

A Food and Nutrition System Analysis of South Korea*

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ABSTRACT

The food and nutrition system is a network of processes linking agriculture, food, eating, nutrition, and health. The system includes a series of nine stages (production, processing, distribution, acquisition, preparation, consumption, digestion, transport, and utilization) and two types of contexts (biophysical and sociocultural). Analysis of whole food and nutrition systems provides information about the structure and processes involved in the complete scope of food and nutrition, assisting in the identification of "upstream" influences and "downstream" consequences in the system. The current analysis gathered existing data about the food and nutrition system in South Korea from public sources and professional publications, and interpreted that information to consider how different elements of the system contribute to health. The findings revealed that South Korea has substantial domestic food production and processing supplemented by imports, widespread food distribution in markets and a growing number of Korean and Western restaurants, a relatively low percentage of household income spent on food, growing use of new food preparation methods such as microwave ovens, a rice/vegetable/fish based three-meal consumption pattern, few recorded digestive problems, increasing calorie storage as body fat, and a relatively low chronic disease prevalence compared to other developed societies. Examination of the full scope of the food and nutrition system provides a broad perspective using whole system thinking that can identify potential strategies for future research and intervention. (*J Community Nutrition* 5(4) : 209~217, 2003)

KEY WORDS : food system · South Korea · agriculture · nutrition · health.

Introduction

This paper 1) describes a conceptual model of the food and nutrition system, 2) presents data characterizing the stages and context of the system in South Korea, and 3) discusses the usefulness of whole system thinking about food and nutrition and applications for community nutritionists. A holistic look at the food and nutrition system provides information about the series of stages that are involved in food and nutrition.

While many models of food and nutrition systems have been developed (Heywood et al. 1991 ; LaBianca 1990, 1991), more recently an extensive review of the literature about food systems was used to develop an integrated conceptual model of the food and nutrition system (Sobal et al. 1998). The food and nutrition system transforms raw ma-

terials into foods and beverages which are then consumed, with the nutrients in the food and drink producing health and preventing illness (Sobal 1999). Transformations in the food system are often characterized by statements like "land to mouth" (Kneen 1989) that represent commodity chains (Friedland 2001), but typically do not explicitly consider nutrition and health. Thinking about the system as a whole provides a broad perspective for examining all aspects of food and drink (Atkins, Bowler 2001 ; Sobal 1999).

The core of the food and nutrition system model is the food chain (Sobal et al. 1998), which is an ordered sequence of stages, each stage flowing into the subsequent one (Sobal 1999). The food chain includes resource inputs, nine food system stages, and health outcomes : Agricultural inputs (e.g. fertilizer), production (e.g. agriculture and agricultural imports), processing (e.g. food manufacturing), distribution (e.g. supermarkets and restaurants), acquisition (e.g. food shopping), preparation (e.g. cooking), consumption (e.g. meals and snacks), digestion (e.g. absorption), transport (e.g. nutrient circulation), utilization (e.g. metabolism), and health outcomes (e.g. nutrition related diseases).

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The nine stages in the food and nutrition system occur within three subsystems: The producer subsystem (production, processing, and distribution stages) involves food suppliers who make food available. The consumer subsystem (acquisition, preparation, and consumption stages) involves accessing food by those who buy food, cook it, and eat it. The nutrition subsystem (digestion, transport, and utilization stages) involves the physiological pathways food takes in the body once it has been ingested.

The food and nutrition system model can be used to describe the system for a particular place. The current analysis uses the model to examine the food and nutrition system of the nation of South Korea to show how whole food system analysis provides insights for community nutrition. South Korea is a nation that has undergone rapid economic changes, especially since the 1970's (Kim et al. 2000; Lee, Sobal 2003). South Korea developed economically earlier than most other Asian nations but has avoided many of the health problems associated with economic development (Kim et al. 2000), and examining its food and nutrition system provides an important case study for food and nutrition systems that have changed rapidly.

South Korea is a nation at the end of the Korean peninsula in Northeast Asia, bordering China, Russia, and Japan (The Korea Overseas Information Service 2003). Approximately 50 million South Koreans live in the area of 100,000 square kilometers. The climate is temperate with four distinct seasons. South Korea is highly urbanized and economically developed, with over 80% of the population living in urban areas and a per capita Gross National Income of \$10,013.

Methods

Existing data were identified and compiled to characterize the food and nutrition system of South Korea. This information was derived from international organizations such as the United Nations Food and Agriculture Organization (FAO) and Korean Government Reports. Information was also drawn from scientific publications about food and nutrition in South Korea. Particular types of data were sought and organized according to the stages of the food and nutrition system model (Sobal et al. 1998). These data are presented in the text of the results and central pieces of quantitative data were summarized in a table that presents information about the

scope of the food and nutrition system.

Considerable data about the food and nutrition system of South Korea was not available in quantitative form. This may be based on the difficulty of collecting or making that data available, or particular types of data may not be seen as important enough to collect or distribute. It is important to recognize which food and nutrition system data is not available, with the hope of collecting and reporting that information in future data collection activities.

Results

The data that are available provide insights about the form, structure, and processes involved in the South Korean food and nutrition system.

The findings will be discussed according to the stages and contexts of the food and nutrition system. Key data are summarized in Table 1.

1. Material inputs

A wide variety of material inputs are used in agricultural production. For example, Table 1 shows that over 800,000 metric tons of fertilizer were used annually in Korean agriculture. Over one million farmers had agricultural machinery (over 80% of all farm households). These figures show that most farming in South Korea is industrialized and uses advanced technology inputs.

2. Production

Only about one in ten South Koreans are employed in farming and fishing (Table 1). However, well over a million farming households exist, producing much of the national food supply (Table 1). Agriculture is focused on production of staples of the Korean diet, especially cereals (largely rice) and vegetables (Table 1). Although the FAO data indicates twice as much rice is imported as is produced in South Korea, the self-sufficiency rate for rice is now at 103% (National Statistical Office 2003). Some rice is exported, some is used for purposes other than human consumption, some is lost to waste before consumption occurs, and some over-consumption occurs. Importation of wheat and wheat products increased rapidly after 1970 (Kim et al. 2000). Other major agricultural commodities such as vegetables, fruits, seafoods, milk, meats, eggs, and animal fats have domestic production levels that exceed imports (except imports of vegetable oil) (Table 1).

Table 1. Selected data about the food and nutrition system of south Korea*

Material Inputs :	801,216 metric tons fertilizer				
	1,130,850 cultivator holdings of agricultural machinery				
Production :	10.6% of population employed in Agriculture/Fishing/Forestry				
	1,383,468 private farming households				
	Agricultural production (FAO data, unit = 1,000 metric tons)				
	Cereals :	17,388	(5,056 produced,	12,978 imported,	192 exported)
	Vegetables :	12,561	(12,244 produced,	382 imported,	65 exported)
	Fruits :	3,464	(2,624 produced,	875 imported,	35 exported)
	Seafoods :	2,699	(2,382 produced,	312 imported,	13 exported)
	Milk :	2,556	(2,257 produced,	312 imported,	13 exported)
	Vegetable oil :	805	(275 produced,	532 imported,	19 exported)
	Eggs :	502	(500 produced,	2 imported,	0 exported)
	Animal fats :	225	(120 produced,	109 imported,	4 exported)
Processing :	Food processing (FAO data, unit = 1,000 metric tons)				
	Cereals :	1,767			
	Vegetables :	42			
	Fruit :	5			
	54,022 Food and Beverage Manufacturing companies (1997)				
Distribution :	583,892 Hotels and restaurants (1997 data)				
	Wholesale and Retail sales volume Index (base 2000) (2003 data)				
	Supermarkets	101.8			
	Convenience stores	251.4			
Acquisition :	27% of income spent on food (urban data)				
	11% of income spent eating-out				
	More than 300 McDonalds restaurants in 2001, compared to 1 in 1988 ¹				
Preparation :	98% of households with a refrigerator (1997)				
	93% of households with a stove (1997)				
	51% of households with a microwave oven (1997)				
Consumption :	Intake of about 1,000 grams of food per person per day				
	Food consumption (FAO data, unit = 1,000 metric tons)				
	Vegetables :	10,842			
	Cereals :	7,499			
	Fruits :	3,200			
	Seafood :	2,402			
	Meats :	2,156			
	Milk :	1,276			
	Vegetable oil :	564			
	Eggs :	445			
	Animal Fats :	132			
Digestion :	Little data available				
Transport :	21.8 BMI men and 21.3 BMI women (both age 17) energy stored as fat				
Utilization :	Little data available				
Health Outputs :	Morbidity Rate on Major Chronic Disease (per 1,000) (2001 data)				
	Hypertensive Diseases		59.9		
	Diabetes Mellitus		25.9		
	Cerebrovascular Diseases		8.1		
	Liver Diseases		8.1		
	Heart Diseases		6.9		
	Malignant Neoplasm of Stomach		1.3		
	Selected Mortality Rate (percent of total deaths) (2001 data)				
	Neoplasms		24.8		
	Circulatory System Diseases		23.8		
	Respiratory System Diseases		6.5		
	Digestive System Diseases		5.9		
	Endocrine, Nutritional, Metabolic		5.1		

*Data are from the Korean National Statistical Office for the year 2000, unless otherwise noted., ¹From www.mcdonalds.co.kr

Overall, in the last several decades the proportion of the South Korean population involved in food production decreased significantly, with the majority of the population now involved in tertiary service industries (Lee, Sobal 2003). However, increased production outputs and imports have permitted traditional Korean food commodities to continue to be available.

3. Processing

Available data shows that cereals (primarily rice) are the main commodity involved in food processing, followed by vegetables (Table 1). There were 54,022 food and beverage manufacturing companies in 1997, accounting for 17% of all manufacturing companies which was up from 13% in 1993. Other quantitative national data about food processing in South Korea is not very readily accessible.

The food processing industry in South Korea deals with both food commodities produced by Korean agriculture as well as importing agricultural raw materials for food manufacturing. An increasing amount of fats and oils have been added to Korean foods in recent decades during food manufacturing (Tchai, Ju 1987), particularly plant food oils (Kim et al. 2000). New food manufacturing technologies were introduced in the 1980's and the food processing industry expanded rapidly (Kim et al. 2000). A considerable amount of food processing was formerly done at home as recently as several decades ago, such as making Kimchi and soybean paste, but by the end of the Twentieth century virtually all of such food processing was done by food manufacturers (Lee, Sobal 2003).

4. Distribution

Well over half a million hotels and restaurants of various types that serve prepared foods operate in South Korea (Table 1). The rapidly changing food distribution outlets make it difficult to obtain representative national data. For example, Western fast-food restaurants were first introduced in 1979 (Kim et al. 2000 ; Mo 1986) and have expanded widely and become integrated into the system since that time (Bak 1997). Currently there are more than 300 McDonald stores in South Korea, which is considerable growth since the first store opened in 1988 (McDonald Korea 2002). In addition to western fast-food restaurants, Korean-style fast food franchises have shown substantial growth (The Korean Economic Daily 2002).

Overall, the food distribution system in South Korea fo-

cuses more on making foodstuffs available for household preparation and consumption than upon foodservice distribution for consumption away-from-home. However, an increasing number of both Korean and Western restaurants and fast food outlets have emerged in recent years (Kim et al. 2000 ; Sim, Kim 1993).

5. Acquisition

Food acquisition has become relatively less expensive in South Korea over recent decades. The Engel index represents the proportion of total household income spent on food, and that is currently about 27% of income in South Korea (Table 1), which represents almost half of what it was in the early 1970's (Lee, Sobal 2003).

While most South Korean food acquisition is for consumption at home, almost one tenth of total household incomes are spent eating away from home (Table 1). Consumption of prepared food at both Korean and Western-style restaurants and fast-food establishments is growing particularly rapidly among younger and urban individuals (Bak 1997 ; Kim et al. 2000 ; Wyne et al. 1994), and the increasing pattern of eating out as a part of Korean food culture contributes to nutrition problems (Mo 1990).

6. Preparation

Daily food household food preparation is the norm for South Koreans. Most households have well-equipped cooking facilities for cooking regular home meals, with virtually all households having a refrigerator and stove, and about half having a microwave oven (Table 1).

Traditional Korean food culture steams rice and boils or steams vegetables (Kim et al. 2000). These food preparation techniques involve relatively low addition of fats and oils compared to many other societies, which often use stir-frying and add considerably more fat to their diets because of their method of food preparation (Kim et al. 2000). Many Koreans use microwave ovens to reheat foods. Also, the rise in microwave ovens facilitates the consumption of pre-packaged manufactured foods (including pre-packaged rice), which often have higher fat and salt contents than traditional Korean cuisine.

7. Consumption

The Korean population consumes approximately 1000 grams of food per capita per day (Kim et al. 2000). Population data about food consumption shows that by weight,

vegetables are the largest type of food consumed, followed by cereals (largely rice), fruits, seafood, meats, milk, and other foods (Table 1). Because vegetables contain a high proportion of water weight and uncooked rice has relatively little water weight, these figures do not fully reflect the actual volume of foods consumed. Vegetable oil and animal fats are also consumed (Table 1) as ingredients in cooked dishes. Plant food consumption has declined and animal food consumption increased over recent decades (Kim et al. 2000 ; Lee, Sobal 2003).

The main meal pattern in South Korea involves a cycle of three daily meals (Tchai, Ju 1987). Relatively few snacks tend to be eaten compared to many other developed societies, although snacking has been increasing.

Overall, vegetables and rice provide the main proportion of calories for South Korean meals and remain the most important constituents of the diet, followed by fruits, seafood, meats, and some dairy foods (Tchai, Ju 1987). A stable three-meal per day pattern exists, with some additional snacking.

8. Digestion

Relatively little national data is collected about digestion in South Korea, which is also true of most other nations. For example, as a nation there is little representative information about ingesting food (including chewing and swallowing problems and disorders). Similarly, few large scale analyses provide prevalence data about nutrient absorption (including digestive problems or diseases such as gastroesophageal reflux disease, inflammatory bowel diseases like Crohn's and ulcerative colitis, irritable bowel syndrome, or peptic ulcer disease).

9. Transport

Most aspects of the transport and storage of nutrients and energy is not well documented for the South Korean population as a whole. Caloric storage is represented by body fat levels, and young people in general have a healthy Body Mass Index averaging between 21 and 22 for women and men (Lee, Sobal 2003) (Table 1). However, body fat levels have been increasing (Lee, Sobal 2003), with low but rising obesity levels (Kim et al. 2000 ; Lee et al. 2002 ; Moon et al. 1992).

Nationally representative prevalence data about the transport and storage of nutrients is not widely available. Low stores of key nutrients such as Iron that lead to conditions like nutritional anemia are not widespread (Tchai, Ju 1987).

10. Utilization

Little national prevalence data about nutrient utilization in metabolic processes exists at the population level for South Korea, which is also true for most other nations. While some diseases are related to nutrient utilization, such as beriberi, scurvy, pellagra, rickets, and others, these metabolic problems and conditions are not prevalent or quantified in representative national data for South Korea that could be reported here.

11. Health outcomes

The health consequences of the food and nutrition system of South Korea indicate an epidemiological transition has occurred. The prevalence of hypertension and diabetes have been rising in recent decades (Table 1). Cancer is the leading cause of death (Kim et al. 2000 ; Moon 1996). A relatively low prevalence of heart disease exists in South Korea compared with most developed nations (Table 1), which may be a consequence of the relatively healthy diet of the population (Lee et al. 2002).

Overall, South Korea has experienced a relatively low prevalence of nutrition-related diseases, although the nation is undergoing an epidemiological transition where there is a shift from acute infectious to chronic non-communicable forms of morbidity (Kim et al. 2000 ; Lee et al. 2002 ; Lee, Sobal 2003).

12. Other outputs

Limited quantitative data are available about food waste in South Korea, but with increasing industrialization of the system food waste may be increasing. Food Waste is a considerable problem in other nations (Kantor et al. 1997), and represents inefficiencies in the food and nutrition system.

13. Contexts for the food and nutrition system

South Korea underwent rapid economic and technological modernization and cultural Westernization in the late twentieth century, with food activities shifting from being largely locally based to being integrated in the global agro-food system (Lee, Sobal 2003). International food policies influenced the South Korean food and nutrition system as trade restrictions decreased, and meats and other products from diverse sources began to increasingly be imported (Kim et al. 2000). Social changes also influenced the system, such as the decreasing family size (Kim et al. 1992) and the increase in women employed out of the home which led to

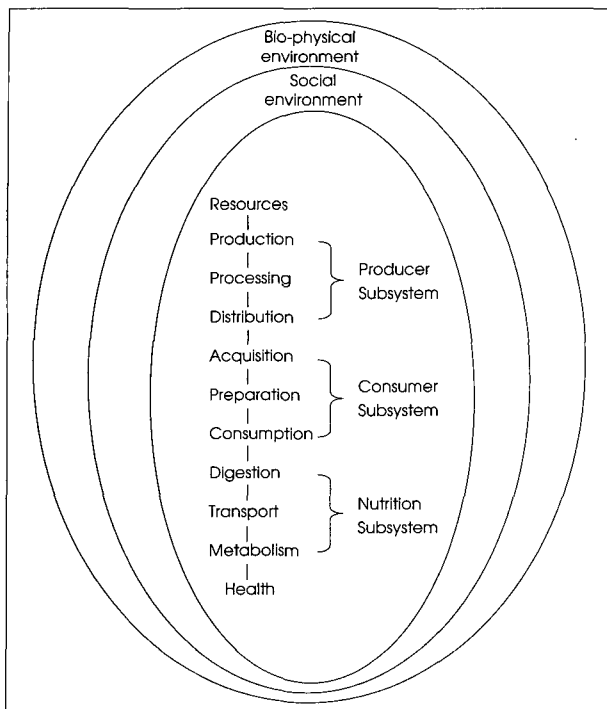


Fig. 1. A Conceptual Model of the Food and Nutrition System*.
*Adapted from : Sobal, J. (1999) and Sobal et al. (1998).

greater emphasis on convenience in food preparation (Kim et al. 2000). Demographic shifts, such as increased life span and the aging of the population (Kim et al. 2000) also influenced the operation of the food and nutrition system.

A number of transitions occurred at all stages of the food and nutrition system in South Korea, including the industrialization of agriculture and food processing, the marketization of foodstuffs and foods, the consumerization of food and eating, and a series of dietary, nutritional, weight, and epidemiological transitions (Lee, Sobal 2003). All of these contexts provide important influences and experience crucial impacts of activities in the food and nutrition system.

Discussion

The food and nutrition system includes a broad scope of interrelated and integrated processes that link stages in the food chain from agriculture to health outcomes. The conceptualization of all of these processes as a system helps to integrate these areas, showing how characteristics of one part of the system are associated with characteristics of others (Fig. 1) (Sobal et al. 1998 ; Tansey, Worsley 1996). Collecting existing data and organizing it using a conceptual framework like the food and nutrition system provides new

insights.

South Korea has traditionally had an indigenous food and nutrition system based on grain and vegetable consumption that prevented cardiovascular and other chronic diseases (Kim et al. 2000 ; Lee et al. 2002). However, the food system has been changing to include more meat and Western foods (Soh 1991). Despite these changes, the food culture of South Korea has maintained many of its traditional features (Lee et al. 2002 ; Kim et al. 2000). To promote health, these patterns need to be encouraged and facilitated throughout all stages of the food and nutrition system. Educational social marketing programs and extension programs have encouraged the consumption of locally produced indigenous foods prepared in the ways of traditional Korean food culture (Kim et al. 2000 ; Lee et al. 2002).

Nutritional concerns in South Korea have shifted from under-nutrition to over-nutrition. South Korea is currently experiencing a body weight transition (Lee, Sobal 2003) where the fatness levels of the population are increasing as children, adolescents, and adults have increasingly higher obesity levels (Kang et al. 1997 ; Kim et al. 2000 ; Lee et al. 2002 ; Moon et al. 1992). The globalization of obesity (Sobal 2001) is strongly influenced by operations at multiple stages of the food and nutrition system (Sobal 2001). Prevention of obesity can be promoted by changes in all stages of the food system, including production and import of less food likely to lead to obesity, processing foods by adding less concentrated energy from fats and sugars, distribution of healthier foods more widely, acquisition of foods less likely to lead to weight gain, preparation of foods with less caloric density, and consumption of appropriate calories in relationship to energy expenditure.

Because of the diversity and complexity of large-scale food and nutrition systems, changes may be initiated and promoted at many points and have consequences throughout the system. Whole system analysis is valuable because it delineates the range of possible change points and suggests their links with other parts of the system. For example, the current low current fat intake of the South Korean population might increase due to production or import of inexpensive higher fat products, processing foods by adding fat, distribution of higher fat foods in conjunction with mass media advertising, acquisition of high fat foods by influential segments of the consumer market such as young adults, preparation of foods with new techniques such as deep-fat

frying, consumption of higher fat foods as snacks in addition to regular meals, or some combination of these changes. A host of strategies could be used to prevent or limit entry of greater volumes of fat into the food and nutrition system, including agriculture and trade policies that subsidize lower fat foods, regulation of addition of fat in food manufacturing, education of consumers about the value of low fat traditional food culture and risks associated with high fat consumption, and others. South Korea will continue to be an interesting example of food and nutrition system change, and future research on this topic will be instructive for other societies.

It is not clear how much the South Korean food and nutrition system has been influenced by the technological and economic changes that occur with modernization versus the cultural and social changes that occur with Westernization. Food processing includes the development of both Korean and Western foods (Kim et al. 2000). Food distribution includes the rise of both Korean and Western fast foods (Kim et al. 2000). It should be also noted that South Korea has recently experienced many cultural exchanges from a governmental policy change to allow civilians to visit foreign countries (the number of South Korean tourists to foreign countries increased more than 1,000 times from 1985 to 2002) and opening doors to foreign cultural products (National Statistical Office 2003). These cultural exchanges allowed South Koreans to familiarize themselves with Western-style eating. While most households have traditional stoves, about half now own microwaves. Most adults still consume a traditional low-fat cooked breakfast (Chang 1996), but an increasing number of young people eat American fast foods (Bak 1997 ; Wyne 1994). The balance between maintaining and changing different elements of the system in the face of technology and culture shifts will occur at different stages of the food and nutrition system, with repercussions downstream in food supply and upstream in consumer demand.

1. Limitations and future research needs

There are several limitations to this analysis. A crucial research need in all nations is the collection and dissemination of population-level data about agriculture, food, eating, nutrition, and health. Indicators of many key aspects of the food and nutrition system were not available for South Korea, which is also true of most other nations. Nutrition surveillance is an important task of community and public health nu-

trition (Habicht, Mason 1983), and is based on the timely and complete collection and distribution of food and nutrition data.

By using existing data, this project inherited the strengths and limitations of data collection methods used by other investigators. For example, agricultural data and nutritional data have limitations in their coverage and measurement that may lead to underestimation and overestimation of prevalence levels and changes in prevalence (Moon 1994). Triangulation of multiple sources of independently collected data can be used to overcome some limitations of individual measurements (Lee, Sobal 2003). Also, aggregate data for the entire population may not reveal demographic differences by factors like age and gender.

Data about systems of entire nations may also mask regional and local variations. Rural and urban food and nutrition also differ (Kim et al. 1992 ; McIntosh, Sobal 2004 ; Moon et al. 1997 ; Tchai, Ju 1987). Many focused nutrition surveys are conducted on special or nutritionally vulnerable groups (Tchai, Ju 1987). Such targeted studies using specific analysis of particular communities may be useful for some purposes, but may not be representative of other areas or comparable with each other. Representative and comparative data are needed for whole food and nutrition system analysis.

Further research examining the scope of food and nutrition systems is needed globally, in other nations, in local communities, and across historical periods. The authors of this article are currently conducting such work. One implication of this analysis for food and nutrition surveys is the usefulness of assessing more than just dietary intake, also including involvement in food production, processing and distribution as well as food acquisition behaviors, food preparation activities, and food consumption patterns (Nelson 2000). Collecting such information will assist in providing more complete whole food and nutrition system analyses in the future.

2. Applications

Whole-system analysis of the food and nutrition system offers insights that may prove useful to community nutritionists. It is important to look beyond eating behaviors and past physiology to consider the precursors of nutrients supplied upstream in the food and nutrition system. Examining the whole food and nutrition system in terms of subsystems

and stages provides a way to identify the antecedents, location, and consequences of strengths and problems in the system. For example, if anemia became a problem then the sources of dietary iron, iron losses during processing and preparation, absorption levels, and health consequences could be located within the system.

Whole food and nutrition system analysis also offers a way to quantify the system to compare with other locations, subgroups, or times. For example, comparisons of the whole system of South Korea can be conducted with respect to other countries in the region to identify potential areas where the system could be made healthier. Similarly, variations in the food and nutrition system for various counties in South Korea could be examined when agriculture, food, health, and other policies are being developed and implemented. Additionally, historical data on the stages of the system could be collected to provide understanding of the types and rates of change in different parts of the system, lags between changes in different portions of the system, and to make projections about future trends in the system. Therefore, analysis of the whole food and nutrition system offers a way to examine changes in the system and their relationship to other parts of the system.

Considering the entire scope of the food and nutrition system shows individual practitioners the relative location and context of their work, identifying the scope of their responsibilities and the major entities that precede and follow them in the flow of foods through the food chain. Quantification of the food and nutrition system and areas where it is changing offers a basis for policy decisions by suggesting particular targets for intervention and their consequences (Heywood, Lund-Adams 1991 ; Tansey, Worsley 1996).

Summary and Conclusion

Broad conceptualization of the food and nutrition system may produce new insights for community nutrition and other areas. Thinking about the South Korean food and nutrition system as a whole offers a broad perspective about food and health, identifies pathways of specific foods and beverages, and reveals links between different aspects of agriculture, food, eating, nutrition, and medicine.

Community nutritionists operate at the health end of the food and nutrition system, looking upstream at the nutrition, consumer, and producer subsystems for antecedents to health

outcomes. This gives community nutritionists a unique vantage point for taking a holistic perspective to develop analyses and insights about the whole food and nutrition system. Community nutritionists can provide feedback to other parts of the food and nutrition system, providing information to the food industry and consumers about the health impacts of their actions. Community nutritionists also can assist in coordinating other parts of the food and nutrition system, making links between health and other food and eating activities. Community nutritionists can show others involved in the food and nutrition system how they are connected using whole food and nutrition system thinking.

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