

PACIFIC FOOD SYSTEM OUTLOOK 2003-2004

**WHERE
DEMOGRAPHICS
WILL TAKE
THE FOOD
SYSTEM**



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Pacific Food System Outlook 2003-2004
S P O N S O R S

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FOREWORD

This report focuses on the role of demographic change in the region's food system. The population of the member-countries of the Pacific Economic Cooperation Council (PECC) is becoming more urban, increasing in number and getting older. The region's food system must deliver food to an additional 400 million people by 2020. With the over-65 population almost doubling to 370 million in 2020 from 200 million in 2000, food suppliers must adjust to changing food demand patterns and food service requirements. For example, Japan is the number one net importer of food and agricultural products in the world. Its rapidly aging population will begin to decline in 2007, resulting in lower total demand for food but increased demand for different kinds of food.

By 2005 more people in the region will live in urban areas than in rural areas, with growth in the urban population more than double overall population growth. The region will face new challenges in supplying food over greater distances to more densely populated urban areas, especially in the developing economies. China is a case in point, with its urban population projected to grow by a staggering 300 million people between now and 2020. Infrastructure improvements will be critical to providing the needed food.

Participants in the Pacific Food System Outlook Project also addressed the general food outlook for 2003-04. The region's food system is confronted by geopolitical uncertainties arising from the war in Iraq and the Severe Acute Respiratory Syndrome (SARS). While economic growth in the region is expected to be roughly the same in 2003 as in 2002, expectations at the beginning of the year were more bullish than now. In contrast, the outlook for the U.S. economy is quite favorable. Low inflation and interest rates, significant tax cuts, stepped-up government spending, and high productivity growth are fueling strong consumer confidence and industry profits. The U.S. economy will act as the engine of growth for the region and its food system.

Agricultural commodity prices are showing some modest upward trend now, due both to greater imports and weather-induced production shortfalls. In Australia, for example, last season's grain yields were off more than 50 percent. Detailed food system outlook profiles for each PECC economy will

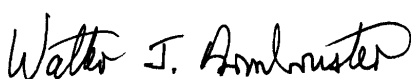
appear on the PECC website: <http://www.pecc.org/food/>.

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We are most grateful to the individual economists representing 13 economies in the region.

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WHERE DEMOGRAPHICS WILL TAKE THE FOOD SYSTEM

The population in member economies of the Pacific Economic Cooperation Council (PECC) is projected to increase by more than 400 million people in the next two decades, a 16-percent increase in the number of people to feed. This increase is equivalent to the combined populations of both Japan and the United States. While economic growth and prices are closely-monitored drivers of food demand, demographic

distribution of human populations; and the changes that occur in these phenomena through the process of fertility, mortality and migration. Making connections between demographic change and food demand and supply go back 200 years to the days of Malthus when he asserted “the power of population is infinitely greater than the power in the earth to produce subsistence for man.” His pessimistic view about the earth’s capacity to produce food was tempered later in the second edi-

Rapid Urban Population Growth

The most significant demographic change in the PECC region in the next two decades will be the rapid growth of urban populations. Some urban areas are already distressingly large and confronted by problems of poverty, pollution, and congestion. Urban growth will test the efficiency and capacity of the region’s food system to deliver a continuous flow of safe, reasonably priced, fresh and processed foods.

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changes — urbanization, growth in populations and changes in the age structure of populations — are subject to less scrutiny, but may have more profound long-term implications for the region’s food system.

This report examines demographic changes as projected through 2020, assessing demand and supply implications for the region’s food system. The information is based on individual economy reports from PECC members and discussions at a three-day conference in Honolulu, Hawaii, May 20-22, 2003. Population data are drawn from the United Nations and from agencies responsible for tracking these data in member economies.

Demography is the study of the size, composition and spatial

tion of “An Essay on the Principle of Populations,” when he recognized the important future role of “physical discovery” (Smil, pp. xxvii-xxviii), or technological change in raising food supply. Indeed, human innovation has steadily increased the “power in the earth” to produce food. Thus, at least for the intermediate term, population growth and other demographic changes are more likely to define food markets than supply constraints.

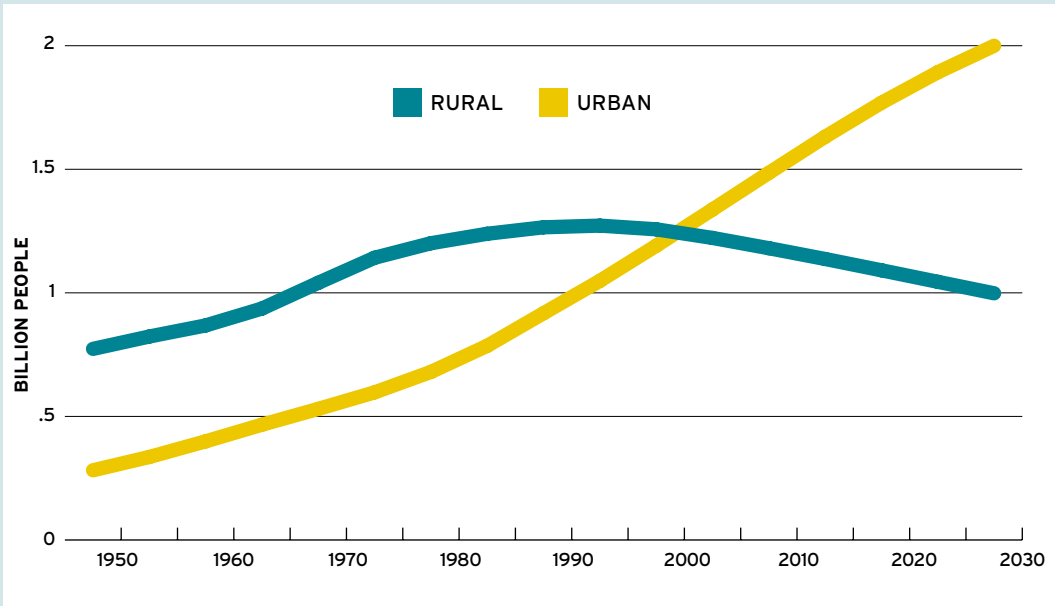
This report addresses three major areas of concern for the agri-food system in the region:

- Greater population concentrations in urban areas;
- Variability in the size and growth of populations within the region; and
- Influences of aging populations on food demand.

PECC’s urban population is projected to grow by more than 590 million people between 2000 and 2020, an increase of about 45 percent, compared to the expected overall population growth of only 16 percent. After 2005, the region’s urban population will surpass the rural population for the first time (Figure 1). This rapid growth is explained by higher birth rates, the migration of people from rural to urban areas, and immigration.

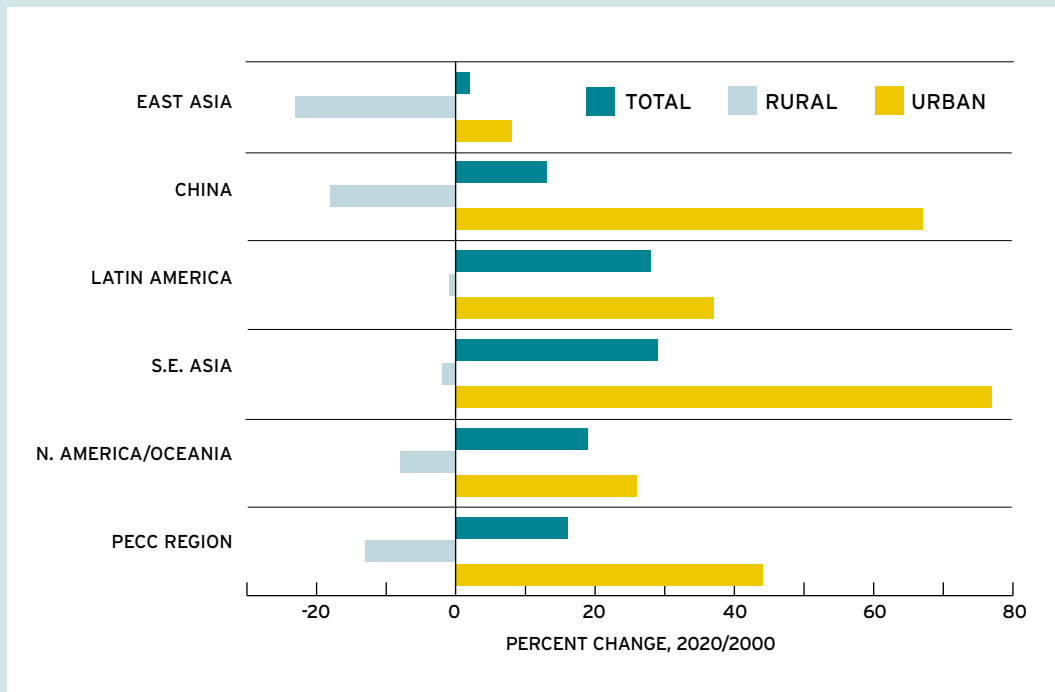
Urban growth will be uneven throughout the region (Figure 2). Definitions of “urban” vary across the region; some urbanization may result solely from changes over time in the definition of what constitutes an urban area. Urban growth is expected to be the most rapid in China and Southeast Asia; at intermediate

Figure 1 PECC's Urban Population Will Soon Surpass its Rural Population



Source: UN

Figure 2 Distribution of Population Growth Uneven in PECC Region



Source: FAOSTAT

BOX 1: RURAL TO URBAN MIGRATION AND URBANIZATION IN CHINA

China's urban population is projected to increase from about 450 million in 2000 to 750 million in 2020, an increase of 300 million people. By 2015, China's urban population will surpass its rural population for the first time (Figure 5). Half of this increase will be "natural." The other half will be through rural-to-urban migration. While the challenges posed by this demographic shift are staggering, this movement of people has already partially been accomplished as China's "floating" migrant population—estimated between 60 and 120 million—has one foot in the furrow and one foot in the city.¹

China's urbanization will have profound impacts on the economy. Overall agri-food productivity in China will rise as labor exits agriculture. Furthermore, migrants help to ease credit constraints in rural areas through remittances and by facilitating the flow of information, technological change, and investment back to commercial undertakings in rural areas. A key question is whether such productivity gains in China's agriculture can keep pace with the increases in food demand associated with greater urbanization. It is clear that migration will lead to greater specialization in the Chinese economy, more efficient allocation of resources, and increased rural-urban trade.

In the past two decades, China has relaxed restrictions designed to control or limit rural-urban migration. The household registration (or hukou) system and the collective approach to rural land tenure historically hampered rural to urban migration. These systems underwent reform after the Household Responsibility System (HRS) was introduced between 1978 and 1984. China's government has become progressively more open in allowing individuals with rural registrations to reside in urban areas. Some speculate that the hukou system may be abolished within the next decade.

The HRS, along with the introduction of market-type incentives, spurred productivity gains in the agri-food sector in the early to mid-1980s. Initial productivity gains freed rural labor and resources for other economic activities, giving rise to a boom in local township and village enterprises (TVEs) in the late 1980s and 1990s. China's official statistics indicate that the number of rural workers with non-farm employment in local rural enterprises doubled from 67 million in 1985 to 127 million in 1999.

The rural-urban shift has had a dramatic impact on food consumption patterns. On a per capita basis, China's rural citizens consume almost three times as much grain per capita as urban residents. However, urban residents consume more of almost everything else. This includes livestock, poultry, and fishery products, which contribute to an overall increase in grain demand. Greater access to refrigeration also affects consumption choices, allowing for the purchase of greater volumes of convenience foods, frozen foods, and perishable goods (Gale).

¹ Official statistics still classify 60 to 70 percent of China's population as "rural" and 30 to 40 percent as "urban." However, this may reflect official definitions rather than accurately represent China's current circumstances. Once China's migrant population and its relative dependency on both urban and rural income sources is considered, the rural-urban population split is likely to be closer to 50:50.

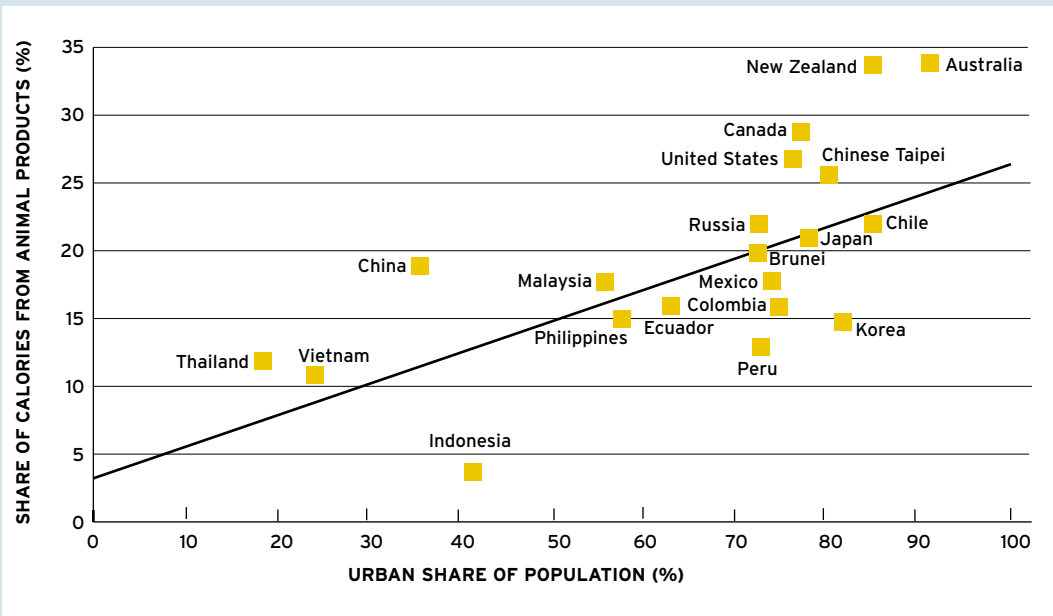
rates in Latin America, North America, and Oceania; and slowest in East Asia. The urban populations of Vietnam, Indonesia, Singapore, and the Philippines are projected to grow more than 70 percent. The expected 67% growth of China's urban population is slower, but will add 300 million people in the next 20 years, a staggering number (Box 1). The most subdued urban growth (less than 30 percent) will be in the region's developed economies, plus Russia and Chile.

While urban populations are increasing, rural populations are expected to shrink in practically all the region's economies. The exceptions are Vietnam, Malaysia, Ecuador, Brunei, Thailand and Mexico. South Korea will experience a sizable decline of around 35 percent; Japan and Chile will register declines of more than 15 percent. The largest absolute decline in rural population will occur in China, where about 145 million people are expected to migrate from rural areas to urban centers between 2000 and 2020.

The region's rapid rate of urbanization is driven by technological, social, cultural and economic changes. Improved efficiencies in rural and farm enterprises and greater opportunities for gainful employment in cities provide the underpinning of this shift. Urban development is an inevitable consequence of agricultural surpluses, economic specialization, more efficient allocation of resources, and higher incomes.

Diets in urban areas are distinct from those in rural areas. Much of this has to do with higher incomes and the predictable substitution of animal products, fruits, and vegetables for more traditional foods, including staple

Figure 3 Higher Per Capita Consumption of Animal Products Associated With Urbanization



Source: UN, FAO food balance sheets economy profiles; data are for 2000

cereals and roots and tubers (Figure 3). Urban residents in the Philippines, for example, eat twice as much “prestige foods” — meat, poultry, eggs, and dairy products — as do their rural counterparts who eat more rice, corn, roots and tubers, and vegetables. Diets in urban areas are more diverse, both in terms of the kinds of foods consumed and their origins. Urban dwellers tend to eat away from home more frequently, and have a greater preference for convenience foods. In developing and middle-income economies, access to superior infrastructure and reliable electricity facilitates the consumption of perishable commodities that have sometimes traveled great distances.

Work and lifestyles in urban areas tend to be more sedentary than those in rural areas, leading to lower per capita energy expenditure and lower per capita

caloric requirements. Higher incomes, lower food prices, and the urban consumer’s propensity to consume more food than justified by one’s energy expenditure tend to offset this.

People concentrated in urban areas are dependent on a vast and complex food system, with supply chains spanning great distances, including overseas. This complex system provides greater opportunities for mishandling and spoilage. In addition to raising farm-level productivity, improving food system efficiency beyond the farm gate is necessary to increase available food supplies.

The competing urban claim on water and other resources important to food production raises farm sector costs, encouraging producers to lower costs and increase efficiency. Urban encroachment on prime agricultural land may affect an economy’s

agricultural productivity by forcing producers onto more marginal lands. As in the case of Chinese Taipei, a government may promote greater efficiency by encouraging farmers to enlarge operations, providing assistance for older farmers to retire with dignity, and providing training for rural youth contemplating farming as an occupation.

Marketing food products in the Asia-Pacific region will increasingly focus on densely populated urban centers, such as the Hong Kong-Shenzhen-Pearl River Delta area, Shanghai, Jakarta, Bangkok, Manila, Santiago-Valparaiso, and Lima-Callao. Many of these urban areas are coastal and have modern port facilities, making them more accessible to foreign suppliers (Figure 4). In some instances, foreign suppliers are more competitive in these coastal urban markets

than inland producers who confront inadequate supply-chain infrastructure and cost-raising policies. Here are two examples:

- High-quality grapes are produced in Xinjiang (China's northwest), but shipping them the 2000 miles to Guangzhou, China's biggest fruit market, is a difficult challenge. It can take longer to get Xinjiang's grapes to Guangzhou than the two weeks it takes for California grapes to arrive from more than three times the distance. China suffers a disadvantage because of inadequate refrigeration and transportation services, road tolls charged by local governments

world. The share of global population in PECC member economies will decline from 43 percent in 2000 to 40 percent in 2020, as regions outside the Pacific, primarily Africa and the Middle East, grow faster. Since the 1960s, population growth in the world, including the PECC region, has slowed. This is a shift from the geometric growth of previous decades. Now, net additions of people to the global and the region's populations are declining each year; the global population is projected to level off at about 9-10 billion after 2050, with the PECC region leveling off at about 3 billion before it starts to decline in the 2040's (Figures 6 and 7).

States will grow at a similar rate as some developing economies because of immigration and the high fertility rate of recent immigrants. In percentage terms, the largest population increases will occur in Singapore, Brunei, Malaysia, the Philippines, Ecuador, Peru, and Colombia, with each of these economies' populations expected to increase by more than 30 percent between 2000 and 2020.

While population growth in the PECC region is slower than the rest of the world, immigration is relatively more important. In 2000, some 760,000 more people entered the region than left; a number that is still small relative

The region's population is projected to increase by more than 400 million people in the next two decades. This increase is equivalent to the current population of Japan and the United States.

that inflate trucking costs, and the lack of advanced technology to grade, clean and wax the fruit (John Pomfret and Philip P. Pan, *The Washington Post*, Nov. 11, 2001).

- In the Philippines, the cost of moving corn from the growing areas of Mindanao to the poultry growers located near metropolitan Manila is estimated at times to be higher than the cost of importing corn from Bangkok, Thailand.

Population growth in the region will not be evenly distributed (Figure 8). At around 160 million people, the largest absolute increase in population by 2020 will occur in China, followed by Indonesia and the United States at about 60 million and 50 million, respectively. Starting in 2007, Japan's population will actually begin to decline. The Russian Federation's population is already in decline.

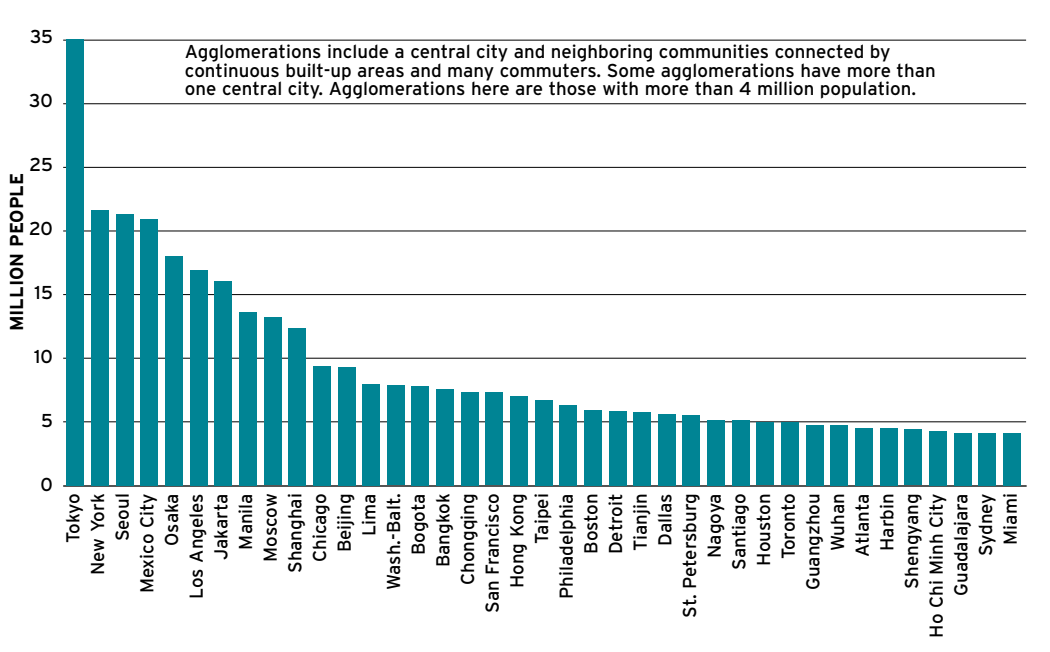
Despite a declining rate of growth in China, the absolute increase in its population relative to other economies in the region will remain large for several decades. Around 2030, China's population will begin to shrink as will its East Asian neighbors — Korea in 2027, Chinese Taipei in 2029, and Hong Kong, China, in 2025. Surprisingly, the United

to the annual 24.5 million natural increase in the region's population. Within the region, however, there is significant transmigration. The most important destinations for migrants are the economies with higher per capita income: Singapore, Hong Kong (China), Canada, New Zealand, Australia, Brunei, the United States, and Russia. Net migration to the United States alone exceeds one million people annually. Japan doesn't fit into this category because of strict immigration policies that explain its homogeneous population. The middle-income East Asian economies of Korea and Chinese Taipei follow a similar pattern. As one would expect, emigration is most common in the lower-income economies of the Philippines, Peru, Ecuador, Vietnam, Colombia, China,

400 Million More People to Feed

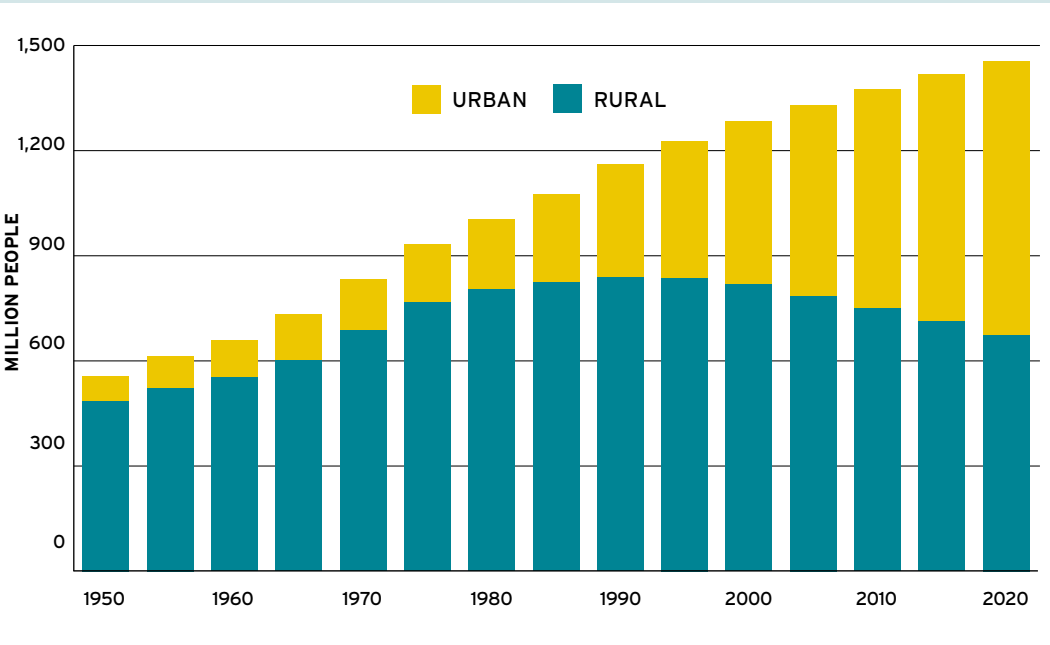
While the population in the PECC region will grow from 2.6 billion in 2000 to 3.0 billion in 2020, about 400 million additional people (Table 1), this growth will be slower than the rest of the

Figure 4 Largest Urban Agglomerations in PECC



Source: Th. Brinkhoff: The Principal Agglomerations of the World. <http://www.citypopulation.de>, 12.11.2002

Figure 5 China's Urban Population Will Surpass its Rural Population by 2015



Source: FAOSTAT

Mexico and Indonesia, with net emigration from the latter three equaling 200,000 to 300,000 annually in recent years.

The Philippines also has significant emigration, with a total of 7.4 million overseas workers. Although they are generally better educated and trained people whose emigration represents a drain on the economy, their remittances back to the economy are significant.

Ethnic changes in Southeast Asia and Latin America result less from migration and more from the intermarrying of native groups within an economy or region. For example, 60 percent of Mexico’s population is Mestizo, the result of a mixing of white and native indigenous populations (Table 2). Another important ethnic phenomenon in the region is the role of the Chinese Diaspora: about 30 to 40 million Chinese who live outside of China, the majority in the PECC region. The Diaspora’s contribution to population growth in the region is minor, but its influence on business in a number of economies and its investment role in China is disproportionate to its numbers.

Population growth will obviously place demands on the Pacific agri-food system; more people means increased food consumption. But the changing rates and distribution of growth also have implications. Japan’s declining population implies lower levels of food demand in this affluent nation, which is a leading net importer of food and agricultural products. Russia’s declining population, when combined with its social and economic restructuring, could result in major changes in its role in international agri-food markets. More rapid population

Table 1 Demographic Indicators for the

Economy	Total population 2000 2020 (MILLIONS)		Increase/ decrease	Urban population 2000 2020 (MILLIONS)	
AUSTRALIA	19.2	22.4	3.2	17.4	21.4
BRUNEI	0.3	0.5	0.1	0.2	0.4
CANADA	30.8	35.4	4.6	24.2	29.4
CHILE	15.2	18.0	2.9	13.0	16.2
CHINA	1262.5	1424.1	161.6	456.4	764.2
COLOMBIA	39.7	52.2	12.5	29.8	43.2
ECUADOR	12.9	18.0	5.1	8.1	12.8
HONG KONG, CHINA	7.1	8.7	1.5	7.1	8.7
INDONESIA	224.1	287.9	63.8	91.9	168.2
JAPAN	126.9	124.1	-2.8	99.9	102.5
KOREA	47.3	51.5	4.3	38.7	46.0
MALAYSIA	23.3	34.4	11.1	13.4	23.6
MEXICO	99.9	124.7	24.7	74.3	98.8
NEW ZEALAND	3.9	4.5	0.6	3.3	4.0
PERU	27.0	35.6	8.6	19.7	28.2
PHILIPPINES	79.7	111.3	31.6	46.7	79.5
RUSSIA	146.0	139.0	-7.0	106.4	104.3
SINGAPORE	4.2	7.5	3.4	4.2	7.5
CHINESE TAIPEI	22.3	24.3	2.0	18.3	20.8
THAILAND	62.4	71.9	9.5	12.4	19.2
UNITED STATES	282.3	336.0	53.7	218.0	276.3
VIETNAM	78.5	99.9	21.4	18.9	34.7
PECC REGION	2615.5	3031.8	416.2	1322.3	1909.8
WORLD	6078.7	7516.5	1437.8	2872.2	4201.7

NA - not available
* Ratio of young (0-14 years) and elderly (65 or over) to working population (15-64 years)
Source: UN (medium fertility scenario), FAOSTAT, Pacific Food System Outlook economy profiles

PECC Region											
Increase/ decrease	Urban share 2000 2020 (PERCENT)		Median age 2000 2020 (YEAR)		Dependency ratio* 2000 2020 (RATIO)		Share of pop. 65 or older (%) 2000 2020 (PERCENT)		Net migration, 2000 (PER 1,000 POP.) (NUMBER)		
	4.0	91	95	35	40	0.50	0.54	12.4	17.6	4.3	81,830.3
	0.1	72	80	25	32	0.51	0.43	2.6	6.8	4.3	1,429.7
	5.1	79	83	37	42	0.47	0.52	12.7	18.2	6.2	190,960.0
	3.2	86	90	29	35	0.53	0.47	7.2	12.2	-0.7	-10,000.0
	307.7	36	54	30	38	0.47	0.45	6.9	11.9	-0.2	-302,993.8
	13.4	75	83	25	30	0.58	0.49	4.7	7.8	-0.3	-13,096.4
	4.7	63	71	22	28	0.68	0.51	4.4	6.5	-0.6	-7,235.2
	1.5	100	100	36	44	0.40	0.45	10.6	16.1	8.1	57,781.9
	76.3	41	58	25	31	0.54	0.46	4.5	7.6	-0.2	-49,310.4
	2.6	79	83	41	48	0.47	0.67	17.1	27.3	0.0	0.0
	7.3	82	89	32	41	0.39	0.42	7.0	13.8	-0.4	-20,000
	10.2	57	69	23	28	0.64	0.55	4.1	6.9	0.0	NA
	24.4	74	79	23	30	0.63	0.50	5.0	8.3	-4.2	-423,690.5
	0.7	86	88	34	40	0.53	0.53	11.8	17.2	-2.5	-9,760.0
	8.6	73	79	23	29	0.65	0.49	4.7	7.3	-1.1	-29,714.3
	32.8	59	71	21	26	0.69	0.54	3.7	5.7	-1.4	-108,446.4
	-2.2	73	75	37	41	0.44	0.49	12.6	15.8	1.0	148,921.0
	3.4	100	100	34	39	0.33	0.36	6.8	10.3	26.8	111,273.6
	2.5	82	86	32	41	0.42	0.45	8.7	14.5	0.4	10,000
	6.9	20	27	29	37	0.45	0.45	6.4	11.7	2.0	124,000
	58.3	77	82	36	38	0.51	0.57	12.4	16.3	3.7	1,047,477.7
	15.8	24	35	23	31	0.61	0.45	5.5	6.9	-0.5	-40,044.2
	587.5	51	63	30	36	0.50	0.48	7.9	12.2	0.3	759,383
	1329.5	47	56	27	31	0.58	0.52	6.9	9.5		

and economic growth in developing and middle-income economies will increase their influence in the Pacific food system, altering production, consumption and trade patterns.

Immigration affects food demand in two ways. First, it immediately raises aggregate demand in the receiving economy. Since immigrants often have a higher fertility rate than native residents, they can boost population growth in subsequent years. In the United States, for example, immigration plus the higher fertility of recent immigrants accounted for about 60 percent of the population growth in the 1990s. Second, the rise in the immigrant share of a population can affect an economy's food preferences. This is observed in Australia (with a rising Asian share of its population), Canada (Asian), and the United

States (Hispanic and Asian). These changes may be short-term in nature, with ethnic dietary differences becoming less pronounced over time, as immigrant progeny adopt the food preferences of their new country, and as the new country's cuisine is, in turn, affected by the influence of successive waves of new immigrants.

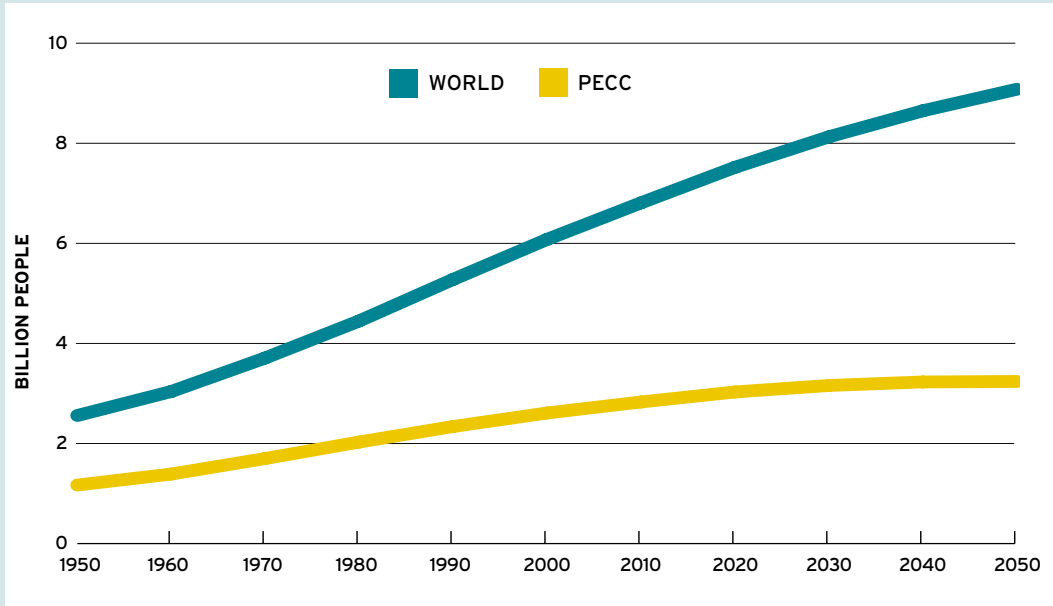
**A Graying Population:
Declining Food Demand and
a Tax on the Economy**

Between 2000 and 2020, average life expectancy in the PECC region is expected to rise from 72 to 77 years and the median age from 30 to 36 years. The over-65 population will increase from 200 million in 2000 to 370 million in 2020. Virtually all the economies in the region have made the transition from high to low birth and death

rates, leading to a projected 8 percent decline in the number of young people between 2000 and 2020, a modest 17 percent rise in the share of the working population, and a very rapid rise of almost 80 percent in the number of elderly. Japan is the most rapidly aging economy in the region (Box 2). This aging phenomenon is not unique to the PECC region, but is happening more rapidly here and in Western Europe than in the rest of the world.

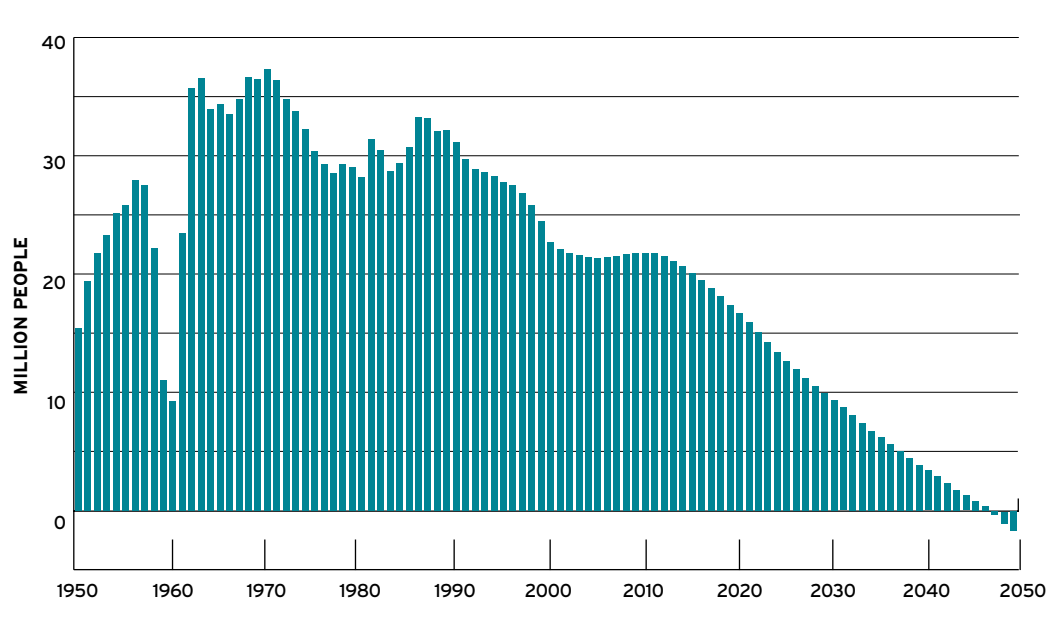
The oldest PECC populations are in East Asia and in the developed economies of Australia, Canada, New Zealand and the United States. In these economies the demographic transition — the decline in the fertility and mortality rates — occurred several decades ago, driven by income growth, medical breakthroughs, healthcare investments, and public policy

Figure 6 World and PECC Populations Leveling Off



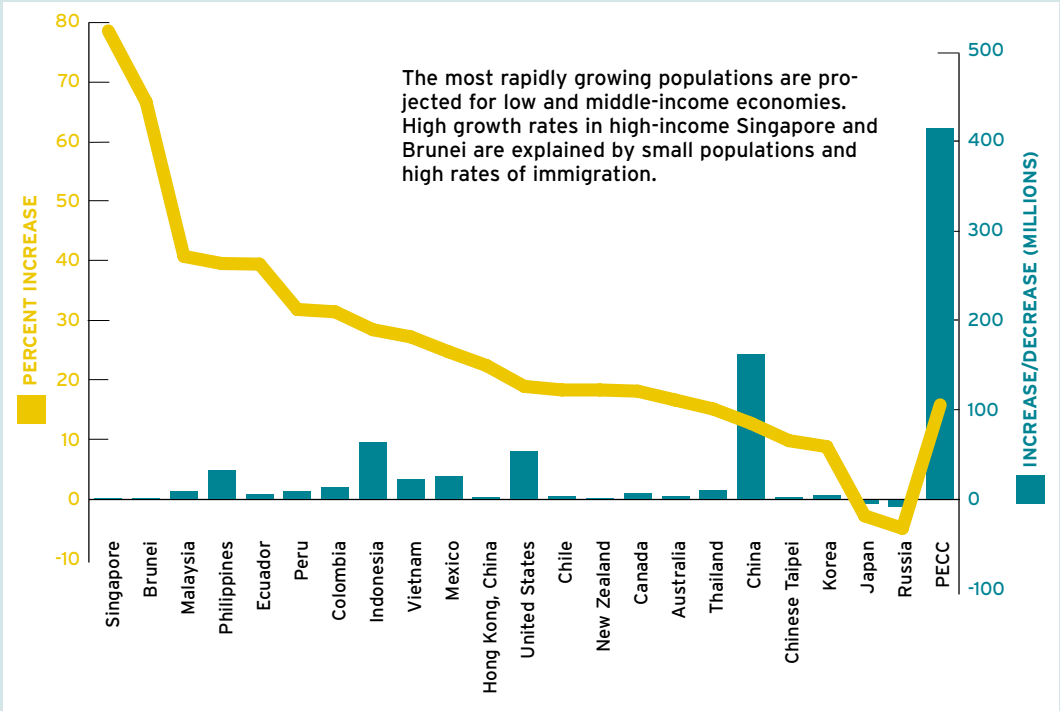
Source: UN

Figure 7 Annual Additions to the PECC Population Declining



Source: UN

Figure 8 Population Growth Uneven, 2020 Compared With 2000



Source: <http://www.census.gov/cgi-bin/ipc/idbsprd>

Table 2 Ethnic and Religious Composition of PECC Populations

AUSTRALIA*Ethnic Groups*

European (92%)
Asian (7%)
Aboriginal and other (1%)

Religions

Anglican (26.1%)
Roman Catholic (26%)
Other Christian (24.3%)
Non-Christian (11%)
Other (12.6%)

BRUNEI*Ethnic Groups*

Malay (67%)
Chinese (15%)
Indigenous (6%)
Other (12%)

Religions

Muslim (67%)
Buddhism (13%)
Christian (10%)
Indigenous beliefs and other (10%)

CANADA*Ethnic Groups*

European (66%)
Amerindian (2%)
Mixed (26%)
Other (mainly Asian, African, and Arab) (6%)

Religions

Roman Catholic (46%)
Protestant (36%)
Other (18%)

CHILE*Ethnic Groups*

European (69%)
Mapuche (27%)
Other (4%)

Religions

Roman Catholic (89%)
Other (11%)

CHINA*Ethnic Groups*

Han (91%)
Zhuang (8.1%)
Other, including Tibetan and Mongol (.9%)

Religions

Buddhist
Confucianist
Taoist
Christian
Muslim

COLOMBIA*Ethnic Groups*

Mestizo (58%)
White (20%)
Mulatto (14%)
Black (4%)
Black-Amerindian (3%)
Amerindian (1%)

Religions

Roman Catholic (90%)
Other (10%)

ECUADOR*Ethnic Groups*

Mestizo (65%)
Amerindian (25%)
Spanish and other (7%)
Black (3%)

Religions

Roman Catholic (95%)

HONG KONG, CHINA*Ethnic Groups*

Chinese (95%)
Other (5%)

Religions

Eclectic mix of local religions (90%)
Christian (10%)

INDONESIA*Ethnic Groups*

Javanese (45%)
Sundanese (14%)
Madurese (7.5%)
Coastal Malays (7.5%)
Other (26%)

Religions

Muslim (88%)
Christian (8%)
Hindu (2%)
Other (2%)

JAPAN*Ethnic Groups*

Japanese (99%)
Other (1%)

Religions

Observers of both Shintoism and Buddhism (84%)
Other (16%)
Christian (.7%)

KOREA*Ethnic Groups*

Korean (almost 100%)
Chinese (20,000)

Religions

Christian (49%)
Buddhist (47%)
Other (4%)

MALAYSIA*Ethnic Groups*

Malay (58%)
Chinese (24%)
Indian (8%)
Others (10%)

Religions

Muslim
Buddhist
Hindu
Christian

MEXICO*Ethnic Groups*

Mestizo (60%)
Amerindian (30%)
White (9%)
Other (1%)

Religions

Roman Catholic (89%)
Protestant (6%)
Other (5%)

NEW ZEALAND*Ethnic Groups*

European and other (72.0%)
Maori (15.0%)
Asian (6.6%)
Pacific Islander (6.4%)

Religions

Christian (67%)
Other or none (33%)

PERU*Ethnic Groups*

Amerindian (45%)
Mestizo (37%)
White (15%)
Other (3%)

Religions

Roman Catholic (90%)
Other (10%)

PHILIPPINES*Ethnic Groups*

Christian Malay (91.5%)
Muslim Malay (4%)
Chinese (1.5%)
Other (3%)

Religions

Roman Catholic (83%)
Protestant (9%)
Muslim (5%)
Other (3%)

RUSSIA*Ethnic Groups*

Russian (81.5%)
Tatar (3.8%)
Ukrainian (3.0%)
Other (12.7%)

Religions

Russian Orthodox
Muslim

CHINESE TAIPEI*Ethnic Groups*

Taiwanese (84%)
Mainland Chinese (14%)
Aboriginal (2%)

Religions

Mix of Buddhist, Confucianist, and Taoist (93%)
Christian (4.5%)
Other (2.5%)

SINGAPORE*Ethnic Groups*

Chinese (76.7%)
Malay (14.0%)
Indian (7.9%)
Others (1.4%)

Religions

Buddhist
Muslim
Christian
Hindu

THAILAND*Ethnic Groups*

Thai (75%)
Chinese (14%)
Other (11%)

Religions

Buddhist (95%)
Muslim (3.8%)
Christian (.5%)
Hindu (.1%)
Other (.6%)

US*Ethnic Groups*

European (71%)
Hispanic (12%)
African-American (12%)
Asian-Pacific Islander (4%)
American Indian (1%)

Religions

Protestant (56%)
Roman Catholic (28%)
Jewish (2%)
Other (4%)
None (10%)

VIETNAM*Ethnic Groups*

Vietnamese (90%)
Chinese (3%)
Other (7%)

Religions

Buddhist
Hoa Hao
Cao Dai
Christian
Indigenous beliefs
Muslim

Sources: Nationmaster: <http://www.nationmaster.com/country>. Hong Kong and Shanghai Banking Corporate Ltd: <http://www.hsbc.com.hk>
Pacific Food System Outlook profiles

(e.g., in the 1970s, China's family planning policies, including later marriage, greater spacing between children and fewer children [Goldstein, p. 7]). Increased female labor market participation in these economies has also contributed to lower birthrates. On the other hand, PECC member economies with lower per capita income have more youthful populations; their transition took place more recently and in some cases is not complete. The advantage of slower population growth is fewer dependent young people and a relatively larger productive segment of the population. The declining dependency of young people, however, will eventually shift to greater dependency

bles is increasing. An aging population generally prefers "quality" to "quantity" and a more healthy diet. Older people prefer convenience, smaller servings, and full-service restaurants.

According to a USDA study, older people consume food prepared at home more often than do younger people, and eat more fresh fruit, fish, eggs, lettuce, and non-fried potatoes (Lin et al., p. 23). A Japanese study concludes that there are three influences on food consumption: the period effect in which income and price changes affect all consumers at the same time; the age effect where changes occur as a person grows older; and the cohort effect, reflecting eating

increased demand for ready-to-cook foods, frozen foods and microwave cooking.

The indirect effects of demographic change are felt in the general economy. Changes in the relative proportion of "economically active" and "economically dependent" components of a population influence economic growth, which in turn, has direct effects on an economy's food demand and supply.

A number of studies demonstrate the strong role demography played in the economic miracles of East Asia and Southeast Asia (Krugman, pp. 62-78). Similar analysis explains the recent strong economic performance of coun-

The oldest PECC populations are in East Asia and in the developed economies of Australia, Canada, New Zealand and the United States.

of older people, as the working segment ages, becomes less productive and retires.

The changing age structure of the region's population has direct and indirect effects on food demand. One direct effect is lower food demand. All across the region populations are getting older, with women outliving men. With an aging population, food demand declines as activity levels and caloric needs decline. Women's caloric needs are lower than men's because of higher body fat levels (Figure 9).

A second direct effect is change in dietary composition and the nature of food service. The effects of population aging on consumption data are already evident. Consumption of livestock products is declining in the developed PECC economies, while consumption of fruit and vegeta-

bles common to a particular age group. The analysis, limited by data covering only at-home consumption, suggests that per capita meat consumption may decline as the population ages because of the negative cohort effect — the tendency for older Japanese to eat less meat because "eating habits may be formed generally at a very young age" (Mori, 317). The opposite may be the case for fresh fruit, rice and fish. Older Japanese are clearly more likely to eat their mid-day meal at home, which has implications for lunchtime food service. In Malaysia, consumption of rice and wheat tends to increase until the mid-40s, and declines thereafter. The consumption of meat, fish and fruits, however, tends to increase until the mid-60s, and declines afterwards. The aging of Chile's population is leading to smaller family sizes and

tries like Chile and Ireland.

An indicator of change in the relative proportions of "economically active" and "economically dependent" shares of a population is the "dependency ratio." This is the ratio of the young (0 to 14) and elderly (65 and over) to the working population (15 to 64). In the PECC region, the dependency ratios for less than half the economies — most high-income economies — are projected to rise over the next two decades (Figure 10). On the other hand, the dependency ratios for the lower income economies are projected to decline, providing an opportunity to save and invest resources for other purposes than supporting dependents. This may give these economies a "demographic bonus," a short-term economic boost. Demographers are quick to point out, however, that this

BOX 2: JAPAN'S POPULATION IS AGING RAPIDLY AND WILL SOON BEGIN TO SHRINK

Japan's population will begin to shrink in 2007, when its death rate surpasses its birthrate (Figure 11). As the largest net importer of food in the world, Japan will serve as a laboratory for understanding the impact of declining population and other demographic changes on the food system. It is expected that Japan's aggregate food demand will gradually decline with fewer people to feed; per capita food demand will also decline with the rapid aging of the population and a growing share of more sedentary, less active people (Figure 12). Japan's economic growth will be affected by a declining savings rate, on the one hand, and rising demand for capital to offset growing labor shortages, on the other. As a consequence, this historically capital-surplus economy could see that surplus diminish.

Demographic pressure affects the future of Japan's agriculture and its approach to trade policy. Japan's farm population is aging more rapidly than the rest of its population and, as in many Western economies, the distribution of farming enterprises is becoming more polarized. There are fewer farms overall and the numbers of both very large farms and very small farms are increasing. This is explained in part by the rapid aging of the farming population; people aged 65 or older account for more than 25 percent of the total farm household population and almost half of those "primarily engaged in agricultural production." As the farm population ages, the number of households raising livestock, growing fruit and engaging in greenhouse farming—all very labor intensive enterprises—will decline at a faster rate than other enterprises. For example, some vegetable farmers have stopped growing crops like watermelons and pumpkins because of the physical strength required to handle these commodities (Campbell).

In time, Japan's agri-food system will face the options of (a) relying more heavily on migrant and tenant workers from overseas; (b) increasing the rate of consolidation in land holdings and the substitution of capital for labor; (c) altering the mix of production agriculture to reflect the capabilities of its farming workforce, thus remaining self reliant but with fewer food choices and nutritional options; and (d) becoming more open to trade liberalization.

"boost to development is not automatic...because there is no guarantee that governments, institutions, or individuals will spend the savings wisely." (East West Center, p. 7) On the other hand, in the richer economies when the dependent component of the population is rising, labor shortages and higher wages may eventually give impetus to capital-labor substitution, and more highly produc-

tive workers who are better able to support the relatively larger dependent segment of the population. It may also lead to less restrictive immigration policies.

Age and family structure also affects peoples' propensity to save and invest, which affects an economy's productive capacity. Recent academic work suggests that population aging in Australia, Canada, New Zealand and the United

States will reduce savings and investment rates over the next 20 years, with spillover effects on growth and productivity.

Recent research also suggests that entrepreneurial and innovative behavior is highest before an individual turns 40 years of age. Lipset and Meltz (1997) observe that the probability an individual will favor performance over seniority declines progressively with age, dropping slowly but steadily between 18 and 34 years of age, leveling off between 35 and 54, and declining rapidly after age 55.

Recommendations

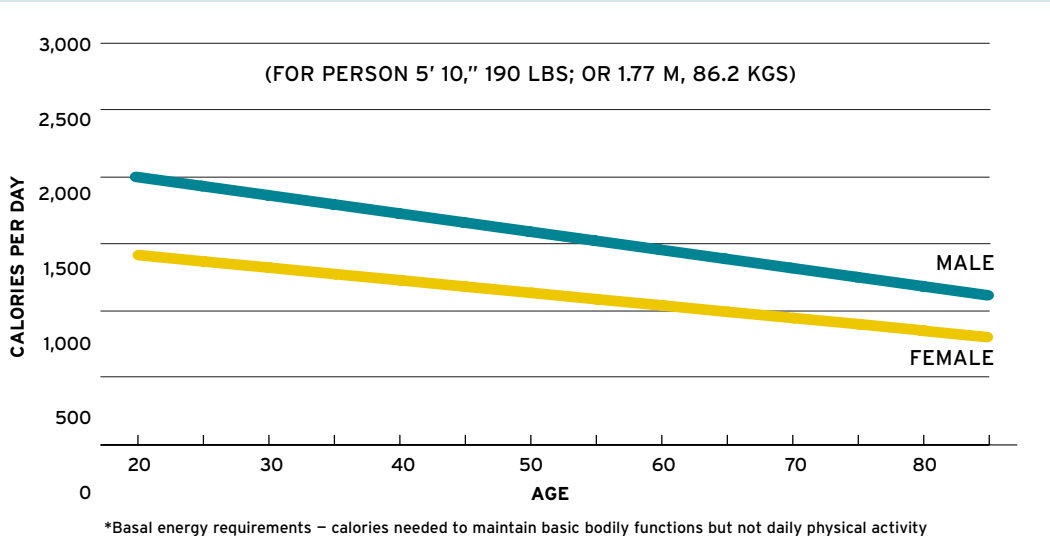
Powerful economic forces generated by demographic changes require the close attention of food system policymakers. Some demographic changes — such as declining fertility and mortality rates and the aging of a population — take years to become clearly visible. Others, like urbanization, may have more immediate impacts. Given these trends:

Policymakers and the food marketing system must adjust to greater concentrations of people in urban areas.

Food system efficiency as well as farm-level productivity, must be a fundamental public policy goal. This is consistent with the Asia Pacific Economic Cooperation Forum's (APEC) Open Food System Initiative (Box 3). Public and private investment in domestic food system infrastructure and more liberal food trade policies will be essential to ensure cost- and operation-efficient food systems.

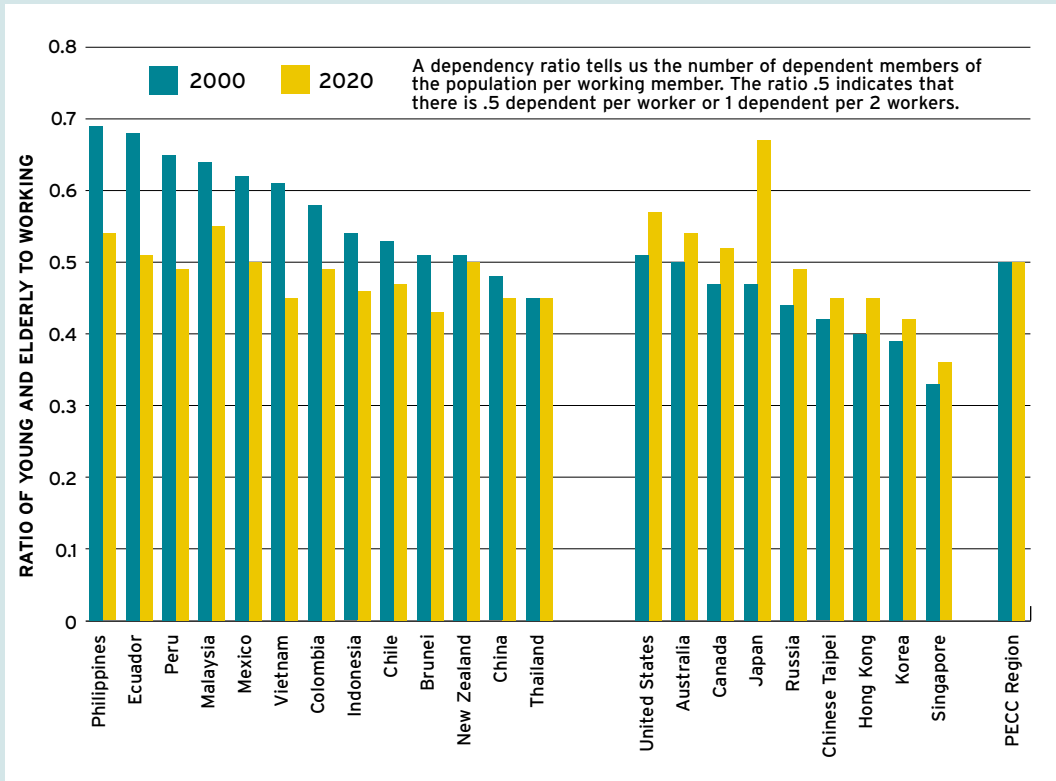
Less centralized distribution systems will play a more significant role in overcoming the high cost of traffic congestion and other

Figure 9 Caloric Requirements* Decline With Age and Are Lower for Women



Source: <http://www.hononline.com/howtoyour.html>. #TOTALCALORICREQUIREMENTS

Figure 10 PECC Dependency Ratios, 2000 and 2020



Source: Table 1

BOX 3: APEC'S OPEN FOOD SYSTEM

APEC's Open Food System (OFS) focuses on the importance of both trade liberalization and rural development to agricultural economies throughout the region.

Endorsed by APEC in 1999, OFS was initially proposed in 1998 by APEC's business advisory council to tailor the economic precepts of open regionalism to the specific dynamics of agriculture and the food supply.

Central to OFS is the view that trade liberalization will provide consumers with a lower cost, more secure food supply. OFS aspires to optimize the gains from trade liberalization by developing rural sectors throughout the region with government/private sector cooperation. Key OFS objectives are:

TRADE LIBERALIZATION. OFS accepts APEC's Bogor schedule for liberalization of tariffs and non-tariff measures – 2010 for developed and 2020 for developing economies. It assumes that trade impediments in food products distort the allocation of land, water, labor, and capital resources in an era when efficient resource allocation is urgently needed. For example, it makes little sense for an economy with scarce land and water resources to export land- and water-intensive food products.

FOOD SECURITY. OFS requires assurances that restrictions on food exports are not imposed except in dire circumstances. If markets are to be open, exporters must expect greater access to import markets and, equally, importers must expect free access to export supplies.

RURAL DEVELOPMENT. While trade liberalization tends to increase agricultural productivity, thus stimulating output growth, it also reduces labor input required per unit of production. Economic opportunities must be created in rural areas to stem outmigration to already densely populated cities in the region. More than half of the world's cities with populations greater than 10 million are located in APEC economies.

Creating economic opportunities in rural areas requires:

- investment in infrastructure;
- rural education and health care comparable to urban areas;
- partnerships between government and private-sector agents to attract investments into rural areas and thus create greater off-farm employment opportunities;
- realistic rural development plans that can be funded and executed by the private sector in conjunction with the World Bank, Asian Development Bank and Inter-American Development Bank.

TECHNOLOGY DIFFUSION: OFS aims to cultivate a "food technology culture," facilitating the diffusion of useful recent developments in food production, storage, shipping, packaging and processing. Improved access to technology is expected to accelerate gains in productivity through information technology and biotechnology, spurring growth in economies that are less developed and thus contributing to faster and more balanced economic growth across all of the region's economies.

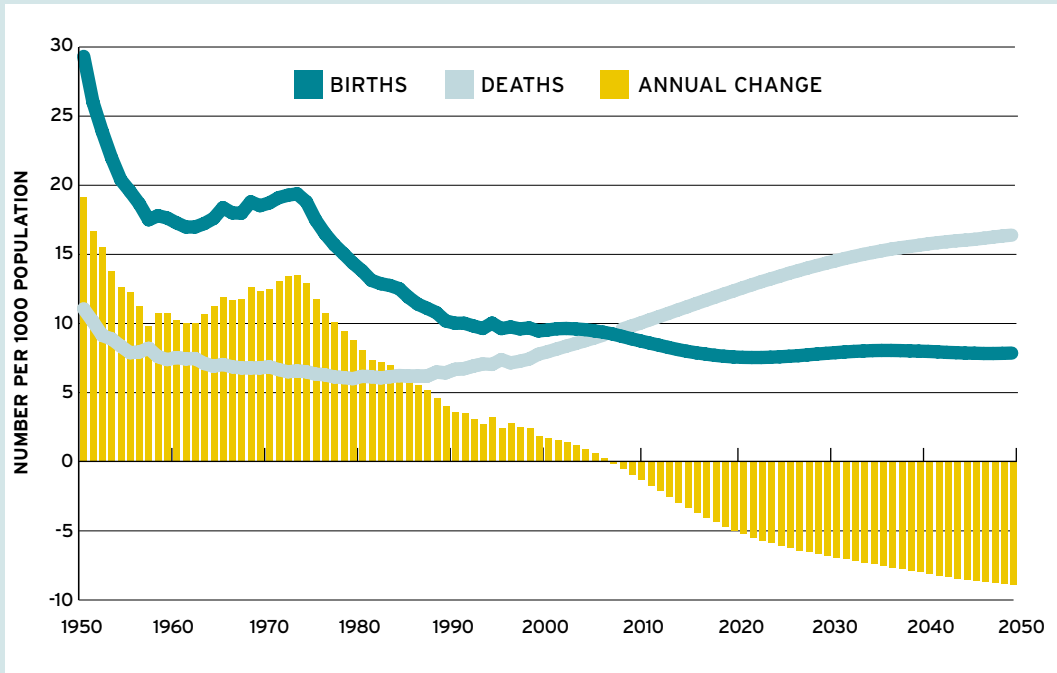
costs of doing business in densely populated cities.

The higher incomes and greater food demand from urbanization must be balanced against more sedentary lifestyles and lower per capita caloric needs. More affluent and health-conscious consumers will demand greater quality, variety and convenience from the food system. Policymakers need to anticipate the needs for trained professionals to implement and monitor quality control systems, like agri-food HACCP technicians, crop and animal health scientists, and other professionals.

The variability in the growth and characteristics of populations over the next two decades has important implications for public policy, as well as the food marketing and investment strategies of the private sector. The most rapid growth—occurring in the developing markets of Southeast Asia and Latin America—requires policies that support domestic food production or importation. The biggest absolute growth—occurring in the three most populous economies of China, Indonesia and the United States—requires policies to mitigate rural-urban conflicts; to support production, marketing and trade; and to assure sustainability of the food system. Declining populations—such as in Japan and Russia—will require changes in the foods supplied, supported by changes in domestic agricultural policies and more flexibility in trade policies.

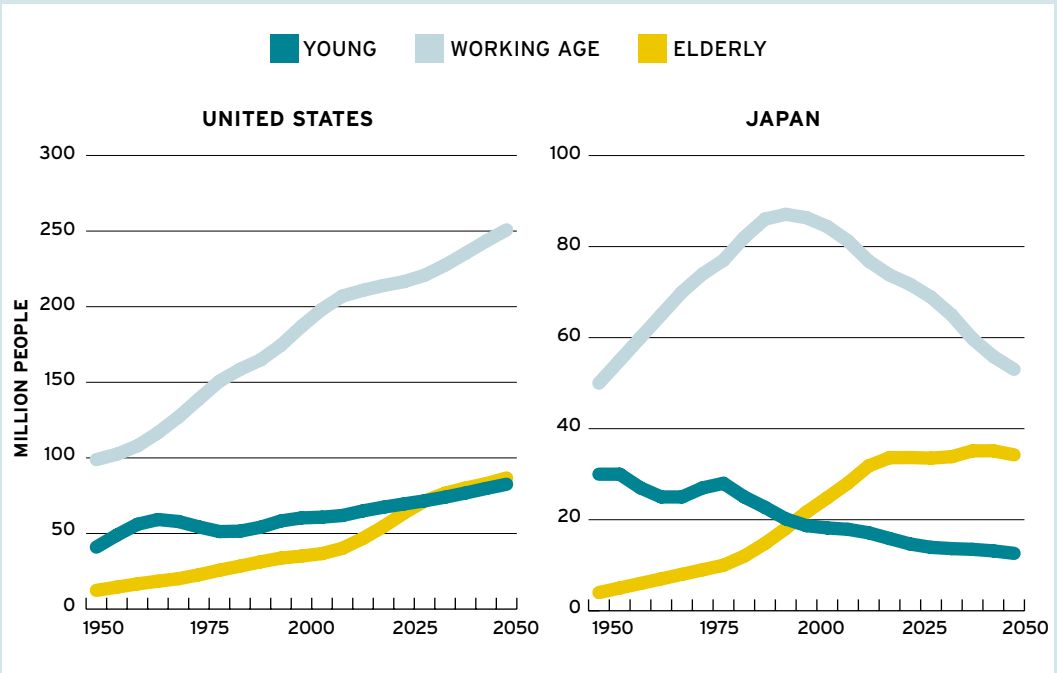
For the private sector, food marketing and investment strategies will, more than ever, require customization for each country. Japan is currently the largest net importer of food in the world, but its population is aging rapidly and

Figure 11 Japan's Population Begins to Decline in 2007



Source: UN

Figure 12 U.S. and Japan: Comparing Population Age Structures



Source: UN

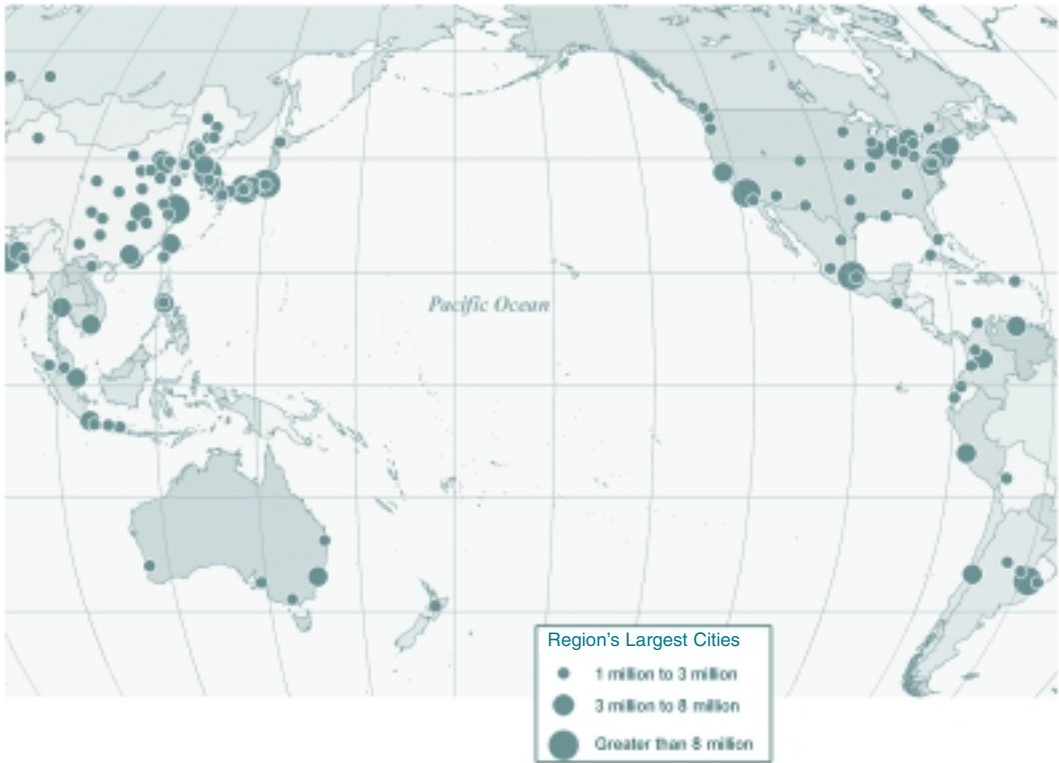
will soon decline. Investment and marketing strategies must address an overall reduction in food consumption and changes in the types of foods consumers demand. The United States, where immigration is expected to result in rapid population growth, strategies must target many more consumers, as well as changes in the population's ethnic mix. The largest absolute growth in population across the region will be in China. This, combined with rapid urbanization, requires a focus on market logistics in a densely-populated area and the changing preferences of higher income consumers.

Aging populations will generate changes in food demand that have significant implications for the food system.

The aging of the region's population will slowly lead to lower per capita food consumption and a shift in the composition of food demand. Changes in the composition of food demand are likely to include more fresh fruits and vegetables, less meat and less eating out. This has important implications for producers, processors, retailers and food service establishments. Policy adjustments must encourage and facilitate needed changes.

Policymakers must work to mitigate the adverse impacts that aging populations will have on economic growth, a leading driver of food demand.

Responses may include: extending the working lives of people; raising worker productivity so fewer people can support more retirees; reducing public obligations for pensions and health care services; relaxing controls on immigration; and adopting policies to encourage higher fertility rates.



GLOSSARY OF TERMS

BASAL METABOLIC RATE (or BMR) is the number of calories a human being needs to maintain basic bodily functions, such as heart beat, respiration and normal body temperature. The BMR does not account for the caloric requirements for daily physical activity. (<http://www.hononline.com/howtoyour.html#TOTALCALORICREQUIREMENTS>)

DEMOGRAPHIC BONUS is the potential economic boost from relatively faster growth in the productive/working segment of the population relative to the dependent segments.

DEMOGRAPHIC TRANSITION is a decline in the fertility and mortality rates of a population that occurs as an economy gets richer.

DEMOGRAPHY is the scientific study of the size, composition and spatial distribution of human populations; and the changes that occur in these phenomena through the processes of fertility, mortality, and migration.

DEPENDENCY RATIO is the number of young and elderly relative to the number of working people in the population.

EMIGRATION is the process of leaving one country to take up permanent or semipermanent residence in another.

ETHNIC refers to a religious, racial, national, or cultural group.

FERTILITY RATE is calculated as the number of births per 1,000 people in a population.

IMMIGRATION is the process of entering one country from another to take up permanent or semipermanent residence

MORTALITY RATE is calculated as the number of deaths per 1,000 people in a population.

NET MIGRATION is the net effect of immigration and emigration on an area's population in a given time period, expressed as an increase or decrease.

POPULATION MOMENTUM is the tendency of a population to continue to grow despite reaching a replacement fertility rate because of the growing number of child-bearing females.

RACE refers to a local geographic or global human population distinguished as a more or less distinct group by genetically transmitted physical characteristics.

RATE OF NATURAL INCREASE is the rate at which a population is increasing (or decreasing) in a given year due to a surplus (or deficit) of births over deaths, expressed as a percentage of the population.

URBANIZATION is the increase in the density of settlement and/or business and other activities of an area over time. The process occurs as an expansion of the existing population, incoming migration, or a mixture of both.

A city population is dependent upon its "hinterlands" or foreign sources to supply it with food. Not until agriculture developed could hinterlands provide food for their own populations and enough surplus to feed a city population. And in agricultural societies the surplus was so small that only a tiny proportion of an entire population could live in cities. Up until very recently – about 200 years ago – that proportion was limited to about 5 percent of an entire population. (www.faculty.fairfield.edu/faculty/hodgson/Courses/so11/population/urbanization.htm)

ZERO POPULATION GROWTH is when a population is in equilibrium, with a growth rate of zero, achieved when births plus immigration equal deaths plus emigration.

Sources: Most definitions are taken from Population Reference Bureau (www.prb.org)

ABBREVIATIONS USED IN THE PACIFIC FOOD SYSTEM OUTLOOK

APEC–Asia Pacific Economic Cooperation Forum

BMR–Basal Metabolic Rate

FAO–Food and Agricultural Organization

HAACP–Hazard Analysis and Critical Control Points

HRS–Household Responsibility System

OFS–Open Food System

PECC–Pacific Economic Cooperation Council

TVE–Township and Village Enterprises

UN–United Nations

USDA–United States Department of Agriculture

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WEBSITES ON DEMOGRAPHIC CHANGE

- **Center for Strategic and International Studies (CSIS), Global Aging Initiative:**
<http://www.csis.org/gai/pubs.htm>
- **Country data; source of information on ethnic and religious composition of populations:**
<http://www.nationmaster.com/countries.php>
- **Global Aging Initiative Program, Center for Strategic and International Studies:**
<http://www.csis.org/gai/pubs.htm>
- **Japanese National Institute of Population and Social Security Research:** <http://www.ipss.go.jp/index-e.html>
- **The Nutrition Transition Program, University of North Carolina, Chapel Hill;** analysis of changes in dietary and physical activity patterns and nutritional status, and exploring their relationships with economic, social, demographic, and health factors. <http://www.nutrans.org/index.html>
- **Population Reference Bureau** (www.prb.org)
- **Rand Corp.; Population and Aging Research Area:** http://www.rand.org/pop_area/
- **U.S. Census:** <http://www.census.gov/ipc/www/world.html> *World population information*
- **The World Gazetteer:** provides information about current population of countries, their administrative divisions, cities and towns as well as images of the current national flags: <http://www.world-gazetteer.com/home.htm>

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CHILE

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SPONSOR PROFILES

Economic Research Service

<http://www.ers.usda.gov>

The Economic Research Service (ERS) is the main source of economic information and research in the US Department of Agriculture. ERS economists and social scientists develop and distribute a broad range of economic and other social science information and analysis to inform public and private decision making on agriculture, food, environmental, and rural issues.

The ERS's timely reports are distributed to public and private decision makers to assist them in conducting business, formulating policy, and learning about the farm, rural, and food sectors. ERS publications are available to the public and the news media in both print and electronic form.

The agency's three divisions—Food and Rural Economics, Market and Trade

Economics, and Resource Economics—conduct research, perform commodity market and policy analysis, and develop economic and statistical indicators. The executive and legislative branches of the US federal government use ERS information to help develop, administer, and evaluate farm, food, rural, and resource policies and programs.

In addition to research reports and commodity analyses, ERS publishes *Amber Waves*, a new magazine covering the full range of the agency's research and analysis, including the economics of agriculture, food, rural America, trade and the environment.

Farm Foundation

<http://www.farmfoundation.org>

Farm Foundation is a publicly supported nonprofit organization working to improve the economic and social well-being of U.S. agriculture, the food system and rural people by helping private and public sector decision makers identify and understand forces that will shape the future. Serving as a catalyst, Farm Foundation

partners with private and public sector stakeholders, sponsoring conferences and workshops to explore factors shaping the competitiveness of agriculture and the food system; encouraging application of research results to increase human capital; promoting informed dialogue on public issues and policies; and building knowledge-based networks for U.S. agriculture and rural people. Farm Foundation does not lobby, nor advocate positions. Its 70-year reputation for objectivity allows it to bring together diverse stakeholders for quality discussions on issues and policies, providing a solid basis for informed private and public-sector decisions.

The East-West Center

<http://www.EastWestCenter.org/>

The East-West Center is an internationally recognized education and research organization established by the U.S. Congress in 1960 to strengthen understanding and relations between the United States and the countries of the Asia Pacific region. The Center carries out its mission through programs of cooperative study, training and research. As a national and regional resource, the Center offers an interdisciplinary research program, dialogue and professional enrichment programs, and educational programs. Funding for the East-West Center comes from the U.S. government, international organizations, corporations, foundations and Asia Pacific governments.

the first college of the newly founded University of Hawaii in 1920. As a land-grant college, CTAHR is charged with three broad responsibilities: extension programs that provide outreach and non-formal education to Hawaii's industries and communities; formal instruction of students through degree programs; and research that generates new knowledge about tropical crops, products, environments and communities. The vision of CTAHR is to actively help Hawaii diversify its economy, ensure a sustainable environment and strengthen its communities, with the aim of being the premier resource for tropical agricultural systems and resource management in the Asia-Pacific region.

The College of Tropical Agriculture and Human Resources (CTAHR), University of Hawaii

www.ctahr.hawaii.edu/ctahr2001

The College of Tropical Agriculture and Human Resources (CTAHR) was established in 1907, as the College of Agriculture and Mechanical Arts and became

PACIFIC ECONOMIC COOPERATION COUNCIL

The Pacific Economic Cooperation Council (PECC) is an independent, policy-oriented organization devoted to promoting economic cooperation in the Pacific Rim. PECC brings together senior government, academic, and business representatives from 22 economies to share perspectives and expertise in search of broad-based answers to economic problems in the Asia Pacific region.

Founded in 1980, PECC now comprises member committees from the economies of Australia; Brunei; Canada; Chile; China; Colombia; Ecuador; Hong Kong, China; Indonesia; Japan; Korea; Malaysia; Mexico; New Zealand; Peru; the Philippines; Russia; Singapore; Chinese Taipei; Thailand; the United States; and Vietnam as well as the Pacific Island Nations. France (Pacific Territories) and Mongolia were admitted as associate members in April 1997 and April 2000, respectively. The Pacific Basin Economic Council (PBEC) and Pacific Trade and Development Conference (PAFTAD) are institutional members of PECC.

PECC's governing body is the Standing Committee, which meets twice a year and consists of the chairs of PECC committees in each member economy. The day-to-day administrative and coordinating functions are carried out by an International Secretariat based in Singapore. Each member committee sends a high-level tripartite delegation from government, business, and academia to the PECC General Meeting held every two years.

In addition, PECC establishes forums, task forces, projects and networks to concentrate on particular policy areas. These groups meet periodically, organize seminars and workshops, conduct studies, and publish their conclusions and recommendations for the benefit of the Pacific community. In 2001, PECC initiated forums on trade, finance, and community building. Task force topics include capital and financial markets, human resource development, Pacific Island Nations IT, and sustainable cities. PECC also supports projects on food, minerals, energy, telecommunications, air transport and transportation and publishes annual editions of *Pacific Economic Outlook* and *Pacific Food System Outlook*.

At the regional level, PECC's most important link with government is through APEC. PECC is the only nongovernmental organization among the three official APEC observers. PECC representatives attend APEC ministerial meetings, senior officials meetings, and working group meetings. PECC also works with other international organizations such as the World Trade Organization, the Organization for Economic Cooperation and Development, the Asian Development Bank, the World Bank, and United Nations' agencies.

For more information, contact the PECC International Secretariat, 4 Nassim Road, Singapore 258372, Tel: 65-6737 9823, Fax: 65-6737 9824, email: peccsec@pecc.net



The *Pacific Food System Outlook* represents the first regionwide coordinated effort to provide the outlook for the Pacific food system. The food system includes not just production agriculture, but also the whole complex of economic relationships and linkages that tie the region's food consumers to producers. The goal of the *Pacific Food System Outlook* is to help increase knowledge about the diverse components of this vital segment of the global economy.