

The Changing Structure of Demand-Supply for Mineral Resources in South Korea *

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ABSTRACT: The accelerated industrialization of Korean economy over the last couple of decades has brought an era of mass consumption of mineral commodities. This increased consumption has been satisfied mainly by imports from abroad. South Korea has about 50 useful mineral commodities for the mineral industry, among 330 kinds of minerals described. In 1988 the self-sufficiency ratio of domestic demand for 44 non-fuel(metallic and non-metallic) minerals as a whole was no more than 29 percent. The ratio for 26 non-metallic minerals was much higher, about 66 percent. On the other hand, the ratio for 18 metallic minerals was relatively very low, about 6.3 percent. The correlation between GNP and mineral consumption in South Korea shows well the slow down patterns during the last two decades.

OVERVIEW OF MINERAL RESOURCES

Owing to poorly endowed mineral resources, South Korea had to expand imports of raw materials in line with its industrialization.

During the period from 1976 to 1987, the average growth rate of mining and manufacturing sector marked 10.9% per annum and that of GNP was 7.7%.

However, the consumption of mineral commodities increased 4.2 times with an average growth rate of 13.9% per annum. Most of expansion was led by the metallic mineral sector such as iron ore, copper concentrates and zinc ore etc. While non-metallic mineral sector also reveals upward trend reflecting the expansion of industry. Thus, in general, local consumption of domestic production has increased.

The present condition of mineral sufficiency in South Korea is showed in Table 1. In 1988,

12 mineral commodities (3 metallic and 9 non-metallic) were self-sufficiency, 18 mineral commodities (8 metallic and 10 non-metallic) were partial-sufficiency and 15 mineral commodities with petroleum depended on the whole-import from abroad. These phenomena have been maintained for the recent 5 years in South Korea.

Table 2 shows the trend of demand/supply of minerals. Production, consumption and import of minerals expanded more than 2 and/or 2.9 times, but the export only increased 1.6 times during the last 8 years.

South Korea exports 15.3% of minerals produced and imports about 167% of domestic production in 1988. However the export/production ratio shows decreasing patterns from 19.3% in 1980 to 15.3% in 1988. But the import/production ratio (Fig. 1) shows rapidly increasing patterns from 113% in 1980 to 167% in 1988 due to the relatively rapid increase of metallic mineral sector. Therefore, self-sufficiency ratio* of total mineral sector dropped from 51.7% in 1980 to 40.5% in 1988 (Table 3) while non-metallic mineral sector is still maintaining nearly 70% (Table 9).

* This paper was presented at a Seminar of "Metals, Minerals and Economic Development in Asia/Pacific Region" organized by UNCTAD/ESCAP at Perth in Australia from May 6 to June 3, 1990.

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* self-sufficiency ratio(%)=(production/local demand) × 100

Table 1. Mineral sufficiency in 1988.

Condition	No. of Minerals	Minerals
Self-sufficiency	12	○ Metal(3) Silver, Tungsten, Pyrite
		○ Non-metal(9) Amorphous graphite, Feldspar, Limestone, Silica stone, Serpentine, Wollastonite, Zeolite, Pyrophyllite, Alunite
Partial-sufficiency	18	○ Metal(8) Gold(7.0%), Copper(0.04%), Lead(93.5%), Zinc(8.7%), Iron(1.9%), Ilmenite(80%), Molybdenite(26.7%), Zircon(0.04%)
		○ Non-metal(10) Kaolinite(83.9), Salica sand(79.3%), Asbestos(2.7%), Crystalline graphite(10.7%), Mica(90.6%), Kyanite(6.7%), Barite(42.1%), Talc(60.3%), Diatomite(97.3%), Marble(98.6%)
Whole-import	14	○ Metal(6) Manganese, Aluminium, Chrom, Antimony, Tin, Tantalum
		○ Non-metal(8) Phosphate, Sulfur, Magnesite, Uranium, Andalusite, Gypsum, Boron, Fluorite

$$* \text{ The Ratio of self-sufficiency(\%)} = \frac{\text{Domestic Production}}{\text{Production} + \text{Import}} \times 100$$

Source : Ministry of Energy and Resources(1989).

Table 2. Supply/Demand Index of 44 non-fuel(metallic and non-metallic) minerals.*

Year	Production	Consumption	Import	Export
1980	100	100	100	100
1981	105.5	123.6	134.0	90.8
1982	89.5	132.9	162.9	83.5
1983	100.7	141.5	165.3	89.4
1984	100.3	152.1	185.8	70.5
1985	126.0	178.2	218.0	64.6
1986	138.7	200.6	232.4	72.3
1987	163.9	248.5	303.4	143.2
1988	201.8	257.4	298.7	160.5

* Source : Ministry of Energy and Resources(1989).

Note : Based on actual price.

The component ratio of mining industry sector of the gross national production (GNP) in South Korea is dropped from 1.2% in 1971 to 0.7% in 1988 due to the rapid growth of other industries in the country(Fig. 2).

To check the correlation between GNP and mineral consumption, per capita mineral consumption is plotted against per capita income. Fig. 3 shows the result of total mineral and

metallic mineral consumption and Fig.4 shows that of the non-metallic mineral consumption.

Both figures show well the slow down patterns. In Fig. 3, total mineral and metallic mineral consumption changes at 3,000 US\$ of per capita GNP. In case of non-metallic mineral consumption, the change appears at around 2,500 US\$. In general, it is common that the change appears when per capita income is about

Table 3. Correlation Trend of Production-Consumption-Import-Export of Minerals.*

Year	Production	Import	Import	Export	Export
	Consumption	Consumption	Production	Production	Import
1980	51.7(%)	58.3(%)	113(%)	19.3(%)	17.1(%)
1981	44.1	63.2	143	16.6	11.6
1982	34.8	71.5	205	18.0	8.8
1983	36.8	68.1	185	17.1	9.2
1984	34.1	71.2	209	13.5	6.5
1985	36.6	71.3	195	9.9	5.1
1986	35.8	67.6	188.9	10.1	5.3
1987	34.1	71.2	208.3	16.8	8.1
1988	40.5	67.7	166.9	15.3	9.2

* Source : Ministry of Energy and Resources(1989).
Note : Based on actual price.

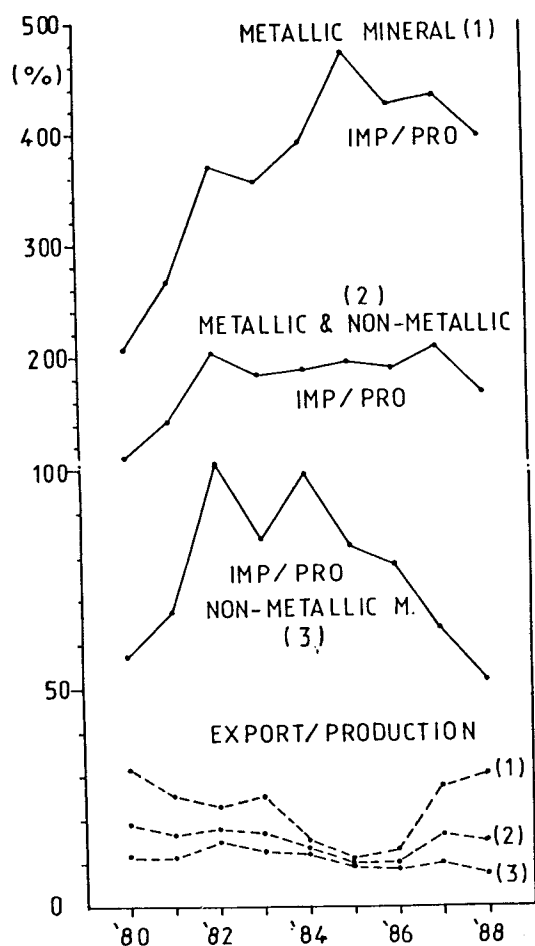


Fig. 1. The Import/Production and Export/Production Trend of Minerals.

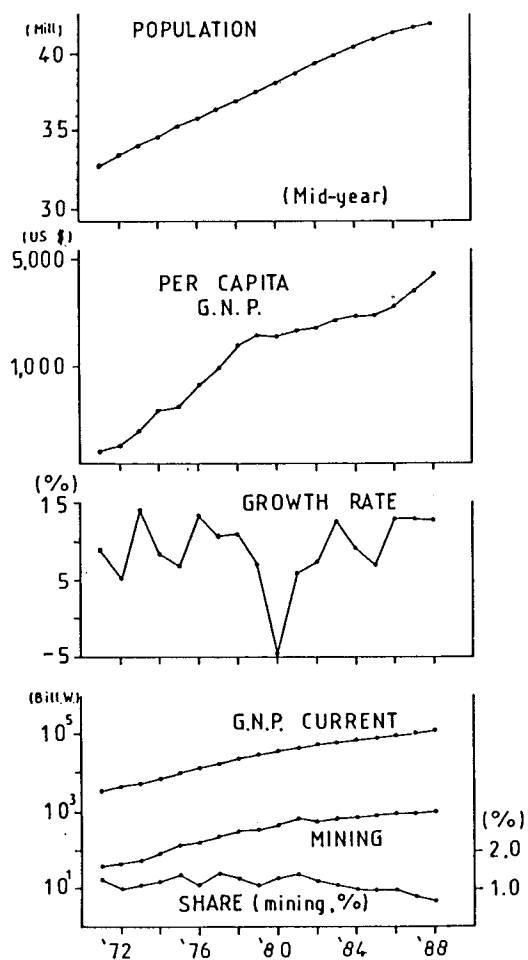


Fig. 2. Major Economic Indicators in 1971-1988.

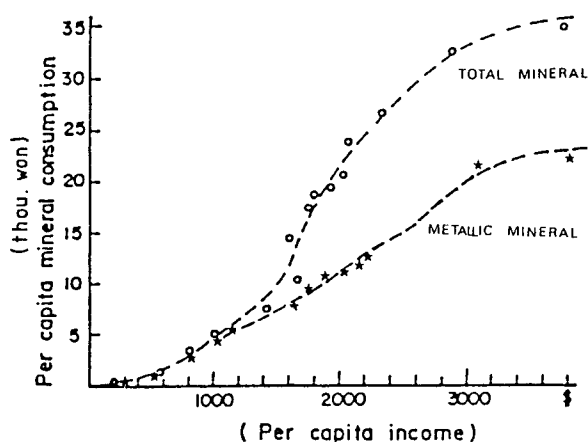


Fig. 3. Trend of per capita mineral consumption.

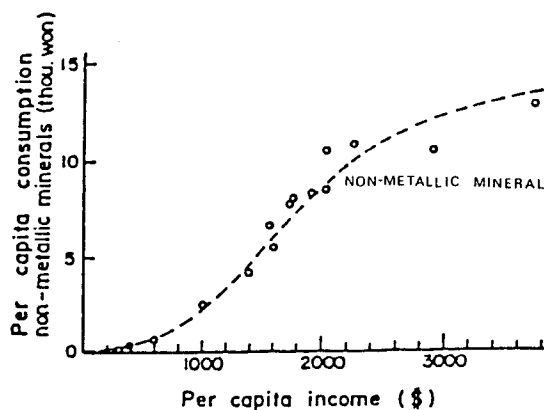


Fig. 4. Trend of per capita non-metallic mineral consumption.

5,000 US\$. This is thought to be influenced by some factors such as the structural change of industry, price fluctuation and the over-valued exchange ratio of won(W) to dollars(US\$).

STRUCTURAL CHANGE OF DEMAND / SUPPLY OF NON-METALLIC MINERALS

South Korea consumes 17 metallic mineral commodities in 1988. Among them, it produce 10 kinds of minerals, of which 3 kinds of mineral commodities (silver, tungsten, pyrite) only are self-sufficiency (Table 1).

Table 4 shows the leading metallic minerals in the field of production, export, import and consumption (domestic demand). Gold ranks top position in production and export due to the processed goods of accessories. Iron ore ranks top position in import and consumption which led by two iron smelter after 1973 and 1987. Among top 9 metallic mineral commodities consumed in 1988, iron ore and copper concentrates are depended on import from abroad.

Even though, South Korea imported 16 kinds of metallic minerals in 1988, the top 3 minerals (iron, copper, zinc) listed above shared about 83%. About 50% of them were imported from Australia, Brazil and Papua New Guinea.

Table 5 shows the trend of demand/supply of metallic minerals. Consumption and import expanded more than 3 to 3.5 times during last 8 years. On the other hand, production and export were not clear. Also, the import/consumption ratio and import/production ratio show in-

Table 4. Rank of Metallic Minerals in 1988.*

Rank	Production (%)	Export (%)	Import (%)	Consumption (%)
1st	Gold 61.9 (7.2%)	Gold 78.2	Iron 40.4	Iron 32.7
2nd	Silver 19.8 (4.3%)	Silver 15.8	Copper 29.3	Copper 25.8
3rd	Tungsten 4.9	Tungsten 1.2	Zinc 13.0	Gold 16.8
4th	Iron 4.3	-	Gold 9.3	Zinc 12.2
5th	Zinc 4.2	-	Manganese 2.4	Silver 4.6
6th	Lead 1.5	-	Silver 1.0	Manganese 2.1
7th	Molybdenite 0.8	-	Molybdenite 0.3	Tungsten 1.0
8th	Copper 0.02	-	Lead 0.07	Molybdenite 0.5
9th	-	-	-	Lead 0.4

* Source : Ministry of Energy and Resources(1989). () : Pure domestic production.
Note : Based on actual price.

Table 5. Supply/Demand Index of 18 metallic minerals.*

Year	Production	Consumption	Import	Export
1980	100	100	100	100
1981	107.0	133.7	138.9	84.3
1982	91.0	148.9	164.0	65.5
1983	99.0	155.6	172.5	79.0
1984	100	173.0	190.8	46.8
1985	96.4	184.6	224.5	31.2
1986	116.8	222.8	243.4	47.9
1987	170.3(63.5)	318.1	360.8	147.1
1988	179.7(53.5)	295.8	346.2	173.9

* Source : Ministry of Energy and Resources(1989).

Note : Based on actual price.

Table 6. Correlation Trend of Production-Consumption-Import-Export of Minerals.*

Year	Production	Import	Import	Export	Export
	Consumption	Consumption	Production	Production	Import
1980	36.7 (%)	75.1 (%)	204 (%)	31.8 (%)	15.6 (%)
1981	29.4	78.0	265	25.1	9.5
1982	22.5	82.7	368	22.9	6.2
1983	23.4	83.2	356	25.4	7.1
1984	21.2	82.8	390	14.9	3.8
1985	19.2	90.5	472	10.3	2.2
1986	19.3	82.0	426	13.1	3.1
1987	19.7(7.3)	85.2	433	27.5	6.3
1988	22.3(0.7)	87.9	394	30.8	7.8

* Source : Ministry of Energy and Resources(1989).

Note : Based on actual price.

creasing patterns during the last 8 years (Table 6, Fig. 1).

Gold

In 1939 South Korea produced 10.3 tons of gold and 3.3 tons in 1962. Since 1971 gold production decreased less than 1 ton and produced only 415 kg of gold in 1975.

Total demand of gold in South Korea was rapidly increased from 5,253 kg to 18,518 kg during last 8 years (1980-1988) due to the increasing gold wire for electronics, especially memorial coinage and medal for '86 Asian and '88 Seoul Olympic Games, and the domestic gold price is 20 to 30% more expensive than that of world price.

Production was also increased from 1,282 kg in 1980 to 11,121 kg in 1988, of which mostly produced from imported raw materials (mainly crude copper ores). Also, pure domestic produc-

tion was a bit from 384 kg in 1980 to 1,294 kg in 1988 (Fig. 5). Export was expanded from 265 kg in 1980 to 6,551 kg in 1988 due to the increasing of processed goods for accessories.

Iron Ore

Since 1960 South Korea annually produced iron ore about 500 to 830 thousand tons, 668 thousand tons in 1985, and 390 thousand tons (Fe 56%) in 1988 from 7 mines (Fig. 6).

Consumption was rapidly increased from 802 thousand tons in 1973 (1st smelting plant constructed) to 11,282 thousand tons in 1981. In 1988 consumption expanded about 19 million tons with the growth rate of 23.5% per annum.

The 95% of domestic demand depended on imports from Australia, Peru, India, Brazil and Canada, and South Korea imported 20,228 thousand tons (42 million US\$) in 1988.

When the total capacity of its two iron smel-

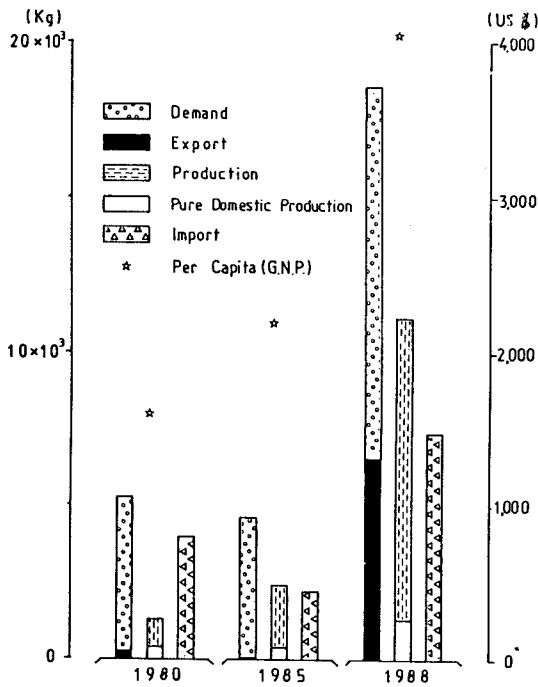


Fig. 5. Demand, Production, Export and Import of Gold.

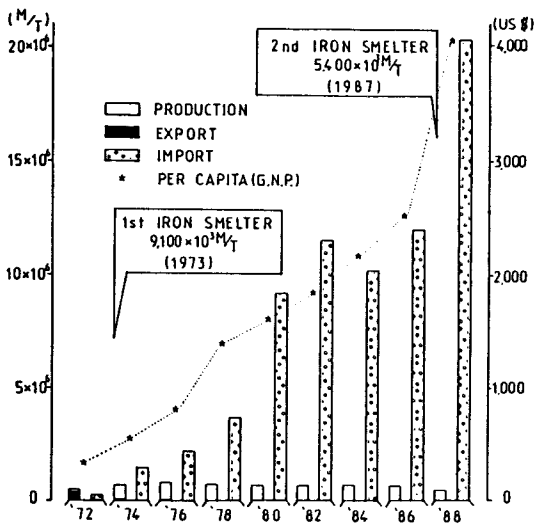


Fig. 6. Production, Export and Import of Iron Ore.

ter will increase 17.2 million tons in 1991, then the demand of iron ore will be 25 million tons.

Copper Ore

Domestic production of copper ore is rapidly decreased from 5,764 tons in 1971 to 133 tons from the by-products of 3 lead-zinc mines in 1988 for the grade of ores are very low and production cost becomes higher due to the deep-sited mining.

The capacity of copper smelting plant at the end of 1988 is 170 thousand tons, of which led by whole-imports from Papua New Guinea, Chile, Mexico, Canada and Philippines. Amounts of imports are rapidly expanded from 11,982 tons in 1971 to 346,370 tons (307,768 thous. US\$) in 1988 (Fig. 7).

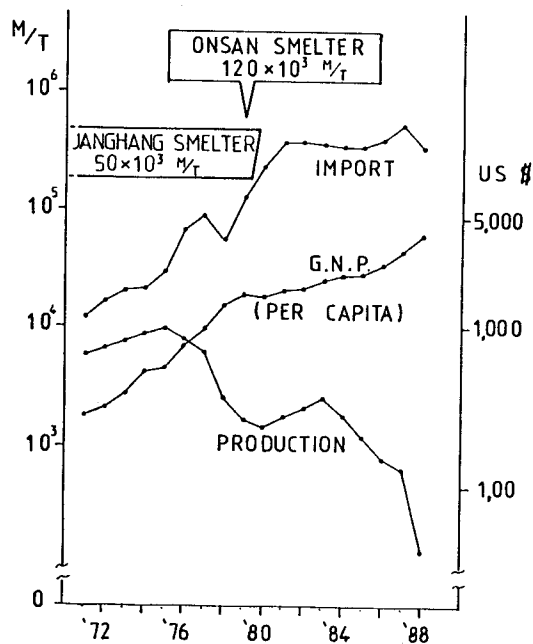


Fig. 7. Production and Import of Copper Ore.

Lead and Zinc Ores.

The exploration of lead and zinc ore deposits are relatively activated since 1970, and after 1978 the production was decreased. Since 1986 lead production was 23,727 to 27,996 tons per year. In 1988 the production was 28.9 thousand tons (Fig. 8).

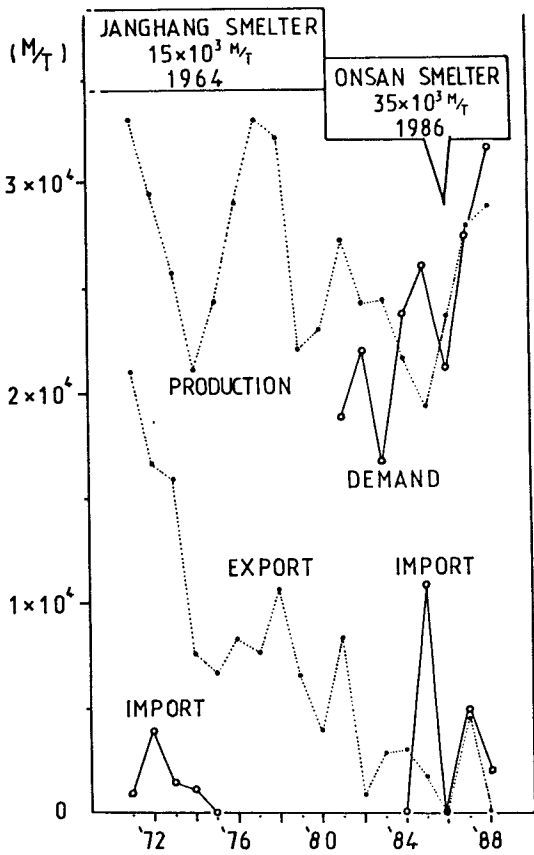


Fig. 8. Demand, Production, Export and Import of Lead Ore in 1971-1988.

The capacity of lead smelting are 15,000 tons at Janghang Smelt Plant and 35,000 tons at Onsan Smelt Plant. Janghang Smelt Plant is smelting of mainly domestic produced crude ore and Onsan Smelting Plant is smelting imported crude ore for 99.9% of concentrated lead since 1986.

The demands of lead are rapidly increased 15% per year due to developed of automobile industry for battery since 1981. The production of lead was 9,300 tons in 1981 to 52,200 tons in 1988 and 38.2% of domestic demand are supplied by domestic production in 1988.

The production of zinc ore is gradually decreased since 1977 (136,700 tons), 47,000 tons in 1987, 43,600 tons in 1988 due to be disused of Yeonhwa II mine (Fig. 9).

The capacities of domestic zinc smelting are 76,000 tons in Seogpo Smelting Plant, 160,000

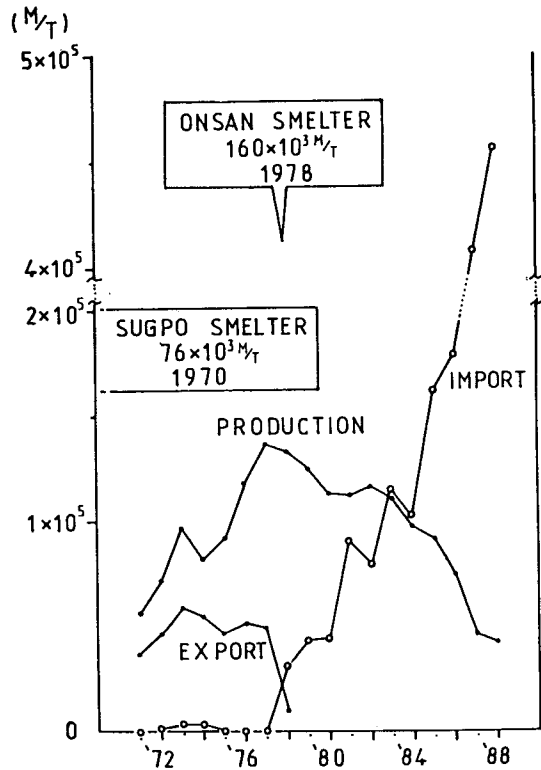


Fig. 9. Production, Export and Import of Zinc Ore in 1971-1988.

tons in Onsan Smelting Plant in 1988. Until 1977 domestic demands are supplied by domestic production and exported a little, since 1978 imported zinc are increased due to decreased domestic production and extended of smelting plant, the ratio of demand from import are 27.8% in 1980, 93.2% in 1988.

Tungsten Ore.

The productions of tungsten ore are 3,500 to 5,000 tons per year and 90% of total production are from Sangdong Mine. In 1988 total production are 3,655 tons, of which 3,594 tons from Sangdong Mine and 66 tons from Ulsan, Geoseong and Seodo Mines.

Whole production ores were exported until 1974, but since 1975 some of them are supplied for domestic industry.

The domestic demands are 22% of production ores in 1975, 65% in 1980 and 96% in 1988 (Fig. 10).

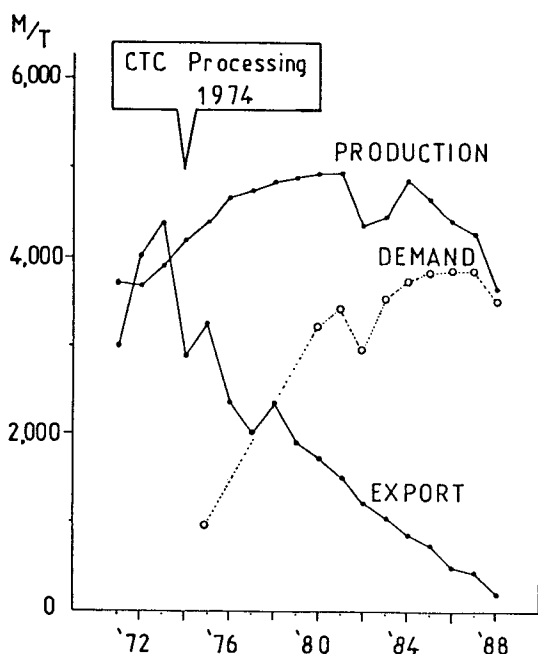


Fig. 10. Domestic Demand, Production and Export of Tungsten Ore.

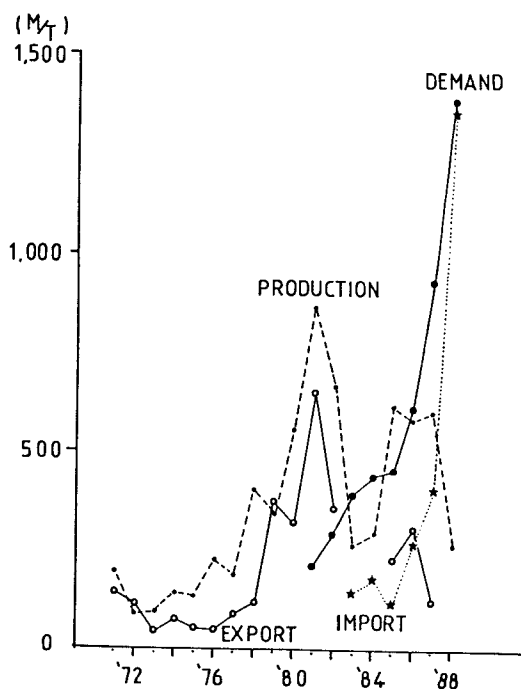


Fig. 11. Demand, Production, Export and Import of Molybdenum Ore in 1971-1988.

Molybdenite Ore.

The production of Molybdenite ores were increased 90 tons in 1960 to 867 tons in 1981 and 266 tons in 1988. Before 1972 whole production were exported but since 1973 to 1982 the ratio of imported and exported are 50%, respectively. Since 1983 the domestic demands have been increased, so some of them were imported and in 1988 domestic supply was only 2% and the others were imported (Fig. 11).

STRUCTURAL CHANGE OF DEMAND / SUPPLY OF NON-METALLIC MINERALS

When the coal mining is excluded, mining sector is led by the non-metallic mineral sector. Production of non-metallic mineral sector in 1988 is 2.15 times as great as that in 1980 and it shared more than 80% of total mineral production in 1988. South Korea, though it can supply lots of needed non-metallic mineral commodities by itself, has to depend on imports of major raw minerals for chemical industry due to the lack of endowment.

Among 28 non-metallic minerals consumed in South Korea, it produces 20 kinds of minerals, of which 9 kinds of minerals are self-sufficiency (Table 1).

Table 7 shows the leading non-metallic minerals in the field of production, export, import and consumption. Limestone ranks top position in production and consumption. Among top 9 non-metallic mineral commodities consumed in 1988, 4 commodities such as phosphate rock, sulfur, asbestos and magnesite are fully imported. Though more than 85% of imports are due to the lack of endowment, there is the tendency to import some high grade ores which can be supplied domestically because they can easily obtained by relatively cheap price.

Even though, South Korea exported 13 non-metallic minerals in 1988, the top five minerals listed above shared 88.9%. About 50% were exported to Japan and Taiwan.

Table 8 shows the trend of demand/supply of non-metallic minerals. Consumption and production expanded more than 2 times and import increased 1.6 times during the last 8 years (1980-1988).

South Korea exports 6.8% of non-metallic minerals and imports about 52% of domestic demand. However the export/production ratio shows decreasing patterns from 11.6% in 1980 to 7.5% in 1988. Also the import/production ratio shows rapidly decreasing patterns after

Table 7. Rank of Non-Metallic Minerals in 1988.*

Rank	Production	(%)	Export	(%)	Import	(%)	Consumption	(%)
1st	Limestone	69.4	Pyrophyllite	21.9	Phosphate	30.2	Limestone	47.4
2nd	Silica stone	5.1	Talc	19.1	Sulfur	22.9	Phosphate	10.8
3rd	Silica sand	4.8	Clay	18.6	Clay	11.3	Sulfur	8.1
4th	Pyrophyllite	4.1	Amorphous Graphite	16.5	Asbestos	10.0	Clay	5.4
5th	Talc	3.7	Dolomite	12.8	Magnesite	7.3	Silica sand	4.7
6th	Clay	3.3	-	-	Silica sand	3.6	Silica stone	3.6
7th	Amorphous graphite	2.4	-	-	Talc	3.0	Asbestos	3.6
8th	-	-	-	-	Gypsum	2.1	Talc	2.7
9th	-	-	-	-	Crystalline Graphite	2.0	Magnesite	2.6

* Source : Ministry of Energy and Resources(1989).
Note : Based on actual price.

Table 8. Supply/Demand Index of 26 non-metallic minerals.*

Year	Production	Consumption	Import	Export
1980	100	100	100	100
1981	104.7	112.2	123.2	102.6
1982	88.5	114.7	132.2	94.4
1983	101.7	125.4	116.3	83.7
1984	126.8	128.5	130.7	83.1
1985	144.0	171.0	144.3	84.1
1986	152.0	175.3	142.5	78.1
1987	160.0	169.4	130.7	101.4
1988	215.2	213.4	161.6	115.1

* Source : Ministry of Energy and Resources(1989).
Note : Based on actual price.

Table 9. Correlation Trend of Production-Consumption-Import-Export of Non-metallic Minerals.*

Year	Production	Import	Import	Export	Export
	Consumption	Consumption	Production	Production	Import
1980	68.8%	39.2%	57.0%	11.6%	20.4%
1981	64.2	43.1	67.2	11.3	16.8
1982	53.1	54.8	103.4	14.9	14.4
1983	55.8	46.8	84.0	12.2	14.5
1984	53.8	53.4	99.2	12.7	12.8
1985	57.9	47.8	82.6	9.7	11.8
1986	59.7	46.6	78.1	8.6	11.1
1987	65.0	41.3	63.6	9.9	15.7
1988	69.3	35.8	51.7	7.5	14.4

* Source : Ministry of Energy and Resources(1989).
Note : Based on actual price.

reaching 103.4% in 1982. In 1988 the ratio was down to 51.7% (Table 9).

Though consumption of non-metallic mineral shows increasing patterns, the ratio of non-metallic minerals to total mineral consumption decreased from 47.1% in 1980 to 38.9% in 1988 due to the relatively rapid increase of metallic sector.

Limestone

The demand of limestone is structured as follows: cement industry 80%, steel industry 10%, chemical industry 5% and others 5%.

South Korea has more than 42 billion tons of limestone resources and these are distributed within relatively confined area. These abundant resources strongly support its cement industry. The capacity of cement plant is about 30 million tons per year.

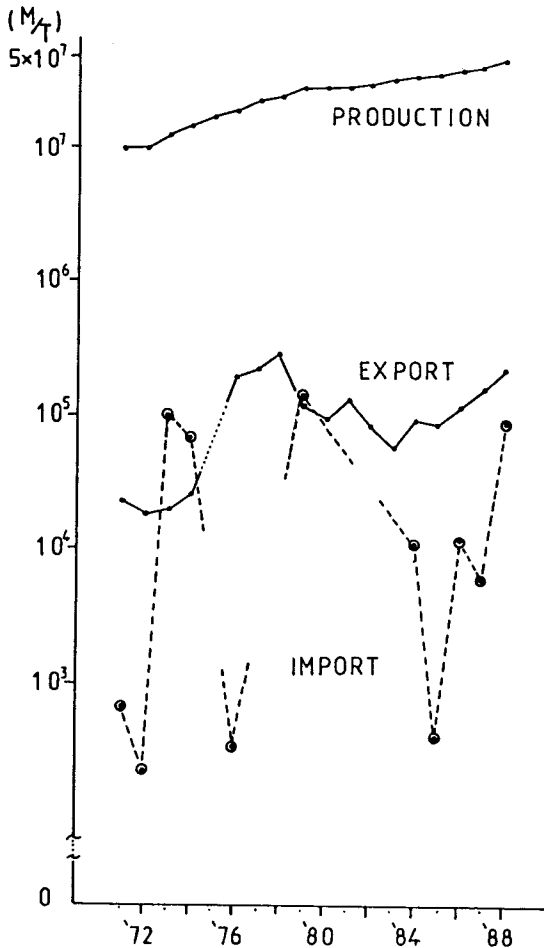


Fig. 12. Production, Export and Import of Limestone in 1971-1988.

Production is increased from 9,104 thousand tons in 1970 to 46,377 thousand tons in 1988.

Export is also increased from 23,200 tons in 1971 to 224,000 tons in 1988 (Figure 12). Import is very fluctuated until mid '80s, but since 1986 import is gradually increased due to the increasing of the construction, especially '86 Asian and '88 Seoul Olympic Games.

Talc.

About 80% of talc is used as a filter in paper industry. South Korea has about 37 million tons of talc ore reserves which can cover more than 200 years based on present demand. However, only 20% of resources are suitable for the required quality of paper industry and production cost becomes higher due to the deep seated mining.

South Korea could balance its demand with own production until 1986 (Table 10). But now,

Table 10. Supply-demand trend of Talc.*

(Unit : M/T)

Year	Demand	Production	Export	Import
1975	50731	92909	42211	33
1980	151452	204662	53478	268
1985	184929	194174	37987	29742
1986	210854	210631	42486	41926
1987	186133	161052	36580	63937
1988	210247	146478	36072	96313

* Source : Ministry of Energy and Resources(1989).

due to the above mentioned reasons, production activity is lowering and imports are expanded rapidly so as to match the local demand (Fig. 13).

Until the mid 1970s, talc demand was decided almost even by two sectors: paper and insecticide. However as liquid type insecticide became more common, talc demand on insecticide was decreased drastically. Thus in 1983 talc demands fell down from 168,000 tons in 1979 to 95,440 tons in 1988.

Recently, talc is used for paper industry, insecticide and others by 80%, 15% and 5% respectively, and this pattern is expected to last for the present.

Pyrophyllite

In South Korea, about 73 million tons of pyrophyllite ore are reported as a resources base. Though those are plentiful to produce more than 100 years, lots of them are not good in quality due to the high content of iron oxide.

The production of pyrophyllite was acceller-

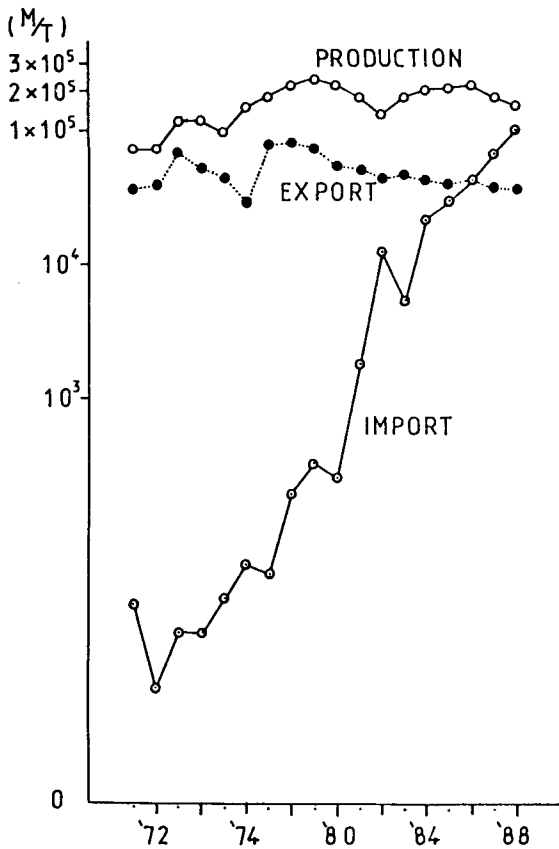


Fig. 13. Production, Export and Import of Taic in 1971-1988.

ated for exports, mainly to Japan. In 1974, the ratio of export per production reached 60.3%, but in 1988 the ratio dropped to 32.9% owing to the expansion of local market (Table 11).

Pyrophyllite is used as a raw material for refractory bricks, and ceramics like tile, sanitary ware etc.. Thus demand has changed in close relationship with the manufacturing activities of non-metallic minerals.

Table 11. Supply-demand trend of pyrophyllite.*
(unit : 10^3 M/T)

Year	Production	Export	Demand	Exp / Prod.(%)
1970	120	53.8	66.8	44.8
1975	323	174.1	148.9	53.9
1980	514.5	248.3	266.2	48.3
1985	738.5	225.2	516.3	30.5
1986	587	203.8	303.7	34.7
1987	690.8	257.3	456.4	37.2
1988	673.8	221.9	443.3	32.9

* Source : Ministry of Energy and Resources(1989).

Clay Minerals.

In South Korea, there are many small-scaled mines producing clays. Clay minerals are composed of kaolinite, china clay, bentonite, fuller's earth, aluminous shale and other kaolinitic clays. As shown in the Table 7, clay minerals play an important role in non-metallic minerals. It ranks 4th in consumption, 5th in production, 3rd both in export and import. More than 70% of clay production in South Korea are halloysite and china clay, which are suitable for the production of ceramics. However, as South Korea has no high quality deposits of kaolinites, it used to import lots of them for paper industry.

In South Korea, more than 80% of clay minerals are used in ceramic industry, half of the rest are used in paper industry, and 8% of the rest are used in rubber, plastics, civil engineering, drilling and others(Table 12).

Table 12. Usage structure of clay minerals.*

Year	(unit : %)		
	Ceramics	Paper	Others
1985	87.8	5.3	6.9
1986	87.3	6.4	6.2
1987	78.1	9.7	12.2
1988	82.8	7.6	8.4
Ave.	84	7.7	8.4

* Sources : Korea Mining Promotion Corporation(1989).

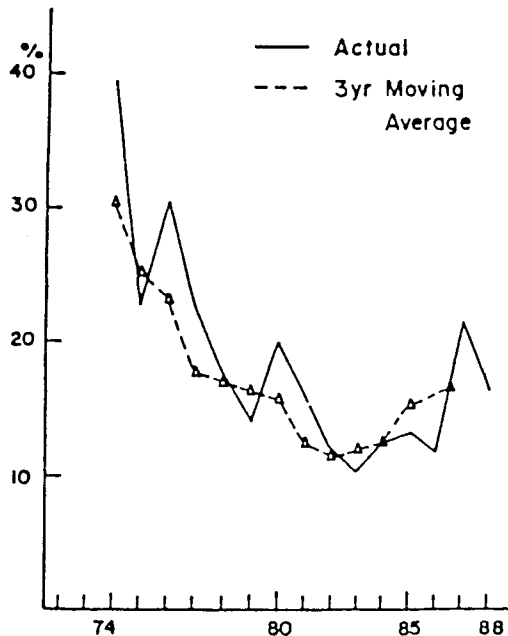


Fig. 14. Trend of export/production ratio of clay minerals (after Hyun, et al., 1989).

The ratio of exports per production shows a decreasing trend since 1974. Recent upward pattern is thought to be a temporary results of some company's marketing strategy. The 3-year moving average curve indicates that the ratio will approach to 10% level afterward(Fig.14).

Fig. 15 shows the trend of production since 1974. Though the actual data shows volatile patterns, the smoothed curve made by 3-year moving average indicates the upward trend.

Since kaolinites shares 50% of imported clay minerals and the ratio shows a slightly upward trend recently, it can also be expected that the portion of kaolinite in imported clay minerals will be more than now afterwards.

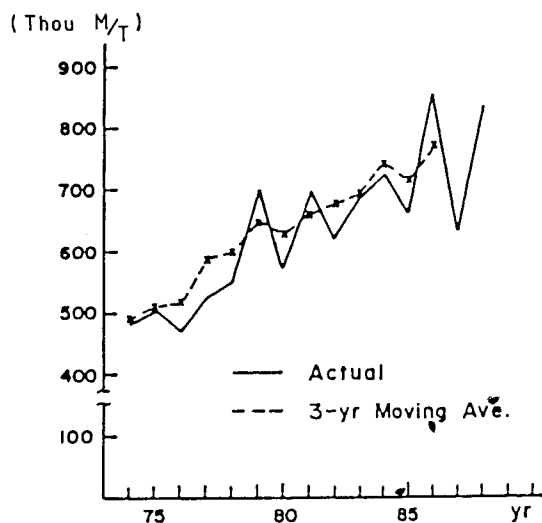


Fig. 15. Production trend of clay minerals(after Hyun, et al., 1989).

Silica Stone and Silica Sand.

Demand for both commodities exceeds local production since 1978. Reflecting this, export of silica sand began to drop and import increased rapidly afterwards. Table 13 shows the previous demand and supply trend of each commodities.

Fig. 16 shows the trend of demand ratio. Both actual and 5-year moving average trend show that the ratio will continue to increase gradually.

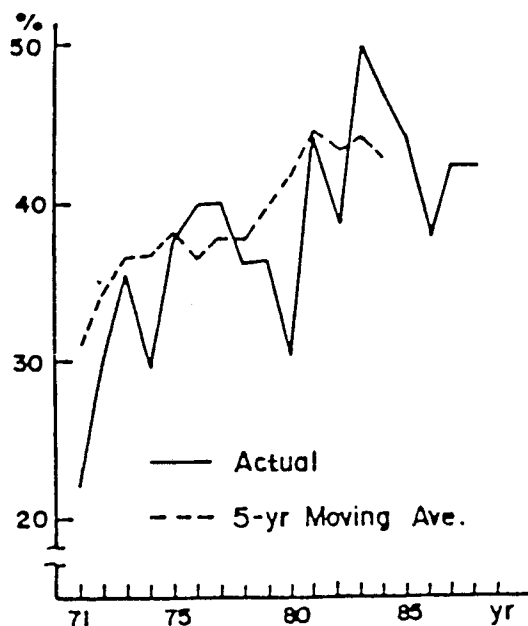


Fig. 16. Trend of demand ratio of silica stone (after Hyun, et al., 1989).

Table 13. Supply-demand trend of silica stone and silica sand.*

		(unit : thousand M/T)				
		1976	1981	1986	1987	1988
Silica stone	Production	297.6	545.2	885.1	1235.1	1378.7
	Demand	192.5	521.1	841.5	1182.5	1397.7
	Export	105.2	24.2	6.7	4.9	7.9
	Import	0.1	nig.	0.8	1.1	1.9
Silica sand	Production	301.1	584.9	1233.2	1350.0	1487.6
	Demand	289.5	663.4	1386.4	1598.9	1906.4
	Export	11.7	7.4	2.0	1.8	-
	Import	0.1	85.9	198.5	260.6	388.7

* Source : Ministry of Energy and Resources(1989).

Feldspar.

Most of feldspar resources in South Korea is suitable for ceramic basis grade. Like as pyrophyllite, production of feldspar began to increase for export. In the early 70's about 30% of production was exported but the ratio dropped to 10% recently since local demand for ceramic industry increased steadily.

The demand of feldspar was increased at 22.7% per year from 1975 to 1988.

Other Imported Non-metallic Minerals

South Korea imports phosphate, sulfur, asbestos, and the others, namely high quality kaolinite and talc.

The quantities of imported minerals in 1988 are as follows: phosphate 1,653,000 tons, sulfur 585,328 tons, asbestos 87,470 tons, kaolinite 159,988 tons and talc 96,313 tons.

It is continually increased since 1970, especially talc is rapidly increased (Fig. 17).

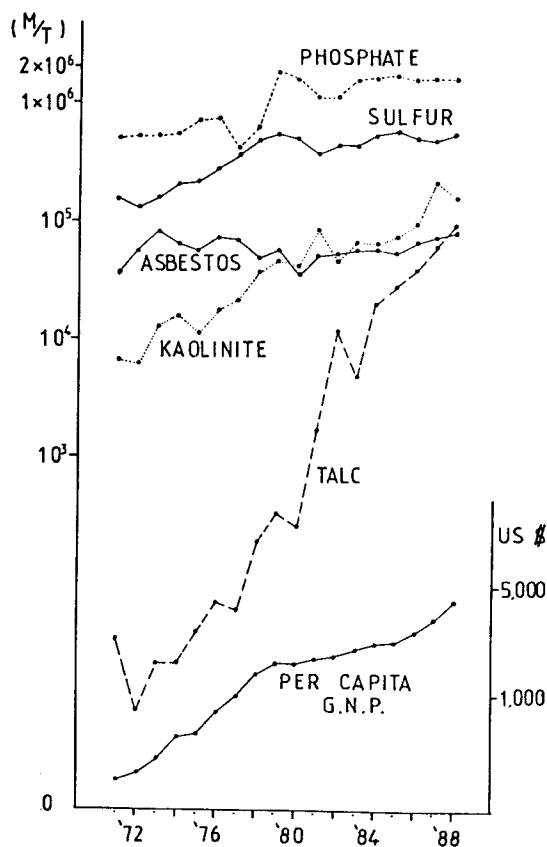


Fig. 17. Import of Some Non-metallic Minerals in 1971-1988.

SUMMARY

1. South Korea has about 50 useful mineral commodities for the mineral industry.
2. In 1988 the self-sufficiency ratio of domestic demand for 44 non-fuel minerals was no more than 29 percent. That of 26 non-metallic minerals was much higher, about 66 percent, and that of 18 metallic minerals was relatively very low, only 6.3 percent.
3. During the period from 1976 to 1987, the average growth rate of mining and manufacturing sector marked 10.9% per annum and that of GNP was 7.7%.
4. South Korea exported 15.3% of minerals produced and imported about 167% of domestic production in 1988.
5. The component ratio of mining industry sector of GNP was dropped from 1.2% in 1971 to 0.7% in 1988.
6. Gold ranks top position in the field of production and export of metallic mineral sector in 1988 and iron ore ranks top position in the field of import and consumption.
7. South Korea imported 16 kinds of metallic minerals in 1988, of which about 50% of them were imported from Australia, Brazil and Papua New Guinea.
8. Consumption and import of metallic minerals expanded more than 3 to 3.5 times during last 8 years ('80-'88).
9. Non-metallic minerals play an important role in the mining sector, because more than 80% of production come from non-metallic mineral sector.
10. During the period from 1980 to 1988, both production and consumption doubled and imports increased 1.6 times in non-metallic sector.
11. Import/production ratio shows a downward trend from 103.4% in 1982 to 51.7% in 1988.
12. Per capita consumption of metallic minerals to the per capita income(GNP) was varied to small when per capita GNP was 3,000 US\$; that of non-metallic minerals was 2,500 US\$, influenced by some factors such as structural changes in industry, price fluctuation and also the over-valued exchange ratio of won to dollars.

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國內 鑛物資源의 需要—供給의 構造變化

吳敏秀

요약: 지난 20年間 韓國經濟의 持續的인 産業發展은 鑛物資源의 大量消費時代를 이룩하였다. 그러나 이와 같은 消費의 急成長은 大部分 外國으로부터의 輸入에 依存하였다. 韓國에서는 330余 鑛種이 알려져왔으며, 그중에서 50여種이 産業原料 鑛物資源으로 利用되고 있다. 1988年 燃料鑛物資源을 除外한 全體 金屬·非金屬 原料鑛物資源의 國內 自給度는 29%였고, 26種의 非金屬 鑛物은 그 自給도가 66%로 比較的 높은 편이나, 18種의 金屬鑛物의 경우는 그 自給도가 6.3%에 불과한 實情이다. 1970年代 以後 우리나라의 經濟發展 단계에서 國民總生産量과 鑛物消費와의 관계는 아주 完만한 變化樣狀을 보이고 있다.