

Agriculture, Forestry, Fisheries, and Mining

As the Korean economy has become more industrialized, the primary industries (agriculture, forestry, and fisheries) overall have gradually declined, and the share of the primary industries in the national economy has gone down drastically. The proportion of employment in agriculture, forestry, and fisheries to the total employment was only 5.7% in 2014, fallen from just below 50% in the 1970s to less than 10% in 2000. These industries' share of gross value added to the Korean economy declined more dramatically than this. In 1970, the share of agriculture, forestry, and fisheries to gross value added was 17.7%, then dropped to 5% by the early 1990s, and to below 3% by the

early 2000s. It is a common phenomenon that all industrialized countries have experienced: as the economy grows, the primary industries' proportion of total national production declines. Compared to other developed countries, it is particularly noticeable that the primary industries' proportion of total national production fell drastically in Korea. For instance, the time it took for the share of the total economy occupied by agricultural production to be reduced from 40% to 7% was only 26 years in Korea, compared to 100 years in Britain, the Netherlands, and Denmark; and over 90 years in the United States, Germany, and France. Even in

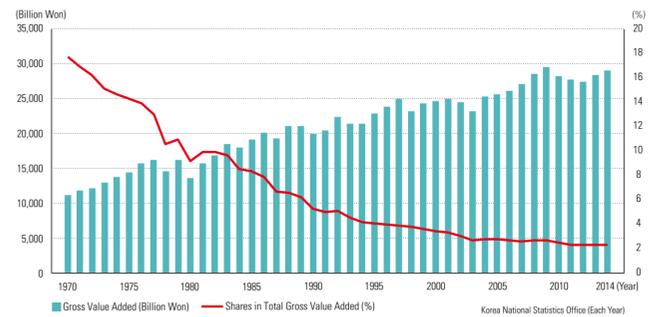
Japan, it took close to 73 years. It took only 14 years for the proportion of agricultural employment in Korea to decline from 40% to 7%, compared to at least 40 years in the United Kingdom, the Netherlands, Denmark, the USA, Germany, and France, and 31 years in Japan. The decline and structural changes in the primary industries did not occur uniformly across regions in Korea. Most rural areas did not have enough local jobs to absorb the surplus agricultural labor force. Therefore, there was mass out-migration to the cities while in-migration to rural areas was negligible. As a result, there are still some areas that maintain a high proportion of em-

ployment in the primary industries. On the other hand, in 2010, for the proportion of employment in the primary industry for all 230 cities, counties, and boroughs (-si, -gun, and -gu), over 58 places have less than 1% of employees working in primary industries, while 71 places have more than one-third of their employees working in primary industries. Thirty-four places (-si, -gun, and -gu) had more than half of their employees engaged in primary industries, but most of these are in the remote rural areas of Gyeongsangnam-do, Gyeongsangbuk-do, Jeollanam-do, and Jeollabuk-do.

Number of Workers in Agriculture, Forestry, and Fisheries, 1970 – 2014

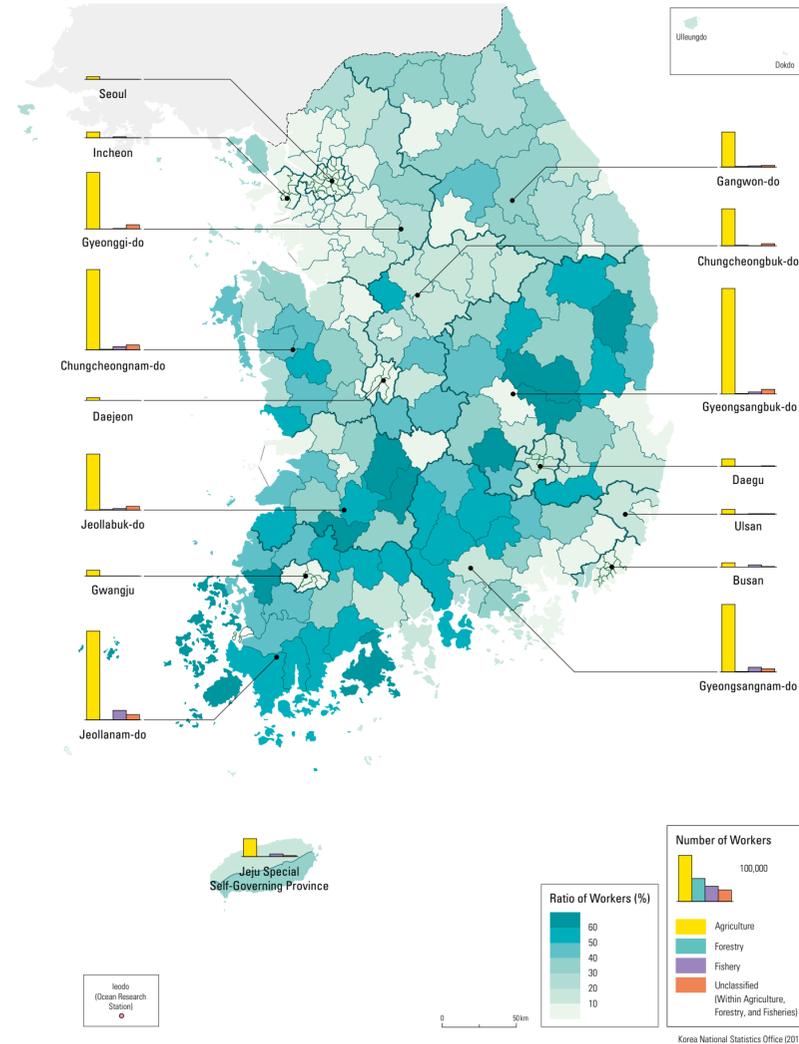


Gross Value Added of Agriculture, Forestry, and Fisheries, 1970 – 2014



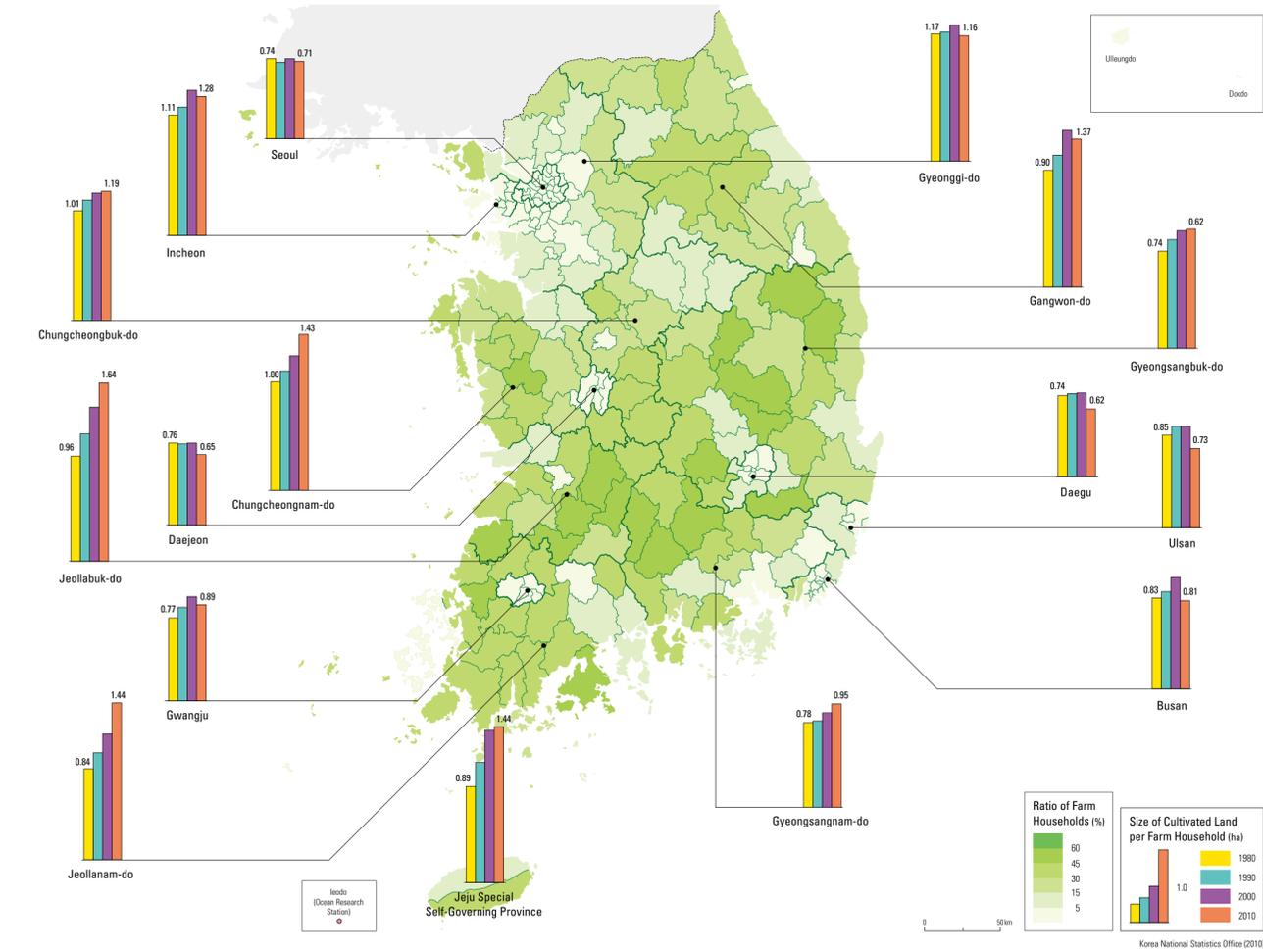
An Overview of Agriculture, Forestry, and Fisheries

Ratio of Workers Engaged in Agriculture, Forestry, and Fisheries, 2010

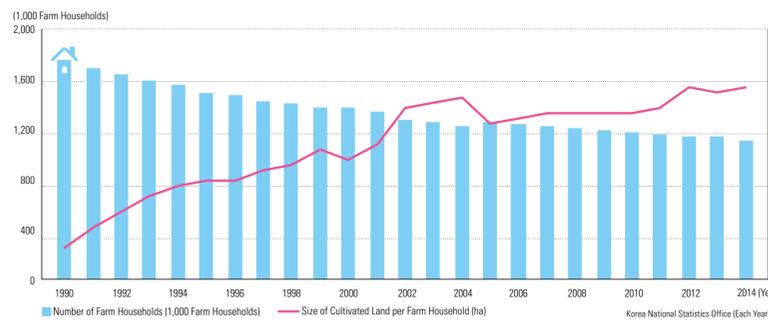


Farm Structure

Farm Households and Farm Size



Changes in the Number of Farm Households and the Size of Cultivated Land per Farm Household (1990 – 2014)

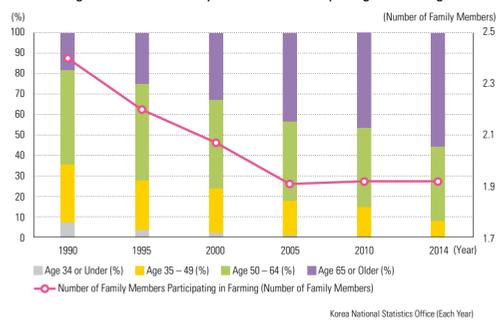


The number of farm households has also decreased continuously, similar to the decrease in agricultural workers, as industrialization has progressed. The total farming households in 1990 was 1.77 million; however, this number declined to 1.12 million in 2014, showing a drastic decline of 36.7%. During the same period, the number of people engaged in agriculture declined by 46.7%, from 4.24 million to 2.26 million people. In fact, the number of people engaged in farming per

household declined from 2.4 in 1990 to 1.9 persons in 2014. The average age of farm managers is also increasing. In 2014, the percent of farm managers over age 65 was 55.7%. Most older managers have failed to find successors for their farm businesses and continue farm work by themselves or with their spouses. From now on, it can be expected that massive farm closures will occur and the decline in farming households will surpass the decline in farm workers.

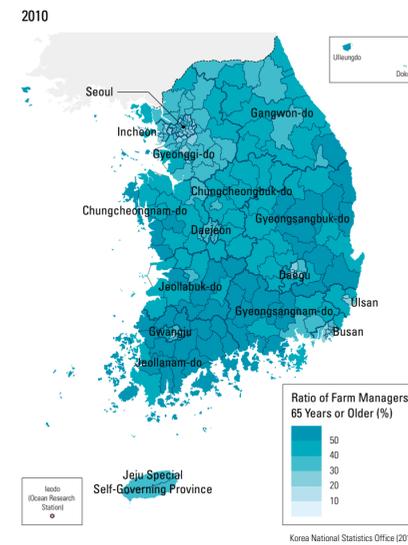
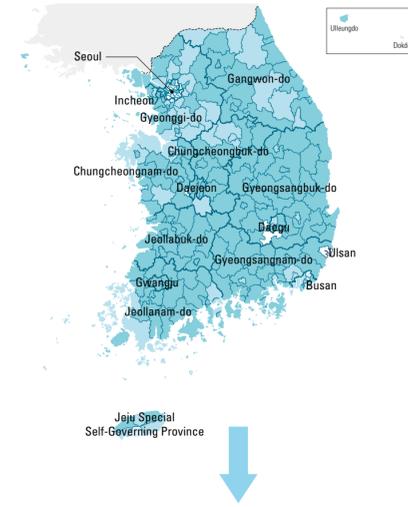
The percent of farming households to total households declined drastically. The average percentage of farming household for the -si, -gun, and -gu was 32.8% in 1990 but only 17.4% in 2010. Out of a total of 230 -si, -gun, and -gu areas, about 113 places had less than 10% of the households involved in farming. On the contrary, 35 places had over 40% of the households involved in farming, but most of them were in Jeollanam-do, Jeollabuk-do, and Gyeongsangbuk-do.

Age Composition of Farm Owners and the Average Number of Family Members Participating in Farming

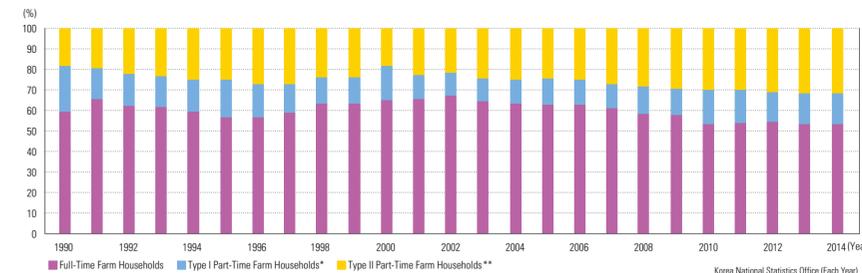


In 2010, over half of the total farming households in 53 places (-si, -gun, and -gu) had farm managers over age 65, compared to only one in 1990. On the other hand, in 2010 there were only 5 places with less than 20% of farm managers over age 65, compared to 179 places in 1990. In areas remote from metropolitan counties, especially Jeollanam-do, Jeollabuk-do, and Gyeongsangbuk-do, the aging of farm managers has become clearly noticeable.

Aging of Farm Managers 1990

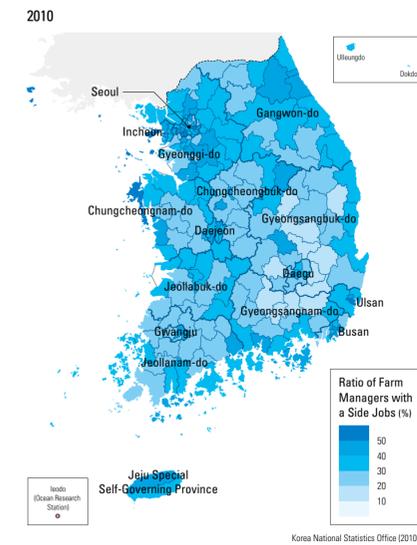
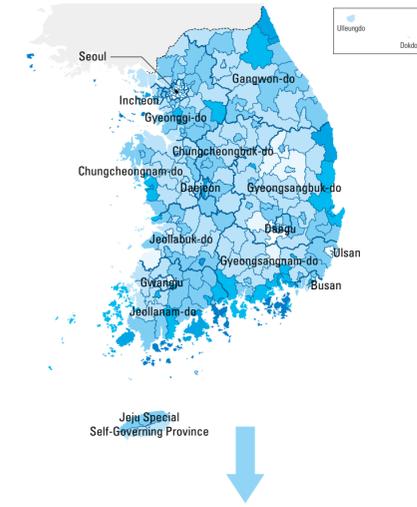


Composition of Full- and Part-Time Farm Households (1990 – 2014)



The income structure of farm households went through a major shift after the full-fledged opening of the agricultural market according to free trade agreements. Overall, off-farm income has grown larger than farm income; the proportion of farm households depending on off-farm income grew from 18.4% in 1990 to 31.9% in 2014. Also,

Off-Farm Activities of Farm Managers 1990

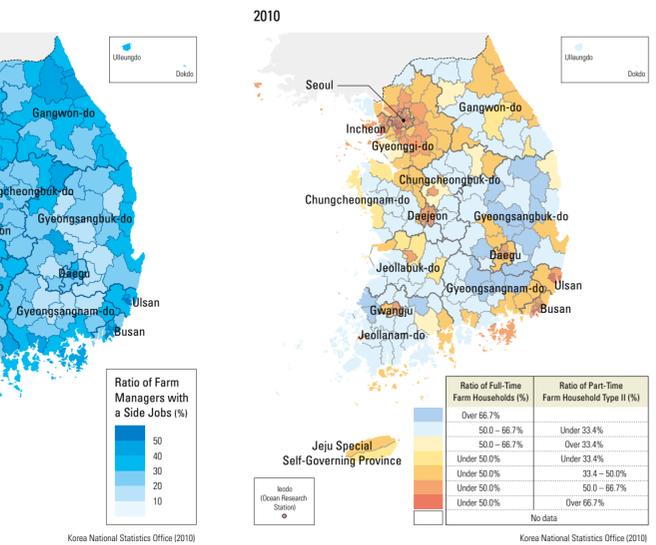
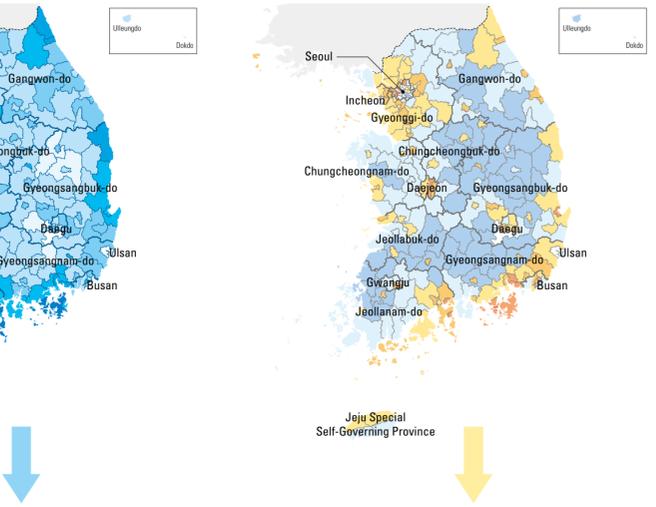


Full and Part-Time Farming of Farm Manager and Other Members (1990 – 2010)



the rate of farm managers participating in off-farm activities grew from 22.0% in 1990 to 30.5% in 2010. These increases indicate that more farm households' incomes depend increasingly on off-farm activities. This dependence is evident throughout Korea. Accordingly, 64 places (out of all -si, -gun, and

Full and Part-Time Farm Households 1990



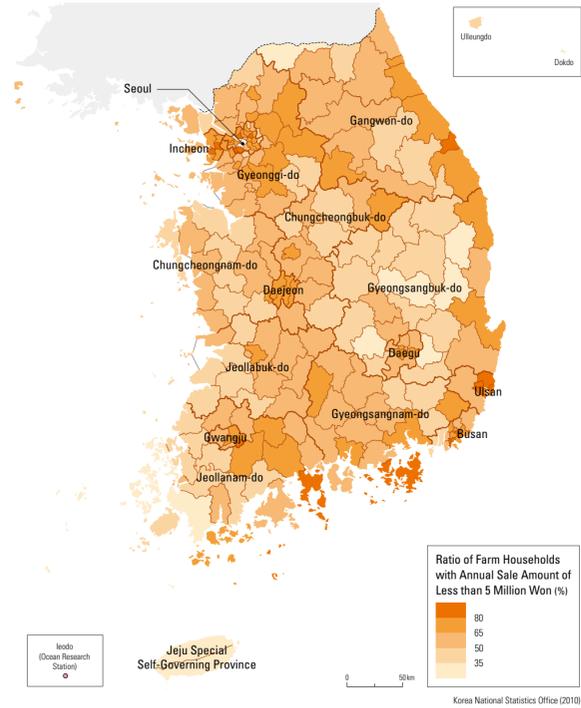
Ratio of Full-Time Farm Households (%)

Ratio of Full-Time Farm Households (%)	Ratio of Part-Time Farm Households Type II (%)
Over 66.7%	Under 33.4%
50.0 – 66.7%	Over 33.4%
Under 50.0%	Under 33.4%
Under 50.0%	33.4 – 50.0%
Under 50.0%	50.0 – 66.7%
Under 50.0%	Over 66.7%
No data	No data

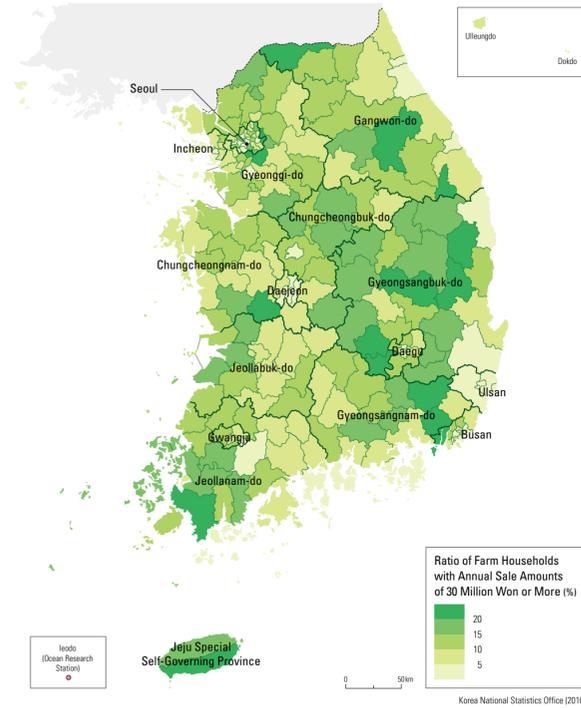
with over 30% of farm managers who engaged in off-farm activities grew from 48 in 1990 to 146 in 2010. The increase in part-time farmers and high dependency on off-farm income tends to take place in greater metropolitan regions and areas adjacent to regional cities.

Economic Polarization of Farm Households

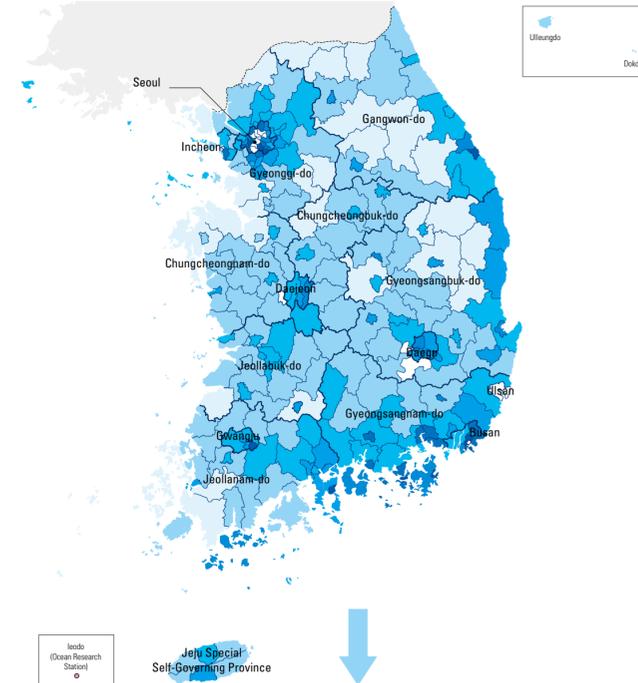
Low Yield Farm Households, 2010



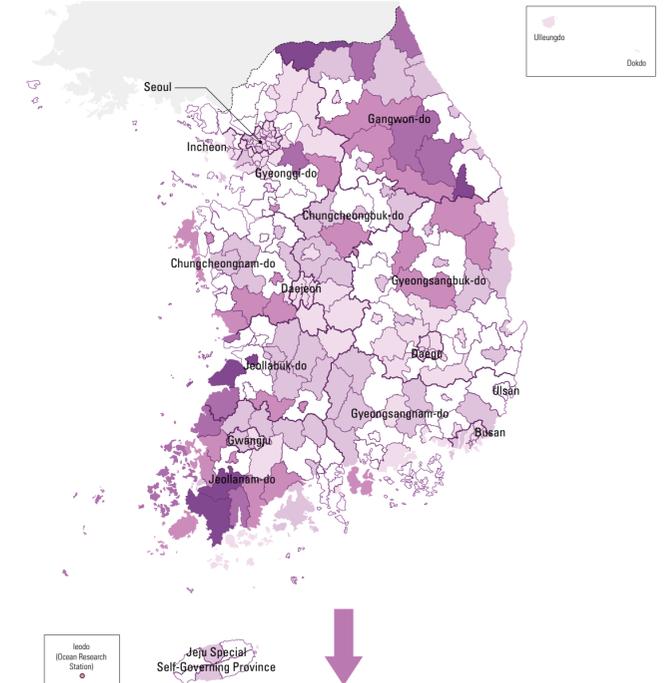
High Yield Farm Households, 2010



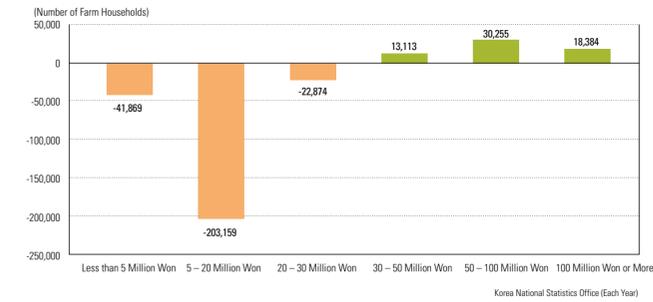
Small-Sized Farm Households, 1990 and 2010



Large-Sized Farm Households, 1990 and 2010



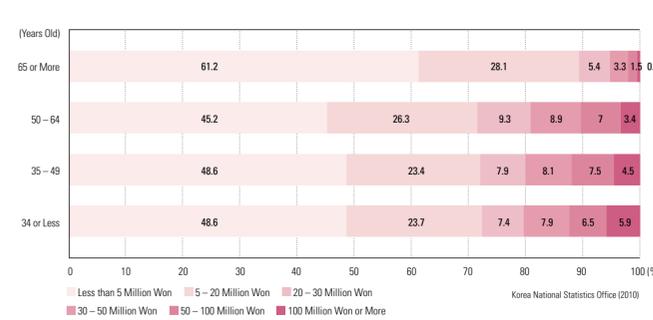
Changes in the Number of Farm Households by Type and Annual Sale Amount between 2000 and 2010



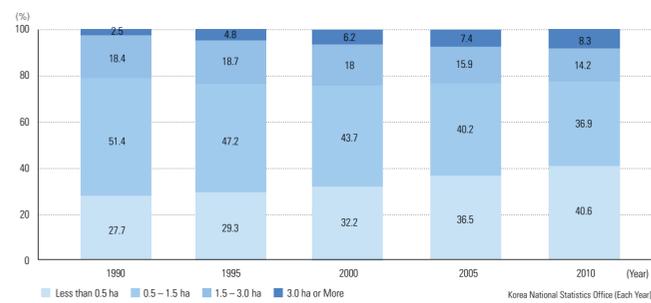
Distribution of Annual Sales Amount within Full or Part-Time Farm Households, 2010



Distribution of Annual Sales Amount within Farm Managers' Age Groups, 2010



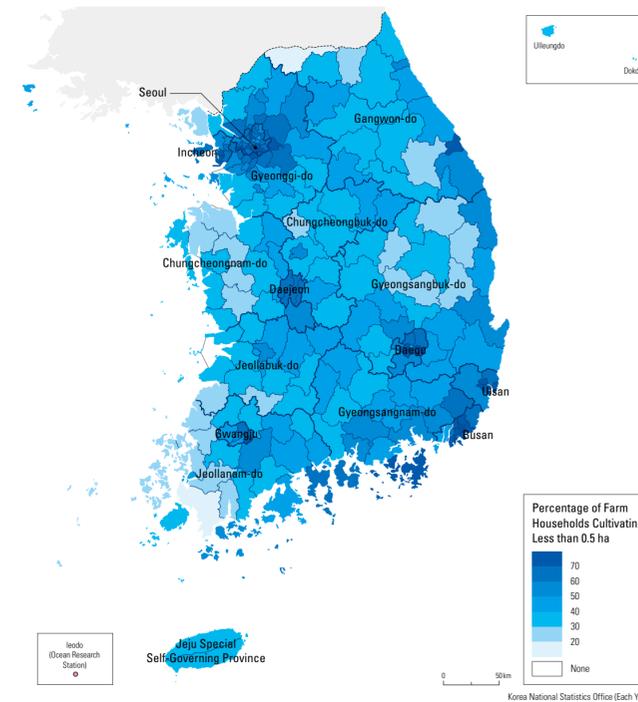
Percentage of Farm Households by Size of Cultivated Land (1990 - 2010)



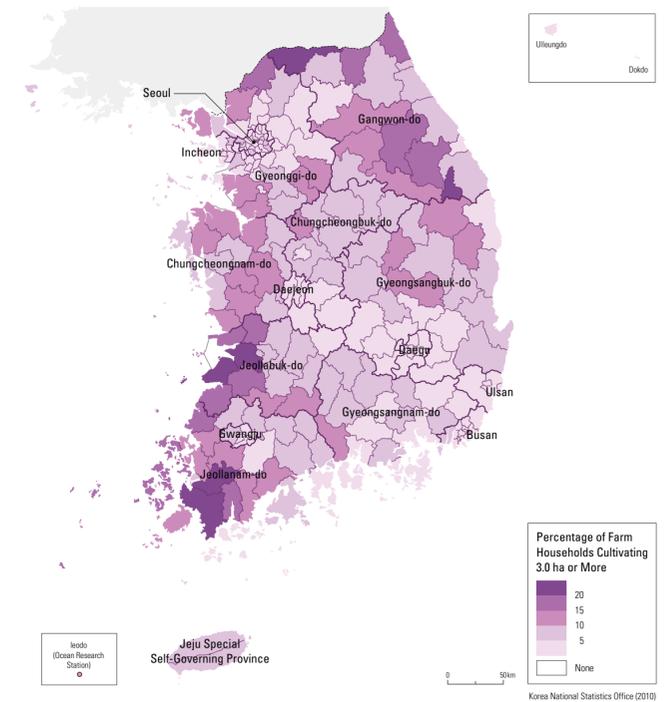
Since the 1990s Korea has seen a trend toward polarization of the farm structure, with large-scale commercial farms, as well as petty farms with almost no commercial farm sales income, increasing rapidly. For instance, the number of farm households with annual agricultural sales of over 30 million KRW between 2000 and 2010 increased by 6.4%,

or by 62,000 households. Over the same time period, the number of farm households with annual agricultural sales of more than 100 million KRW reached 18,000, an increase of 1.7%. The places (-si, -gun, and -gu) with a higher proportion of large-scale commercial farms were in Gyeongsangnam-do, Gyeongsangbuk-do, Chungcheongbuk-do, and Gangwon-do, in mostly non-metropolitan areas. On the other hand, farm households with almost no farm sales also increased to about 34,000 during the same time period. In 2010, the proportion of farm households whose sales amounted to less than 5 million KRW accounted for more than half of all farm households. These petty farms were either owned by aging farmers waiting to retire or part-time hobby farmers. About half of the farm managers younger than 49 had annual agricultural sales incomes of less than 5 million KRW in 2010. They represent the typical hobby farm households. Most petty farm households whose sales amount to less than 5 million KRW tend to be located adjacent to metropolitan areas or along coastal areas.

2010



2010

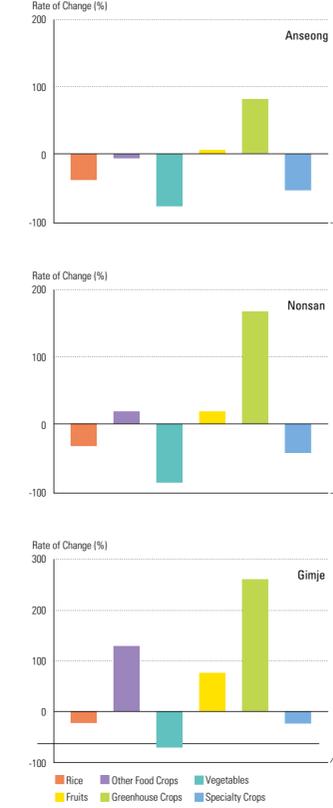


The polarization trend is also evident in farm size. The proportions of farms less than 0.5 hectares (1.24 acre) as well as large-scale farms of 3.0 hectares (7.4 acres) or more increased significantly between 1990 and 2010. Even though this polarization trend can be identified in almost all

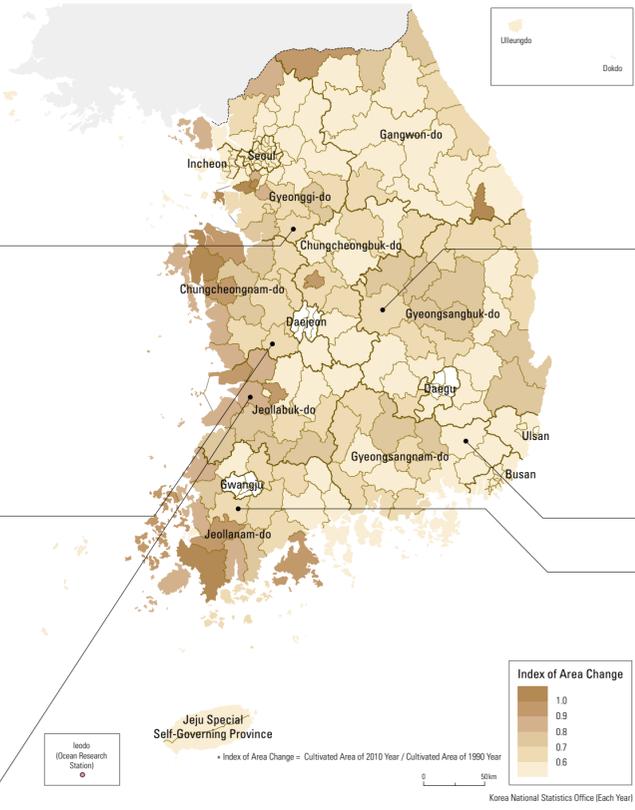
rural areas, some -si, -gun, and -gu show an extremely polarized pattern. Only 43 of 261 -si, -gun, and -gu in 1990 had more than 10% of their farms devoted to large-scale farming, and by 2010, the number increased to 50. In 2010, the areas with over 10% of their farms being larger than 3.0 hectares were in the plains of Gyeonggi-do, Chungcheongnam-do, Jeollanam-do, and Jeollabuk-do, and in the cool upland areas in Gangwon-do.

Changes in Rice Production

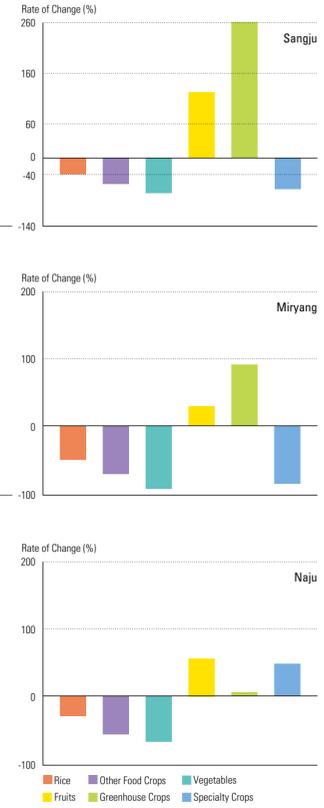
Changes in Cultivated Area by Crops in the Same Selected Regions, 1990 – 2010



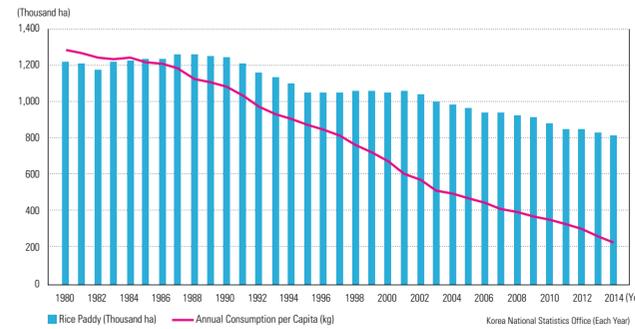
Changes in Rice Paddy, 1990 – 2010



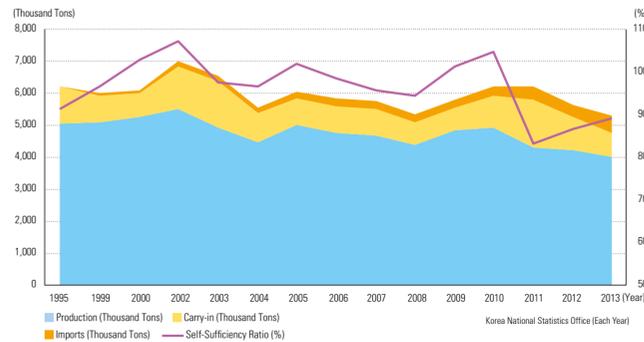
Changes in Cultivated Area by Crops in the Same Selected Regions, 1990 – 2010



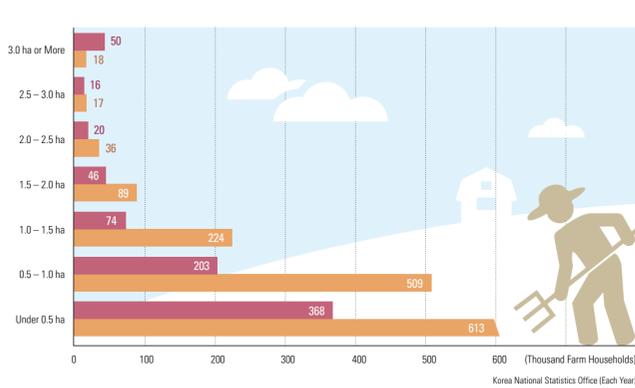
Rice Paddy and Annual Consumption per Capita (1980 – 2014)



Supply and Self-Sufficiency Ratio of Rice (1995 – 2013)



Number of Farm Households by the Size of Rice Paddy, 1990 and 2010

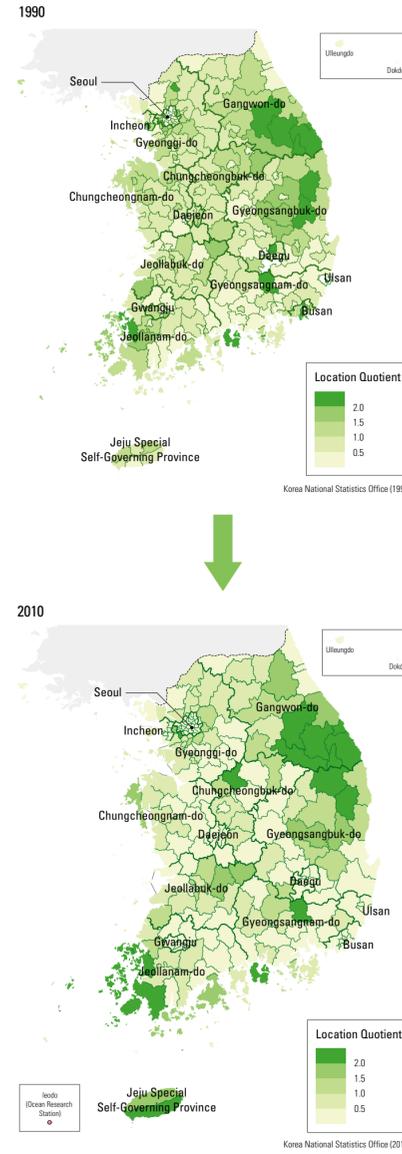


The most prominent change in Korean agricultural production has been the decline in rice production. The rice cultivation area was about 1,220,000 hectares (3,014,686 acres) in 1980, but declined steadily to 814,000 hectares (2,011,438 acres) by 2014, a reduction of 406,000 hectares (1,003,248 acres) in 34 years. Nevertheless, the per capita annual rice consumption was greatly reduced during the same period; rice has become rather seriously oversupplied. Moreover, the amount of rice imports by MMA (Minimum Market Access) based on the WTO agreements has increased annually, which creates an added burden to the rice production oversupply problem. Eventually, many rice growers either reduced their rice crop areas or switched to other paddy to

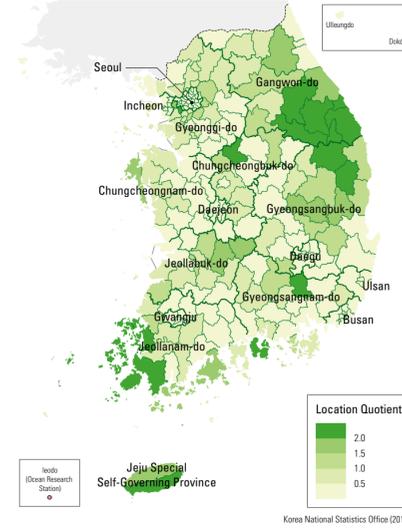
a lack of profit. As a result, the overall rice producing area in 2010 declined compared to 1990 in most parts of the country. Even the areas that have been well known for rice production have reduced rice production and switched to other cash crops. Anseong-si in Gyeonggi-do, Nonsan-si in Chungcheongnam-do, and Naju-si in Jeollanam-do are such examples. Compared to 1990, their rice production areas have declined by thousands of hectares, while fruits and greenhouse crops have replaced rice. This trend is confirmed by the distribution of fruit crop acreage and cultivated areas in greenhouse facilities. In 1990, fruit trees were grown in high density in the northern region of Gyeongsangbuk-do, eastern Chungcheongbuk-do, and

Crops Production

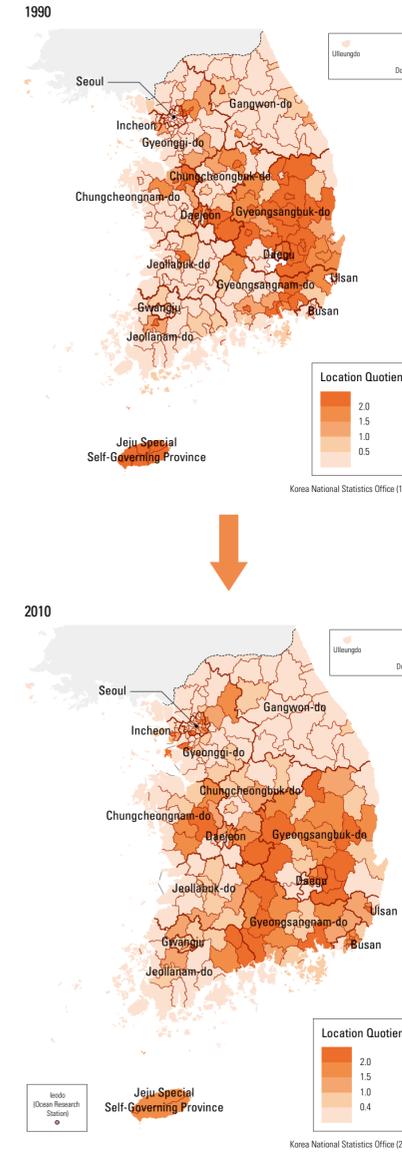
Vegetables 1990



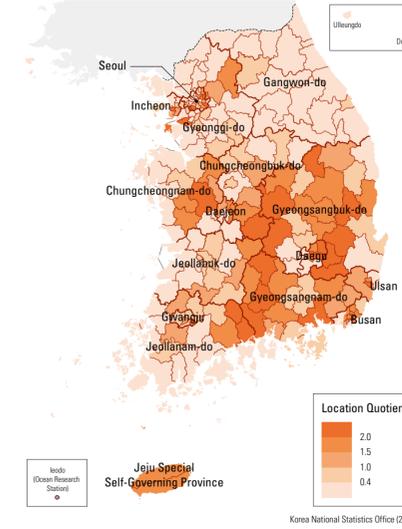
2010



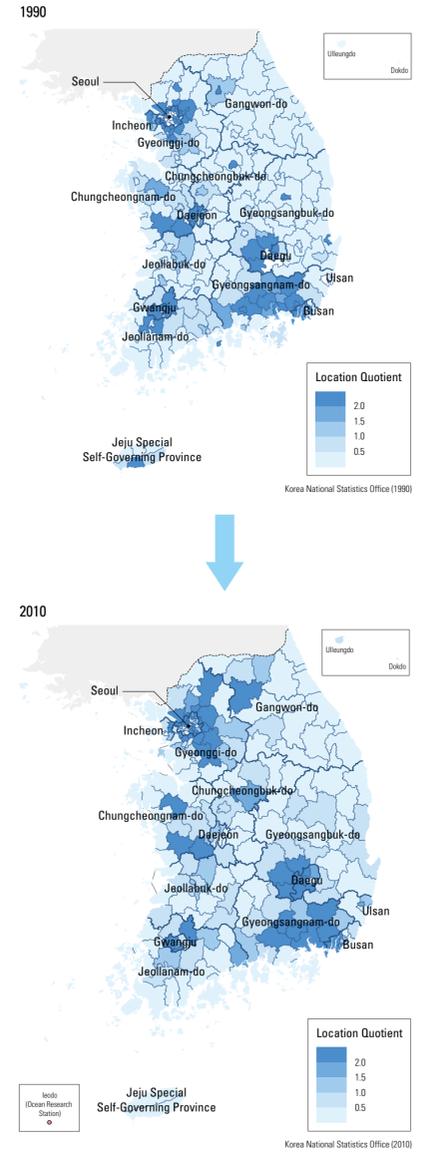
Fruits 1990



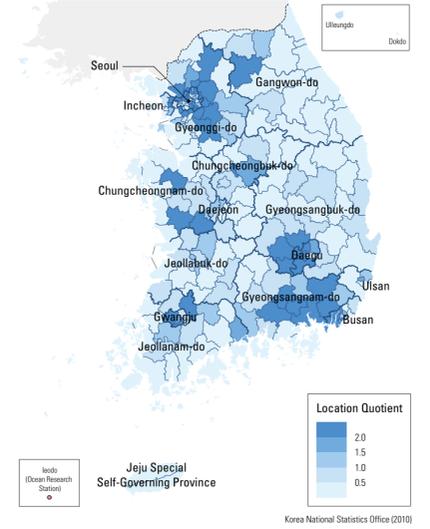
2010



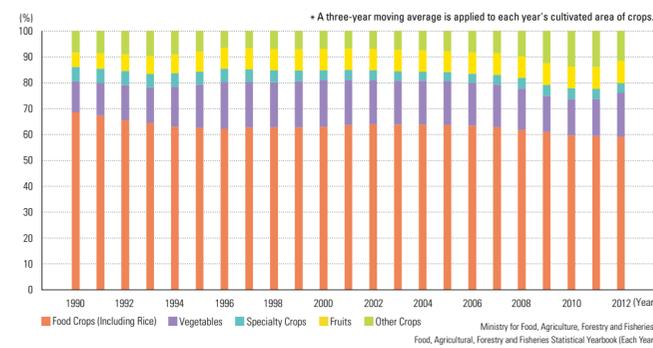
Greenhouse Crops 1990



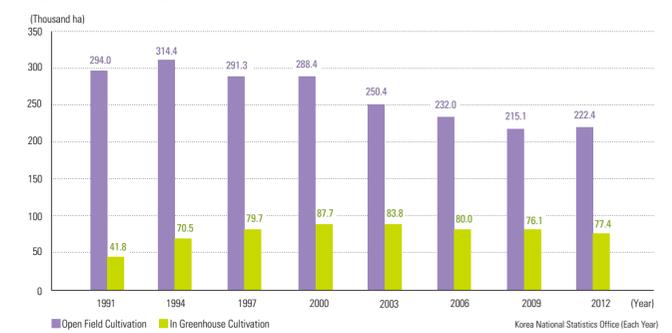
2010



Crops Production, 1990 – 2012



Vegetables Producing Areas by Cultivation Type (1991 – 2012)



southern Gyeonggi-do, and by 2010 these areas had expanded to the surrounding areas. Green-

house crops were mostly limited to places near metropolitan areas, some -si and -gun, and areas

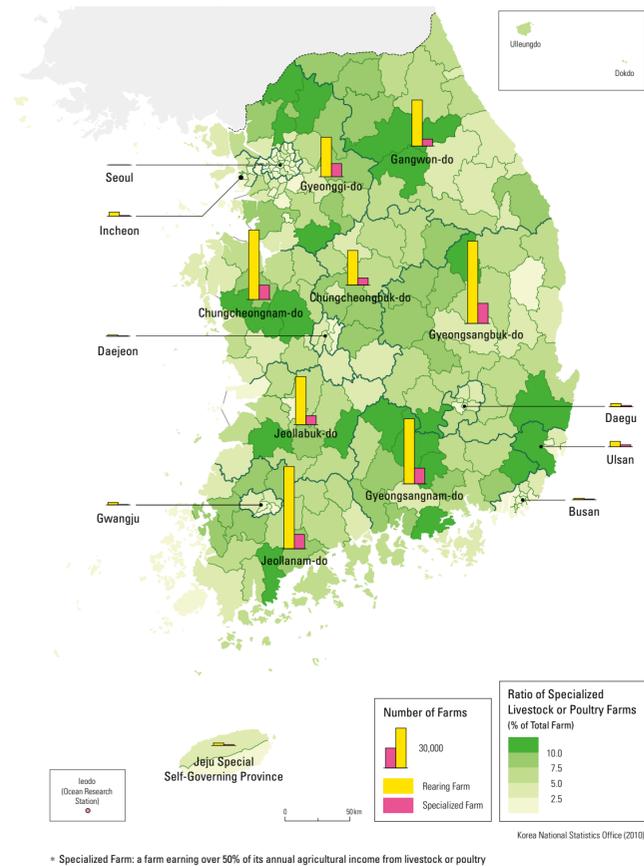
along the southern coastal area; however, today extensive areas of cultivation in greenhouse facil-

ities are found in not only metropolitan areas, but also some non-metropolitan areas.

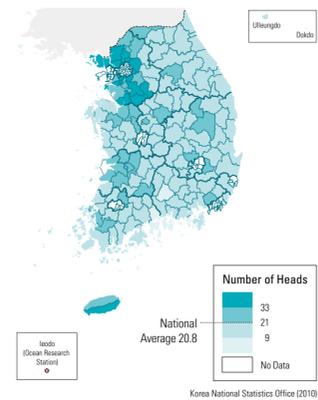
INDUSTRIAL ACTIVITIES

Livestock and Poultry

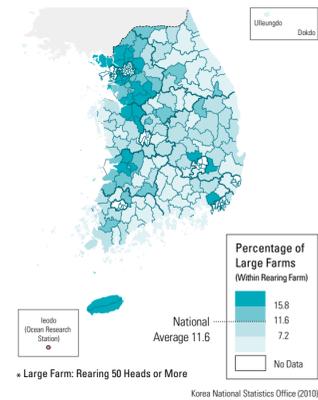
Specialized Livestock or Poultry Farms, 2010



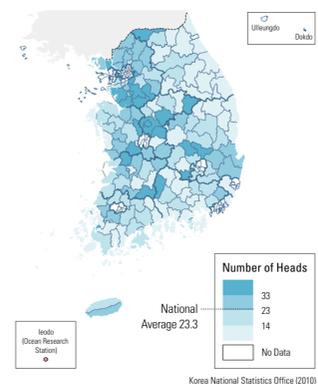
Number of Heads per Rearing Farm: Korean Beef Cattle (2010)



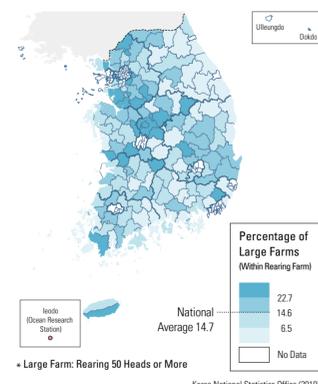
Proportion of Large Rearing Farms: Korean Beef Cattle (2010)



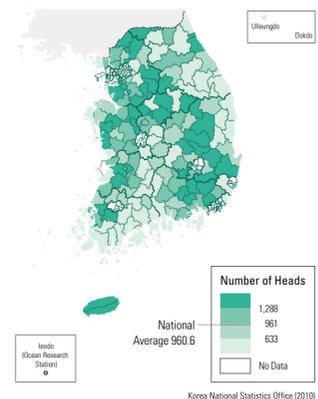
Number of Heads per Rearing Farm: Beef Cattle (2010)



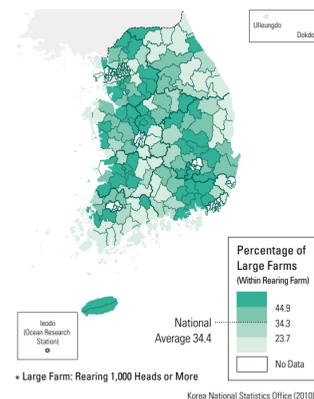
Proportion of Large Rearing Farms: Beef Cattle (2010)



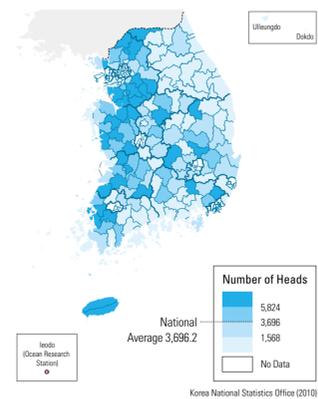
Number of Heads per Rearing Farm: Pigs (2010)



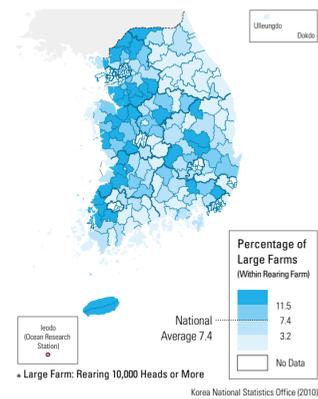
Proportion of Large Rearing Farms: Pigs (2010)



Number of Heads per Rearing Farm: Chickens (2010)



Proportion of Large Rearing Farms: Chickens (2010)



Major Structural Changes Produced by Livestock Sector

Livestock Type	1990			2010		
	Rearing Farm (A)	Specialized Farm* (B)	B/A (%)	Rearing Farm (A)	Specialized Farm* (B)	B/A (%)
Cattle**	608,667	26,136	4.3	163,163	56,523	34.6
Pig	139,455	21,323	15.3	7,929	5,098	64.3
Chicken	131,850	9,490	7.2	46,397	4,915	10.6

* A specialized farm means a farm earning over 50% of its annual agricultural income from cattle, pigs, or chickens.
** Cattle: Korean Beef Cattle and Beef Cattle

The livestock industry is one of the fastest growing segments in Korean agriculture. Since

1990, the value of livestock output grew at an annual average of 6.7%, and since 2010, the live-

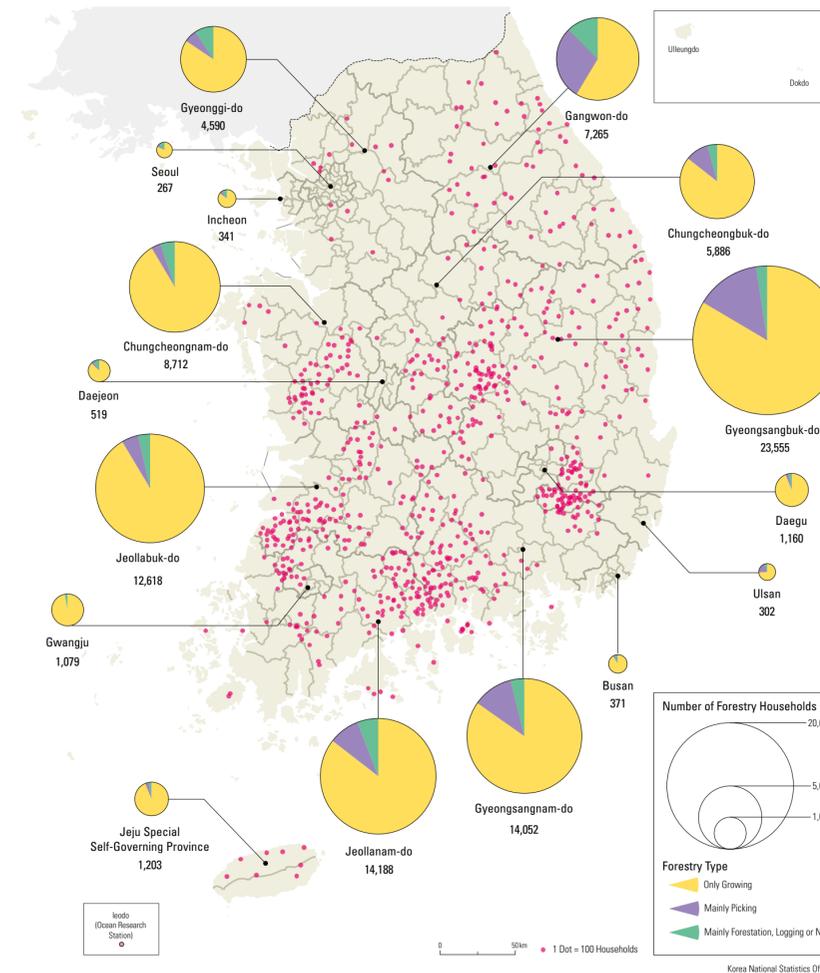
stock sector has taken a giant leap to comprise almost 40% of Korea's agricultural production value. Between 1990 and 2010, the total number of livestock and poultry farms declined greatly; however, the number of cattle, pigs, or chickens per farm increased drastically. At the same time, specialized livestock farms, which derive most of their income from livestock rearing, significantly increased. This indicates that the rapid growth of the livestock industry was accomplished together

with the increase in farm-size and specialization in production. There was no clear regional concentration of livestock farming in 2010. However, a close geographical association between the number of livestock and the distribution of large-scale livestock farms can be identified. In other words, large-scale livestock farms and specialized livestock farms are closely associated, reaffirming their geographic concentration.

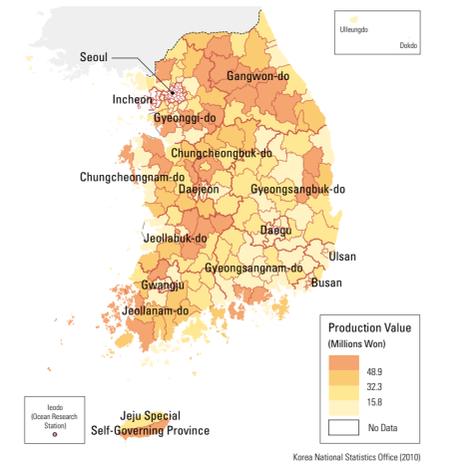
INDUSTRIAL ACTIVITIES

Forestry

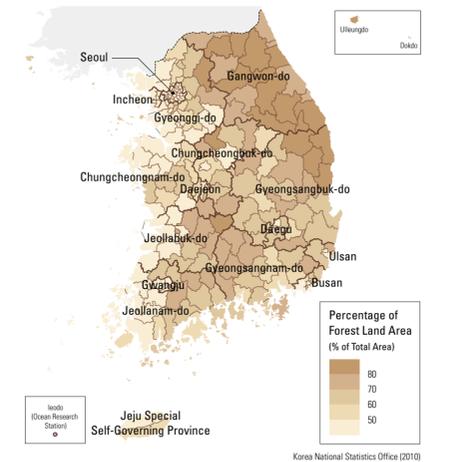
Forestry Households (2010)



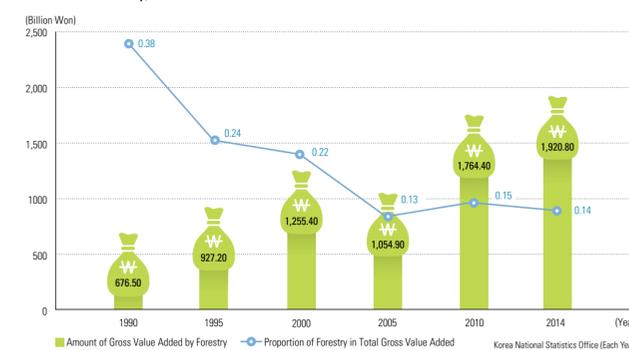
Production Value per Forestry Household (2010)



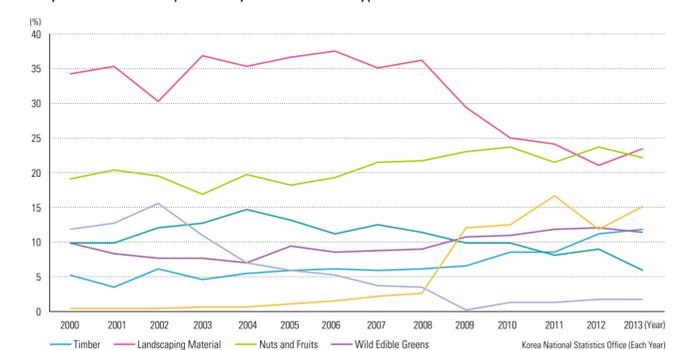
Proportion of Forest Land Area (2010)



Growth of Forestry, 1990 - 2014



Proportion Value Composition by Forest Product Type



The share of Forestry to the national economy has traditionally been low. From 1990 to the present, the annual forestry production value remained in between 0.2 and 0.5% of the gross national product. However, forestry households, which main source of income is forestry, have increased slightly compared to the past. There were 66,320 forestry households in 2000, and the number increased to 95,557 households in 2014. This is because a lot of forestry products

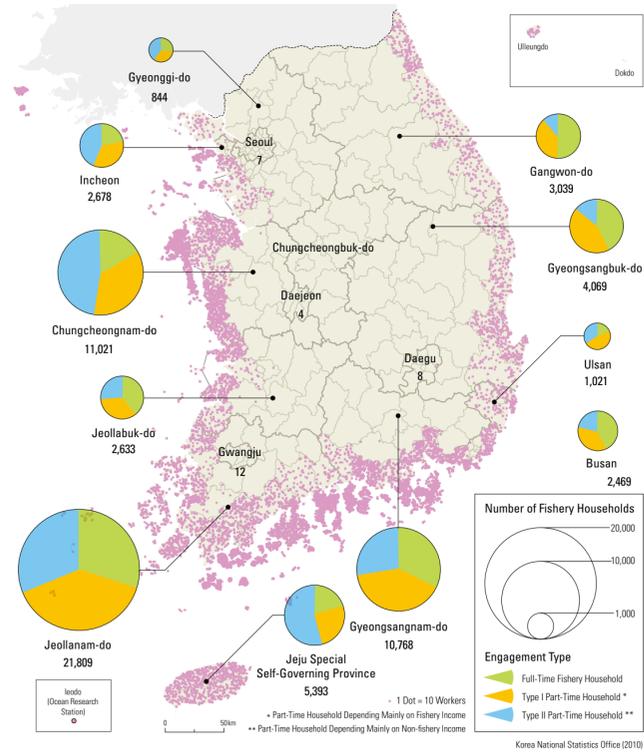
that used to be gathered from the forest are cultivated directly now. As a result, it is difficult to distinguish forestry households from agricultural households cultivated forestry products. This change in the forestry households is also reflected in the regional distribution of forestry households in 2010. In fact, more forestry households are found in the traditionally agricultural regions of Jeollanam-do, Jeollabuk-do, Gyeongsangnam-do, and Gyeong-

sangbuk-do. Gangwon-do, a relatively well-forested province, has only 7.6% of the country's forestry households. In Gangwon-do, a higher percentage of forestry households are engaged in forestation, logging, nursery, and collecting of herbs than in any other cities or provinces. Production value composition by forest product has also changed in the same period. The production of wild edible greens, herbs, and fruits from fruit-bearing trees has gradually increased. In the

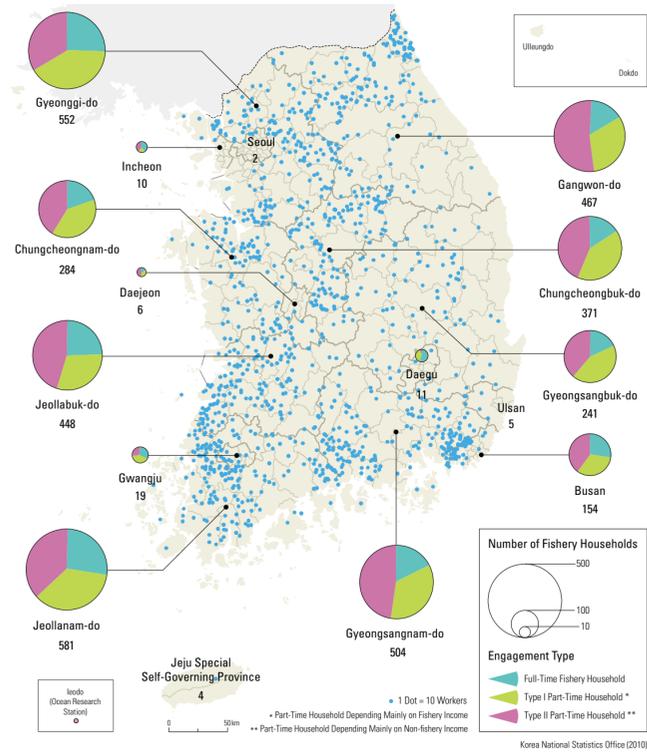
past, these forest products were mainly gathered and collected from the wild, but in recent years they have been cultivated in large quantities in the field, resulting in a rapid increase in yield and production value. Also, the increase in cultivated forestry products has been a primary contributor to the increase in total forestry production value.

Fishery

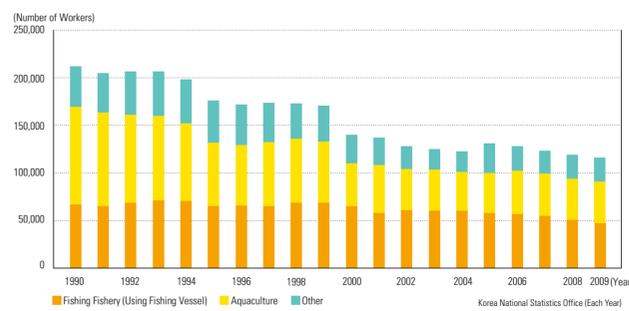
Marine Fishery Workers and Households (2010)



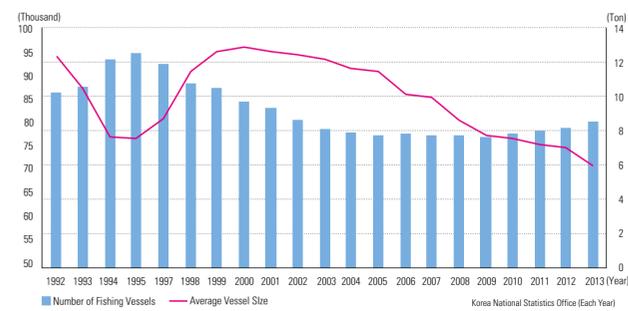
Inland Water Fishery Workers and Households (2010)



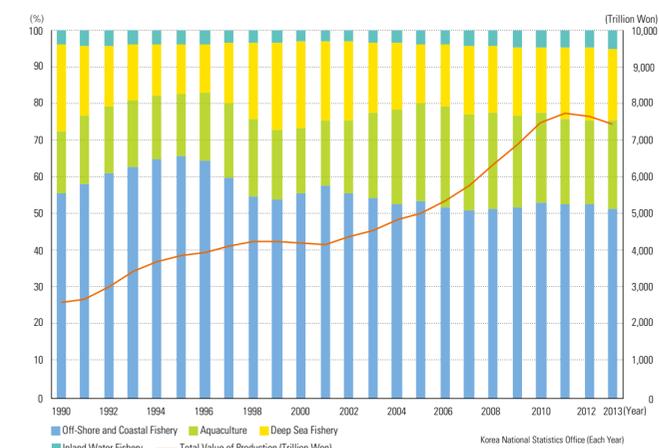
Number of Workers by Type of Fishery: Marine Fishery (1990 – 2009)



Number and Size of Fishing Vessels (1992 – 2013)



Proportion of Production by Fishery Type (1990 – 2013)



The Korean fishing industry has experienced a lot of uncertainties due to the depletion of fishing resources and imported fishing products over the last few decades. The decline is more prominent in coastal and deep-sea fishing, which have traditionally been important in the Korean fishing industry. Only after 2000, with a gradual increase in aquaculture and inland fisheries, has the total fishing industry output and value of production slightly improved.

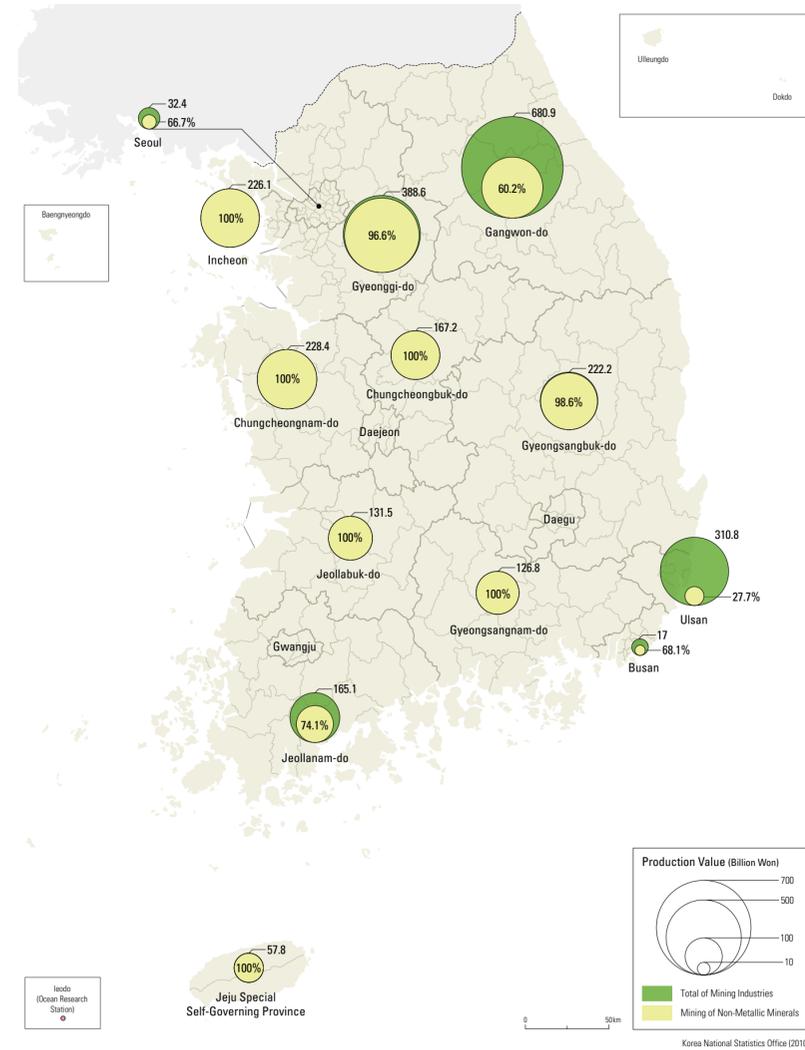
In recent years, however, even the aquaculture industry has begun to decline. This overall depression in the fishing industry has caused a persistent decline in the fishing industry population. The number of fishermen employed in offshore or coastal fishing in 2010 was reduced to almost half, while the number in the inland fishing industry declined to about 36% during the same period. This trend is expected to continue in the future because there is hardly any influx of new fishing industry

workers, and current fishing industry workers are aging. The average age of managers of fishing industry households in 2014 was 62.7 years of age, and the percent of fishermen over 65 was 32.2%.

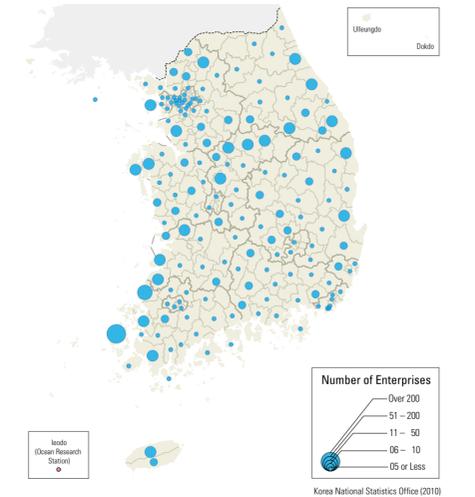
Fish businesses overall are still small in scale. The government has tried to limit the number of fishing vessels in an effort to encourage fishing businesses to engage in larger scale operations. As a result, the number of total fishing vessels has steadily decreased in the 2000s. Despite the governments effort, the average tonnage per vessel (T / units) is still less than 10 tons. However, there are many fishing households whose annual sales are growing. In particular, the average aquaculture farm size has increased significantly. Another characteristic of the Korean fishing industry has been that the proportion of full-time fishing industry employees is very low. Currently, less than 30% of fishing industry employees are full-time workers.

Mining

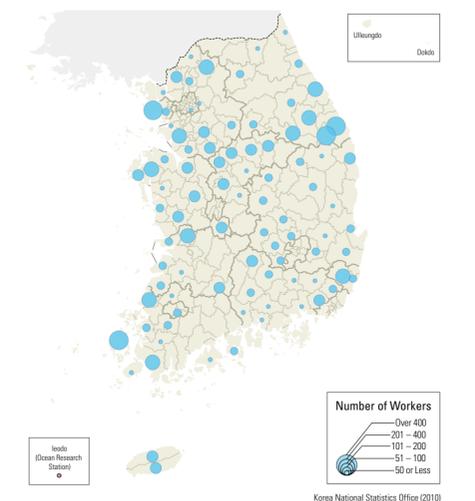
Production Value of Mining Industries (2010)



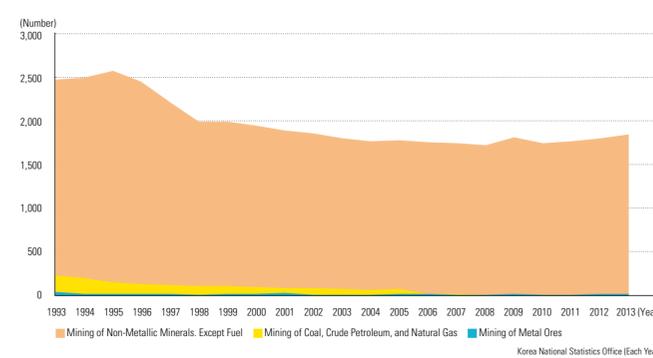
Number of Enterprises in Mining Industries (2010)



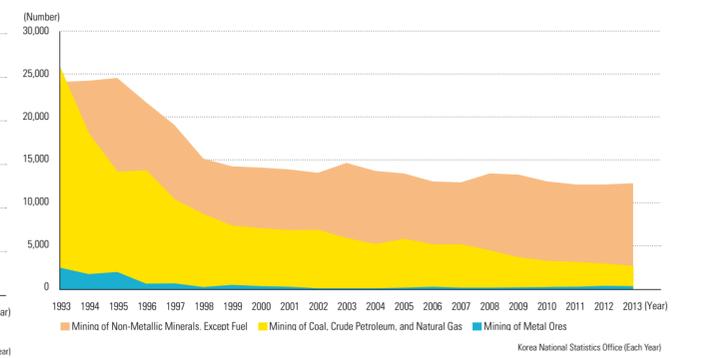
Number of Workers in Mining Industries (2010)



Number of Enterprises by Mining Industry Type (1993 – 2013)



Number of Workers by Mining Industry Type (1993 – 2013)



About 300 minerals are found in Korea. Of these, 140 are valuable minerals. Among them, however, about 20 are considered to be valuable mineral resources and only a few are considered economically worth mining. Minerals mined in Korea are mainly non-metallic and coal. In recent years, with the decline of the coal industry, the

non-metallic mineral mining sector makes up the majority of the Korean mining industry. In 2014 about 98% of total mining production came from small companies that engage in non-metallic mineral mining, such as kaolin, limestone, and silica mining. Since kaolin, limestone, and silica are deposited nationwide, min-

ing companies and workers are also distributed nationwide. Currently, anthracite is the main type of coal being mined. Although anthracite is found in Gangwon-do, Chungcheongnam-do, Chungcheongbuk-do, Jeollanam-do, and Jeollabuk-do, over half of it is deposited in the Taebaek-si and Jeongseon-gun areas in Gangwon-do.

With a decrease in the demand for coal, the government has initiated a policy to rationalize coal mining; this decrease has also led to the highest number of abandoned mines in the coal industry since 1989. As a result, the number of mines in operation was 374 in 1988, but only 5 remain today.