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A Comparative Review of Structural Changes in South Korea and South Dakota Agriculture

Larry Janssen
South Dakota State University

Yong Kwon

A COMPARATIVE REVIEW OF STRUCTURAL CHANGES IN SOUTH KOREA AND SOUTH DAKOTA AGRICULTURE*

by

Dr. Larry L. Janssen** and Dr. Yong Dae Kwon**

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**Dr. Janssen is Professor of Agricultural Economics at South Dakota State University and Dr. Kwon is Professor and Head of Agricultural Economics at Chungnam National University, Taejon, South Korea. Both professors have teaching and research interests in agricultural policy and economic development. Dr. Janssen recently participated in an SDSU faculty teaching exchange program to Chungnam National University, Taejon, South Korea, from March – June (spring semester) 2000. Dr. Kwon was host to Dr. Janssen and his family during the exchange program.

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ABSTRACT:

Structural change is an ongoing feature of economic development around the world. Despite vast differences in the structural organization of South Korean and South Dakota (U.S) agriculture, many structural changes are similar. This paper includes a comparative review of selected structural changes in Korean and South Dakota (U.S.) agriculture and the relative impact of forces affecting structural changes in both nations. Reduced economic impact of farm sector, farm population and farm size trends, full-time vs. part-time farming, changing food consumption, imports and exports are some of the major structural trends examined. Implications of changing agricultural structure in South Korea and South Dakota for agribusiness are discussed.

INTRODUCTION

Concern about the future organization of production agriculture is a major reason why social scientists study structural changes in agriculture. Agricultural structure is the control and organization of resources needed for food and fiber production. It includes a study of the economic contribution of agriculture; farm population and farm size trends; ownership and control of resources; farm - household interactions; linkages to agribusiness; and other topics. The study of changing farm structure and the forces behind the changes allows us to view agriculture in its entirety and also examine how changes affect individual farms and agribusiness firms (Knutson et.al. 1998). A study of international comparisons of structural changes in the agricultural - food sector permits a richer, deeper perspective on the relative impact of economic and social forces that impact the organization of agriculture.

In this paper we provide a comparative review of structural changes in South Korea and South Dakota's agriculture and food sector. The major purpose is to present an overview of key structural changes and why many changes are similar despite vast difference in the organization of agriculture in South Korea and in South Dakota. The comparative review is illustrative, not exhaustive, of the structural changes in both regions. A comparison may be of interest to the reader because South Korea is a major importer of agricultural products raised in the Northern Plains of the United States and ranks as the 4th largest importer of U.S. agricultural products (ERS, 2000). Also, South Korea has achieved the most rapid per capita economic growth and development of any nation in the past 40 years and is the only Asian nation to achieve First World status in this time period.

FORCES OF STRUCTURAL CHANGE IN PRODUCTION AGRICULTURE

Many social and economic forces influence structural changes in agriculture. Five major forces are highlighted in this section: (1) technology, (2) economic development policies, (3) domestic agricultural policies, (4) international trade policies, and (5) impact of rising national income on food consumption patterns.

The shift from labor-intensive to capital-intensive and information-intensive technologies has transformed agriculture in most developed nations and in many developing nations. For example, the shift from animal power to mechanical power was largely accomplished on South Dakota farm's by 1950. Larger and more complex farm equipment and machinery has been the dominant trend since the 1950's from four-wheel drive tractors, combines with 32' headers, automated feeding systems, and livestock confinement buildings. South Korean agricultural technology shifted from animal power to small-scale mechanization (power tillers) in the late 1960's and throughout the 1970's. The development of moderate size dairy and swine confinement facilities similar to those found in North America has occurred since the late 1970's.

From 1962 to the late 1990's, South Korea pursued a government led, growth-first economic development strategy emphasizing widespread education opportunities, outward looking industrialization, export promotion, and development of large family-

owned conglomerate (chaebol) firms. Structural transformation from an agrarian society to an industrialized, high technology, urban society was deliberate and carefully planned. Rural development and agricultural policies were designed to facilitate transfer of skilled and semi-skilled human resources to the industrial sector (Sakong, 1993; Park, 1998).

Economic development policies in the United States involved a much lower degree of central (federal or state) government planning, but certainly emphasized infrastructure development that expanded markets and greatly reduced unit transport costs. Education policies (primary, secondary, and higher education) and other human capital investments facilitated human resource transfer and mobility from rural to urban and suburban employment centers.

Agricultural policies and international trade policies have long been intertwined in the United States because the U.S. is the world's largest net exporter of agricultural products. Various combinations of price and income supports, export subsidies and import tariffs/ quotas, land retirement, and production control programs have been used to stabilize or improve farm sector incomes during the past 35 years of increasingly open world markets for agricultural products. However, public and privately supported agricultural research has probably had more impact on farm structure in the past 50 years than any other set of agricultural policies.

Agricultural policies have directly influenced the structure of South Korean agriculture in four key areas. First, land reform policies in the late 1940's and early 1950's deliberately created a small-scale family farm sector with widespread land ownership. Until 1995, farm ownership size was limited to 3.0 hectares. Second, South Korea developed a national federation of agricultural and livestock cooperatives which provided key inputs, technical education, and marketing services for Korea's farmers. Government subsidized inputs and credit for fertilizer, chemicals, and small-scale farm machinery was instrumental in the rapid modernization of Korean agriculture. Third, Korean agricultural policies are designed to sustain a "rice culture" by maintaining nearly 100% self sufficiency in rice production. Fourth, a modern domestic dairy, beef, swine, and poultry sector is sustained by nearly complete reliance on imported feed grains, oilseeds, and hay. Also, South Korea is a major net importer of food items not

produced domestically. Overall, the cereal grain self sufficiency rate in South Korea is less than 30%, one of the lowest self-sufficiency rates in the world (OECD, 1999; KREI, 2000; Choi, 1997).

Growing consumer markets and rising per capita incomes emerging from rapid industrialization along with development of modern railway and highway systems in South Korea led to considerable transformation of its domestic agricultural sector. From 1962 to 1995, per capita incomes in South Korea increased an annual average of 7.1%, the highest growth rate in the world (OECD, 1999). This rapid income growth resulted in: (1) increasing calorie consumption from an average of 2200 calories per person in 1960 to 2900 calories per person in 1990; and a (2) major shift in the Korean diet in favor of fruits, vegetables, and meat and decreases in amount of cereal grains (rice) consumed. Changing food consumption patterns led to a modern livestock industry and shifted land use toward higher valued fruit and vegetable crops in South Korea.

During this same time period, changing food consumption patterns in the U.S. had considerably less impact on South Dakota's agriculture sector. Beef cattle, hogs, and dairy remained the major livestock industries while soybeans replaced oats and barley as a major use of cropland.

COMPARATIVE REVIEW OF STRUCTURAL CHANGES IN AGRICULTURE

In the section, we compare major structural changes in South Korean agriculture - food sector with changes in South Dakota or U.S. agriculture-food sector, as appropriate, and as dictated by data availability. Most of the data examined is from Korean Ministry of Agriculture and from the U.S. Census of Agriculture or U.S. Dept. of Agriculture economics data series.

Declining Share of Agriculture in the National Economy

An important characteristic of modern economic development is the declining share of agricultural employment or production in the national or regional economy. This pattern has occurred in all developed nations and more rapidly in South Korea than

elsewhere. For example the proportion of persons employed in South Korean agriculture declined from 49.5% in 1970 to 32.3% in 1980 to only 10.3% in 1996. Similarly, the agricultural share of South Korea's GDP declined from 23.3% in 1970 to 12.7% in 1980 and only 5.4% in 1996 (Choi, 1997). Most of the rapid decline in agriculture's share of U.S. employment and production had occurred prior to 1970.

A detailed comparison of changing industrial structure in eight developed nations, including the United States and South Korea, indicates the same structural pattern occurred in all eight nations. Initially, agriculture is the predominant source of employment and production. The service sector (broadly defined) becomes the leading source of employment when the share of agricultural employment declines to about 40% of national employment. As economic development proceeds, manufacturing sector employment overtakes the agricultural sector when its share declines to 20 - 25% of total. The relative share of agricultural employment continues to decline thereafter. During this entire process, the productivity ratio of agricultural to nonagricultural labor is less than 1.0 (Lee, 1997).

The speed of employment adjustment and production adjustment is the major difference between South Korea and the other developed nations. For example, the reduction of agricultural employment from 40% to 16% of national employment took 42 years in the United States (from 1900 to 1942), but only 14 years (from 1977 to 1991) in South Korea. In other words, employment structure changed three times faster in Korea than in the United States and even faster relative to Western European nations. A similar pattern of findings occurs from examination of the changing share of agricultural production. Most of the declining share of agricultural production is due to final demand factors which "reconfirms the classical assertion that agricultural share of production decreases with economic development mostly because income elasticity for agricultural products is substantially less than unity" (Lee, 1997, pp. 15).

Farm population and farm number trends

The farm population and number of farms continue to decline throughout the developed world. Most of the decline in the U.S. farm population (from 30.8 million to

10.0 million) occurred between 1940 and 1970 with further decline to only 5.5 million persons by 1997. However, the farm population in South Korea did not decline until after 1965 and the magnitude of decline has been very rapid during the past 30 years. In 1970, the South Korean farm population was14.4 million or 46% of the nations population. The farm population declined to 10.8 million (28.4% of the nations population) in 1980 and to only 4.8 million (10.8%) by 1995. The number of farm households (which approximates the number of farms in Korea) declined from 2.41 million in 1970 to 1.48 million in 1995. (Kim, 1997; Choi, 1997) The average number of persons per farm household declined from 6.0 in 1970 to only 3.3 in 1995, a direct consequence of smaller family size and an aging farm population.

The farm population and number of farms continues to decline in South Dakota at a faster rate than observed for the entire United States, but at a slower rate than in South Korea. The number of farms in South Dakota peaked in 1935 at 83.3 thousand, declining to 45.7 thousand farms in 1969 and to 31.3 thousand farms in 1997 (Diersen et.al. 2000). During this same time period, the farm population decline was greater than the decline in farm numbers as the average number of persons per farm household also declined.

Selective out-migration of young persons and young families from farms and rural areas is pronounced in South Dakota and in South Korea. This has resulted in a rapid aging of farmers in both places. For example, 14.2% of South Dakota farm operators in 1969 were less than 35 years old compared to 11.8% who were 65+ years of age. By 1997, only 11.5% were less than 35 years old compared to 23% who were 65+ years of age. (Diersen et.al. 2000) This situation is even more dramatic in South Korea where 22% of farmers were 20 -29 years of age in 1970 compared to only 6.3% who were 60+years of age. By 1995, only 3.3% of farmers were 20-29 years of age compared to 36.1% who were 60+ years of age or older (Kim, 1997).

The changing age distribution of farmers insures continued decline in farm numbers in the next 20 years. Janssen and Diersen estimate South Dakota farm numbers will likely decline between 1.3% to 1.8% per year to between 20,200 and 23,000 farms. In South Korea, the number of farm households will likely decline more than 2.0% per year - the average rate of farm household decline from 1970 to 1995.

However, the rate of farm population decline may not be as high as the -4.2% annual average from 1970 to 1995 as the number of persons per household should stabilize.

Farm Size Trends

Average farm size is another major difference between the agricultural sectors of South Dakota and South Korea. However, the trend to larger average farm size is evident in both places.

Average farm size in South Dakota increased from 445 acres (180 hectares) in 1935 to 997 acres (404 hectares) in 1969 and 1,418 acres (575 hectares) in 1997. The smallest average farm sizes are found in eastern South Dakota where average farm size by county is 360 to 1030 acres. In western South Dakota average farm and ranch size varies from 1600 to 7000 acres in most counties.

The distribution of farm size (in acres) has also changed over time. Since 1969 increasing average farm size in South Dakota has been accompanied by an increased number of larger farms and ranches (2000 acres or more), substantial declines in the number of small to medium size farms (180 to 999 acres), with modest declines in the number of farms in the other acre size categories (less than 180 acres and 1000 to 1999 acres). In 1997, farms and ranches of 2000 acres or more are worth 48% of the total value of the state's farmland and buildings, operate 49% of the state's cropland and most of its range and pasture acres. Very small farms of less than 180 acres control less than 2% of land in farms and cropland, but comprise 6% of the total value of farmland and buildings on South Dakota farms. (Diersen et.al. 2000).

Farm size is very small in South Korea and is measured by the amount of cultivated land. Average farm size has increased from 0.90 hectares in 1970 to only 1.32 hectares (about 3.2 acres) of cultivated land in 1995. By comparison, the average South Dakota farm had 185 hectares of harvested cropland and 575 hectares of land in 1997. Three factors explain much of the variation in average farm size between South Korea and South Dakota:

(1) intensive land use (irrigated rice paddy, horticultural crops) in Korea vs. extensive range land and non-irrigated cropland uses in South Dakota;

(2) legal prohibition on farm size above 3 hectares in South Korea from the early 1950's to 1994. Land reform in South Korea emphasized small-scale family farms; and

(3) small-scale mechanization and supporting infrastructure found on most South Korean farms compared to medium / large scale mechanization on most South Dakota farms.

The number of small farms operating less than 1.0 hectare has declined from 1.61 million (66.8% of farms) in 1970 to 865,000 (58.6% of farms) in 1995. The number of farms operating 1.0 to 2.0 hectares of cultivated land has declined from 639,000 in 1970 to 418,000 in 1995, but the proportion has not changed much. The number of farms operating more than 2.0 hectares has increased in numbers and doubled in percentage of farms from 6.7% in 1970 to 13.1% in 1995. Korean agricultural economists generally consider a farm size of 3.0 hectares as the minimum size farm necessary to generate agricultural net income to cover modest living expenses. Recent agricultural policy changes (repeal of farm size prohibition), growing trend to leasing farmland, and other proposed policy changes to increase the number of larger size farms to compete in a future of market / trade liberalization will surely increase the number of larger farm tracts (KREI, 2000; Park, 1998).

Trends in off-farm income and full-time vs, part-time farms

Income receive from off-farm sources is a major component of net household income earned by many farm families. Off-farm income and employment is an important trend in the farm structure of almost all developed nations. For example, since 1964, a majority of net family income earned by U.S. farm families has originated from off-farm sources and is concentrated among operators of small farms. A majority of off-farm income is from employment (wages and salaries) of operators and spouses in non-farm jobs. South Dakota farmers receive a lower proportion of their family income from

off-farm sources than farmers in most states. However, off-farm income in South Dakota has consistently increased and has been much less volatile than net farm income.

Data from the 1997 Census of Agriculture, indicates 45% of South Dakota farm operators are also employed part-time (less than 200 days) or full-time (200 + days) off-farm. The number and proportion of farm operators with a full-time off-farm job has increased during the past 20 years. Janssen and Diersen estimated that 64% of South Dakota married farm households had one or both spouses employed off-farm in 1997. (Diersen et.al. 2000). Also, 23% of South Dakota farm operators are 65+ years of age with most of these farm families receiving off-farm income in the form of social security payments.

The number and percent of Korean farmers receiving a majority of annual household income from off-farm sources (part-time II farmers) is rapidly increasing, while the number and proportion of full-time farms is declining. For example, in 1975 80.6% of Korean farms were full-time farms compared to only 56.5% in 1995. Part time II farms were only 6.9% of Korean farms in 1975 compared to 25% in 1995 (OECD, 2000. Annex Table 1.6). The remaining 12 to 18% of farm households are classified as part-time I farmers who receive off-farm income from 1 - 49% of household income.

From 1991 to 1995, agricultural net income varied from 48% to 54% of farm household income in South Korea. Off-farm earned income varied from 28% to 32% of farm household income and transfer income (from extended family members and from other sources) varied from 18% to 20% of farm household income. The proportion of off-farm earned income has increased considerably in the past 20 years due to improved rural transportation and employment opportunities in nearby cities. Transfer income has increased as the proportion of elderly farm families has rapidly grown.

Land Use Shifts

Differences in land use and population density "explain" many of the structural differences in production agriculture between South Korea and South Dakota. Agricultural land is relatively scarce and intensively used in South Korea, while agricultural land is abundant and extensively used in South Dakota.

South Korea has a population of 45.1 million people on a land area of 9.93 million hectares (24.2 million acres). In 1995, nearly 65% of land area is forests and mountains and only 20% is cultivated land. Less than 2% of land area is in pasture. The amount of cultivated land has declined from 2.3 million hectares in 1970 to 1.985 million hectares in 1995, due to urban expansion and due to abandonment of marginal farmland in the mountainous regions. The ratio of population to arable (cultivated) land in 1995 is 22.7 persons per hectare or 9.2 persons per cultivated acre, the highest density ratio in the world (except for Singapore).

South Korea has a "rice culture" which has developed for more than 2000 years. Rice is still consumed two or three times per day by most Koreans and remains an integral part of contemporary Korean culture. Rice consumption per capita has declined since 1987 following the experience in Japan. However, rice consumption was still above 100 kg./person per year in 1996 and supplied 35% of calorie intake.

Agricultural land use and agricultural policy reflect the cultural / social preferences of Koreans for continued economic development and a measure of food security within an increasingly open world market. A majority of South Korea's agricultural land (53% to 59% depending on year) is used for rice production and continues to be nearly self-sufficient in rice production relative to domestic consumption. Korea has a well-developed rural infrastructure for paddy rice production and even continues to reclaim some tidal wetlands for rice production.

Remaining agricultural land use in South Korea has shifted from lower- value crops of barley and soybeans to higher-value vegetables and fruits. In 1970, fruit and vegetable production used 13.6% of agricultural land area compared to 29.1% in 1995. These land use shifts are a direct response to rapid economic growth, the resulting domestic food consumption shifts toward vegetables and fruits, and relatively close proximity of Korean farms to urban centers. The growth in the domestic livestock industry from 1970 to present is also a response to economic growth and food consumption shifts. Livestock industry growth was facilitated by a nearly complete shift from past reliance on domestic feedstock to imported feed from the United States, Australia, and (more recently) China.

South Dakota has a population of 720,000 and a land area of 19.7 million hectares (48.6 million acres) - nearly twice the land area of South Korea and only 1.6% of its population. Nearly 92% (44.8 million acres) of South Dakota's land is operated by farmers and ranchers. About 61% of South Dakota's agricultural land (excluding farm sites and woodland) is used as range land and pasture and 39% is used for crop and hay production. The ratio of population to cultivated land area is one person per 8.0 hectares or 20 acres, which is lower than in most nations or states within the U.S.

Most land use shifts in South Dakota occurred during the settlement era and in the first half of the 20th century. Since 1950, the amount of land used in crop production has been influenced by Federal land retirement and production control programs. The crop mix has been influenced by Federal commodity programs and crop research programs. Soybean acreage has increased at the expense of oats, barley, and rye acreage. Overall land use changes have been more affected by farm export markets and domestic livestock feeding industries, than by DIRECT shifts in human food consumption.

Land Tenure and Ownership Trends

Land tenure and ownership is an important component of agricultural structure because it is concerned with the extent and ownership of the farmland resource. Land tenure also influences resource organization and control at the farm level, degree of freedom to make business decisions and degree of risks assumed by the owner, ease of entry into farming, and transfer of farmland to the next generation.

Agricultural land tenure in South Dakota was greatly impacted by Federal homestead acts during the settlement era favoring owner-operated farms, subsequent loss of 25% of farmland acres to mortgage loan defaults in the 1920's and 1930's, and transfer of ownership to farmers and ranches in the 1940's. Major changes from 1950 to 1997 were continued declines in relative importance of full tenants and increased relative importance of full owners. In 1997, 86% of South Dakota farmers own some or all of their land operated. Part owners, who operate land that they own and also lease additional land to others, continue as the dominant land tenure class in terms of farm

numbers and land operated. The average size of part-owner operated farms in 1997 is 1905 acres (1024 acres owned and 881 acres leased) compared to 1013 acres owned and operated by full-owners and 988 acres leased and operated by full-tenants (Diersen, et.al. 2000).

In 1997, South Dakota farmers owned and operated 62% of land in farms, owned and leased 7% of farmland to other farmers, and rented 31% of agricultural land from non-operator landlords. Overall there are nearly 18,700 farmers leasing land from 48,300 landlords, including an estimated 42,200 non-operator landlords and 6,100 farmer landlords. The number of non-operator landlords has increased over time while the number of farm owner operators has declined. Most non-operator landlords are retired farmers, farm widows, or persons who were raised on the "family farm" but currently live elsewhere and work in other occupations.

Land tenure in Korea is a direct outgrowth of the land reform acts from 1946 - 1950 and agricultural modernization trends since the early 1970's. Land reform was specifically designed to transfer agricultural land from feudal Korean and Japanese landlords to farm tenants through expropriation (with partial compensation) by the government and distribution to the tenant or by direct sale from landlord to tenant. Full tenancy was reduced from 49% of farmers after WW II to 7% in 1965, while full ownership increased from14% of farmers in 1945 to 70% in 1965. The main effects of land reform in South Korea were: (1) to greatly improve income distribution and farmer welfare in rural Korea with little impact on agricultural land productivity, and (2) to impose a small farm agrarian structure (Ban et.al. 1975). It also influenced the modern direction of Korean agriculture in favor of small-scale mechanization, and relatively labor-intensive and capital-intensive agricultural production.

Leasing farmland has become very important since 1970 in South Korea as a means to acquire more farmland and gain the benefits of advanced farm mechanization. The proportion of leased farmland steadily increased from 17.8% of cultivated land in 1970 to 37.4% in 1990 and 42.2% in 1995. Leased farmland is operated by a family labor force and has lower cash flow commitments than purchasing land with borrowed money. Non-operator landlords own two-thirds of leased farmland in South Korea and are mostly retired farmers and those who gave up farming. In 1990, 55% of Korean

farmers were full-owners, 10% were full-tenants, and 35% were part-owner operators. KREI, 2000; Park, 1998). As in South Dakota, part-owner operators usually operate more land than full-owners or full-tenants.

Farmland rental markets have become and will likely remain a "permanent" part of agriculture in the United States, South Dakota, and in South Korea. Landlords provide a major source of capital to farm operators. Their relative importance will continue to increase because: (1) commercial farmers are usually able to achieve higher current rates of return by investing in other production assets, and (2) farmland ownership is a source of current return, potential capital appreciation, and "consumption income" for many owners.

Dependence on exports and imports

Relative dependence on agricultural exports and imports may be the greatest contrast between South Korean and South Dakota (and U.S.) agriculture.

South Korea's rapidly rising standard of living, rising labor costs, and relative lack of land for agricultural production creates increasing demand for imported agricultural products. The total amount of imported agricultural products increased from less than $2 billion per year from 1980 to 1987, to $4.4 billion in 1991, and $8.2 billion in 1996. In recent years, the U.S. share of Korea's agricultural imports exceeds 40%. Bulk and intermediate inputs for processing dominate U.S. agricultural exports to South Korea. In 1995 and 1996, the U.S. supplied South Korea with more than 90% of its imported corn and soybeans and 50% of its imported wheat and beef. Other important suppliers of agricultural products to South Korea include Australia, Canada, New Zealand, Malaysia, China, and the European Union (ERS, 2000).

South Korea has deliberately used trade policies to import agricultural products to supplement domestic supplies of food, feed, and raw materials for processing. Economic development and export promotion policies created rising incomes and export earnings that made it possible to pay for commercial imports of agricultural products. Rising labor costs, growing ability to import, and shifts in consumer demand toward fruits, vegetables, and meat products resulted in major land use shifts away from

feed grains, soybeans, and cotton and toward high-value crops and dairy, swine, beef, and poultry confinement systems. The modern livestock industries and feed processing industries in Korea are almost completely dependent on imported feedstock from the U.S., Canada, Australia, and China. From 1970 to 1996, South Korea's cereal self-sufficency has been reduced from 80% to 27% and overall self-sufficency of all cereal, oilseeds, and livestock products has been reduced to about 50%.(ERS, 2000; KREI, 1999).

Further changes in economic structure and growing trade liberalization (reduced trade barriers) is developing new markets for imported food products emphasizing convenience, attractive marketing, variety and greater use of imported meats, fruits and vegetables, processed foods and beverages. Due to income-elastic demand for many of these products, especially those sold in restaurants and fast-food establishments and supermarkets, the market potential for consumer-ready foods is expected to increase considerably (ERS, 2000).

South Korea also exports a growing amount of agricultural and forestry products, $1.85 billion in 1997 compared to $1.4 billion in 1991. The major customers are Japan, Russia, and China, which purchase 75% or more of Korea's agricultural exports.

The United States is the world's largest exporter and is often the largest importer of agricultural products in the world. The U.S. is a net exporter of wheat, feed grains, soybeans, and meat products and a net importer of tropical agricultural products, dairy, and selected fruit and vegetable products. The U.S. market share exceeds 70% of world trade of corn and soybeans and nearly 30% of world wheat trade. The net agricultural trade balance (exports minus imports) has decreased in the 1990's due, in part, to strong domestic demand for imported food products.

South Dakota is a raw material exporter of agricultural products to surrounding states and to foreign nations, although the amount of agricultural processing has increased. Soybeans, corn, wheat, beef cattle and calves, hogs, dairy products, sheep and lambs, alfalfa and other hay are some of the major products exported from the state. South Dakota is a net importer of fresh fruits and vegetables and processed food items sold in restaurants and grocery stores. South Dakota typically ranks within the top 20 states in terms of agricultural production volume and sales. In 1996, South Dakota's

farm cash receipts were $3.68 billion, or 1.8% of U.S. farm cash receipts, ranking 19th among the 50 states. South Dakota farm producers compete in the world's largest domestic market and produce substantial amounts of the major agricultural export products exported from the United States. Unlike South Korea, most South Dakota farmers do not primarily produce for the local (within state) market as the population base is too small and the incidence of agricultural products processing is quite low.

KEY ISSUES / IMPLICATIONS OF STRUCTURAL TRENDS

Our review of structural changes in production agriculture in South Korea compared to South Dakota and the United States illuminates some major differences in their organization of agriculture, but also illustrates many similarities in structural trends over time.

Major differences in natural resource endowment, in the ratio of population to arable land, and cultural preferences are closely related to, and perhaps "explain", the differences in the organization of the farm sector in South Korea and South Dakota.

South Korea's farm sector is primarily organized to provide: (1) some measure of food security for rice - the staple cereal of Korean and all of eastern and southern Asia, (2) a substantial portion of the growing volume of high-value fruits, vegetables, and livestock products consumed by South Koreans, (3) employment for a majority of the rural population, and (4) open space and many other environmental services to a crowded, highly urbanized nation. Small scale mechanization of production agriculture and the preponderance of small businesses in the agricultural marketing, food processing, and food distribution sectors is an important result of technology adoption in a developing nation with high population density and cultural attitudes favoring widespread employment (Choi and Lee, 1997).

South Dakota's farm sector is the state's #1 industry and is primarily organized to provide feed and food grains, oilseeds, and livestock products to the surrounding region, nation, and world. Agricultural land use shifts in South Korea were directly related: (1) to changing food consumption patterns stemming from rapidly rising per capita incomes, and (2) deliberate public policy intervention to maintain a "rice culture"

and a diversified, relatively small-scale, crop / livestock agricultural sector. Agricultural land use shifts in South Dakota were more INDIRECTLY affected by changes in national and international markets and by Federal commodity program changes (CRP, production flexibility etc.)

The process of economic development with rising per capita incomes creates fundamental changes in the industrial structure of a region or nation. A major structural change is a declining share of production agriculture, whether measured by relative employment, population, or GDP. The economic development process along with widespread adoption of more capital-intensive technology are major reasons for similarities in FOUR major structural trends in South Korean and South Dakota (U.S.) agriculture. These trends are: (1) declining farm population and farm numbers, (2) increasing farm size, (3) increase in part-time farming, and (4) increase in agricultural land leasing and part-ownership. These same trends are also occurring, at different rates, in other developed (OECD) nations.

The South Korean experience has shown the dramatic consequences of successful economic growth policies, along with widespread distribution of benefits to the nation's population, on the rapidity of structural change in the nation's economy. The highest sustained per capita economic growth rates in the world for the past 40 years also resulted in the most rapid change in the economic structure of any developed nation. Agricultural policies were designed to facilitate the transfer of human resources to the rapidly growing industrial and service sectors and to adapt domestic agricultural production to the changing food consumption patterns of South Koreans.

The future role(s) of the farm sector in economic development are conditioned by previous structural changes, growing importance of environmental issues, and growing international interdependence. The farm sector will continue to be an important employment source in South Dakota and in South Korea during the next 20 - 25 years. The major exodus of farm people to urban centers has largely passed in the United States, but will continue to occur in South Dakota and in the Northern Plains region for the next 20 to 25 years. The exodus from agricultural employment will probably be more rapid in South Korea, but the magnitude will depend on the direction and extent of

agricultural policy changes to improve the competitive position of Korean agriculture in an era of market liberalization (Choi, 1997).

Agro-environmental policies are in their infancy in South Korea and are relatively recent in South Dakota. The beneficial and adverse consequences of agricultural practices on the natural environment are under increasing scrutiny. Abundant land resources in the United States has led to broad voluntary land retirement measures (CRP and Wetland Reserve programs), conservation compliance for highly erodible cropland fields, and "best management practices" for crop and livestock production practices in some programs. Most U.S. environmental programs related to agriculture emphasize cost-sharing programs and other subsidies as incentives to comply with environmental guidelines (Knutson, et.al. 1998).

In South Korea, environmental protection programs have been directed at agro-forestry programs to sustain and rebuild the forest resource for watershed protection, lumber and other forest products, recreation and other uses on public and private lands. Environmental management programs are included in land reclamation projects and rice paddy infrastructure programs emphasize improved irrigation management. The most far-reaching environmental policy legislation was enacted in 1996, which established targets to reduce pesticide use by 50% and fertilizer use by 40% from 1996 to 2004. Livestock waste management programs and incentives for establishing organic farms have also been initiated. It is becoming clear that environmental issues are becoming more important in the agricultural policy agenda, but the future impact of agro-environmental policy on actual farm management practices and on agricultural structure is unclear at this point.

During the past 40 years, South Korea has placed great reliance on international trade to facilitate its economic development by obtaining raw materials and intermediate goods (including agricultural products) from other nations and exporting manufactured products. Korea's agricultural trade policies emphasized imports of bulk products for its livestock feeding industries and agricultural processing industries, but protected its rice, dairy, beef, pork, and vegetable industries by various trade barriers (tariffs, quotas, import licenses, etc.). Korea steadily reduced trade barriers on many competing agricultural products from during the late 1980's and 1990's. However, Korean

agricultural trade policy was not consistent with the market liberalization approach eventually adopted in the GATT Uruguay Round agreements.

Market liberalization of Korean agriculture has accelerated since establishment of WTO (World Trade Organization) in 1994. Korea has made numerous and far reaching changes in its agricultural policies to comply with the tariffication, market access, and phyto-sanitary provisions of WTO. The most important issues are developing agricultural policies to promote a market structure of agricultural production, processing, and distribution that is "competitive" in the emerging world agricultural trade regime.

Continued economic development in Korea and increased market liberalization of key agricultural markets should benefit U.S. and Northern Plains agriculture via increases in beef, soybean, corn, wheat, and pork exports to South Korea and other Asian markets. However, the major growth markets are expected to be in the intensely competitive processed food product markets

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