

### 3. China

#### *The status of micronutrients and the efficiency of intervention in China*

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In the last 20 years, the nutritional status of the Chinese population has greatly improved, in association with economic development and increased income. At present, malnutrition in the form of severe protein-energy malnutrition, vitamin A deficiency, or thiamine deficiency is not common. However, marginal deficiencies in micronutrients such as iron, vitamin A, iodine, calcium, zinc, and vitamin B<sub>1</sub> are rather common among children, adolescents, and women of childbearing age in urban and rural areas. Despite substantial progress in health and economic indicators over the last two decades, nutritional anemia, rickets, vitamin A deficiency, and zinc deficiency remain public health problems in China. These deficiencies have potentially adverse consequences for the growth and development of children and the health of women.

The extent of iron-deficiency anemia and its causes among men, women, and children were studied as part of the 1992 National Nutrition Survey. The data showed anemia to be most prevalent among children under three years of age, with a prevalence of 11% to 23% in urban areas and 16% to 29% in rural areas. The prevalence of anemia among children 3 to 5 years of age was lower, less than 12% for both girls and boys, but it showed an increase among children aged 6 to 10 years. Among young adults, anemia prevalence was estimated at around 10%, and the difference in prevalence between males and females was more marked than for children. The anemia rate for young adult females was much higher than for young adult males. Among the middle-aged and aged population, the prevalence of anemia was higher than that among young adults; there was no difference in prevalence between males and females.

On the basis of results from the 1992 National Nutrition Survey, the estimated iron intake by the Chinese population is adequate. Nevertheless, iron deficiency and iron-deficiency anemia are the most common nutritional deficiency problems, particularly among women and children. Because of poor absorption of iron from plant foods, the iron absorbed from plants fails to meet the requirements of the body. To improve the iron status of the population, it therefore seems necessary to increase dietary diversification as well as to explore the possibility of enriching food with iron.

In order to promote the use of an iron-fortified food

as a national strategy for the control of iron-deficiency anemia, a two-year soy sauce fortification study, supported by the International Life Sciences Institute and the Micronutrient Initiative, was conducted to test the efficacy of NaFeEDTA-fortified soy sauce in combating iron deficiency and anemia linked with low hemoglobin levels. The study also evaluated the effects on vitamin A and anthropometric status. The prevalence of anemia among the group receiving fortified soy sauce decreased significantly after six months of intervention. Given the impact on anemia, the next step is to make the fortified soy sauce widely available to consumers. This process involves working with national authorities to promulgate regulations and standards for the control of NaFeEDTA-fortified soy sauce, and with the national soy sauce association to gradually expand the production and distribution of NaFeEDTA-fortified soy sauce.

Vitamin A deficiency remains a major public health problem among preschool children in China. In China, plant provitamin A carotenoids account for about 70% of dietary vitamin A. As in many developing countries, seasonal variations in the availability of plant foods may result in fluctuations in provitamin A intake, and thus vitamin A status generally declines during the fall and winter seasons. Data on the prevalence of vitamin A deficiency are available from multiple sources and, in each case, indicate a high rate of marginal vitamin A deficiency among preschool children. A survey in 1999–2000 collected measures of vitamin A deficiency among 8,669 children zero to five years of age from 14 provinces. The survey found that 1,018 children (11.7%) had serum retinol levels below 20 µg/dl, and 3,396 (39.2%) had serum retinol levels between 20 and 30 µg/dl. Clinical indicators of vitamin A deficiency were also prevalent: 8 children (about 0.14%  $8/8669 = 0.09\%$ ) were found to suffer from night-blindness, 7 children (about 0.12%  $7/8669 = 0.08\%$ ) were diagnosed as having signs of xeroma, and 61 mothers were reported to have night-blindness.

Recent studies have confirmed the efficacy of high doses of vitamin A in reducing the incidence of diarrhea and respiratory diseases among children. The serum vitamin A level among those receiving one capsule containing 50,000 IU vitamin A every three months was significantly higher than that in the control group. However, these studies had yet to lead to national vitamin A-supplementation programs.

More than 425 million people in China live in areas of endemic iodine deficiency; this figure accounts for close to 40% of the affected world population and 66%

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of the affected Asian population. Iodine deficiency has a wide distribution in China, occurring to varying degrees in 29 provinces, municipalities, and autonomous regions, except Shanghai and Taiwan Province.

The use of iodized salt increased on average from 40% of households to over 90% between 1995 and 1999, in association with a drop in goiter rates from

20% to 8%. The use of adequately iodized salt was greater than 80% in most provinces. Increased use of iodized salt can be seen to parallel substantial reductions in goiter and increases in urinary iodine. Such results attest to the effective and rapid prevention of iodine-deficiency disorders by the use of iodized salt in much of China.

## 4. Indonesia

### *Micronutrient programs in Indonesia*

Hardinsyah and Suroso

Policy and programs for controlling micronutrient problems have been developed in Indonesia since the 1980s, starting with distribution of iron tablets and vitamin A capsules, followed by iodization of salt. Nutrition- and health-related policy also includes immunization and sanitation programs and antenatal care. The first Indonesian dietary guidelines, called a guide to a balanced diet, were formulated and published in 1994. In 1998, the Indonesian Government adopted the formulation of a Food and Nutrition Plan of Action (FNPA).

The prevalence of clinical iodine-deficiency disorders in schoolchildren was 28% in 1988 and 10% in 1999. In previous surveys, goiter prevalence ranged between 2% and 38%. The prevalence of iodized salt intake was stagnant at around 64% in 1998 and 2000, respectively. Since the 1980s, the Government of Indonesia and the private sector have received significant funding for reducing the problem of iodine-deficiency disorders through salt iodization programs. Although the problem of iodine-deficiency disorders still exists, the prevalence of iodine-deficiency disorders has decreased very significantly during the last 20 years, mainly because of salt iodization.

Iron-deficiency anemia is still prevalent, especially in pregnant women and young children. The most current (2002) estimates of prevalence are 63% in pregnant women, 65% to 85% in children under two years of age, 40% in children under five years of age (2000), 40% in women of reproductive age, and 60% among the elderly. From 1985 to 2002, the prevalence of iron-deficiency anemia among pregnant women decreased by only about 10% to 15%.

In 1998, Ministry of Health Decree 632/1998 estab-

lished the mandatory fortification of wheat flour. Wheat flour produced and distributed in Indonesia must be fortified with iron, zinc, thiamine, riboflavin, and folic acid. With support from UNICEF and the United States Agency for International Development (USAID), fortification of wheat with iron was initiated in Indonesia. From January 1999 to January 2000, a grant of US\$850,000 from USAID through UNICEF was given to the Indonesian Government to purchase 340 metric tons of iron premix, which has been distributed to Bogasari, Berdikari Sari Utama, Citra, and Sri Boga Ratu Raya Flour Mills for fortification of wheat flour (60 ppm of iron). In 2001, the wheat flour industry received 240 metric tons of premix from the Canadian International Development Agency.

In addition to the above decree, in May 2001 the Ministry of Industry and Trade issued Decree 153/2001 on the Mandatory Application of the National Standard of Indonesia (SNI) for Fortified Wheat Flour. Both imported wheat flour and domestically produced wheat flour must follow this SNI. According to the SNI, the wheat flour must be fortified with 50 ppm iron, 30 ppm zinc, 2.5 ppm thiamine, 4 ppm riboflavin, and 2 ppm folic acid.

A decreasing trend in the prevalence of clinical vitamin A deficiency is evident, but for lack of data, trends could not be assessed for sub-clinical vitamin A deficiency. Regarding vitamin A supplementation, twice per year, infants between 6 to 12 months of age should receive vitamin A supplementation in the amount of 100,000 IU and children between 1 to 5 years should receive 200,000 IU.

Mass campaigns for distribution of vitamin A capsules are held every February and August. Village midwives or health center personnel should provide vitamin A supplements of 200,000 IU to every mother within the first 30 days after she gives birth.

Fortification of complementary foods is a current

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