

## **C4 PROJECT- THE MIRACLE RICE**

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### **Abstract**

Nearly billion people across the world are living with hunger. Over 3 billion depend on rice for survival. According to International Rice Research Institute (IRRI), each hectare of land used to cultivate rice in Asia provides food for 27 people. By 2050, the same hectare will need to feed 43 people.<sup>1</sup>

In this huge population, what can we do to overcome these hunger needs? The solution for this situation is increase the yield. A group of scientists working on genetically modified rice which can resist the effects of climate change.

The C<sub>4</sub> project is all about redesigning the photosynthetic process of rice to make it more efficient. Crops with photosynthetic mechanism utilize solar radiation that can be translated into yield. This will help in producing more grains,<sup>2</sup> reduce water loss and increase nitrogen fixation efficiency especially in hot and dry environments.

Growth of a C<sub>4</sub> plant follows a typical pathway in which the process of light independent reactions occurs inside the bundle sheath cell whereas in a normal plant the reactions takes place in mesophyll cells. In this mechanism the atmospheric CO<sub>2</sub> gets converted into carbonic acid (HCO<sub>3</sub><sup>-</sup>) then it reacts with phosphoenol pyruvate to form C<sub>4</sub> acid then in the bundle sheath cell it converts into C<sub>3</sub> carbon and CO<sub>2</sub> which in result leads to photosynthesis in that cell and C<sub>3</sub> is utilized to complete the cyclic process.

**Keywords:** Genetically modified rice, resisting the effects of climate, redesigning photosynthetic process, utilize solar energy, reduce water loss.

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