

Case study: Reducing vitamin A deficiency

The global challenge

Vitamin A deficiency is the leading cause of preventable blindness in children and increases the risk of disease and death from severe infections. In pregnant women it can cause night blindness and may increase the risk of maternal mortality (the death of women during pregnancy or within 42 days of giving birth). An estimated 250 million pre-school children worldwide are vitamin A deficient. An estimated 250,000–500,000 vitamin A deficient children become blind every year, with half of these children dying within 12 months of losing their sight because their deficiency is so severe.

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Approaches to reducing vitamin A deficiency

The most common way to reduce Vitamin A deficiency is by providing vitamin A supplements. These should be provided every four to six months in all children aged six months to five years at risk of vitamin A deficiency, and cost US \$0.04 per child per year. Many countries where children receive vitamin A supplements also have programmes to fortify foods with vitamin A. Other initiatives seek to increase the variety of foods available to people with nutrient-deficient diets by encouraging people to grow fruit and vegetables at home.

A genetic technologies example

Rice can make up the majority of food that children suffering from vitamin A deficiency eat in some countries. Scientists have therefore developed, using GM technology, a type of rice, labelled Golden Rice, which provides more dietary vitamin A. The first Golden Rice was developed in 1999 using philanthropic funding. The intellectual property was then given to Syngenta, an agro-chemicals company, on the basis that it was made freely available for 'humanitarian uses'. Syngenta can charge for uses that do not qualify as humanitarian. There are currently trials to develop locally adapted varieties of Golden Rice in sixteen national rice research institutions including in Bangladesh, Vietnam, the Philippines and India.

UK facts & figures

- Vitamin A deficiency is not a significant problem in the UK. The most significant nutrient deficiency is for vitamin D which affects 30–40% of the population during winter
- An increasing proportion of the UK's overseas development budget is spent on improving nutrition (from under 6% in 2010 to over 10% in 2015).

Arguments made in favour of Golden Rice

- Supplement programmes do not reach all children all of the time, so increasing dietary sources of vitamin A is still important
- Increasing dietary sources of vitamin A provides a lasting solution whereas supplement programmes require continuous investment
- Since GM foods were first eaten by people in the 1990s, over a trillion meals that include GM food have been eaten with no evidence of negative health effects.

Arguments made against Golden Rice

- Golden Rice provides a solution to vitamin A deficiency rather than addressing the underlying causes of poverty and poor diets
- Despite almost 20 years of research and development there are still no commercially available Golden Rice varieties
- Golden Rice varieties developed in Europe are culturally or environmentally unsuited to the countries where they are needed
- Despite licence requirements that mean Golden Rice has to be provided free to farmers earning less than US \$10,000 per year, Golden Rice varieties are still the intellectual property of Syngenta so growing them increases the influence of large agribusiness in local supply chains
- Some people are concerned about negative health effects from eating GM foods.