasis has been given to the expansion of infrastructures of the city due to rapid industrialization and urbanization. Recently the mast plan of city development for integrated Changwon City toward 2016 put a great emphasis on improving the level of culture and welfare, increasing the role to support industry complex and developing the rural and urban area harmoniously.

In order to maintain better living environments, including more green spaces, compared to the other cities, 'Green Polis Changwon 21', which is the local 'Agenda 21' for Changwon City, was made. This is a practical tasks and action plan for environmental protection and sustainable development,, which was adopted from 'the United Nations Conference on Environment and Development', held at Rio de Janeiro in Brasil, 1992, for the target of realizing sustainable society. Changwon City has suggested several goals for various social environments such as environmental preservation, education, welfare, etc. and has set practical target to make sustainable city in harmony of economic development and comfortable living development.

Issues

First, local environments critically have been deteriorated and destructed by growth based development mainly emphasizing on local development tasks,

Second, environmental problem has becomes issues due to rapid industrialization, city expansion by the integration of rural and urban areas and population increase.

Third, environmental degradation and pollution problems become more serious, due to population increase and development as a industrial city.

Forth, inner bank area in some of the streams was wide and used as parking lot and parks in Changwon City, and this interrupted the circulation route of ecosystem, and reduced the assimilation capacity of the streams.

Fifth, due to the lack of park management personnel and the lack of professionalism, administrative demand cannot be met, and patrol types of management are not effective.

Sixth, since park facilities in Changwon City are mainly focussing on athletics and recreation, they cannot satisfy the visual and intellectual needs of the residents.

Efforts for Problem solvings

1. Implementation of 'Green Polis Changwon 21'

In order to implement the local agenda of Changwon, 'Green Polis Changwon 21', various social and environmental targets will be established with 5 directions and 21 action plans, and implemented in connection with ISO14001, environmental management system, and the 'Changwon City Environmental Master Plan'.

A committee for environmental conservation consisted of members from academic institutions, business, environmental organization and women's organization has been organized to discuss the policy related to environmental conservation and development projects to reflect the opinions of various groups.

However, the endeavors only made by the city has a limitation, practical activities of the citizens and active participation of the businessmen under the partnership of environmental organizations and business enterprises will make it possible to substantially implement 'Green City Changwon 21' project.

2. Establishment of Harmonious City Development Plans

A master plan for city development is long-term, comprehensive and future-oriented to pursuit future vision, and it has original and comprehensive contents for basic structures, which should be planned to establish the flexibility providing for the changes during implementation process. And also it should include precedent plans, related plans and subordinate plans to establish indicators of Changwon City in the future.

As the local autonomous system got into practice, since the areas in the city master plan will correspond to administrative districts of Changwon City, new plans pertinent to locality will be established for semi-rural and semi-agricultural areas and excellent agricultural area will be preserved if possible. The areas restricted for development will be left, but will have plans for preparation and management of the streets, and practical development plan will be suggested mainly for the development of locality.

3. Development of City Considering Environment

Since Changwon is a planned city, it has more green areas, a good living surroundings and relatively pleasant environment despite industrial complex as compared to the other cities. Therefore eco-polis should be built for all the residents in harmony with nature under pleasant environments in order to build 'the Charming City Changwon'. Ecological map needs to be produced for environmentally sustainable city development, and green

areas need to be brought up and preserved for maintaining natural ecosystem, securing water resources, adsorbing carbon dioxide and stabilizing climates.

In order to preserve green areas, the following action plans will be implemented:

- Endeavoring environmentally sustainable development
- Expanding the areas of city parks and green area
- Preparing green transportation system
- Preserving natural ecosystem
- Building environmentally oriented streams

This is the direction of sustainable city development in harmony with natural environment for Changwon City.

4. City Development in Harmony of the Urban and the Rural

The urban area of Changwon City is divided into two distinctive zones by Changwon Boulevard. The north zone is the heart of residence, commerce, education and culture in the city, while the south zone mainly consists of industry complex and harbor.

Considering information business, commerce, manufacturing industry and civil services to strengthen external competitiveness, the life zone for 520 thousands population of Changwon will be divided into two big zones, 5 middle zones and 26 small zones, and will be linked to the centers of each zone to set up the order for spaces.

However, in rural areas which incorporated into Changwon City, it is planned to the divide the life zone into one big zone which can accommodate 2000 thousands population, 5 middle zones and 14 small zones to function as sparsely populated area, tourism, recreation and research support on.

5. Developing City Green Areas

As a factor comprising city scenery, various kinds of parks need to be developed or expanded in order to provide spaces for emotional life and for recreational opportunities of the citizens. In addition to develop and expand parks, the levels of facilities also should be revised to provide recreation opportunities as the income level and the standard of living increased.

6. Establishment of Pleasant City Scenery

Since Changwon is a planned city, where the size and purpose of buildings are in harmony, and maintains comfortable environments. It is necessary to prepare and control the city scenery in order to establish diverse and viable city environment as well as to establish planned and orderly environments.

In order to improve the quality of life for the citizens and to make pleasant city environments, various ecological parks have been established, such as building small rest areas by the roads, expanding athletic and convenient facilities in children's park and planting various trees in the city, and so on, to make ecological network linked to the life of the citizens.

The policy for parks and green areas in Changwon will be implemented continuously to establish the base for the city with ecological parks and to realize green city with less environmental burden.

Core Action and Problem Solving

In order to implement sustainable city development, the distribution of spaces in the city will be arranged and revised systemically, and the incorporated city equipped with richness of the country as well as convenient services in the city will be promoted. And based on regional life zones, the balanced development between regions will be promoted through spacial or functional incorporation of the zones.

Area	Activity	Leading Agency	Delivery Partners	Time Scale	Intended Outcomes
Implementing Green Polis Changwon 21	Discussing environmental preservation policy and development projects by reflecting the opinion of various group	Changwon City	Steering Committee for Green Polis Changwon 21	Ongoing	Encouraging participation of citizens, businessmen and organizations
City development	Endeavoring environmentally oriented city development	Changwon City,	Construction committee	Ongoing	Realizing environmentally oriented community
Expanding parks and green area	Expanding the area of city parks and green area	Changwon City	Steering Committee for Green Polis Changwon 21,	Ongoing	- Increased utility rate of the citizens - Protecting habitats of birds and insects
Preserving natural ecosystem	Preserving natural ecosystem	Environmental conservation committee	Steering Committee for Green Polis Changwon 21,	Ongoing	Preserving the city environment
Ecologically oriented stream management	Revising stream to consider natural beauty	Changwon City	Environmental conservation committee	Ongoing	Expanding water-front spaces
Managing city park	- Establishing professional	Changwon City	Steering Committee for	Ongoing	Establishing the parks where the

	park personnel - Expanding facilities in the parks		Green Polis Changwon 21,		citizens enjoy
Producing ecological map	Endeavoring the preservation of green areas	Environmental Conservation committee	Steering Committee for Green Polis Changwon 21,	Ongoing	Building ecological city

Improvement of Physical Environment

Goal

As suggested in '*Changwon City Environmental Master Plan*', it is the main goal to provide pleasant and clean living conditions for the residents and to implement environmental policy considering the future generation with the participation of concerned agency, organization and individual citizen by minimizing the environmental degradation due to various type of pollution such as air pollution, water pollution, noise and vibration, electromagnetic field, etc..

Development of city environment also should not be development-oriented direction but should be naturally sound and environmentally sustainable. We should make this city as a good place where people and nature pleasantly live together, and bring it back to our future generation.

Objectives

With the cooperation of the city, industry and private sector, the following environmental targets are set in order to achieve environmental goals for the improvement of environment in the city.

- Providing a comprehensive plan for solid waste management and disposal
- Reducing volume of waste by practicing separation and recycling of wastes
- Building a noiseless living environment
- Actively coping with air pollution control
- Strengthening environmental education programs to make environmentally friendly community

Overview

Since Changwon City is located in a basin surrounded by mountains, air circulation is not occurring well despite the influence of the sea breeze. The city has expanded rapidly for over 20 years, and its population has been growing approximately from 110 thousands to 520 thousands after this city newly developed in early 1980's. All of which have led to various kinds of environmental degradation in Changwon City.

In order to solve those problems, the city formulated an environmental master plan, and put continuous efforts to protect environment and to obtain ISO14001 certification with the cooperation of private sectors. As a result, the city environment has improved, and the people has become to participate voluntarily so as to make more pleasant environment. The results are shown as follows:

1) Realizing 'Green Polis Changwon 21'

'Green Polis Changwon 21' is a long-term program for environmental policy and strategies in 21st century made by Changwon city in order to realize local 'Agenda 21', which is a practical strategic plan for global environmental protection and sustainable development. The city organized a promoting committee in April, 1997, and decided the title of detailed action plans and practical principles to build a model of environmental city in harmony of environment and development as 'Green Polis Changwon 21'.

Also the city issued a '*Changwon City Basic Environmental Ordinance*' and '*Changwon Declaration of the Environment*' in May, 1998. This ordinance clearly specified some basic ideas and principles of environmental preservation, as well as rights, responsibilities and roles of the city, businessmen and citizens for the preservation of environment, and also made some provisions for opening of environmental information to the public and for participation of citizens in environmental planning.

The detailed action plan for '*Green Polis Changwon 21*' was promulgated in March, 1998, after having public hearing, seminar and public opinion survey. The main point of this action included changing life patterns to preserve the environment, establishing development plan and city system considering the environment, and preparing socioeconomic system in harmony with the environment

In addition, a white paper titled as 'the Environment of Changwon', has been published every 2 years to light up the future blueprint of 'Eco-Polis Changwon', in which the people make a happy living with nature in a pleasant environment, and to suggest the direction of city environmental policy.

2) Seeking sustainable environmental policy in harmony with environment and development

In order to solve complicated environmental problems in the city, it was recognized that benchmarking principles and procedures should be adopted to set up the whole city as a system and to reorganize it to environmentally sound way. Several approaches has been tried out. For example, the approach was changed to produce environmental or ecological value in stead of applying passive way to resolve environmental problems afterwards.

Continous endeavor has been made to establish 'Eco-Polis' by developing and promoting environmentally sustainable policy distinguished from other cities.

3) Campaigning to enlighten environmentally sound mind for the citizens

It has been recognized to establish ecological ethics, which values the life harmonious with environment in stead of sensual and consumption-oriented lifestyle addicted to materialism, as philosophy of living for the citizens.

As the people has been concerned more about the environment, to inspire environmental mind in students or citizens, opportunities are given to visit eight environmental facilities in the city, such as Namcheon water purification facility, sanitary landfill sites, and so on. It brings good response from the people because they had a chance to look up all the procedures from occurrence to treatment of pollution.

At the same time, monitoring cameras have been installed to watch and prevent illegal

dumping of wastes as a part of active surveillance activity, along with strengthening to guide and inspect waste recycling, and also the main point for volume reduction of the wastes has been publically informed continuously through city newsletter, cable broadcasting, etc. As a result, the amount of wastes generated has been decreasing every year.

As a result of developing sustainable city policy for the environment in harmony of environment and development, and focussing on various projects pertinent to green environment area by managing parks and green areas systematically and successfully, it is thought that the framework to establish environmental eco-polis is prepared, and development plans in detail should put into practice under this matured circumstances at this point of time.

Issues

1. Air Pollution

Changwon is a planned city with a history of more than 20 years, and environmental degradation has been added due to rapid increase of population and accelerated urbanization in addition to air pollution problems due to existing industry complex. Air pollution problems in Changwon are as follows:

- Environmental degradation due to rapid population increase
- Community noise due to urbanization
- Air pollution due to emissions from industry complex with continuously expanding infrastructure of existing industry complex
- Emission of exhaust gas due to increased number of vehicles

Since air pollution had become a serious problem during development process of the city, environmental policy pertinent to air pollution should be developed as a model Eco-Polis in order for the residents to make a healthy and pleasant living.

However, the trend of air pollution is shifting from the type of air pollution as seen in developing countries to those types of developed countries, showing decreasing levels of SO₂ and dusts due to air pollution reduction policy of the Government, such as extensive supply of clean and low-sulfur fuels, while steadily increasing in NO₂ and O₃ levels due to increased emissions from automobiles.

Although Changwon City is located in the basin and topographically vulnerable to air pollution, air quality is not so bad overall as compared with other neighboring cities or other industry complexes. This is mainly due to ventilation effect since the network of roads in Changwon City consisted of straight lines and served as routes for air flows. Moreover the levels of air pollution gradually tend to decrease due to widespread use of low sulfur gasoline and clean fuels

2. Solid Wastes

It is the most rational scheme to build a waste disposal facility complex in the city in order to encourage recycling of wastes with complete separation and optimum disposal of wastes, to reduce the total expenses for disposing solid wastes by reducing waste volume disposed finally, cutting down management and material costs and utilizing waste energy from incineration facility, and to ease the difficulties in securing sites for waste disposal facilities because of 'NYMBY' syndrome

There are no public waste disposal facilities in Changwon industry complex, and industries have had difficulties in disposing industrial wastes with high cost to dispose wastes and possibilities of environmental pollution due to disposing wastes improperly. Considering prevention of environmental pollution and competitiveness of industries, general waste landfill with the size of 205,731m² will be constructed in connection to construction of specified waste treatment facility managed by Ministry of Environment near Jeokhyun-dong area.

Volume-based waste charge system was implemented in Changwon City for the first time in Gyeongnam province in 1996 when the city was designated as a demonstration area for volume-based waste charge system. Since then, this system has been practiced nationwide to encourage reducing the volume of wastes, and separating wastes for recycling as much as possible. Continuous guidance and publicity has led to active participation of the residents to reduce waste volume and to promote recycling, for example, separating reusable material such as papers, irons, cans and plastics for recycling, and to burden more costs for the residents disposing more wastes by using specific plastic bags issued by local governments.

3. Community Noise

Noise in the community comes from various sources in daily life of the residents, including moving noises from loud speakers, noise from entertaining business at night, etc., and publicity for the residents is more necessary than any other area.

In order to make quiet and comfortable living environment for the residents, noise generated from workplaces or construction sites is controlled by designating noise and vibration restricted area. Within that area, use of speakers and noise from workplaces and construction sites are regulated, and noise reduction measures are enforced, for example, to install noise prevention facility or to adjust work hours, in case of exceeding the noise standard.

4. Wastewater Treatment

It is recommended to install wastewater treatment facility for all new building in the suburbs, where sewer system is not connected yet, to prevent water pollution since 2002. Several municipal wastewater treatment plant have been built to protect the water quality of Nakdong River and Junam Reservoir.

Changwon City adopted high rate oxidation process for the treatment of night soil, a new leading technology for night soli treatment, to accomplish to secure stable treatment of night soil enough to meet environmental standard and thus to keep the image of pleasant and clean environmental city.

According to the rules and regulations, facilities discharging farm wastes are subject to guidance and inspection on a regular basis or temporarily for the proper treatment of farm waste. And it is recommended for small scale farms to install sawdust fermenting type of farm waste treatment system, in which wastes does not discharge outside.

5. Sewerage Management

As the first planned city in the country, separated sewer system was established and a municipal wastewater treatment plant was operated jointly with Masan City to protect the water quality of the streams since the early development stage. Advanced wastewater treatment system was added to existing facility and operated successfully since 2003.

6. Overall Environmental Planning

Strengthened air environment policy will be reinforced to establish safe and clean air environment in Changwon City, such as establishing air environment management system concretely, reinforcing air pollution control by the source, strengthening to control mobile sources of air pollution, etc..

Assuming countries only with firm environmental basis to be able to have sustainable growth and development in the 21st century, Changwon healthy city project will be established and implemented to improve environment of the city on the basis of environmental policy pertinent to Changwon city in combination with national environmental policy.

And every endeavor will be made to prepare health plan of the Changwon City, titled as '*Changwon Health Plan 2010*', to implement city administration giving priority to health of the residents, and to promote circumstances for the residents to participate voluntarily in improving city environments by informing the effects of environments on the health of the residents.

Concerning environmental problems in Changwon City, environmental control system will be established independently by using systematic and comprehensive approaches to promote environmentally sound city. Although there is a effective management system for some air pollutants such as ozone and yellow dusts, and also there is a plan to establish more air monitoring sites according to 'Basic Plan for Air Pollution Monitoring System in 2000's' by the Ministry of Environment, air monitoring systems will be established and operated separately as national monitoring system and local monitoring system. Some air pollution problems, such as local background concentration, national background concentration, hazardous air pollutants, photochemical pollutants, acid precipitation, global air pollution, etc., will be monitored in national monitoring system. On the other hand, the residents will be aware of air pollution such as local air pollution, pollution level by the streets, heavy metals, visible distance, etc., monitored by local air monitoring system..

Core Action and Problem solving

In order for the residents of Changwon City to make a healthy and pleasant living, a comprehensive environmental plan should be established and implemented to present a vision as a environmental model city, to establish comprehensive and future-directing plans pursuing a harmony of development and preservation of the environment, and to solve the problems mentioned in the above.

Area	Activity	Leading Agency	Delivery Partners	Time Scale	Intended Outcomes
Air pollution	Encouraging awareness using warning system	Changwon City	Steering Committee for Green Polis Changwon 21	Ongoing	Increased recognition of air pollution
Solid waste disposal and recycling	Continuous publicity and education on waste separation/ recycling	Changwon City, Voluntary citizens' organizations	Steering Committee for Green Polis Changwon 21	Ongoing	Participation of the residents in promoting clean and pleasant environment
Environmental emission control	Establishing environmental control system to accomplish environmental targets	Changwon City	Related departments Steering Committee for Green Polis Changwon 21	Ongoing	Increased awareness of wastewater discharging facilities
Wastewater control	Preventing water pollution by establishing control system for wastewater discharging facilities	Changwon City	Steering Committee for Green Polis Changwon 21	Ongoing	Increased awareness of wastewater discharging facilities
Using food wastes as resource	Expanding food waste treatment facilities and developing collection system	Changwon City,	Waste collecting company Steering Committee for Green Polis Changwon 21	Ongoing	Encouraging citizen's movement to reduce food wastes.

Operating cyber environmental surveillance team	Eliminating blind spots of pollution by assigning residents to environmental surveillance	Environmental surveillance group	Steering Committee for Green Polis Changwon 21	Ongoing	Encouraging participation of the citizens in environmental protection by exchange of environmental information
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Clean Drinking Water Supply

Goals

Since environmental policies related to water have been carried out separately by several department including city planning, environmental preservation, stream management, water and wastewater control and industrial affairs in Changwon City, it is suggested to establish a firm basis of promoting comprehensive water policy systematically and efficiently, and to establish a water circulation system appropriate to Changwon in order to supply clean and safe drinking water to the citizens.

Objectives

Changwon City is planning to supply clean drinking water in preparation for population increase in the future as follows:

- Expanding drinking water supply facilities;
- Expanding facilities for filtering river water by weirs to secure clean water supply;
- Preventing indiscreet exploitation of groundwater in advance and supervising existing groundwater facilities more thoroughly;
- Securing stable water resources by cleaning up streams in downtown and expanding sewerage system;

In order to protect water resources and supply good quality of drinking water, a automated water quality monitoring system should be installed, and every efforts should be made to secure safety and reliability of drinking water

Overview

It has been one of the major tasks for every nations to secure water resource in preparation for increasing water demand due to population increase and industrial development worldwide. The water crisis can be classified into two categories; one is the lack of quantity caused by unequal distribution of water geographically and temporally, and the other is the qualitative problems such as water pollution, soil and ground water pollution, etc.

The current water problems is very complicated but a matter of concern, relating to emotion of the people and practice of water use as well as climate changes, geographical and socio-cultural environments in an area. In UN Millenium Declaration, 2000, it was clearly stated regarding the water crisis "to reduce by half, between now and 2015, the portion of people who lack sustainable access to adequate sources of affordable and safe water". Since Korea may be classified into the country in the lack of water, the policy and strategies to secure water resources should be seriously considered.

Since Changwon City is located downstream in Nakdong River, it is not easy to secure good quality of water sources, and also the other streams crossing Changwon

are narrow and do not have sufficient flows. And they are heavily polluted during passing through industry complex in downtown area.

Issues

However, the people in Changwon City are not aware of seriousness of the problem, such as being classified as a country in the lack of water by UN, shortage of water in the future and further environmental degradation.

The problems related to drinking water supply in Changwon are as follows:

1) Groundwater has been extensively developed and exhausted with progressive contamination since there were many individual houses using groundwater in the city, and groundwater was used for domestic water during the early development of the city due to lack of public water supply system.

2) It requires high costs for investment and maintenance to supply drinking water. Since most drinking water supply depends on water sources from downstream in Nakdong River, which usually maintains water quality of grade III classified by environmental standard,

3) Streams crossing downtown are usually narrow with insufficient flows, and heavily polluted by domestic wastewater since they pass through residential area or industry complex.

4) There are no environmentally sound waterfront in the streams, since small streams become to dry out during dry seasons and are polluted sometimes due to connecting to sewer,

Efforts to solve the problem

1) Domestic water supply

Most domestic water in Changwon is supplied from Chilseo Water Treatment Plant of which water source is from Nakdong River. However, water quality of main streams in Nakdong River has been degrading, and advanced water treatment system, including activate carbon filtration process and ozonation process, has been installed in addition to existing facilities in order to provide clean water.

It is planned to replace and expand water supply pipelines gradually by 2007 in order to prevent secondary contamination and leaking of treated water due to wornout of existing pipelines.

Also every efforts will be made to supply safe drinking water for the residents, such as monitoring of water quality in each process of water supply, introducing water quality certification system for tap water, practicing to clean up water storage tanks every 6 months and monitoring water quality of the tanks every month for buildings and apartments.

2) Development of water supply for filtering river water by weirs

Since water balance has been seriously disturbed worldwide, the demand of water has increased rapidly over the supply, and also difficulties due to shortage of water is expected in Korea.

A water intake facility using weirs for filtering river water was built with a capacity of 20,000 tons, which will expand to 80,000 tons of water intake a day by 2004. Continuous efforts will be made after 2005 to secure safe water source stably by expanding the water intake sources and to supply good quality of drinking water for 520 thousands of citizens.

3) Protection and control of groundwater supply

When Changwon City first developed in early 80's, groundwater was extensively developed and used by most of the residents for domestic water. Furthermore, water quality of the streams has been degraded due to many industrial complexes in the city and factors for groundwater contamination has been dramatically increasing, all of which have led to the need to protect and control groundwater supply systematically.

Therefore it will be implemented to establish a control system for groundwater supply to prevent exploiting groundwater indiscreetly, to install contamination prevention devices for newly developed groundwater facilities, and to restore abandoned groundwater holes as early as possible.

4) Ecologically sound management of stream

Water quality of streams across Changwon City has been degrading and exceeding water quality standard due to pavement covering of streams, lack of maintenance water and incoming domestic wastewater.

To solve this problem, a consensus was reached by some citizens and environmental movement organizations to improve the water quality of the streams and to make ecologically sound streams, so that maintenance of small streams could be started to restore small streams crossing downtown in Changwon City as shown bellow:

First, providing resolution after implementing and evaluating pilot projects to restore streams and deciding a remediation technique through survey on successful cases of ecological restoration of streams.

Second, installing portable purification system or sewer collecting system for incoming wastewater in heavily polluted streams

Third, monitoring water quality of the streams periodically and announcing the results to the public to encourage awareness of the residents

Forth, changing master plans for stream maintenance, if necessary, to fit into ecological restoration of streams

Fifth, building water fountains in small streams across downtown area, and building partitions to circulate water to upstreams and to ensure the maintenance water flow for streams.

Sixth, making ecologically sound streams where plants and fish can live by posting environmental surveillance teams consisting of citizens and utilizing cyber watchers to prevent pollution of streams in advance.

5) Expansion of sewerage system and wastewater treatment system

Wastewater generated in Changwon city flows in Deokdong Municipal Wastewater Treatment Plant for the treatment in Masan City. This plant currently has a treatment capacity of 500,000m³/day, and jointly treats wastewater from Changwon and Masan. And two more wastewater treatment plants are under construction for the treatment of wastewater in rural area of Changwon.

There are several night soil treatment facilities enough to treat all the amount generated in Changwon, and, however, the coverage rate of sewerage system is 92.8% in urban area while 64.0% in total including rural area.

Core Action

For the purpose of analyzing water balance and promoting desirable water environments in Changwon City, a master plan of water circulation will be made to establish sustainable and stable water supply-demand system, and to establish the basis for building and expanding waterfront spaces.

Area	Activity	Leading Agency	Delivery Partners	Time Scale	Intended Outcomes
Securing water resources	Developing and preserving water resources	Changwon City, Citizens	Steering Committee for Green Polis Changwon 21	Ongoing	Inspiring the importance of water resources
Groundwater control	Preventing indiscreet exploitation and controlling groundwater throughly	Changwon City, Voluntary citizens' organizations,	Groundwater devolping company Steering Committee for Green Polis Changwon 21	Ongoing	Inspiring the importance of water resources
Making ecologically sound streams	Improving stream environments and expanding water front considering natural scenery	Changwon City, Voluntary citizens' organizations, Residents	Steering Committee for Green Polis Changwon 21	Ongoing	Encouraging voluntary participation of the residents

Sewerage system	Establishing wastewater treatment capacity	Changwon City	Steering Committee for Green Polis Changwon 21	Ongoing	Preventing water pollution of streams
Water Quality Management system	Establishing integrated water quality management system	Changwon City	Steering Committee for Green Polis Changwon 21	Ongoing	Seeking good cooperation with related agencies
filtering river water by weirs	Expanding facilities for filtering river water by weirs	Changwon City	Steering Committee for Green Polis Changwon 21	Ongoing	Ensuring stable water supply

Improvement of Transport Systems

Goal

The goal is to establish user-oriented transport system that can ensure prompt and convenient movement of people and materials. By improving current road and transport systems in line with the city development plan, time and distribution costs can be reduced, which would provide an important basis for the city's continuing economic development. Also, by establishing modern traffic system and related infrastructure, safe and smooth flow of traffic can be achieved.

Objectives

Long and short-term objectives of transport systems, which should take Changwon's current traffic conditions into account, are as follows:

- Arrange and reform the network of streets so that enhancement of functions, smoothness of traffic flow, and environment-friendly, people-oriented system can be attained.
- Control the traffic problems of main roads and frequently congested areas by reasonably allocating traffic lanes and improving traffic signals.
- Construct new, larger terminals with more convenience facilities for express buses, out-of-city buses and freight trucks. In addition, increase the number of bus lines and improve the road signs so that the accessibility of citizens of and visitors to Changwon City can be enhanced.
- Modernize the traffic system to ease congestion problems, provide better traffic and public transportation services, expand the safety system of roads and vehicles for reduction of traffic accidents, promote scientific management of freight transportation, and efficiently establish 'intelligent' traffic system.
- Improve the traffic infrastructure so that the problems of insufficient parking lots, crosswalks, and bicycle routes can be solved.
- Improve the bus operation system so that the problems of insufficient circulation and inconsistency of line numbers can be solved. Also, introduce 'bus information system' to ensure the accuracy of bus schedule, enhance the user convenience, and promote the utilization of buses.
- Expand and increase bicycle roads while securing the connection of discrete parts such as intersection and improving other bicycle facilities, in order to facilitate commuting and school-attending.

Overview

Changwon City is the central city of Kyongnam Province in terms of public administration, education and economy. It is located about 30 kilometers away from Busan metropolitan area and comprises the same traffic region with the cities of Masan and Jinhae. Changwon has been developed on the basis of urban planning, and its traffic conditions are generally good. It is connected with several cities via railroad and two highways, and a broad street passes through the center of the city east-westward..

Total length of the city roads adds up to 700 kilometers, consisting of local roads(650km), national roads(40km) and highways(10km). The city has 140,000 parking

spaces in 5,000 places, and out-of-city bus and express bus terminals are located in the same facilities.

Bus transportation has joint dispatching system, in which 100 bus lines with 600 vehicles are registered. Also, 500 taxis are operating in the city and approximately 500,000 passengers per year are using Changwon railroad station.

According to *Medium-term Plan for City Traffic Arrangement*(2002), which is based on *Basic Plan for Traffic Arrangement*(1995) and *City Basic Plan*(1996), population is expected to increase from 530,000 in 2002 to 580,000 in 2007, and the number of automobiles from 180,000 to 220,000.

Issues

Improvement of larger-area traffic system, better connection with neighboring cities, and expansion of traffic lines in association with surrounding regional development are needed. As for the status of street network inside the city, inadequate connection between northern residential area and southern industrial area causes congestion problems during rush hours, requiring construction of main north-southward road.

Also, only one national road exists between traditional city area(urban) and newly incorporated area(rural), which again causes chronic congestion problems; therefore, development of substituting routes and connection of discrete sections are necessary.

Core Action and planning

Medium-term Plan for City Traffic Arrangement was developed based on multi-aspect, thorough examination of Changwon City and surrounding traffic areas. The Plan is now under implementation and basic strategies to resolve the traffic problems and improve traffic conditions are as follows:

- Establish human-oriented, environment-friendly traffic system;
- Establish uniform and standard traffic system using modern technology;
- Establish the foundation for economic growth of the City by developing national distribution network;
- Promote the utilization of public transportation by upgrading the quality of service.

Core Action

Area	Action	Lead Agency	Delivery Partners	Timescale	Intended Outcomes
establishment of human-oriented, environment-friendly traffic system	Traffic Improvement Program.	city office	citizens transport companies transport unions administrative departments	2007	user-oriented traffic system.
	Traffic Demand Management Program.				consideration of weak pedestrians and passengers.
	Improvement of bus use system.				betterment of environment by arranging 'behind' roads.
	improvement of bicycle utilization facilities.				maintenance of traffic volume by managing traffic demand.
	expansion of parking facilities and improvement of operations.				
establishment of advanced traffic system	construction of traffic DB.	"	"	Ongoing from 2002	establishment of road rank and scientific operation of the system. establishment of traffic information system
	introduction of new traffic signal system.				
	establishment of bus information system(BIS).				
	establishment of advanced traffic information system. (ATIS).				
	establishment of advanced unmanned traffic regulation system.				
establishment of parking lot guidance system.					

building of foundation for city's economic growth	<p>construction of national distribution network.</p> <p>establishment of efficient freight transport system.</p> <p>establishment of advanced distribution information system</p>	"	"	Ongoing	<p>establishment of traffic system in line with Changwon development plan(heavy industry→high-technology industry).</p> <p>arrangement and scientification of distribution system</p>
facilitation of utilization of public transportation	<p>introduction of 'small-sized' electric railroad.</p> <p>restructuring of bus line system.</p> <p>establishment of transfer system.</p>	"	"	Ongoing	<p>introduction of new traffic method.</p> <p>enhancement of convenience of existing public transportation</p>

Improvement of Transport Systems

Goal

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Also, only one national road exists between traditional city area(urban) and newly incorporated area(rural), which again causes chronic congestion problems; therefore, development of substituting routes and connection of discrete sections are necessary.

Core Action and planning

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- Establish uniform and standard traffic system using modern technology;
- Establish the foundation for economic growth of the City by developing national distribution network;
- Promote the utilization of public transportation by upgrading the quality of service.

Core Action

Area	Action	Lead Agency	Delivery Partners	Time scale	Intended Outcomes
establishment of human-oriented, environment-friendly traffic system	Traffic Improvement Program.	city government	citizens transport companies transport unions administrative departments	2007	user-oriented traffic system.
	Traffic Demand Management Program.				consideration of weak pedestrians and passengers.
	Improvement of bus use system.				betterment of environment by arranging 'behind' roads.
	improvement of bicycle utilization facilities.				maintenance of traffic volume by managing traffic demand.
	expansion of parking facilities and improvement of operations.				
establishment of advanced traffic system	construction of traffic DB.	city government	citizens transport companies transport unions administrative departments	2002	establishment of road rank and scientific operation of the system. establishment of traffic information system
	introduction of new traffic signal system.				
	establishment of bus information system(BIS).				
	establishment of advanced traffic information system. (ATIS).				
	establishment of advanced unmanned traffic regulation system.				
establishment of parking lot guidance system.					

<p>building of foundation for city's economic growth</p>	<p>construction of national distribution network. establishment of efficient freight transport system. establishment of advanced distribution information system</p>	<p>city government</p>	<p>"</p>	<p>Ongoing</p>	<p>establishment of traffic system in line with Changwon development plan(heavy industry→high-technology industry). arrangement and scientification of distribution system</p>
<p>facilitation of utilization of public transportation</p>	<p>introduction of 'small-sized' electric railroad. restructuring of bus line system. establishment of transfer system.</p>	<p>city government</p>	<p>"</p>	<p>"</p>	<p>introduction of new traffic method. enhancement of convenience of existing public transportation</p>

Housing

Goal

Changwon City was built 20 years ago based on urban planning with population capacity of 300,000, and has nicely-arranged streets, parks and other infrastructure. However, current population is already 530,000 and it is expected to grow in the future; thus, the goal should be to prepare enough, comfortable space for growing population so that they can enjoy high quality of life.

Objectives

Since Changwon is an industrial city, a large number of laborers migrated into the city, resulting in much greater population than initially planned and causing various problems that modern cities would face. So the objectives are:

First, prepare large area of housing sites to accommodate growing population;

Second, prepare large-scale apartment sites to construct and supply high-story apartment buildings;

Third, promote reconstruction and/or remodelling of existing apartment buildings to improve residential environment that has worsened due to aging of large-scale apartments,

Fourth, set up plans to turn rural lands into housing sites and improve poor residential environment of rural areas.

Overview

Development of Changwon Industrial Base started in 1973 and the site was announced as Industrial Base Development Area in April, 1974. Two years later, by the end of 1976, 58 companies moved into the industrial complex, 18 of which started operation with 6,000 employees. Besides, there were already a number of industrial base construction workers, and the series of migration caused rapid growth of population.

This change required the development of residential areas, so the City set up and implemented a long-term plan(1977 ~ 1986) for New Town of 300,000 population to accommodate the migrating people. Total of 54 residential areas were developed during the period of 1977 to 2000, and 7 areas with 201 million square meters are still being developed for residential use.

The development was administered publically, and even though there were some administrative and financial difficulties in purchasing process, the program was gradually implemented, and the City constructed and supplied houses on these developed areas. As the result, the number of houses in Changwon City was increased to 130,000 units by the end of 2002, and housing supply rate amounted to 86%.

In addition, the City constructed public apartments and supplied 900 households to

assist low-income families and meet their housing requirements. Especially, policy emphasis was placed on meeting housing requirements of the workers who belong to industrial complex, and in this regard, total of 5,500 households were supplied during the period of 1992 to 1998.

In the mean time, industrial and residential areas were saturated, so, in 1995, the City incorporated 167 square kilometers of rural areas in the vicinity and expanded the city boundary for further development.

For the future, the City will establish and implement basic housing plan until 2006 with such principles as 'restrain from disordered city development,' 'plan first, develop later,' and 'emphasize pleasant and harmonious residential environment.' Also, the City is planning to reconstruct 4,500 units of aged (more than 20 years old), low-story apartment buildings into 5,300 units of new, high-story apartments, so that improvement of residential environment of downtown areas can be achieved.

Issues

- 1) As many factories gradually moved into the industrial complex, the number of laborers increased and they were faced with shortage of housing. The City needs to provide adequate housing at reasonable costs in a timely manner.
- 2) As the population increased to 530,000, compared to originally planned capacity of 300,000, serious shortage of residential land supply has occurred. The City needs to set up a plan for supplying more residential land, especially in the newly incorporated rural areas.
- 3) Part of 'green-belt' areas should be deregulated and allowed for housing construction.
- 4) Due to high-density re-development of apartment areas demanded by local residents, basic structure of the City is being jeopardized.
- 5) For pleasant environment of residential areas, the City should establish an integrated plan for recreation facilities, exercise facilities and business sites.

Core Action and Planning

To settle the housing problems, the City needs to take population growth rate into consideration and set up an integrated plan for expanding residential areas so that the City can be changed from current single-core to multi-core structure and accommodate 800,000 population in 2016. In addition, to disperse the population, the City will formulate policy programs whereby new towns with good educational and cultural infrastructure are developed in suburb areas to which many families and businesses would want to move.

Also, in response to growing demand for residential land, part of green belt should be changed to residential areas so that apartment buildings and various forms of houses can be constructed and supplied. Sufficient daily living facilities will be constructed in these areas and the policy emphasis will be placed on comfortable life of the residents.

Core Action

Area	Action	Lead Agency	Delivery Partners	Timescale	Intended Outcomes
development of residential land	5 districts (747,000m ²) development plan for rural areas	city office	construction companies, land owners, citizens, city authority	2004	increased efficiency of land use effective supply of residential land balanced development of city improvement of city environment
construction and supply of houses	construction of apartments improvement of rural residential environment construction of city-operated rental apartments	"	house buyers, construction companies, citizens, city authority	"	settlement of unbalanced house ownership and stabilization of house prices increase of permanent rural households and convenience of life ensuring stable residential spaces for urban low-income families
establishment of arrangement plan for urban residential environment	establishment of basic plan implementation of basic plan's administrative procedures	"	"	2006	refraining from disordered city development expectable programs ('plan first, develop later')
promotion of apartment reconstruction project	5,316 households in 105 buildings	"	house buyers, construction companies, citizens, city authority, reconstruction association	2005	revitalization of city functions by improving residential environment improvement of

					city view by arranging and reforming underdeveloped residential areas
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Infectious disease, Food poisoning and Vaccination

Goals

Prevent disease, disability, and death from food poisoning and infectious diseases, including vaccine-preventable diseases.

Objectives

Our main objectives for the issues on the Infectious disease, Food poisoning and Vaccination are 1) vaccination against vaccine preventable disease; 2) reducing of hepatitis B and C infection; 3) vaccination against influenza; 4) control and management of tuberculosis; 5) prevention and management of food poisoning; 6) securing of vaccine safety.

Overview

In Korea, before 1970, major infectious diseases were Typhoid, Pertussis, Mumps, JB encephalitis and Malaria. Since 1980, outbreaks of acute communicable infection have been decreased greatly through the introduction of vaccination and improvement of hygiene, but since 1994 again these have been increased because of the periodic prevailing of Measles and Mumps, reemergence of Malaria, and epidemics of a few water-borne communicable diseases. In 2001, the prevalence of overall acute communicable diseases were decreased to average year level, resulting from the consequence of the Measles Eradication Vaccination Plan and Malaria Elimination Plan and comprehensive communicable disease management.

The goal of Immunization Program is to reduce the incidence of vaccine-preventable diseases. There are diseases which are highly preventable with the use of vaccines or immunization. Diseases targeted include, but are not limited to, measles, tetanus, diphtheria, Hemophilis influenza, rubella and congenital rubella syndrome, mumps, pertussis, hepatitis B, hepatitis C, pneumonia and influenza.

Infectious diseases remain major causes of illness, disability, and death. More-over, new infectious agents and diseases are being detected, and some diseases considered under control have reemerged in recent years. In addition, antimicrobial resistance is evolving rapidly in local community-based infections.

Food poisoning is an illness usually caused by consuming food or drinks contaminated with bacteria (germs) or their toxins (poisons). Food poisoning caused by bacteria can be highly infectious and it is important to follow good hygiene precautions. Contamination of food with chemicals can also cause food poisoning symptoms but occur less often than those caused by bacteria.

The responsibility for infectious disease and food poisoning control fall jointly to the local authority (City government) and health authority (Health center). The Environmental Health Department work closely with the Consultant in Communicable Disease Control. Within local authorities Environmental Health Officers deal with food safety and with preventing and investigating food poisoning.

Issues

Vaccine preventable diseases(tetanus, diphtheria, Hemophilis influenza, rubella and congenital rubella syndrome, mumps, pertussis, hepatitis B, Japanese encephalitis, and influenza) are on the stable status of prevalence, except of measles.

However, the organisms that cause these diseases have not disappeared. Rather, they have receded and will reemerge if the vaccination coverage drops. The serious health burden of vaccine-preventable diseases (VPDs) is evident from the measles resurgence of 1998 in Changwon.

Hepatitis B is caused by a highly contagious virus that infects the liver. It affects all age groups and can lead to liver disease, liver cancer and death in many of those afflicted. Safe, effective hepatitis B vaccines are available. The vaccines are used to protect everyone from newborn babies to older adults. The hepatitis B vaccine is recognized as the first anti-cancer vaccine because it can prevent liver cancer caused by hepatitis B infection.

Japanese B-encephalitis (JBE), the "Plague of the Orient", is the more important mosquito-borne viral encephalitis in Korea. Mainly, most cases are in young children and persons > 65 years of age. This is sporadic, endemic with occasional outbreaks, and July-October, most cases August and September. There was last major outbreaks in 1982-1983 in Korea.

Influenza infection causes fever, sore throat, muscle pains, cough, lassitude and headache. Annual attack rates average 10% to 20%, but may be higher during severe epidemics. Malaise following influenza can persist for several weeks. Morbidity and mortality, associated with influenza, are usually more common in the older population and in individuals with significant concurrent medical problems. These latter groups have been traditionally targetted for the immunization programs.

Tuberculosis (TB) is a severe and potentially life-threatening disease. The number of new cases of TB are increasing for many reasons in both developed and developing nations. TB remains 10th leading cause of death from a single infectious disease in Korea. Early detection and intervention may have significant health benefits for the individual infected as well as for public health.

Adult vaccination rates continued to increase over five years. Hepatitis B and Influenza vaccine coverage rates were up from 60, 10 percent in 1999 to 80, 20 percent respectively, in 2003.

Efforts need to be intensified, particularly to increase vaccination coverage for children living in poverty. Substantial numbers of under-vaccinated children re-main in some areas, particularly the large urban areas with traditionally under-served populations, creating great concern because of the potential for outbreaks of disease. In addition to very young children, many adults are at increased risk for VPDs.

Vaccination against influenza among persons aged 65 years and over has increased slightly. The coverage in these groups, however, remains substantially below the general population.

There are many different types of food poisoning, each with slightly different symptoms, incubation period (the time between eating the contaminated food and onset of symptoms) and duration. They are Salmonella, Campylobacter, Staphylococcus, E coli 0157, Bacillary Dysentery, Typhoid & Paratyphoid, but Salmonella, Staphylococcus, Bacillary Dysentery, Typhoid and Paratyphoid are occurred frequently in Changwon.

For the reduction or elimination of indigenous cases of vaccine preventable disease;

Immunization against vaccine preventable diseases is one of the most cost-effective health strategies available to the health care system. It results in improved individual and population health.

Highly effective vaccines are used routinely in childhood for prevention of measles, mumps, rubella, varicella, diphtheria, tetanus, pertussis and polio. Vaccinations for these diseases have reduced reported cases of most vaccine-preventable disease common in childhood to record-low levels. With a high level of coverage of two doses of measles, mumps, and rubella vaccine, interruption of the spread of both rubella and mumps is feasible. But measles transmission probably was interrupted multiple times in Changwon since 1993. Polio has been eliminated in Korea due to high vaccination coverage. Because of widespread vaccination, reported cases of diphtheria are near zero. Tetanus toxoid is highly effective. Pertussis among children will be reduced by increasing vaccination coverage.

For reduction of hepatitis B and C infection;

Hepatitis B virus (HBV) infection will be reduced greatly as the age groups covered by universal infant and adolescent vaccination efforts enter young adulthood, a period when the risk of HBV infection increases. Hepatitis B vaccination has been recommended for persons with risk factors for hepatitis B virus infection since the vaccine was first licensed in 1981.

Hepatitis C virus (HCV) is the increasing common chronic blood borne viral infection in Korea. HCV infects persons of all ages, but most new cases are among young adults aged 20 to 39 years. But vaccination against hepatitis C is now not available.

For influenza;

With the aging of Korea. population, increasing numbers of adults will be at risk for these major causes of illness and death. Persons with high-risk conditions (that is, heart disease, diabetes, and chronic respiratory disease remain at increased risk for these diseases, as do persons living in institutional settings.

Vaccination for children and the elderly has been recommended. In addition, opportunities for vaccination outside of primary care and other traditional health care settings could be increased to reach elderly persons who do not routinely access primary care.

For the control and management of tuberculosis;

The highest priority for TB control is to ensure that persons with the disease complete curative therapy. If treatment is not continued for a sufficient length of time, such persons often become ill and contagious again. Completion of therapy is essential to prevent

transmission of the disease as well as to prevent outbreaks and the development and spread of drug-resistant TB. Current therapy guidelines recommend that patients with drug-susceptible TB should complete a successful regimen within 12 months.

Multidrug-resistant TB presents difficult treatment problems, often requiring consultation with a TB specialist and longer treatment regimens. The measurement of completion of therapy is a long-accepted indicator of the effectiveness of community TB control efforts.

For the prevention of Food Poisoning;

Food poisoning bacteria (germs) are found in raw food and soil, especially raw meat, poultry and root vegetables. They are carried by animals including pets, birds and insects. If food is not handled properly, is undercooked or is contaminated by insects or other raw foods after cooking, food poisoning can result. Food poisoning bacteria are also carried by people; on the skin (especially around septic cuts and sores), in the nose and mouth and in the gut, so everyone must be careful not to contaminate food. Unfortunately contaminated food usually looks, tastes and smells perfectly normal, so it is important to take precautions against food poisoning all the time.

Most precautions are based on a few simple facts about bacteria, they cannot move by themselves, they cannot grow very easily at low temperatures and they are killed by high temperatures.

For the reduction of vaccine-associated adverse effect;

Today's vaccines are very safe. The benefits of proper immunization far outweigh the risks. A high standard of safety is expected of vaccines since they are recommended for millions of healthy people, including infants. A schedule of routine vaccinations is available from the Korean Department of Public Health. Other vaccines are recommended to individuals based on such factors as age, medical conditions, employment and increased risk of infection. Vaccine safety monitoring to identify and minimize vaccine-related reactions is necessary to help ensure safety because no vaccine is completely safe. Knowledge of vaccine safety is essential to accurately assess the risks and benefits in formulating vaccine use recommendations.

Core Action

Area	Action	Lead Agency	Delivery Partners	Timescale	Intended Outcomes
Health Education	<p>Linking between Health center and Regional School Board</p> <p>Pilot health education programmes</p> <p>Consultation with food handler.</p>	Health Center.	Food processing industry. Regional School Board.	Ongoing	Increased knowledge and empowerment for hygiene or, sanitation.
Media Advocacy	Public concerning to Infectious diseases and Food poisoning	Public information Bureau	All community members	Ongoing	Increased empowerment of all citizen
Parents education	education of a schedule of routine vaccinations	Health Center	Regional Kidergarten Association	Ongoing	Increased knowledge of vaccination
Vaccination monitoring program	monitor the adverse effects of vaccination	Regional Clinics Association	Health Center	Ongoing	Decrease the side effects from vaccination

Improvement of Alcohol Drinking Customs

Goal

General goals of Changwon City's program for abstinence from alcohol drinking are to establish social environment that can lead to the reduction of alcohol consumption; to prevent young people from alcohol drinking by making them realize its various damages; and to establish sound alcohol drinking customs for the reduction of drunken driving and prevention of excessive drinking.

Objectives

Towards these goals, Changwon City set up the following specific objectives:

- promotion of life-cycle program for abstinence from alcohol drinking
- expansion of coordinated programs with NGOs
- support of treatment and rehabilitation programs for alcohol-abusing families
- expansion of education and public relations programs

Overview

According to a WHO report, alcohol can contribute more to death than smoking, and one of the greatest health problems in developed countries is alcohol-related problem. Alcohol drinking is also emerging as an important health problem in developing countries.

Alcohol-related statistics show that Korea ranks third in the world, or first in OECD nations, in the rate of death due to traffic accidents, of which 10% are caused by drunken driving. Likewise, it is found that industrial accidents, sexual violence, violence at home, child abuses, and other fatal accidents are closely related to alcohol drinking. Moreover, Korea ranks second in alcohol consumption per adult, and economic costs of alcohol drinking account for 2.75% of GNP.

Although the increase of drinking rate among adults in Korea is relatively small (from 68.4% in 1998 to 69.8% in 2001), drinking rate of women went up sharply (from 54.9% to 59.5%), and drinking experience of the youth is high and rising (71.8%). Long period of drinking and/or heavy drinking increase the risks of high blood pressure, arrhythmia, heart diseases and stroke, as well as can cause fatty liver, hepatitis, cirrhosis, liver cancer and other various types of cancers.

Issues

In May, 2002, Changwon City conducted a questionnaire interview survey on alcohol drinking for the stratified sample of 520 households. According to the results, 64.7% of the respondents at the ages between 15 and 69 enjoy drinking, which is lower rate than national average. The survey also revealed that male drinking rate (70.7%) was higher than that of the female (61.2%), and the rate in urban areas (65.5%) was higher compared to rural areas (55.3%).

In addition, male teens and twenties, along with female twenties and forties, showed high rates of drinking, and, after fifties, female drinking rate tended to go up. Changwon City does not have the statistics about incidence rates of alcohol-related diseases, but the number of alcohol-related deaths is estimated to be 9.4% of total deaths, based on Kyongnam Province data.

Even though social damages caused by alcohol drinking are diverse and severe, they are preventable and most countries implement various drinking control policies and programs. Current trend in advanced nations shows that these policies and programs are based on theoretical models of public health, which adopt integrated approach whereby the whole community, not just some problematic drinkers like alcohol addicts, should be dealt with. Similarly, WHO classifies liver diseases, injuries and traffic accidents as the main causes of alcohol-related deaths, and strongly recommends that drinking control policies and programs should be concentrated on these causes.

Therefore, Changwon City's future programs for abstinence from alcohol drinking should also adopt integrated approach at community level, whereby alcohol consumption and related social damages are reduced and sound drinking customs are established through education, public relations and continual campaigns with NGOs.

Efforts of Problem solving

In an effort to reduce alcohol consumption, Changwon City organized 'Citizens Meeting for Right Drinking Customs' in February, 2000, which was in effect the first attempt of integrated drinking control campaign promoted at community level. Although this kind of campaign is somewhat universal in developed countries, it was the first attempt in Korea. Initiated by NGOs and supported by Changwon Health Center, the campaign was acknowledged to have great meaning as a joint effort of private and public sectors.

Also, there were numerous activities after the promulgation of 'The Day of Abstinence from Drinking' in march, 2000, including assistance to police supervision on drunken driving, contest of citizen stories about alcohol-related mistakes and episodes, and contest of cases about abstinence from drinking as well as sound drinking customs. The contests were widely publicized and contributed to citizen consciousness about physical and social damages of alcohol drinking

In addition, letters calling for participation in the campaign were sent to various organizations, and one firm(Changwon factory of LG Electronics) was designated as the 'Model Workplace for Abstinence from Drinking,' which was the first case of connecting business firm with community drinking control program. Besides, as the programs for the youth, drinking habits of middle and high-school students were researched and used as basic data, street campaigns for prevention of youth drinking and drunken driving were conducted, and a symposium on 'How to Deal with the Problem of Youth Drinking' was held.

Future programs should go beyond the boundary of government initiation, and advance to social movement through more active participation of NGOs, with expanded contents and improved quality. In this regard, the following programs should be considered: street campaigns for citizens, life-cycle health education, social education for drunken drivers, selection and publicization of Model Workplace with various incentives,

training of drinking control program leaders, and more participation of social and religious organizations.

Core Action

Area	Action	Lead Agency	Delivery Partners	Timescale	Intended Outcomes
research on drinking habits of the youth	long-term planning of drinking control program for youths based on survey results of graduating middle and high-school students	Health Center,	Regional School Board	2003	knowledge about drinking rate of the youth
training of drinking control program leaders	community education and instruction on desirable drinking customs by trained leaders	Health Center,	health care organizations, hospitals, administrative agencies, Regional School Board	2004	many, high-quality drinking control program leaders
Treatment, and Supporting Programs on alcoholism and its family members	mental health promotion of linkage with regional mental works	Mental Health Center	Health Center	"	Increased social adjustment
Student-oriented alcohol programs	Publication of articles concerning alcohol drinking	Mental Health Center,	Regional University and College	"	Making them having a good drinking habits.
Worksite-based Alcohol Programs	Be ware of the harm of alcohol drinking on works	Health Center,	Regional industry association	"	Reduction of industrial injury

Smoking Quit Program

Goal

The goal is to reduce smoking(direct and indirect)-related diseases, disabilities and deaths through systematic promotion of such programs as education of effective methods for quitting smoking, continual inspection on regulated facilities, and various events to develop atmosphere for no-smoking.

Objectives

To set up a proper environment for practicing healthy life and promote health for community residents,

- prevent adults and youths from smoking
- raise the average age of first smoking
- reduce smoking rates of adults and youths
- increase the number of attempts to quit smoking
- educate the youth about know-how for successful rejection of smoking
- cut off minors and youths' access to smoking
- minimize exposure to indirect smoking by prohibiting smoking in schools, hospitals, public buildings and work sites.

Overview

Smoking is not only the problem of smokers themselves but acts as a risk factor to others('indirect smoking') and negatively affects economy by lowering labor productivity and raising national medical care expenditures.

High rate of smoking at present means high rates of disease prevalence and death in the future. Since smoking-related chronic diseases like malignant tumors take long period of incubation until manifestation, these are likely to change future disease structure.

Facts about harms of cigarette smoking have been revealed: It is not only fatal to one's own health but also harms others. Cigarette is not just a favorite but a toxic substance like a drug. It is harmful to almost everyone and hence should be expelled from our society. Smoking causes heart diseases, numerous kinds of cancers and chronic lung diseases. Especially, smoking during pregnancy induces miscarriages, under-weighted births and sudden infant death symptoms.

Nowadays, therefore, countries are paying special attentions to policies and programs for quitting smoking. Korea also enacted 'National Health Promotion Act' in 1995 and, since then, quitting smoking has been an important element of community health promotion programs, which include prevention and interception of youth smoking, protection of non-smokers from damages by indirect smoking, and support for smokers' quitting attempts.

Also, there are more specific programs, promoted mainly by health centers (especially

by Changwon City Health Center), which include education for preventing and quitting smoking, counselling on quitting smoking, no-smoking camp, contest of no-smoking posters, no-smoking campaign, designation of no-smoking buildings, training of program leaders for quitting smoking, 5-day quitting smoking class, operation of data bank for quitting smoking, no-smoking exhibitions, research on smoking habits, and quitting smoking acupuncture.

Issues

Rate of smoking among Koreans is one of the highest in the world. Especially, smoking rates of twenties and thirties are very high, recording 70-75%, and do not easily fall despite all kinds of no-smoking policies, although the rate slowly decreases after forties. Moreover, smoking rates of youths and female students are rapidly rising each year, and starting age of smoking is being lowered. These all suggest smoking is a social problem that should no more be overlooked.

In particular, youths are exposed to high risks of starting smoking due to socio-demographic, environmental and personal factors. Socio-demographic risk factor means that one belongs to the family of low socio-economic class. Environmental risk factors range from accessibility to and usability of tobacco products to cigarette advertisement and sales promotion, prices of tobacco products, perception that smoking is normal, tobacco use and tolerance by colleagues and brothers, and lack of parents' intervention. Finally, personal risk factors include self-image and pride lower than colleagues, belief that smoking can be beneficial, and lack of ability to refuse suggestions for smoking.

Koreans' high rate of smoking began in mid-1970s when the nation had visible economic growth, while the smoking rate of youths started to rise in early 1980s when the wave of self-control of schools was getting high. With better economic conditions of the country, buying cigarettes within allowances was not financially burdensome to most students, which also contributed to the increase of youth smoking rate.

As for Changwon City, adult smoking rate is found to be 20.3%, somewhat lower than the national average of 35.5%. By sex, male smoking rate is 43.5%, but the female has relatively low rate, recording 6.0%. Besides, smoking rate of the youth with the ages of 15-19 is 18.0%(male 37.5%, female 10.0%), and it is gradually increasing.

Core Action and Problem solving

Area	Action	Lead Agency	delivery Partners	Timescale	Intended Outcomes
education for preventing and quitting smoking	provide accurate information about harms of smoking, motivate smokers to quit smoking, and induce practice of quitting smoking	Regional school Board, Health Center	Local Smoke-fee Board, Regional Industry Association	from 1998	reduction of amount of smoking and establishment of no-smoking atmosphere by informing damages from direct and indirect smoking
no-smoking camp and 5-day quitting smoking class	provide accurate information about harms of smoking, motivate smokers to quit smoking, induce practice of quitting smoking, and educate knowhow to refuse smoking	Regional school Board , Health Center	Quit Smoking Cooperation	2002-2003	reduction of youth smoking rate with prevention of smoking-related misconducts and prevention of economic loss by decreasing smoking-induced health problems
contest of no-smoking posters	visually express ideas about damages from smoking	Regional school Board , Health Center	Local Smoke-fee Board	from 2003	formation of public opinions on damages from smoking, establishment of no-smoking atmosphere, and prevention of youth smoking
designation of no-smoking buildings	set up no-smoking environment and minimize exposure to indirect smoking	Regional school Board , Health Center	Local Smoke-fee Board Regional Industry Association	from 1997	schools without smoke and establishment of no-smoking environment

training of program leaders for quitting smoking	develop leadership through training programs	Regional school Board , Health Center	Local Smoke-fee Board Regional Industry Association	2001	expansion of no-smoking movement and enhancement of performance through PR and autonomous education in schools and work places, as well as through maintenance of systematic cooperation among private sector, health care organizations and schools, by trained leaders
operation of data bank for quitting smoking	lend books and videos, and provide correct information and knowledge about smoking	Heath Center	Quit Smoking Cooperation Regional Industry Association	every year	prevention of adult and youth smoking, and establishment of atmosphere for expanding no-smoking programs
no-smoking campaign	provide information on smoking, consistently bring attention to the importance of smoking problem, and hence establish no-smoking culture, through various events and cultural performances	youths, residents	Local Smoke-fee Board Regional Industry Association	every year	prevention of adult and youth smoking, and establishment of atmosphere for expanding no-smoking programs
research on smoking habits	perform basic research for implementing smoking-related programs	Regional school Board , Health Center	Local Smoke-fee Board Regional Industry Association	2003	utilization of results as basis for planning, implementing and evaluating related programs

Health Promotion of Foreign Workers.

Goals

1) Health promotion of foreign workers should be performed on the basis of human rights, without considering their nationalities and/or social classes.

2) Health management of foreign workers, whose access to medical care is limited, is an important problem with regard to health care of the natives. Especially, considering the danger of infection of communicable diseases(tuberculosis, sexually transmitted diseases, AIDS, etc.) into the natives, it is an urgent problem that public health care organizations should try to solve to prevent such diseases.

3) By developing communication abilities of foreign workers, we have to make them enjoy normal lives.

Objectives

1) Improve foreign workers' communication abilities through continuous education of Korean, and, by doing so, facilitate safety and health education at work sites for better prevention of industrial accidents, acute communicable diseases, and other diseases.

2) Perform medical counselling and examination throughout the year, and utilize community health care resources in order to improve the cure rate for the diseases and injuries that cannot effectively be treated by public health care organizations(traffic accidents, industrial accidents, surgeries, etc.) so as to ease their pains.

3) Manage foreign workers' stress effectively, ensure their psychological well-being, and hence improve their mental health, by making them realize their social values through, for example, events and occasions on Korean and global traditional holidays.

Overview

In the past, Korea was one of the labor-export countries, but, with the rise of income and advancement of industry structure, became labor-import country after 1980s. Hosting of 1988 Olympics led to visa exemption agreements with many countries, permission of no-visa entry, and simplification of entry procedures, which in turn caused rapid entrance of illegal foreign workers from neighbor developing countries.

In addition, large housing construction projects in early 1990s caused serious shortage of laborers in so-called 3D jobs, giving an important momentum for importing foreign workers. Legally, however, domestic employment of foreign workers was not permitted in Korea except for professional technical occupations not substitutable by domestic workers, meaning that, in principle, foreign simple laborers could not get the job in this country. This principle is still effective.

Later in 1991, Korean government established 'industrial technique training system.' In this system, if a Korean company invested and opened a firm in a foreign country, laborers in that country could receive training in the parent corporation in Korea. In the

mean time, however, the number of illegal foreign residents(unregistered foreign workers) still increased and the shortage of labor supply in 3D jobs still continued. Also, violation of human rights of illegal foreign workers and industrial trainees became a social issue. In response, Korean government enacted in 1995 'The Guideline for Protection and Management of Foreign Industrial Technique Trainees' in which the following provisions were included:

- Allowance of workers' compensation and health insurance benefits
- Legal protection against forced labor, violence, non-payment of wages, illegal work hours, and the like
- Implementation of measures for safety and health, including medical examination
- Payment of training allowance at least equal to domestic minimum wage

The number of foreign workers who possessed 'industrial training visa(D-3)' was estimated to be 50,000(14% of total foreign labor force) in 2002, and main channels of entrance were *Central Assembly of Small and Medium-sized Company Cooperative Associations, Fisheries Cooperative Association, Construction Association*, and companies with foreign investments.

Utilization of foreign workers has pros and cons: it supplements the shortage of domestic labor supply, but it also hinders the exit of 'marginal'(inefficient) firms who take advantage of low wages. In fact, the number of foreign workers employed in 3D jobs far outweighs the number of those in high-technology industries, meaning that the import of foreign workers has been utilized as a method for solving labor shortage problems in 3D jobs. These foreign workers in 3D jobs are concentrated in Seoul metropolitan area, and all the illegal residents are working at companies that belong to 3D occupation categories.

As for Changwon City, more foreign workers are using '*Kyongnam Foreign Worker Counselling Office*' compared to all other cities. There exist 1,115 companies that are legally employing 5,120 foreign workers in Kyongnam Province, and 180 companies employing 927 workers in Changwon City. Illegal residents in this area, including the ones employed in small and medium-sized companies, are estimated to be 30,000.

Issues

The problem of foreign workers in Korea has some special characteristics that are distinguished from Western countries: Foreign workers in Korea have short history, their number is relatively small, and, due to strict rules of Korean government, the majority have the status of illegal employees(undocumented workers).

Also, most of them entered Korea without any family members, and stayed only one or two years. They tend to live in geographically scattered areas, so, unlike in Western countries, 'ghetto' type of residence is not found. As for the occupation categories, there are more of them in small manufacturing businesses than in construction and service sectors, so, again unlike in Western countries, diverse differentiation in labor markets is not found.

Disadvantages and problems suffered by these foreign workers are diverse:

First, they experience serious violations of human right, most of which are related with

illegal residents. In particular, worrying about regulations and possible penalties, the companies with illegal employments often do not keep wage payment records, and when disputes occur because of industrial accidents, the companies take advantage of foreign workers' illegal status, do not provide adequate treatment and compensation, or even threaten the workers to inform the authorities for expulsion if they don't obey.

Second, they have limited access to health care. More specifically, since most of them do not have the chance to receive medical examinations, they are likely to infect others when they have communicable diseases. Also, in case of simple laborers, even if they become ill because of overburdened work, their illegal status and financial conditions often keep them away from hospitals, which in turn can cause more serious diseases.

Third, they have serious problems with communication. This would be the starting point of all the problems concerning industrial accidents. Poor communication causes all kinds of inconveniences in daily life, difficulties in adaptation at work sites, and high risk of industrial accidents.

Fourth, they receive little health and safety education. Most of illegal foreign workers are engaged in physically hard works and receive inadequate safety education due to poor communication. Since they often have to start their work after only a few hours of safety education, most of them are exposed to high risk of industrial accidents.

Core Action and Problem solving

Area	Action	Lead Agency	Delivery Partners	Timescale	Intended Outcomes
health education	prevent possible accidents and diseases	Health Center,	Mental Health Center, Health Promotion Center	first and second half of the year	improve perception on health management pursue mental stability through education
vaccination	manage health through timely artificial immunization	Health Center	Counselling center	June, October	prevent waterborne diseases prevent influenza
medical examination	check one's own health through monthly medical examination	Changwon MDs Association,	Health Center	every month	prevent infection to others by early discovery of communicable diseases
treatment	provide treatment every week (Angel Clinic)	Changwon MDs Association, Changwon	Counselling center, Health Center Oriental	every week	ease physical pain due to simple labor

			MDs Association		
medical counselling	on occasion	Health Center,	Angel Clinic	on occasion	perform continuous management of pain enhance self-care ability by offering health-related data
exercise	link with exercise programs	Health Promotion Center,	City marathon club	October	improve physical and mental well-being
health management of mother and child	health management of pregnant women and infants	Health Center,	Angel Clinic	on occasion	enhance community concept through health management of mother and child
Korean language class	every week	Foreign Worker Counselling Office,	volunteers, high school and college students	throughout the year	facilitate communication through language education strengthen health education
health festival	twice a year	Foreign Worker Counselling Office,	volunteers, Health Center, Chanwon City office, Kyongnam Province office	summer camp, year-end festival	improve mental health and provide motivation for work through emotional stability
rest place	Foreign Worker Counselling Office	Chanwon City office,	Kyongnam Province office	throughout the year	stabilize psychological state by providing lodging and place for rest
missionary activities	on occasion	Sungsa Catholic Institute, religious institutions	Kyongnam Province office	throughout the year	pursue mental peace through religious activities

Conclusion

Since *Kyongnam Foreign Worker Counselling Office* is located at Palyong-dong, Changwon City, we are in a good position to conduct health promotion programs for foreign workers. Changwon also has many diverse community health care resources such as Angel Clinic(a private, voluntary organization established by Changwon MDs Association and consisting of 60 physicians), Changwon Oriental MDs Association and many other volunteer groups. Especially, periodical, if not sufficient, financial supports from the offices of Changwon City and Kyongnam Province provide great help to the operation of the Counselling Office. Above all, foreign workers themselves consider the Counselling Office as an important institution, as the Office can represent their interests. Our City will continue to maintain close relationship with the Counselling Office, actively develop and utilize health promotion programs, and exert best efforts to effectively manage the health of foreign workers.

Health Promotion in young people

Goal

Its goal is to comprehensively address the Healthy City Changwon objectives that represent the most serious health issues among young people in Changwon. This section covers smoking, heavy alcohol drinking, violence, overweight/obesity, physical inactivity and mental problems.

Objectives

- increasing awareness of the serious nature of the health problems of adolescents;
- strengthening technical capacity in adolescent health in Changwon.
- making health promotion services more available, acceptable, accessible and affordable to adolescents.

Overview

The Adolescent have pivotal and enduring changes(biological, intellectual, emotional and social); have puberty; establish patterns of behavior and lifestyles; societal institutions are very influential. These are why adolescence and young adulthood are so important.

Good health (physical, emotional, social and spiritual well-being) enables young people to make the most of years while laying a strong foundation for adult life. Lifestyle behaviors developed during adolescence have immediate consequences that often continue into adulthood. These behaviors influence short and long-term prospects for health, educational attainment, risk of chronic disease and quality of life. Investment in the health of youth has long-term benefits.

Adolescent health is a critical issue, because 1) Adolescent health problems result in great personal, societal and monetary costs; 2) The Adolescent population is growing; 3) Adolescents benefit for supportive environments; 4) Adolescence offers an opportunity for prevention; 5) We can make a difference.

Adolescence is a period of physical and mental development. Adolescents are confronted with both opportunities for and risks to their health and development. More than ever, adolescents have greater opportunities to educate themselves and to maximize their potential. At the same time, however, adolescents are exposed to health risks because of poverty, exploitation, gender discrimination, violence, changes in social and economic situations as well as their own risky behavior.

Issue

There is increasing recognition that behavior formed in adolescence has lasting implications for individual and public health. It is estimated that many premature death among adults are largely due to behavior(such as smoking) initiated during adolescence.

There is also significant mortality and morbidity among young people due to accidents, suicide, violence, pregnancy-related complications or illnesses. Many of deaths and illnesses are preventable.

Rapidly changing societies and lifestyle are bringing a new sense of urgency to concerns about adolescent health and development. Most adults begin to smoke during adolescence, and up to half male adolescents aged 15 to 19 in Changwon.

Also, heavy alcohol drinking, violence, overweight/obesity, and physical inactivity are major concerns in the adolescent or college students. Especially, there is increasing concern about inappropriate eating habits, particularly those leading to obesity, many of which are established during adolescence.

Changing social norms are leading to increases in sexual activity among adolescents. Consequently, significant numbers of young people experience increasing risks of STD, including HIV/AIDS.

The mental health of young people is a major issue in Changwon. Like adults, children and adolescents can have mental health disorders that interfere with the way they think, feel, and act. Mental health influences the ways individuals look at themselves, their lives, and others in their lives. Like physical health, mental health is important at every stage of life.

Smoking

Cigarette smoking during childhood and adolescence produces significant health problems among young people. Cigarette smoking among adolescents remains high(20.3%), with almost of 18% of high school seniors reporting daily smoking in Changwon in 2002. The majority of high school smokers have seriously thought about quitting, but few succeed, encumbered by nicotine dependence. Little is known about the factors associated with quitting behavior among high school students. Such information is critical to the development of new public health smoking cessation interventions tailored to the special needs of adolescent smokers.

Alcohol Drinking

Alcohol use and abuse among adolescents are associated with a broad range of high-risk behaviors that can have profound health, economic, and social consequences. These behaviors include drinking and driving, participation in deviant peer groups, abuse of other drugs, unprotected sexual intercourse, interpersonal violence, destruction of private property, and poor school performance. Experience ratio of alcohol drinking in adolescence is very high, with 71.8%(2002) in Changwon.

STD

Adolescence is a period of physical, cognitive, psychosocial, and moral development that often results in risk-taking behavior. As a consequence, adolescents are at high risk for sexually transmitted disease (STD). Two of the most common STDs in Korea, Syphilis and Gonorrhea. AIDS is not common in Korean adolescent.

Violence

Violence is a form of aggressive behavior that has a debilitating effect on the optimal growth and development of our youth. Violence pervades the lives of a significant proportion of all adolescents in Korea, but has a particularly devastating impact on males and minority youth. For all adolescents, exposure to violence at home, school, or in the community is associated with aggression later in life, the development of supportive attitudes toward aggression and violence, psychological distress, school absenteeism, academic dysfunction, and subsequent injury. We may not be able to protect our adolescents from exposure to violence, but we most certainly can help them develop the necessary skills to survive such exposure and work to enhance and strengthen their access to protective factors.

Overweight/Obesity

Children who are overweight are more likely to be that way when they grow up, new research suggests, and adolescence is the critical time to stop the trend in its tracks. A child with a high body mass index (BMI) is more likely to be obese or overweight as an adult. The adolescent over BMI of 25 or more is considered overweight for both males and females aged 2 to 20 years. The higher a child's or adolescent's BMI and the older the child, the more likely they would be an overweight or obese adult. Young males with high BMI-for-age were more likely to be overweight adults than young females with high BMI-for-age. Over BMI of 25 in the teenagers of Changwon city is 10.7%. But this ratio is increasingly growing.

Physical Inactivity

Sedentary lifestyles increase all causes of mortality, double the risk of cardiovascular diseases, diabetes, and obesity, and increase the risks of colon cancer, high blood pressure, osteoporosis, lipid disorders, depression and anxiety.

Physical inactivity, along increasing tobacco use and poor diet and nutrition, are increasingly becoming part of today's lifestyle leading to the rapid rise of diseases such as cardiovascular diseases, diabetes, or obesity. Chronic diseases caused by these risk factors are now the leading causes of death in every part of world. These chronic diseases are, for the most part, entirely preventable.

In Changwon, the rate of physical inactivity is enormous, 75.2% in adolescent age(<19 years). This is a critical and serious issue in young people's general health and seems to be a predictor to chronic diseases in adulthood.

Mental Problems

Adolescent mental health is the strength and capacity of the adolescent's minds to grow and develop with confidence and enjoyment. It consists of the capacity to learn from experience and to overcome difficulty and adversity. It's about physical and emotional well-being, the ability to live a full and creative life and the flexibility to give and take in friendships and relationships. The adolescent who are mentally healthy are not saints or models of perfection but ordinary adolescent making the most of their abilities and opportunities.

The emphasis in promoting the adolescent's mental health is on building resilience in the adolescent, rather than on treating problems and disorders. Of particular importance

is the encouragement and teaching of emotional literacy and intelligence - increasing the capacity of young people to understand and manage feelings and thoughts about themselves and others.

Significant numbers of the adolescent feel a certain anxiety(60.1%), or get depressed(62.6%) in Changwon.

Core Action

Area	Action	Lead Agency	Delivery Partners	Timescale	Intended Outcomes
Skill-based health education program	establish the role-model discussion one to one exercise	Regional School board	Health center Karam Culture Foundation	Ongoing from 2003	nurture the social skills, cognitive skills, and emotional coping skill good school attainment.
Smoking Stop program	Smoking Quit School	Regional School board	Health center Karam Culture Foundation	ongoing	being aware of the severity of smoking
Sound Drinking Culture Campaign	control of heavy drinking in students preventing the drunken car drive education in freshman	Regional police, Regional College Council	Health Center Drinking Culture Revolution Committee Voluntary groups	Ongoing from 2000	establish the sound culture of drinking habit
Adolescent Festival	activity after school music concerts	Arirang Action group, Regional university	Health Center voluntary groups	2004	make being important of physical activity
ADHD program	psychological exam peer group communication behavioral & environmental management parents education	Mental Health Center	Dong Seo Hospital, Regional Psychiatry Association	Ongoing	early detection of ADHD gaining a good school attainment

**Mechanism for Community
Participation**

**Mechanism for Intersectoral
Coordination**

**Information Dissemination and
Sharing**

Monitoring and Evaluation

Mechanism for Community Participation

Community participation is very important. It is important for many different reasons and offers many different benefits for individuals, communities, organizations and society as a whole. These benefits relate to both the process and the effects and outcomes of participation-participation as an end in itself and participation as a means to achieve other goals.

Community participation is a core element of the WHO strategy for health for all in the 21st century, and of Local Agenda 21. The Healthy Cities Project is based on the Principles of both these strategies, and community participation is therefore fundamentally required to achieve health and sustainable development at the local level.

Community participation requires going beyond consultation to enable citizens to become an integral part of the decision-making and action process. This is not confined to a response to initiatives or agendas set in motion by politicians and professionals. It reflects the need for the development of more active communities in their own right: people seeing a need and acting upon it, for example, as advocates, pressure groups or self-help groups. Community participation draws on the energy and enthusiasms that exist within communities to define what that community wants to do and how it wants to operate.

Much literature has recommended as follows, for the partnerships:

- Partnerships interested in engaging a variety of community sectors will benefit from early planning to include diverse sectors as formal partnership members, and establish mission statements and values that embrace a broad and inclusive definition of public health.
- Partnerships will commit to community involvement, sharing priority-setting and decision-making with community representatives, allowing their full participation in planning processes as contrasted with simply asking for review and comment on plans
- being developed or nearly complete.
- Partnerships that fully engage the community in the planning process need to prepare themselves to accept community-driven priorities that may generate some political and financial discomfort if they are different from established agency or government agendas.
- Partnerships must use innovative, culturally competent strategies to engage minority groups that have often been marginalized in our society.
- Partnerships should establish distributive mechanisms to keep community members informed about public health issues and involved in public health activities. Turning Point partnerships offer numerous examples of creative strategies that might be adapted to other settings.

Action to enable community participation must take place in a number of ways at a number of different levels. It should include support for grassroots community-level capacity-building and development, the establishment and strengthening of networks and infrastructure for communities and professionals and a commitment to meaningful organizational development.

Categories and types of community action for health:

- A. Participation in official (statutory) mechanisms of decision-making
- B. Community-level activities
 - Pressure groups
 - Self-care and self-reliance groups
 - Self-help groups
 - Voluntary services
 - Social movements
 - Advocacy activities
 - Community development projects
 - Community self-management
 - Social networking
- C. Community organization enabling practices and support skills
 - Community analysis
 - Organizing for action
 - Advocacy skills
 - Neighborhood planning
 - Mass media work
 - Public information
 - Momentum maintenance

Techniques and methods:

The techniques and methods are broadly categorized according to an action planning model comprising a continuous cycle with five stages : assessing needs and assets, agreeing on a vision, generating ideas and plans for action, enabling action, and monitoring and evaluating.

- A. Assessing needs and assets
 - 1. Community profiles and appraisals
 - 2. Neighborhood and parish maps
 - 3. Rapid participatory appraisal

- B. Agreeing on a vision
 - 1. Future workshops
 - 2. Guided visualization
 - 3. European awareness scenario workshop
 - 4. Future search

- C. Generating ideas and plans for action
 - 1. Modelling and simulation : Planning for Real
 - 2. The work book method
 - 3. citizens' juries

- D. enabling action
 - 1. Community networks
 - 2. Community participation advisory groups and community councils
 - 3. Theatre of the oppressed
- E. Monitoring and evaluation
 - 1. Story-dialogue method
 - 2. Community indicators

For this community participation mechanism, we will adopt a staged approach involving the following five key steps:

- step1: developing a shared understanding of community participation
- step2: establishing the current position
- step3: identifying issues and needs to be addressed
- step4: agreeing an action plan
- step5: reviewing progress.

Mechanism for Intersectoral Coordination

A wide variety of partners are becoming involved in all stages of policy-making and implementation, from the initial definition and prioritizing of issues to the collection and analysis of information and the development and implementation of plans. To ensure that long-standing commitments are met, it is important that partners be properly involved in the definition and solution of problems. The concerns, needs and preferences of all relevant, interested and affected parties, including the services users, must be articulated.

Intersectoral coordination develops/strengthens tools and mechanisms for public-private collaboration. And also it enhances capability of local governments in managing and sustaining local health promoting works.

The involvement of all sectors of community is regarded as fundamental for ensuring that programs reflect local priorities, enjoy widespread support and are sustainable. Holistic, intersectoral approaches and a harmonization of strategies at all levels are needed to address the economic, environmental and social dimensions of sustainable development and to engage all relevant partners in cooperative planning. Therefore, we think that the objectives of the intersectoral coordination are:

- Effective functioning of the program
- To avoid duplication of the programs
- To monitor and evaluate the progress of the program
- To discuss about further possibilities of expansion.

And also, the objectives of the planning initiative might include creation of a shared vision of the future, identification and ranking of key issues, development of action plans, mobilization of resources and ways of increasing public support.

Consistent and effective intersectoral coordination is a high priority to support people with disabilities, especially those with cross-sectoral needs.

Intersectoral activity for the health sector can occur at a number of levels:

- planning and strategic(eg, statement of intent, workforce planning)
- policy advice/development(eg, child and family policy)
- programs and services delivery(injury prevention)
- monitoring/implementaion(eg, the social report, the health and independence report)
- research and evaluation(eg, social policy evaluation and research)

Foe instance, Bike Road Initiative, which was a locally led one by city government, has developed process for collaboration at all levels between all city Departments, including Public Health Center(physical activity), Environmental Dep.(control of air pollution), Commerce Dep.(saving of Energy), Transportation Dep.(traffic), City Planning Dep.(road construction & pavement) and Information Office(advocacy). Of course, City Council, Youth council, and NGPs were taken part in this initiative.

Collaboration can be as strightforward as sharing information or as complex as the development of joint intervention programs or strategic frameworks which may be jointly

funded and have either lead agencies, or shared responsibility.

But the majority of services for the various population groups are delivered through sector silos. There natural links between sectors that synergies and efficiencies(eg, joint development of workforce). A certain particular Strategy would be established in an attempt to address these issues.

Despite the complexity of Healthy cities project, there are a number of factors that favor better coordination and integration of the efforts of the municipal, health, social and other services partners to fulfill our shared responsibility to improve the health and well-being of Changwon. We will acquire better tools for intersectoral coordination by:

- establishing common priority zones for concerted intervention between the City, the Health of Ministries(health Center) and the Steering Committee.;
- generalizing and harmonizing effective prevention programs that are accessible in all of the services areas;
- synchronizing and harmonizing the regional strategic plans of the main partners (City, the Health of Ministries and the Steering Committee); and
- sharing and disseminating information between the respective areas of the regions or neighbor.

The structure of the partnership has been found to be critical in terms of providing political links and direction and the form for facilitating intersectoral coordination and community participation. Adapting committee structures to facilitate links with existing political and community structures has been found to be important. Stakeholder groups can range from roundtables and fora with relatively short-term mandates to mere formal statutory committees and councils with long-term mandates. They can be formed either within or outside an existing government structure.

Once the formal stakeholder group has been formed, it has been found useful to establish more specialized working groups to deal with particular issues, which could be structured along district or neighborhood boundaries or be divided according to responsibility for various elements of the planning process, such as issue identification, action planning or evaluation. This is often an important component of the intersectoral effort, since it is difficult to sustain the interest and involvement of groups with such diverse interests and backgrounds. Specialized working groups can help to focus the interests and energies of disparate groups.

Identification of Partners

Identification of the right partners is a crucial step, as it determines the legitimacy of the initiative and the ability to develop new insight, ideas and approaches and to establish consensus. A general principles to be followed is that service users and providers should be represented, as well as other interested and affected parties and parties with particular knowledge and expertise. Partners should have a vested interest in the problems and should be interdependent in reaching solutions.

Potential Partners include :

- Business and industry
- Local, national and regional government
- Trade unions

- Community groups and residents
- Women's groups
- Youth groups
- Media

Information Dissemination and Sharing

The communication strategy presents a plan for promotion the project application to the public, media and all the relevant user groups.

The main objective of the communication strategy is to raise awareness of the existence of the project and the possibilities of getting interested and participating in it. The communication strategy also aims at securing the updating and maintenance of the project as well as further development.

1. Channels of communication

It is worth noting that the first and most important channel was considered to internet: exactly the channel that the project is using. Otherwise, the groups named several possible channels of communication:

a) Internet

Advantages of this route are the potential for continuous updates, making the data processing easier, potential for multimedia presentation, and development of user infrastructure.

b) CD ROM

The CD ROM enables to work with an application for the graphic presentation of the indicators without the need to be connected to the network, updated to a certain date; advantages: lower production costs, easy distribution, possibility for multimedia presentation.

c) Printed Information Materials/Leaflets

This medium may serve as a brief introduction of the potential of the indicator use to users, will mostly give examples, contacts, and references to other information sources.

d) Printed Publications

A printed sibling to the Internet application for the graphic presentation of indicators, in this form it would be still easily accessible to a higher number of users, major drawbacks are high production and distribution costs, less comfortable search, limited potential of other data processing.

e) Mass Media

- TV, Radio,
- Press: There is a greater chance in regional press (there is no need the indicators published reflect conditions in the region only).

2. The communication plan

2.1 External communication

The printed information materials together with the presentations within different seminars will presumably be the most used ways to promote the product.

2.1.1 Tools of external communication

- Business card
- Folder
- Seminars and workshops

The purpose of the seminar was to both promote the project application and the use of various indicators and to inform the potential users about the application as well as to get their inputs to the project.

- project internet site.

The website contains information of all the activities during the project and naturally links the user to the application in several places.

- Radio
- Customized news/magazines/newspapers
- Face-to-face communication
- Direct marketing through emails

2.1.2 Primary target groups of external communication

The primary target groups are considered as state administration, decision and policy makers, and the public. We have to keep in mind that Health Center is a state administration body that is obliged to serve these target groups by law.

2.1.3 External Communication: Table of Summary

Target group	emails to advisory Channels	The main message
Policy makers	seminars, folders, b-card	Trends of how the project is developing
Politicians	emails to advisors, b-cards	
Private sector	b-card, folder, emails	
Public; citizens, teachers, students	business cards, b-card, project site	Inform about various problems and reasons behind, trends
Media	Face-to-face communication, email, folder	Background information to their stories, illustrations to reportages
Funding bodies	Folder	Enables comparison to what has been invested and what has been the result, background information about biggest problems
Scientific experts	Email, b-card	Data source
NGOs	b-card, folder, emails	Data, government information about the environment

Regional stakeholders	emails, face-to-face communication in seminars	Comparative data from national level, examples of indicators
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2.2 Internal communication

Internal communication will support the co-operation and interaction between the developers, the financier and the partners of the project.

2.2.1 The participants of the project

- Health Center: Health Managerial Dept., Stastical Dept.
- Provider of the technology (programming)
- Provider of the data
- Expert cooperation

2.2.2 Internal Communication: Table of Summary

Organization /division	Channels	The role/tasks in the project	Preconditions an possibilities for participation and commitment
Health Managerial Dept	Daily contacts	Co-ordination of the project, managing cooperation	Working programme and priorities within the whole portal, Existing financial and human resources.
Statistical Dpt.	face-to-face email, internal comm. channels	Might participate in the updating and promotion, but their exact role will be a matter of further negotiation	Need to find points of contact (share of raw and perhaps processed data), do not duplicate gathering and processing the data. Possibility to modify the indicatory set, to use Stat. Dpt. potential as much as possible instead of paying money to external data providers.
The provider of data and background info	Meetings, email	Data and information provision, updating yearly	Outsourced by now. Investigate the possibilities of closer cooperation with Statistical Dpt. Adequate funds at Health Center
The provider of expert cooperation	Meetings, email	Development of indicator sets	Development plan prepared Adequate funds at Health Center
The provider of the technology (programming etc.)	Meetings, negotiations	Provide the technology	Development plan prepared Adequate funds at Health Center

3. Evaluation and follow-up of the communication

The evaluation of the communication of and within the project can be evaluated by using the following criteria:

3.1 External communication

- Number of internet visits to the project application
- Number of the feedback comments
- Number of enquires about the application by face-to-face or e-mail communication.
- Number of newspaper/media reportages about ISEI
- Attendance of the seminars

3.2 Internal communication

- Update frequency/timeliness
- Results of the feed-back comments analysis
- Establishment of the project team involving representatives of all project participants, that would meet on regular base

Monitoring and Evaluation

Communities engaged in planning are generally concerned with getting things moving. Communities take time to monitor their progress and evaluate their efforts. Measuring change resulting from a planning process is important for several reasons as mentioned on the "*REGIONAL GUIDELINES FOR DEVELOPING A HEALTHY CITIES PROJECT*"(WHO/WPRO, March 2000):

Evaluation is important because it:

- monitors the progress of the project;
- demonstrates the effectiveness of a Healthy Cities project, including cost effectiveness;
- provides individuals involved in the project with feedback;
- ensures a commitment to good practice;
- provides a basis for planning by identifying local contexts;
- accounts for disbursement of resources to funding bodies, policy makers, and communities;
- understands how the project operates;
- improves practice for future use and reference; and determines outcomes achieved by the project

Evaluation focuses on the specific accomplishments of a plan. A distinction should be made between measuring output and outcomes. Outputs are usually things that can be counted and result from the action plan. Outcomes, however, are usually much more long term and are more difficult to link to specific elements in the action plan.

Evaluation works may be mainly focused on the following issues: inter-sectoral collaboration; integrated planning for health development; making the links to health and other sustainable development initiatives; infrastructures for and management of change; community participation and civic engagement; preconditions for change; action addressing equity, poverty and the determinants of health; innovation and transferability; sustainability of political commitment and assessment of impact on local process in context of national policy frameworks.

Simply gathering information about community change or surveying residents about their perceptions regarding change is not enough to understand or evaluate the effectiveness of planning. The data may be examined in the context of elements of the planning process.

Evaluation may be undertaken throughout the projects lifetime and covered all target groups. The following evaluation criteria is identified:

- Program: Activities, progress and development, appropriateness to the needs of the target groups and unexpected consequences of the of program.
- Professionals(local partners): numbers participating, their competences and the implications of the training/program for them.
- Communities or society: degree of participation, satisfaction and fulfillment of needs.

- Resources: availability, management and difficulties.

Evaluation process may be done both by inner-evaluator(eg, Steering committee itself) and by outer-evaluator(eg, neighbor University or post-graduate Schools).

Evaluation will be done on the basis of the process and outcome, or the levels of short-term impact and implementation, medium-term health and well-being outcomes, and health and development outcomes.

Evaluation mechanism is used to evaluate progress and activities undertaken our within Healthy Cities project. The aim is to measure the determinants of health and social dimensions of Local Agenda 21. Methodology includes the following tools:

- Indicators
- Questionnaires
- Reviews of materials
- Interviews

Evaluation process shall use Evaluation Framework which is newly developed and has been recommended in document series No. 13 for our Healthy city project.

Evaluation Framework

This newly developed evaluation framework is comprised of four parts:

- (1) city health profiles:
- (2) needs and resource assessments:
- (3) analyses and consensus building: and
- (4) periodical monitoring.

Community-defined indicators

The process of the development of indicators has technical as well as social and political dimensions. Indicators for policy and planning should be developed as an integral part of the overall planning process at local and national levels.

SUSTAINABLE ECONOMY

- Gross Regional Product
- income Distribution
- Median Income
- Living Wage Income
- Unemployment Rate
- Poverty

HOUSING SUPPLY

- Housing Supply
- Jobs-Housing Balance
- Population Density and intensity of Land Use
- Housing Affordability
- Homelessness

TRANSPORTATION

- Commuting
- Vehicle Miles Traveled

NATURAL ASSETS

- Protected Land
- Brown-fields
- Water Use Per Capita
- Ecological Health of the Bay
- Ecological Footprint

RESOURCE USE

- Energy Use
- Carbon Emissions
- Ozone
- Particulate Matter
- Waste Kispool and Diversion

NERGHBORHOOD INTEGRITY

EDUCATIONAL SYSTEM

- Educational Performance
- Per Pupil Spending

COMMUNITY HEALTH AND SAFETY

- Arrest Rates
- Insurance Coverage

LOCAL GOVERNMENT FINANCE

- Tax Revenue

CIVIC ENGAGEMENT

- Voter Participation
- Diversity of Officials