

## Thème 2 – Enjeux planétaires contemporains

### 2-B – La plante domestiquée

#### Genetically Modified Rice

**Do you think Genetically Modified crops will help or hurt people and environment in the long run?**

#### Document 1: Rice, a staple food source in many countries

*from Scout Davis, <https://bigpictureeducation.com/plants-changed-world-rice>*

Around 20 per cent of human energy intake worldwide comes from rice. Rice is often eaten boiled, but can also be used to make rice flour, sweets, rice wine or vinegar, and products such as cosmetics and medicines, as well as being used in crafts and for religious purposes.

- 5 There are currently over 40,000 types of rice in the world. It is thought to have originated in the Yangtze Valley in China, as far back as 6000–9000 BCE, but there is some debate about this. Rice (*Oryza sativa*) is a type of grass which typically grows in wet paddy fields<sup>1</sup>.

#### **Nutrition**

- 10 White rice is high in carbohydrate and low in fat and has moderate amounts of protein. It has lower fibre and vitamin and mineral content than brown rice.  
A grain of white rice is a grain of brown rice minus the rice germ, the surrounding rice bran and the hull. (...) The rice bran and germ provide fibre, protein, vitamins and minerals. (...)

#### **15 Research and development**

- Rice has the smallest genome of all cereals, with only 12 chromosomes. This makes it a prime candidate for genetic modification. In the 1960s, a GM rice was created which was more resilient and yielded up to three times greater produce. However, these GM crops require more artificial pesticides and fertilisers in order to flourish.
- 20 In China, new types of GM crops similar to rice and wheat, known as crop wild relatives, are being produced to thrive<sup>2</sup> in extreme conditions, such as those that may result from climate change. Producing just 1 kg of rice takes up to 3,000 litres of water, so the rice on your plate has an impact on the environment. Researching this impact and finding solutions is vital for the planet's future. Other research is looking at changing the structure of rice to reduce its calorific value, which could help to reduce obesity.
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#### Document 2: Vitamin A Deficiency

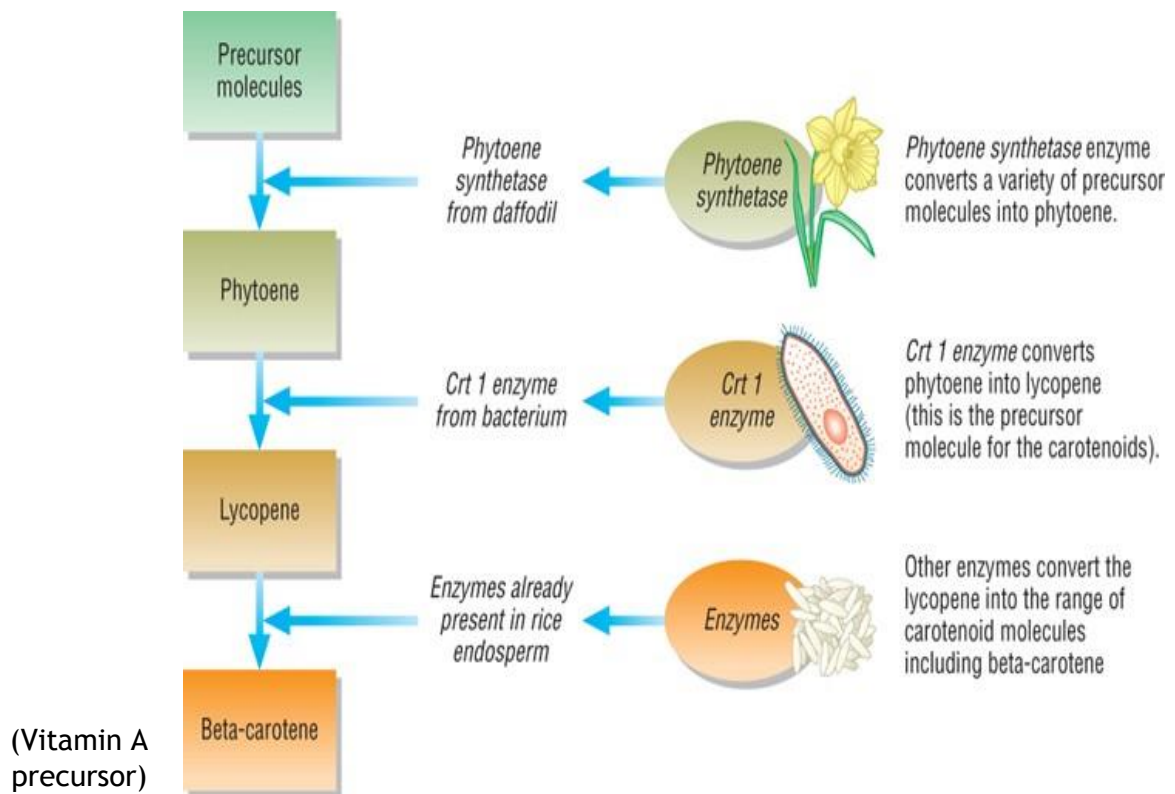
*<http://www.goldenrice.org>*

- The most damaging micronutrient deficiencies in the world are the consequence of low dietary intake of iron, vitamin A, iodine and zinc. Vitamin A deficiency (VAD) is prevalent among the poor whose diets are based mainly on rice or other carbohydrate-rich, micronutrient-poor calory sources. Rice does not contain any  $\beta$ -carotene (provitamin A), which their body could then convert into vitamin A. In 2012 the World Health Organization reported that about 250 million preschool children are affected by VAD, and that providing those children with vitamin A could prevent about a third of all under-five deaths, which amounts to up to 2.7 million children that could be saved from dying unnecessarily.
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<sup>1</sup> paddy fields: rizières

<sup>2</sup> thrive=flourish=grow particularly well

### Document 3: The Golden rice solution: genetic engineering



By adding only two genes, a phytoene synthase gene (Psy) from narcissus (=daffodil) and a bacterial phytoene desaturase gene (Crt I),  $\beta$ -carotene consequently accumulates in the « Golden rice » grain.