

The presidential election of March 2000, increasing telecommunications expenditures, and a vigorous stock market stimulated real private consumption to grow as high as 7.65 percent in the first quarter of 2000.

However, increasing conflict between the parliament and the new government, inconsistency in major government policies, and inappropriate intervention in the stock market have gradually deteriorated the confidence of investors and caused a pessimistic outlook on the future of the economy. The economic growth rate in 2000 was 6.0 percent, which is slightly lower than the 6.4 percent projected last year. The downturn was mainly caused by fluctuations in private consumption and private investment, especially in the dismal fourth quarter. The unexpected downturn of the US economy and its slumping stock market were also the main reasons for the poor performance of the last quarter.

Factory closures, mostly in traditional industries, have contributed to several months of increasing jobless rates since October 2000. The unemployment rate struck a 15-year high in May 2001. The average jobless rate of 3.66 percent for the first quarter of 2001 was also a historic high for the same period. The unemployment rate will likely break the 4 percent mark in the second quarter and is expected to average 4.1 percent overall for the year 2001. Manufacturing production for the first quarter declined 4.95 percent, which was the largest fall since the oil crisis of 1975. Textile industry production was reduced by 10.28 percent due to many factories moving their production lines to China and other Asian countries. Electronics and mechanical equipment also shrank 5.43 percent as the result of a decrease in the demand for information technology products and the continuing trend of moving factories overseas.

The NT dollar depreciated slightly, to 31.2 per US dollar in 2000. It is expected to depreciate to 34.0 in 2001. Due to stable food prices and a small increase in garment prices, the CPI increased 1.26 percent in 2000. Joining the World Trade Organization (WTO) and opening domestic markets to the world will help to minimize the impact of rising oil prices. The current domestic investing environment and stock market losses have also made people wary of spending. Therefore, the CPI will only grow by 0.56 percent in 2001. The wholesale price index increased 1.82 percent in 2000 as a result of oil price increases and NT dollar depreciation. It is projected to drop 0.28 percent in 2001.

In 2001, the slowdown of both the US and the global economy will decrease the growth rate of exports and imports. The slowdown will also increase investment risk and thus curb investment. While the slumping stock market and rising unemployment rate could slow down the growth in private consumption, pressure from budget deficits will trigger growth in government consumption. As a result, the overall growth in real GDP is projected to be only 2.4 percent for 2001, led by 5.4 percent growth in public investment and 3.0 percent growth in private consumption. Private investment is expected to drop 11.3 percent. Exports are expected to decrease 4.0 percent, while

imports should drop 7.7 percent. Since the world economy is expected to continue growing at a slightly slower rate in next few years, the Taiwan economy is projected to grow from 5.0 to 6.0 percent during the period 2002-2005.

Food Prices and Consumption

In 2000, food and beverage prices in Chinese Taipei increased slightly (0.15 percent), while overall consumer prices rose 1.26 percent. The increase was mainly driven by vegetables and fruits, which increased an average of 7.1 and 1.2 percent respectively, due to a bad harvest from typhoons and other weather anomalies. Prices for rice increased about 4.9 percent. Meat prices decreased 7.0 percent in comparison to 1999. Prices for fresh seafood rose 2.6 percent while prices for processed seafood remained unchanged. Prices for prepared food rose slightly (0.9 percent), while prices for food-away-from-home rose 1.2 percent in 2000.

During the first quarter of 2001, food and beverage prices dropped again by 1.43 percent while the CPI increased 0.58 percent. In 2001, the CPI is expected to increase by 0.56 percent. Food prices are expected to be slightly lower in 2001 due to the economic downturn.

Expenditures on food and beverages were about 25 percent of total municipal consumption in 2000. This is almost the same as in the previous year since both food prices and consumer prices were in a fairly stable situation. Daily per-capita calorie intake has remained stable in recent years, approximately 3,000 calories per capita. This trend is likely to continue in the future. Per-capita consumption of rice continues to decline, from 64 kilograms in 1990 to 54.7 kilograms in 1999. Meanwhile, per-capita consumption of meat increased from 66.2 to 78.1 kilograms. An increasing concern for health has led to increased demand for dairy products. Per-capita consumption of dairy products increased from 16.6 kilograms in 1990 to 58.1 kilograms in 1999. Per-capita fruit consumption also increased sharply, from 99.8 kilograms in 1990 to 142.2 kilograms in 1999. Due to increased demand for ready-made foods from the service sector, the proportion of household expenditure used on take-out food and restaurants was 28 percent in 1999, double the proportion it was 10 years before.

Food Processing and Marketing

The total value of food processing production in 2000 was NT\$443 billion, a 4-percent decrease from 1999. More than half of the product items experienced a recession, with the exception of health foods and frozen and dehydrated products. The total export value of processed food is now down to 5 percent of its total production.

The major reasons for this recession are a drop in consumer demand and increased competition from foreign imports. Frozen seafood products have lost their competitiveness to the Southeast

Asian and China manufacturers. The development of frozen vegetable production was hampered by unstable supplies and a lack of varieties. Cooking oil production dropped more than 12 percent because increasing oil prices raised the cost of raw materials (soybeans) which are largely imported from the United States. The expansion of granola and olive oil as healthier substitutes also squeezed the market share of domestically produced soybean oil.

The feed industry suffered a 5.7 percent decline from the previous year because of shrinking demand from the hog and poultry industries. The government has bought out many small-scale operations in the hog and poultry industries since the outbreak of foot-and-mouth-disease (FMD) in 1997. This effort has also aimed to improve the efficiency of these operations and lower their production costs to make them more competitive with imports. Under such a market environment, the feed industry is adopting vertical integration strategies to increase their profits and gain export market share.

Market growth in the non-alcoholic beverages sector has also slowed down due to the recession and cooler weather conditions in 2000, but demand for natural juices and bottled water has increased steadily. Product quality and successful advertising are the key elements in making their market share more upscale. Product innovation is another key element in maintaining market share and competitiveness because of the short product cycle and low-price characteristics of these beverages.

Agricultural Production and Trade

Conditions for crop production were favorable during the first half of 2000, but in the second half, typhoons and heavy storms caused severe damage to vegetable and fruit production. Rice production increased 3.7 percent because of the favorable weather conditions. However, overall growth in the crop sector was negative.

Chicken production decreased 32 percent, a huge drop caused by the government's buy-out program in response to Taipei's anticipation of joining the WTO. Livestock production stabilized after three years of contracting in response to the government's phasing-out effort and the aftermath of the foot-and-mouth-disease (FMD) epidemic of 1997. The hog inventory has decreased 30 percent since the FMD outbreak in 1997, while the number of hog farms has dropped nearly 40 percent. Another outbreak of FMD among goats and cows was reported in February 2000. This outbreak cut the number of slaughtered animals in half. Therefore, prospects for the livestock sector have become bleaker.

The fishery sector also experienced a large reduction in 2000. Far-sea fishery accounts for 50 percent of the total value of Taipei's fishery production. The harvest in far-sea fishery decreased 15 percent in 2000 mainly from reductions in squid jigging. Production of inland aquaculture decreased 22 percent from the previous year, while marine culture showed an increase of 26 percent.

Agricultural and food imports declined slightly in 2000. The import value of cereals and sugar increased 5.8 and 26.3 percent, respectively. However, oilseed and cotton declined 4.5 and 11.88 per-

cent. Most of the livestock imports also declined. During the first quarter of 2001, the import value of livestock products again dropped 9.2 percent from the same period during the previous year. Imports are not expected to increase unless the economy recovers in the latter half of 2001.

The total value of agricultural and food exports increased 5.7 percent. This is the first upward change since 1997. Seafood is the major export item. The total value of seafood exports increased 18.4 percent in 2000. However, this number is still lower than it was in 1997. Fruit and vegetable exports decreased 9 and 2 percent, respectively. During the first quarter of 2001, seafood exports dropped 6.6 percent in value, while exports of vegetables and fruit declined 3.2 and 19.7 percent, respectively. This declining trend in exports is not going to reverse in the near future, since many factories are moving their production bases to China.

Food and Agricultural Policies

One year has passed since Chinese Taipei elected a new president from the opposition party. The new cabinet is making its way in managing the economy. The recent economic slowdown certainly poses a challenge to the new government. Prospects for the year 2001 point to a hard year. A stringent budget situation and weak banking sector limit the options of using fiscal policy to fight unemployment. How the economy and financial sector adapt to the recession will become crucial to future growth.

Furthermore, accession to the WTO has been stalled due to a disagreement on subsidy rates for the agricultural sector between China and the US. Entering the WTO would send an unwelcome jolt to the domestic agricultural sector but would benefit the manufacturing sector. To cope with the pending entry into the WTO as well as the movement toward liberalization, the government is revising the Land Law with a view to relaxing restrictions on foreign investment in land and real estate. Local governments will also be given authorization to approve the rezoning of non-urban land below a set size. Other policy priorities involve the development of a knowledge-based economy and the speeding up of financial reform.

Internet-based electronic commerce is growing at a booming rate. Information released by the Institute for Information Industry indicates that the electronic shopping market in Taiwan reached US\$120 million in 2000, registering a growth approximately 1.5 times that of 1999. To strengthen the regulatory environment for the Internet, the Council for Economic Planning and Development will implement an Internet Regulatory Development Plan to address the issues of electronic transaction, intellectual property protection, consumer rights, Internet crime, and electronic government.

The minister of the Council of Agriculture (COA) also announced a mid-term development plan to cope with the trend of rapid trade liberalization, food insecurity caused by environmental degradation, and structural changes in food consumption patterns. To accelerate resolution of these problems, the government is vigorously promoting

the vertical and horizontal integration of production and marketing organizations, and advocates a system of joint marketing through contractual arrangements. This integration is aimed at helping the farmers become more competitive internationally. It will also help to promote urban-rural interaction. The transformation of traditional agriculture into a service-based industry will provide multi-functional and consumer-oriented farming services to our society. It will also restructure agriculture into a more market-oriented industry.

Water Resource Issues

WATER DEMAND. With an estimated annual growth of 0.5-0.6 percent, total water demand is expected to increase from 16.6 billion tons to no more than 20.0 billion for the years 1996-2021. The percentage share for agriculture (including conservation) will decrease from 73 percent to 66 percent, while industrial use will increase from 11 percent to 15 percent, with municipal use remaining at 17 percent. The reuse of reclaimed wastewater will contribute about 12 percent of irrigation water when the long-term sewage system project is finished (Hsu, Ouyang, and Weng, 2000).

Irrigation accounts for 85 percent of agricultural water demand. Aquaculture accounts for 12 percent and livestock only 3 percent. Among industrial demand, food and beverages account for 15 percent, which is smaller than the 20 percent used by the paper, pulp, and chemicals industry, but larger than the 12 percent utilized by the textile and metals industries.

WATER SUPPLY. Rivers in Chinese Taipei are short and steep. There are 24 river systems governed by the central government and 91 rivers governed by county offices. Hydrographs are characterized by high peaks, short duration, and heavy silt content. About 80 percent of the annual precipitation falls between May and October, with the major portion provided by summer thunderstorms or typhoons. Water shortages usually occur between February and May.

During the past decade, total water supply has been about 18.0 billion metric tons, 12.0 billion (65 percent) coming from surface water and 6.0 billion (35 percent) from underground pumping. By the year 2010, river runoff is expected to provide 11.0 billion metric tons and account for 55 percent of the total water supply, while reservoir and dam waters will provide 5.0 billion metric tons and account for 25 percent. Pumping from underground sources will drop to 4.0 billion metric tons and only account for 20 percent of total supply.

In the past, groundwater was a significant part of the total water resources in many areas and it played a key role in rural development. Because of the rapid economic growth, the use of groundwater resources has increased dramatically and overutilization has become a serious problem. The extraction of groundwater has three negative consequences: (1) overall water-level decline; (2) salt-water intrusion in coastal areas; and (3) land subsidence in coastal areas.

In the coastal areas, fresh-water and brackish-water fishponds use large amounts of groundwater to regulate salinity, oxygen, and temperature. Seawater intrusion and land subsidence in coastal areas are

mainly caused by the withdrawing of groundwater for aquaculture. Aquacultural farming has proved to be more profitable than other methods of crop cultivation. Consequently, many farmers switched to raising eels, clams, and shrimp. According to Lin (1986) and Ting, Kerh and Liao (1998), an eel farm consumes about ten times the amount of fresh water than that used by paddy fields. The government did not restrict the expansion of aquaculture until recent years, when land subsidence occurred in some of the coastal areas.

WATER POLICY. To maintain the future balance of water demand and supply, the government has initiated a water resource development plan with a planning horizon up to the year 2021. The development plan emphasizes conservation, environmental protection, and user's pay issues. There are three major policy priorities:

- Promoting water-saving techniques and market mechanisms to enhance efficiency in water use.
- Strengthening regional water transfer capacities.
- Diversifying water development projects.

The action plan considers regional differences and needs. In the northern region, where most demand comes from households and factories, the promotion of water savings and transfers among river systems are two major targets. In the central region, the government has approved construction of the Hushan Reservoir, with a total budget of US\$0.7 billion and scheduled for completion in 2008. This reservoir will satisfy the needs of the industrial zone for the central region until the year 2021. In the southern region, where most agricultural production takes place, an efficient water-transfer system between agricultural and non-agricultural sectors is a primary concern. The development of self-purification to reuse and recycle the returning agricultural and industrial wastewater is another equally important option.

From 1953 to 1999, total public investment in water resource development and management amounted to NTS908 billion. Investment in irrigation accounted for 17 percent of the total. Flood prevention and public utilities accounted for 24 percent. Due to a budget deficit problem, investment in 1999 dropped nearly 50 percent from the previous year. Investment in flood prevention and water pollution suffered the most dramatic reductions, while investment on irrigation was somewhat spared.

EFFICIENCY OF WATER USE. Jiang et al. (1997) use several indexes to measure water use efficiency. For international comparisons, they suggest a ratio of total water used to GDP because it is easier to obtain data. According to their calculation, the overall water use efficiency in Switzerland is the highest in the world, while Singapore ranks the first among the APEC economies, followed by Japan.

In terms of industrial use, the efficiency found in Australia is the highest of the selected APEC economies, followed by Singapore and Japan. As for agricultural use, Colombia is on top of the list, followed by Indonesia.

Chinese Taipei lags behind in its efficiency of agricultural water use. Most of the rice-producing economies rank lower in efficiency of agricultural use because rice is a water-demanding crop. Therefore, the comparison of these economies to non-rice-producing economies may

not be fair. However, among the rice-producing economies, the efficiency of Chinese Taipei still lags behind Japan and Korea, which shows that water conservation is an issue to be addressed. The key may be to find the appropriate policy instruments to provide incentives for adopting these technologies.

OUTLOOK FOR AGRICULTURAL-FOOD SECTOR. Public investment in water resources has increased significantly since the early 1990s because of heavy investment in flood protection construction in several river systems in the northern region. It peaked in 1987 after typhoon Hob caused severe damage throughout the island. Investment in water projects was cut in half in 1999 compared to 1998, because most of the construction was near completion and because of budget difficulties after the Asian financial crisis.

The relative importance of water investment in total domestic capital formation had stabilized at around 4 to 6 percent after the 1980s. However, it dropped to less than 2 percent in 1999. Water investment as a percentage of GDP decreased from 1.5-2.0 percent to about 1.0 percent. This mild decreasing trend is caused primarily by the rapid GDP growth of the past two decades. Per-capita water investment is about NTS3,000 (approximately US\$100) per person. This amount is almost twice as much as it was ten years ago and is more than 20 times higher than it was four decades ago.

During the period 1961-1978, investment in irrigation facilities was more than 30 percent of total water investment. Unlike other investments, most of the funding came from private sources, mainly the irrigation associations. However, after 1979, the share of irrigation facilities in total water investment dropped to less than 20 percent. The main funding source also shifted to the government. After a decade of stagnation, the absolute amount of irrigation investment went up again in the early 1990s and reached NTS14.6 billion in 1998. Most of the investment is used for improving the sewage system, renovating aging facilities, and routine maintenance. Like the other investments, the amount dropped to NTS8.8 billion in 1999, which is a 40 percent cut from 1998.

Currently, there are 17 irrigation associations in Chinese Taipei in charge of 382,000 hectares of cultivated land, which accounts for 44 percent of the total cultivated area. The annual amount of irrigation water used per hectare is about 34,500 cubic meters. According to recent estimates from the Council of Agriculture, crop irrigation withdraws 13.1 billion tons of water annually if there is no water shortage, 12.2 billion tons if there is. Projections into the next decade range from 12.2 to 14.8 billion tons, depending on planting and management conditions.

Water pollution from the industrial sector and the deterioration of revenue generation are the main operational concerns of the irrigation

associations. These issues affect the quality and amount of water available for irrigation purposes. Many associations are in the process of diversifying into the drinking water and recreation business or selling their assets in order to maintain their operations. On the other hand, increasing demand from the industrial and municipal sectors is also putting tremendous pressure on the irrigation associations to release their water rights. Water right reallocation and water fee collection have become central issues in water resource management and policy debates. Currently, a water transfer compensation scheme is used to compensate farmers' losses of farmers when their water is diverted to nonagricultural use.

References

- Council for Economics Planning and Development, "Taiwan New Economy Newsletter", INDUSTRY OF FREE CHINA, March 2001.
- Hsu C.L., Ouyang, C.F., and Weng, H.T., "Purification of rotating biological contractor treated domestic wastewater for reuse in irrigation by biofilm channel". RESOURCES, CONSERVATION AND RECYCLING 30(2000): 165-175.
- Jiang J.-N. et al., WATER RESOURCE PLANNING-THE ECONOMIC PERSPECTIVE (PRELIMINARY STUDY), Taiwan Institute of Economic Research, Chapter 2, June 1997.
- Lin, Y.T., "Information on Land Subsidence in Coastal Areas of Taiwan: A Collection of Papers on Irrigation Drainage and Engineering in Taiwan." Agricultural Engineering Research Center, Chungli, Taiwan, pp. 927-953, 1986.
- Ting, C.-S., Kerh, T., C.-J. Liao, "Estimation of Ground Water Recharge Using the Chloride Mass-Balance Method, Pingtung Plain, Taiwan." HYDROGEOLOGY JOURNAL (1998) 6: 282-292.
- Water Resource Bureau, Ministry of Economic Affairs, 2000. WATER RESOURCE INVESTMENT ANALYSIS YEARBOOK, 1999, Draft.
- World Bank, WORLD DEVELOPMENT REPORT, 1995

CHINESE TAIPEI

	Units	1997	1998	1999	2000	2001 ^E	2002 ^F
FOOD CONSUMPTION PATTERNS ^a							
Per capita caloric intake	Cal/day	3,129	2,891	3,038	3,083	3,128	3,174
From animal products	Cal/day	726	709	798	801	805	808
From vegetable products	Cal/day	2,403	2,182	2,240	2,281	2,323	2,366
Protein (% of calories)	%	13.2	13.2	13.1	13.2	13.3	13.5
Fat (% of calories)	%	38.4	38.0	37.9	37.6	37.4	37.1
Carbohydrates (% of calories)	%	48.5	48.8	49.1	49.3	49.3	49.4
INCOME AND FOOD PRICES							
Per capita income ^b	US\$/capita	11,950	10,918	12,163	13,380	13,648	14,194
% of disposable income spent on food	%	18.3	19.1	18.5	18.4	18.3	18.2
% spent eating out	%	4.5	4.8	5.1	5.3	5.0	5.3
Food price index ^c	1996=100	99.1	103.5	103.0	102.6	104.1	106.2
General price index (CPI) ^c	1996=100	100.9	102.6	102.8	104.1	104.7	106.2
POPULATION ^d							
Total population	Million	21.7	21.9	22.1	22.3	22.4	22.5
Urban	Million	16.7	16.4	16.5	16.6	16.5	16.7
Nonurban	Million	5.0	5.5	5.6	5.7	5.9	5.8
Share of population in the following age groups							
0–4 years	%	7.4	7.1	6.8	6.6	6.4	6.14
5–14 years	%	15.3	14.9	14.6	14.3	14.1	13.8
15–19 years	%	9.3	9.1	8.8	8.6	8.4	8.2
20–44 years	%	42.6	42.6	42.6	42.5	42.5	42.4
45–64 years	%	17.5	18.1	18.7	19.3	20.0	20.6
65–79 years	%	6.9	7.1	7.2	7.3	7.4	7.5
80–over years	%	1.2	1.2	1.3	1.4	1.4	1.5
Median age of population	Years	30.7	31.2	32.0	32.2	32.4	32.6
Female labor force participation	%	45.6	45.6	46.0	46.9	47.7	48.5
LIFE EXPECTANCY							
Males	Years	71.9	72.1	72.2	72.3	72.4	72.5
Females	Years	77.8	77.9	78.1	78.2	78.5	78.4
FOOD INFRASTRUCTURE							
Trade capacity ^e							
Grain exports	1,000 Tons	114	96	155	72	60	50
Grain imports	1,000 Tons	7,202	6,262	6,274	6,200	5,890	6,050
Total food and agricultural exports	Million US\$	3,985	3,155	4,116	4,338	4,078	3,955
Perishable products	Million US\$	250	215	311	280	266	261
Fishery exports	Million US\$	1,271	1,092	1,373	1,618	1,489	1,414
Total food and agricultural imports	Million US\$	9,919	7,794	10,251	10,957	10,080	10,282
Perishable products	Million US\$	603	552	738	744	707	742
Fishery imports	Million US\$	730	541	805	1,140	1,026	1,005
Port capacity ^f	1,000 Tons	962,185	988,886	1,014,420	1,036,654	984,821	1,004,518
Road access ^f	Kms	33,433	34,102	35,765	36,080	36,398	36,718
Rail access ^f	Kms	1,156	1,156	1,156	1,156	1,156	1,156
Telecommunications ^f	Million US\$	10,862	11,500	12,040	12,784	13,168	13,826
Power generation ^g	Gigawatts	133,448	147,141	153,027	175,217	166,456	171,450
Percent of population with refrigerators ^h	%	99.2	99.3	99.4	99.4	99.5	99.5
FOREIGN INVESTMENT IN THE FOOD SECTOR ⁱ							
Inward FDI in the food sector, total	Million US\$	48	60	18	82	na	na
From other PECC economies	Million US\$	36	44	13	61	na	na
Outward FDI in the food sector, total	Million US\$	389	126	59	47	na	na
To other PECC economies	Million US\$	280	91	43	34	na	na
ROLE OF AGRICULTURE AND TRADE IN THE ECONOMY ^h							
Agriculture as a share of GDP	%	2.7	2.7	2.6	2.5	2.6	2.5
Self sufficiency in grains	%	20.9	19.8	19.2	19.0	18.8	18.3
Self sufficiency in horticultural products	%	87.7	86.7	83.5	80.0	78.0	75.0
MACROECONOMICS INDICATORS							
GDP growth ^j	%	8.7	7.3	4.2	5.9	3.1	4.5
Interest rate	%	6.8	6.9	5.1	6.0	3.0	4.0
Exchange rate	NT\$/US\$	32.60	32.26	31.39	32.00	34.02	34.00

na = not available E = estimate F = forecast

Sources:

- a. Council of Agriculture, Food Balance Sheet.
b. Directorate-General of Budget, Accounting and Statistics, Report on the Survey of Family Income and Expenditure.
c. Directorate-General of Budget, Accounting and Statistics, Commodity-Price Statistics Monthly.
d. Council of Economic Planning & Development, Urban and Regional Development Statistics.
e. Council of Agriculture, Monthly Statistics of Agriculture
f. Ministry of Transportation and Communications, Statistics Abstract of Transportation and Communications.

- g. Energy Commission, Ministry of Economic Affairs, Monthly Statistics of Energy.
h. Council of Agriculture, Basic Agricultural Statistics.
i. Investment Commission, Ministry of Economic Affairs, Statistics on Overseas Chinese & Foreign Investment, Indirect Mainland Investment.
j. Directorate-General of Budget, Accounting and Statistics, Quarterly National Economic Trends.