

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

The authors are affiliated with the Center for Food and Nutrition Policy Studies, Bogor Agricultural University, Bogor, Indonesia.

priority. The following are some challenges faced by the complementary food industry in fortifying foods for young children: The current available national capacity cannot fulfill more than 25% to 30% of the total requirement; the duration of usage of complementary

food is shorter than that of usage of milk; the perceived image of complementary food is still low among mothers; regulations need to be revised and established; and there is a lack of long-term strategic nutritional plans and programs at the regional level.

---

## **5. Lao People's Democratic Republic**

### ***Programs for micronutrient-deficiency control in the Lao People's Democratic Republic***

S. Naphayvong, P. Vongvichit, and M. Deitchler, and J. Knowles

This paper addresses iodized salt and vitamin A-supplementation programs. The case study aims to describe these programs, document the story leading to program initiation, describe the challenges and successes met in program implementation, and provide data on the extent of the impact achieved.

High rates of micronutrient deficiencies have been documented in recent years in Laos. Prior to adoption of national micronutrient-deficiency control programs in the country, approximately 95% of school-aged children were reported to have suboptimal iodine status (urinary iodine < 100 µg/L), and 65% of children were reported to have deficiencies in iodine (urinary iodine < 20 µg/L). The prevalence of night-blindness was estimated as 0.7%, among children 24 to 71 months of age and 5.7% among lactating women.

The Laotian Government responded to reports of widespread micronutrient deficiencies in the country by adopting national programs for iodized salt and vitamin A supplementation. Both the iodized salt program and the vitamin A-supplementation program have been consistently implemented since initiation, and although they have faced various constraints and challenges in program implementation, they have both achieved notable success in program delivery.

The iodized salt program has already achieved a

high level of impact nationwide. All recent coverage and prevalence data available show high use of iodized salt (> 75% of households using adequately iodized salt in 2000) and low rates of iodine deficiency (27% with urinary iodine < 100 µg/L). Data on vitamin A supplementation are more difficult to interpret; the Ministry of Health reported coverage to children of 70% for almost all rounds and years of VAC distribution. However, a national survey in 2000 showed that among children under five years of age, 44.7% had serum retinol < 20 µg/dl and more than 7% had serum retinol < 10 µg/dl.

The consistent implementation of the iodized salt and vitamin A-supplementation programs is evidence of the Laotian Government's commitment to controlling micronutrient deficiencies in the country. The national government's collaboration with international and bilateral agencies, as well as with foreign governments, in the design and implementation of the program has facilitated program delivery. The various successes already achieved by the programs are due largely to the collaborative efforts of these bodies in establishing appropriate systems for enhanced program delivery, monitoring, and evaluation. However, some aspects of both the iodized salt and the vitamin A-supplementation programs still need further development. Increased capacity for improved program delivery and enhanced systems for monitoring and evaluation of each of the programs are desired. Ensured sustainability of currently implemented programs and identification of a longer-term strategy for the control of vitamin A deficiency are additional program concerns.

---

S. Naphayvong and P. Vongvichit are affiliated with the Ministry of Health, Vientiane, Laos; M. Deitchler was with the Department of International Health and Development, Tulane School of Public Health and Tropical Medicine, New Orleans, Louisiana, USA, and is now affiliated with the FANTA project in Washington, DC. J. Knowles is an independent consultant.