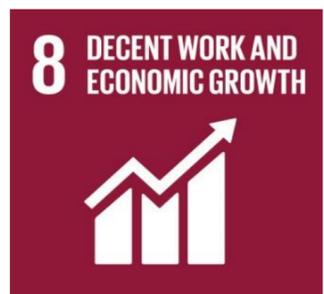


SUSTAINABILITY THROUGH ENHANCED FOOD QUALITY

To investigate the declining food quality as a result of rising carbon concentration on ASEAN initiatives and to inspire changes to ensure sustainability in the long run.



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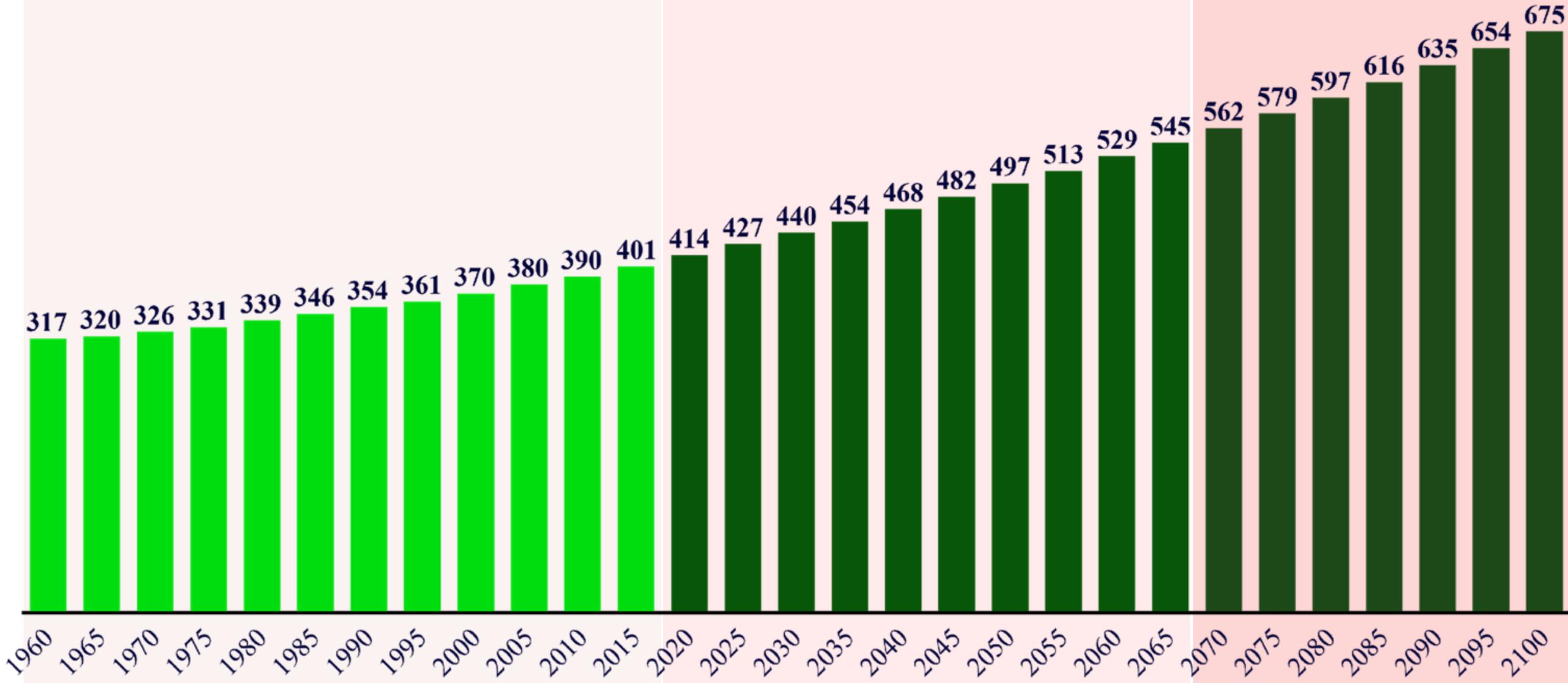
Rising Carbon Concentration Over Years Threatens The Quality of Plants

Carbon Concentration over the Years (PPM)

Despite climate change efforts in recent years, carbon concentration is **rising faster than ever.**

Timeframe to **transform the agriculture industry** to prepare for the adverse effect of carbon emission on food.

! Plants will start losing key nutrients which will be detrimental to the food chain at **550ppm.**



Actual Forecast

RICE THE GLOBAL STAPLE FOOD



3,500,000,000 people

depends on rice for more than 20% of daily calorie.

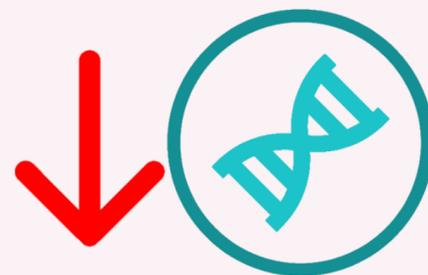
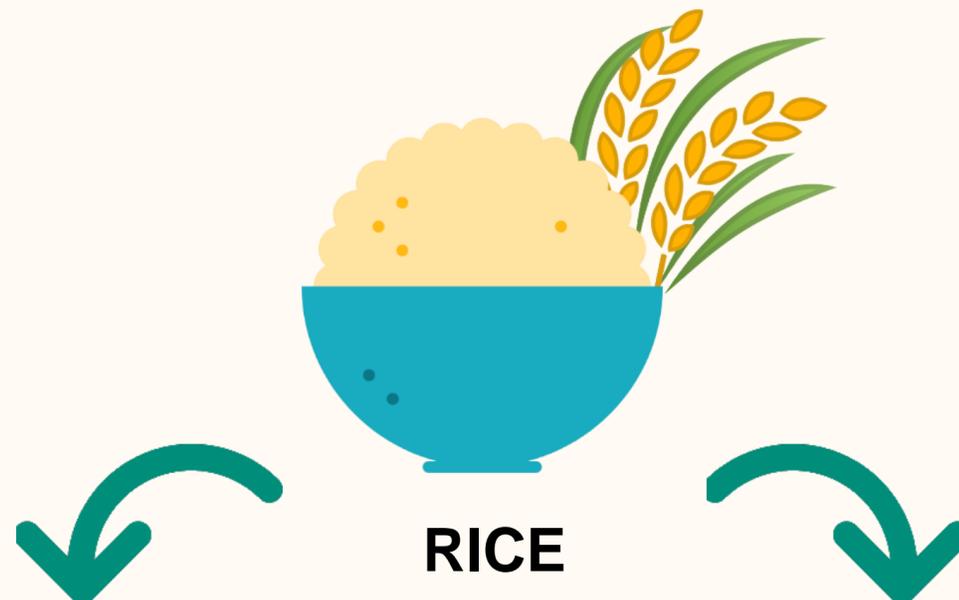
In South East Asia, rice provides:

46% dietary protein

54% dietary energy

11% dietary fat

What happens at 550ppm carbon concentration?



Protein content drops by **14%**



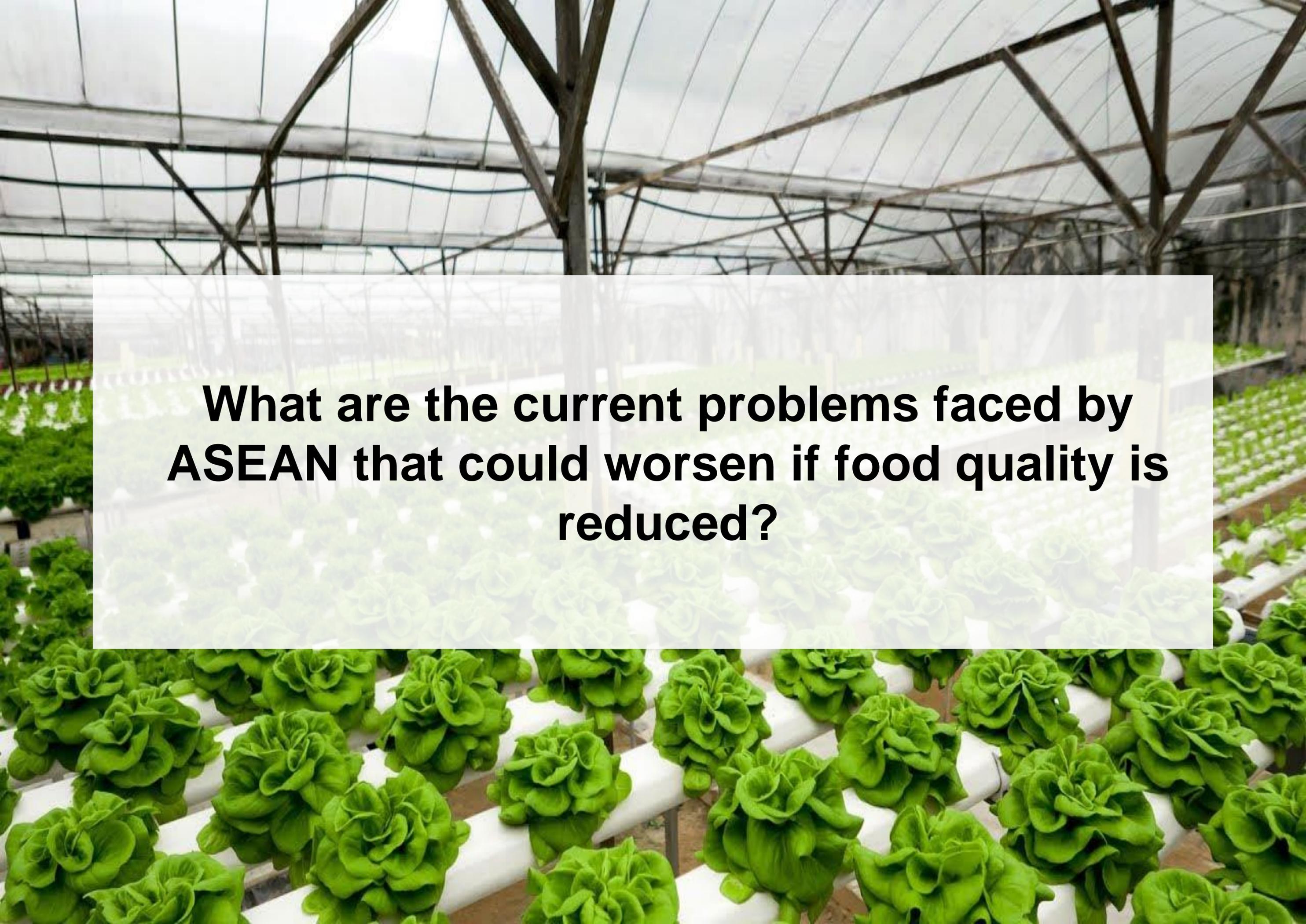
150,000,000 people
expected to experience protein deficiency



Iron content drops by **22%**



1,400,000,000 women and young children
lose at least 3.8% of their dietary iron.

A large-scale hydroponic greenhouse with a complex wooden and metal frame. The interior is filled with rows of vibrant green leafy vegetables, likely lettuce, growing in white foam channels. The plants are densely packed and appear healthy. The lighting is bright, suggesting a well-lit environment. The text is overlaid on a semi-transparent white box in the center of the image.

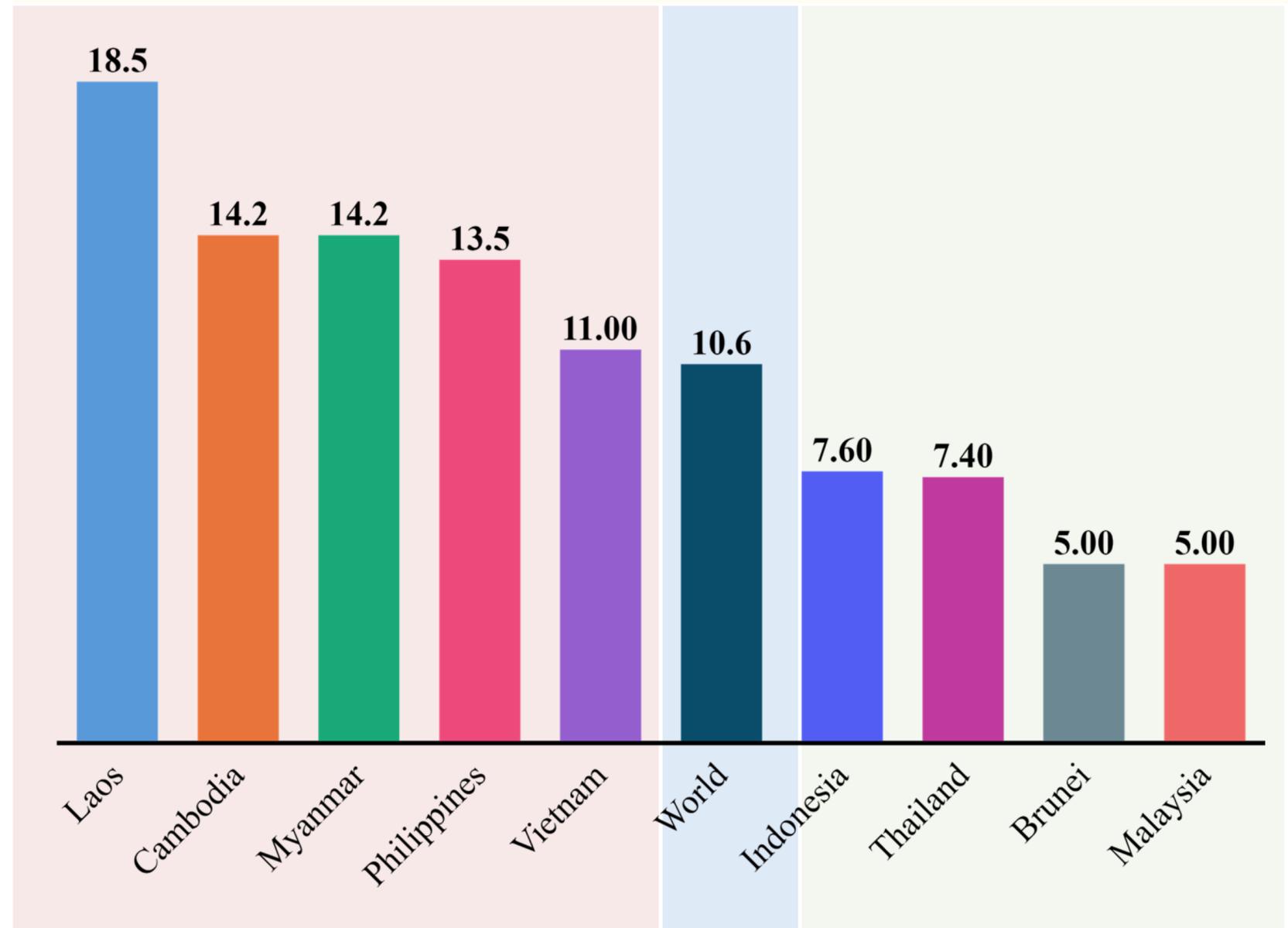
What are the current problems faced by ASEAN that could worsen if food quality is reduced?

Key Issue in ASEAN 1: High Undernourishment Rate



On average, **1 out of every 10 people** in South East Asia eat less than they are supposed to.

Undernourishment Rate in ASEAN Countries (%)



Undernourishment in South East Asia remains worrying in 2015 with at least five countries in SEA having above average undernourishment rate.



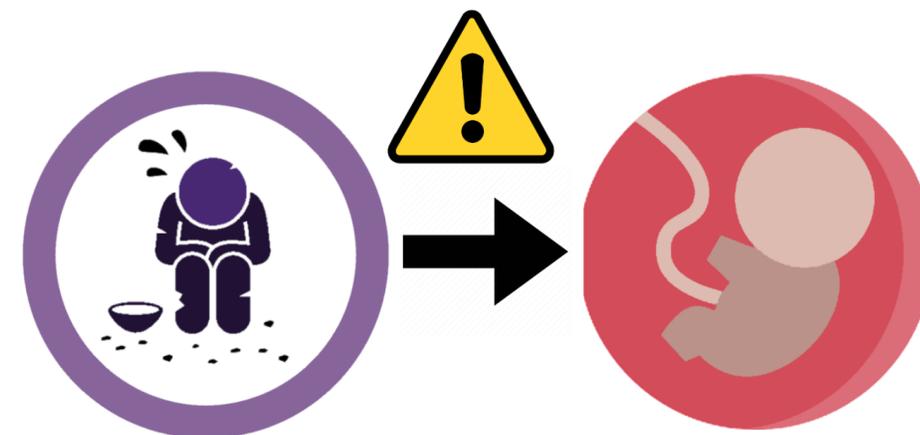
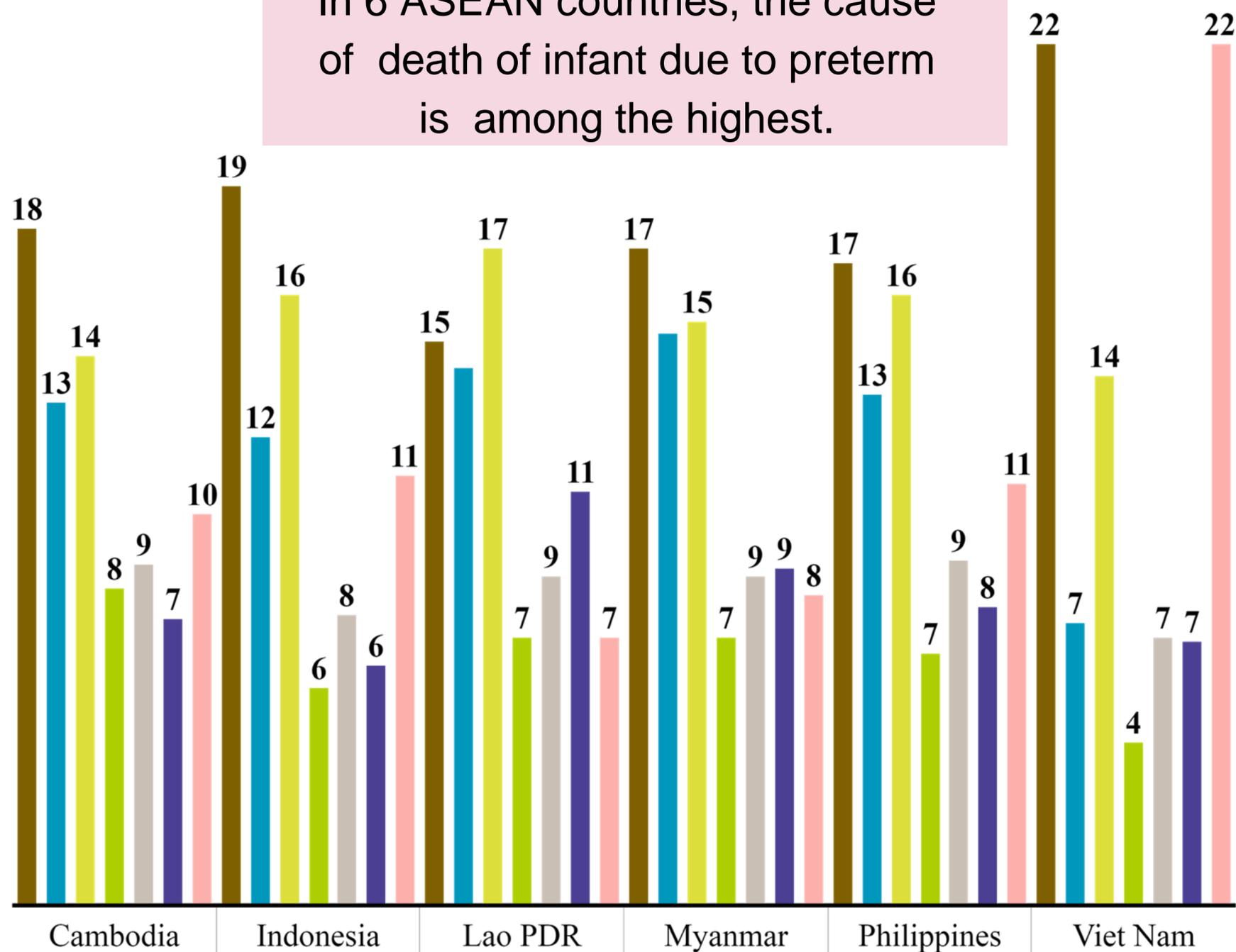
It is expected that the **undernourishment will worsen** when food consumed does not have sufficient nutrients for human day to day activities

Key Issue in ASEAN 2: Health Risk to Infant

Infant Cause of Death in 2017 (%)

■ Preterm
 ■ Intrapartum
 ■ Pneumonia
 ■ Sepsis
 ■ Injury
 ■ Diarrhoea
 ■ Congenital

In 6 ASEAN countries, the cause of death of infant due to preterm is among the highest.



Under nutrition before and during pregnancy can lead to poor pregnancy outcome such as **preterm and miscarriage**.



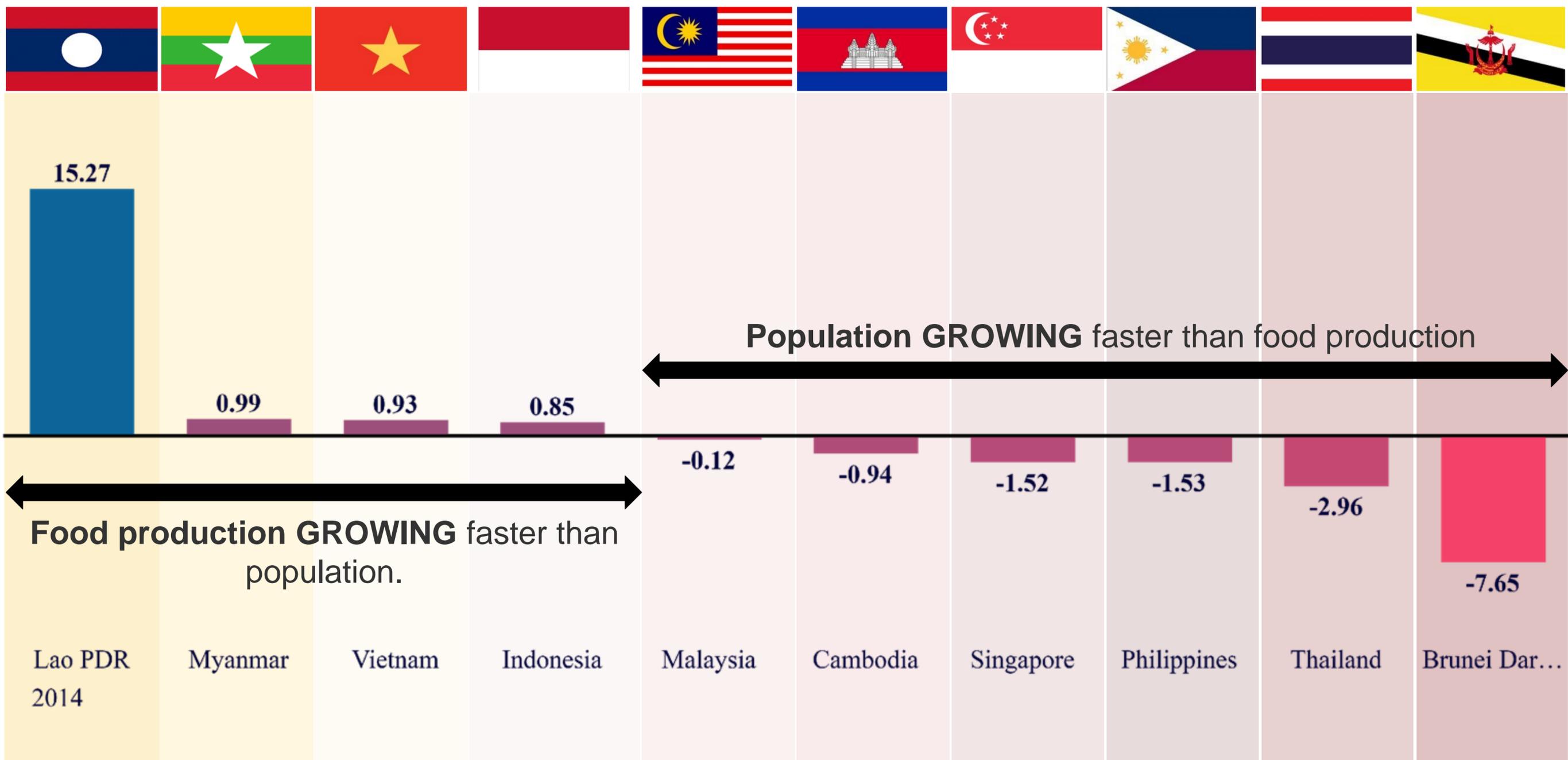
Around **45% of deaths among children** under 5 years of age are **linked to under nutrition** especially in lower/medium income group.



When the plant nutrition drops, the issue of **poor pregnancy outcome will be worsened**.

Key Issue in ASEAN 3: Slow Food Production Growth

Excess Food Production Across ASEAN in 2014 (%)

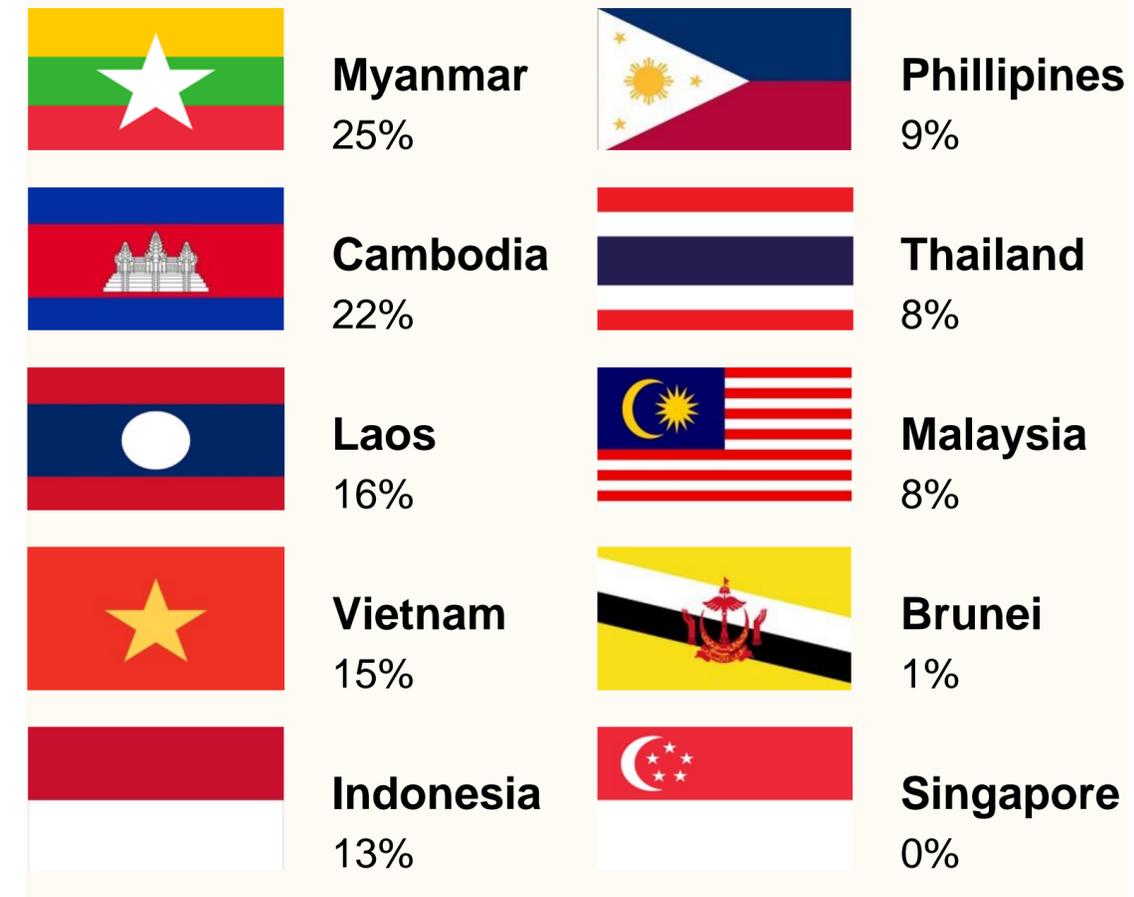
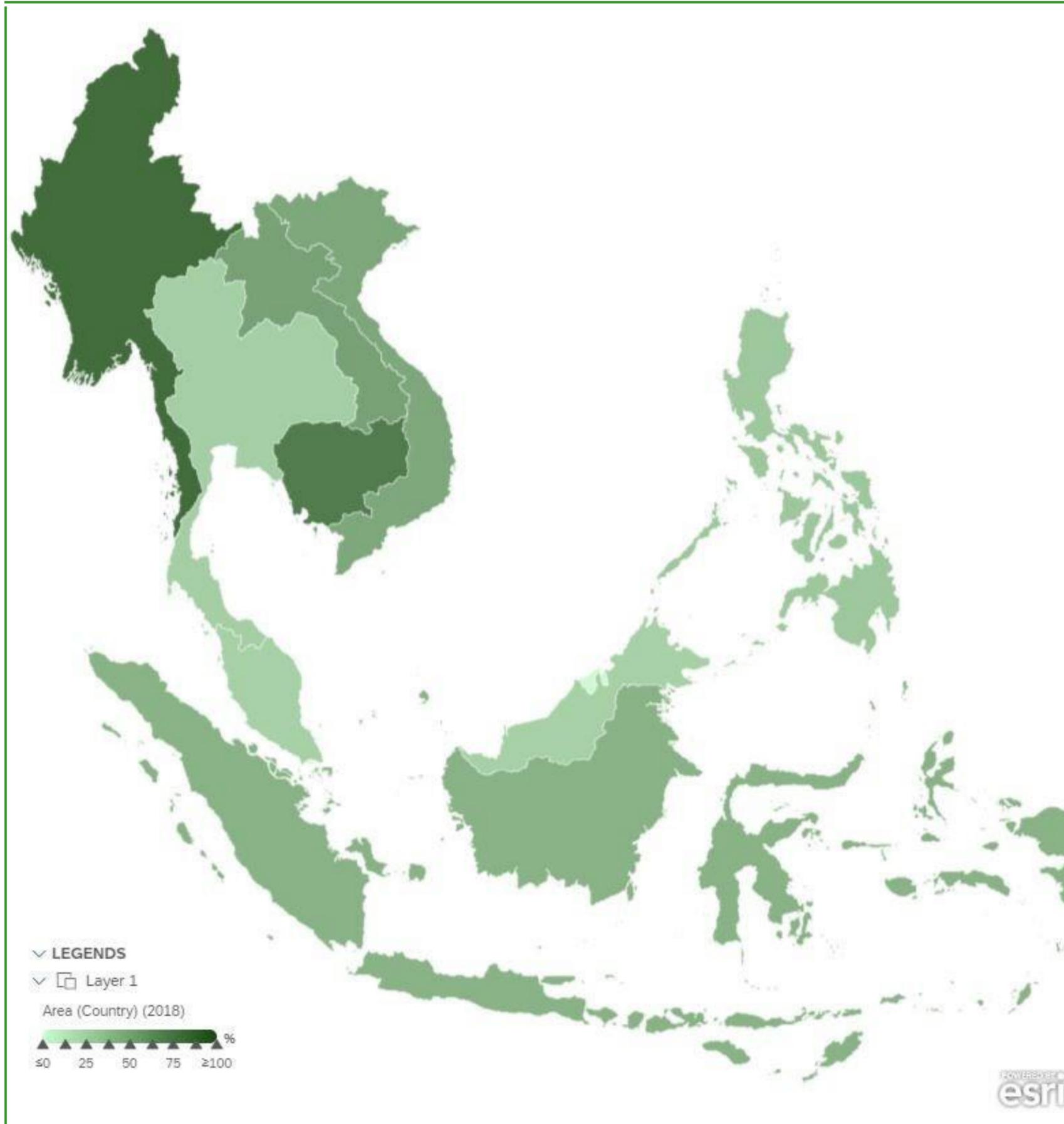


Excess Food Production (%) = Food Production (%) - Population Growth (%)



If the food production continues to grow slower than population, **ASEAN risk insufficient food** to feed the population leading to **under nutrition of population**. This is **worse when plant nutrients started falling**.

Key Issue in ASEAN 4: High Reliance on Agricultural Sector



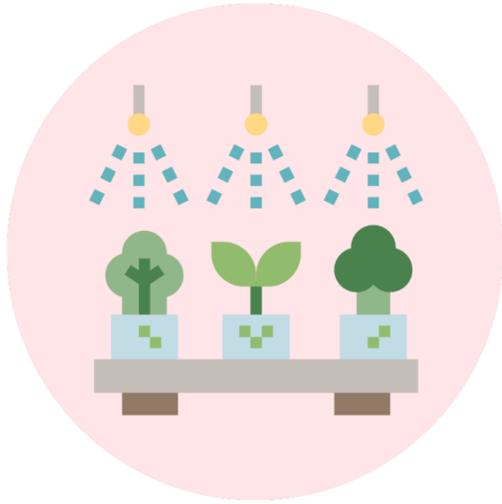
With key nutrients falling in plants, this may affect the **economy of ASEAN countries** which is **reliant on agricultural sector**.

As the world exporters of agricultural goods, the **drop in quality** of crops may cause **importers to shift purchase** to countries who are able to maintain quality of their crops.



What can ASEAN countries do now to mitigate these risks before it is too late?

Solution 1: Promote Hydroponic Farming System



Why Hydroponic Farming?

Farmers able to **control the quality** of agriculture products through the use of **nutrition solution**, by giving what the plants need for growth and what human need to live.

Advantages as compared to the conventional farming?



300% to 1000% greater production given same amount of space



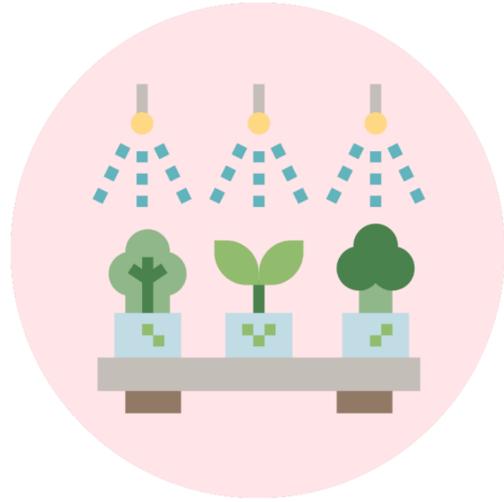
200% faster production rate



Up to 90% more efficient use of water

Government in ASEAN countries should consider providing **training, supervision and incentives to suitable** farm owners to help them adopt the hydroponic technology.

Solution 2: ASEAN to Support Research and Development in Agriculture



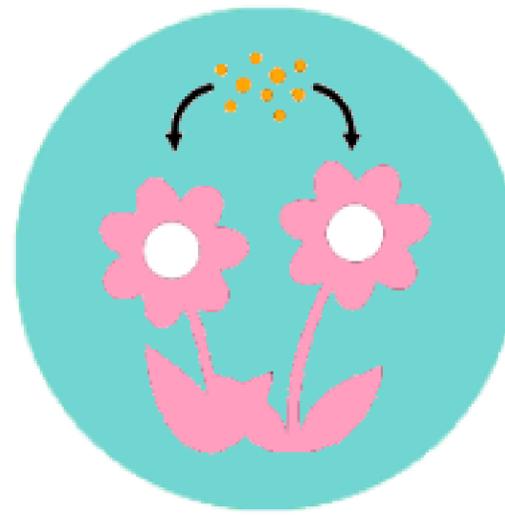
Hydroponic Farming

Objective

To develop cheaper alternatives to hydroponic equipments and systems.

Intended Outcomes

All farms across ASEAN are able to adopt hydroponic technologies in farming.



Cross-breeding

To develop more effective ways to ensure cross pollination in crops

Crops have stronger immunity against diseases and have higher yield.

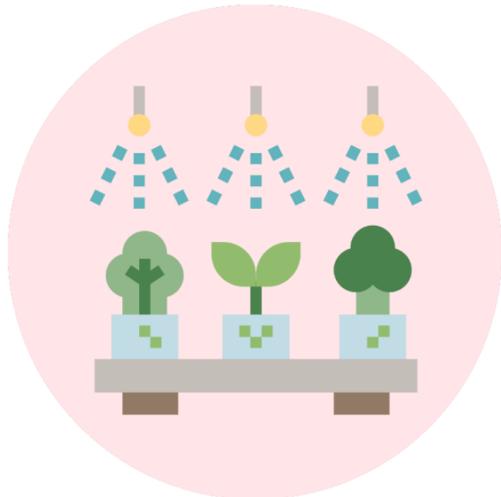


Gene Manipulation

To maximise nutrition and yield produced by crops.

Crops have sufficient nutrition for consumption.

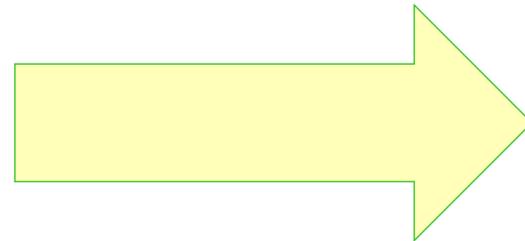
Conclusion



Hydroponic Farming



Research and Development



Continuously reduce undernourishment in ASEAN



Continuously reduce infant mortality caused by undernourishment in ASEAN



Ensure enough food are produced to serve the ASEAN population



Maintain ASEAN countries as top agricultural exporters with high quality crops.

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Thanks!
Any questions?

