



THE POWERFUL NATURE OF PROTEIN

Pesticides Free, Herbicides Free, Soil Free
Fertilizer Free, Yeast & Mold Free

Proteins are important components of every cell in the body

Proteins are made up of smaller units called: Amino acids

- **Enzymes** are proteins that facilitate biochemical reactions.
- **Antibodies** are proteins produced by the immune system.
- **DNA-associated proteins** regulate chromosome structure during cell division and/or play a role in regulating gene expression.
- **Contractile proteins** are involved in muscle contraction and movement.
- **Structural proteins** provide support in our bodies.
- **Hormone proteins** co-ordinate bodily functions.
- **Transport proteins** move molecules around our bodies.



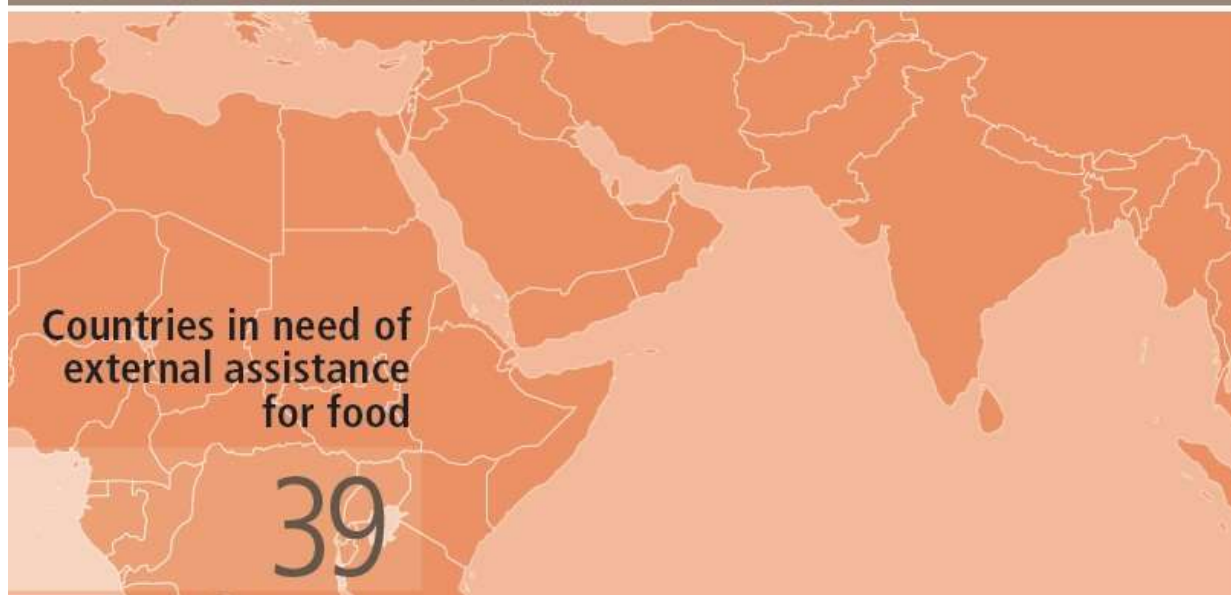
Food and Agriculture Organization
of the United Nations

#2

JUNE 2018

CROP PROSPECTS and FOOD SITUATION

Quarterly Global Report



COUNTRIES REQUIRING EXTERNAL ASSISTANCE FOR FOOD

FAO assesses that globally 39 countries are in need of external assistance for food. Persisting conflicts continue to be the dominant factor driving the high levels of severe food insecurity. Weather shocks have also adversely impacted food availability and access.

Asia	0.0
Africa	-3.6
Central America and the Caribbean	+0.7
South America	-9.3
North America	-1.9
Europe	-1.4
Oceania	+9.5
World	-1.5

WORLD

Cereal production 2018 over 2017

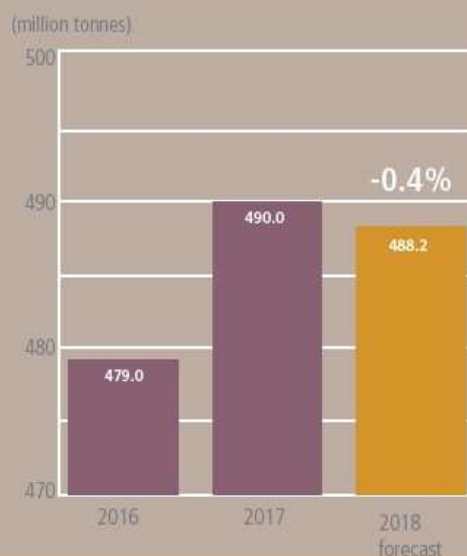
(rice in milled terms)

-1.5%

LIFDC

Cereal production 2018 over 2017

-0.4%



REGIONAL HIGHLIGHTS

AFRICA Poor rains sharply curtailed 2018 production expectations in Southern Africa, while in North Africa prospects are favourable. Abundant rains in East Africa boosted crop prospects in 2018, although they also triggered floods causing losses and damages in the agriculture sector. Agro-pastoralists in West Africa are facing heightened food insecurity due to unfavourable weather conditions, which has also raised uncertainty over 2018 crop prospects. Conflicts in several countries continue to acutely impact agricultural capacities.

ASIA In the Far East, the 2018 paddy output could reach a record high, supported by government initiatives. By contrast, in the Near East and CIS Asia cereal harvests are anticipated at or below average levels, resting on poor rains, while ongoing conflicts in parts of the Near East continue to incapacitate the agriculture sector.

LATIN AMERICA AND THE CARIBBEAN A reduced 2018 cereal output compared to last year's record is expected in South America, on account of dry weather conditions. In Central America and the Caribbean, maize production is set to remain at a high level.

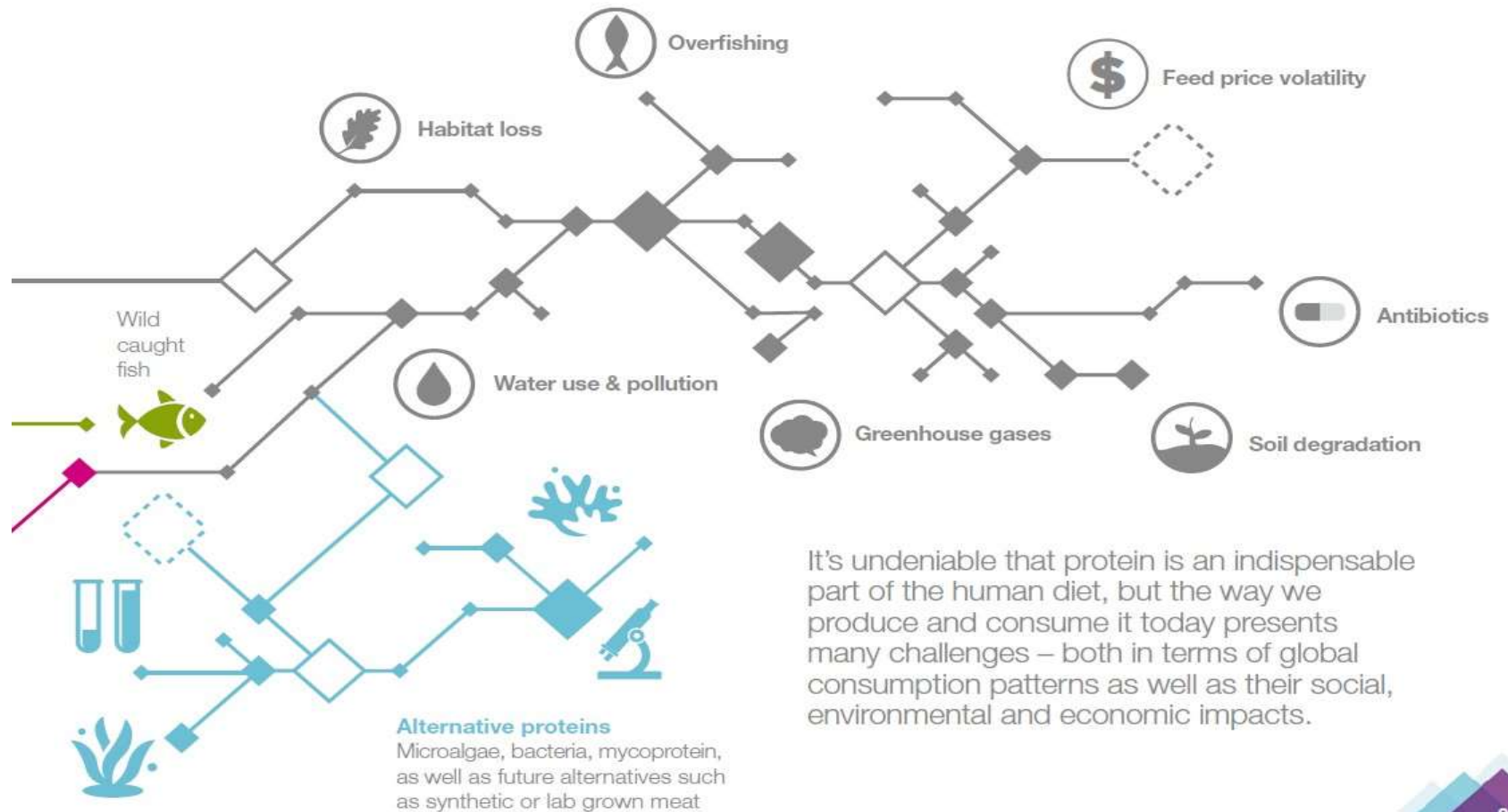
Table 1. World cereal production¹
(million tonnes)

	2016	2017 estimate	2018 forecast	Change: 2018 over 2017 (%)
Asia	1 132.0	1 150.4	1 150.0	0.0
Far East	1 028.6	1 045.3	1 048.1	0.3
Near East	66.6	69.4	68.3	-1.5
CIS in Asia	36.9	35.7	33.5	-6.1
Africa	170.3	186.6	179.9	-3.6
North Africa	30.8	36.2	38.0	4.8
West Africa	57.1	59.9	56.8	-5.1
Central Africa	5.0	4.5	4.5	-0.6
East Africa	52.7	48.3	49.3	2.2
Southern Africa	24.7	37.6	31.3	-16.9
Central America and the Caribbean	44.8	44.6	45.0	0.7
South America	174.3	216.7	196.5	-9.3
North America	531.8	493.9	484.3	-1.9
Europe	508.2	523.8	516.5	-1.4
European Union	299.5	310.3	306.5	-1.2
CIS in Europe	192.9	202.0	196.4	-2.7
Oceania	53.5	34.6	37.8	9.5
World	2 614.9	2 650.7	2 610.0	-1.5
Developing countries	1 464.9	1 535.0	1 513.5	-1.4
Developed countries	1 149.9	1 115.7	1 096.5	-1.7
- wheat	759.7	757.2	754.1	-0.4
- coarse grains	1 354.0	1 388.9	1 344.6	-3.2
- rice (milled)	501.2	504.6	511.3	1.3

Note: Totals and percentage change computed from unrounded data.

¹ Includes rice in milled terms.

¹ Based on the [FAO Cereal Supply and Demand Brief](#) released on 7 June 2018.



Impacts of production

In the ocean

Fish and seafood are a critical source of protein for 3 billion people, but the ocean's supply has reached its limit.



Overfishing

90.1% of global fish stocks were fully or over exploited in 2011.⁹ Seas are over-exploited for wild-caught fish, leading to severe consequences for marine ecosystems – and yet as much as 40% of caught fish are discarded every year.¹⁰ Farmed fish is likely to make up the gap and is predicted to represent 2/3 of global supply by 2030¹¹, but it is fast reaching its limit as well. Farmed fish is heavily dependent on wild caught fish for feed (fishmeal).¹²

OVER
EXPLOITED

Agriculture
accounting for
70%
of freshwater
use

40% of plant protein
and 85% of soy
used for animals

90% of global soy crops
produced in USA Brazil and
Argentina

70% of antibiotics
in the USA is used for
livestock

On land

Agriculture takes up two-fifths of total global land use.¹³ Of the total plant protein produced, less than half is used for human consumption.¹⁴ This includes high-quality soy protein which could otherwise be used to feed humans. The shift towards industrialised animal farming systems creates significant demand for grain and other plant proteins as feed for animals, as well as contributing to production challenges of waste, pollution, deforestation, greenhouse gas emissions and soil degradation.



Water use and pollution

The production of protein is a heavy user of fresh water, with agriculture accounting for 70% of freshwater use. Not all proteins are created equally, for example for beef the water footprint of protein is 6 times larger than that of pulses.¹⁵



Habitat loss

Over 40% of global plant protein – including 85% of soy crops – are used to feed animals and fish.¹⁶ Soy cultivation is a big driver of deforestation, particularly in South America.¹⁷ The production of animals and of crops for feed alone accounts for nearly a third of global deforestation and associated carbon dioxide emissions.¹⁸



Greenhouse gases

Food and agriculture are major contributors to climate change. Livestock production in particular are associated with 14.5% of all human-caused greenhouse gas emissions.¹⁹



Feed price volatility

The overdependence on soy for animal feed is a growing risk, leading to future uncertainty of supply and animal feed costs. 90% of global soy crops is produced in just 3 countries: the USA, Brazil and Argentina – the supply of which is at risk due to climate change.²⁰



Antibiotic resistance

45% of antibiotics in the UK and 70% in the US are used for livestock rather than humans.²¹ Antibiotic overuse in human and animal medicine contributes to resistant infections, which cause 25,000 deaths per year in the EU alone.²²



Soil degradation

Fertile soils are critical for plant production and food security, yet this resource is being degraded at an alarming rate primarily due to overgrazing, deforestation and agricultural activities. It is estimated that 25 billion tonnes of fertile soil are lost each year.²³





*Production
Growth
Continues...*



*Bringing
Increased
Competition*



Plant-based protein is preferable to animal-based protein from a land-use and greenhouse gas emissions perspective

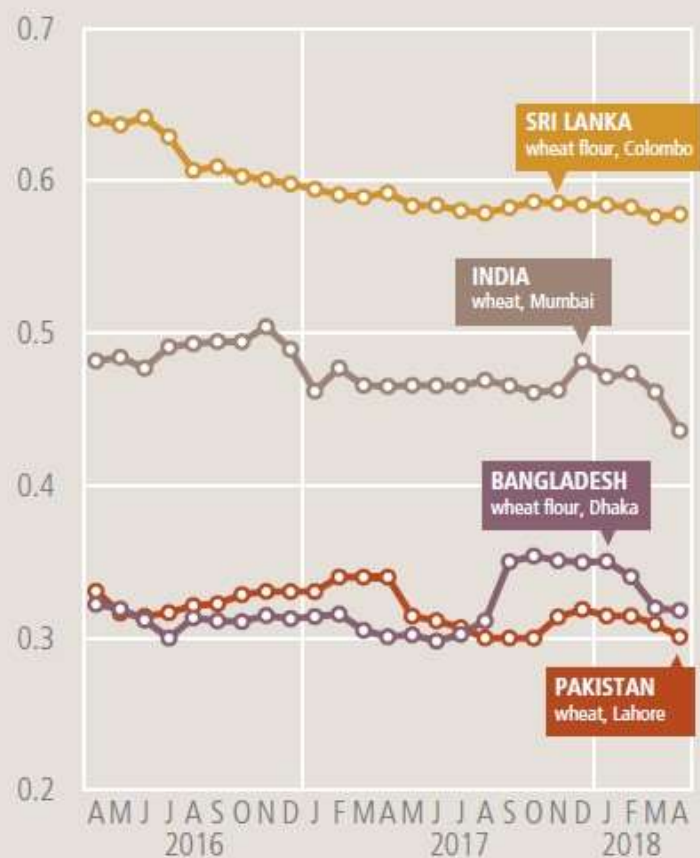
Vegetal sources
currently account for
the vast amount of
PROTEIN supply globally **57%**

Meat 18% Dairy 10% Fish 6%



Wheat and wheat flour retail prices in selected Far East countries

(USD/kg)



Sources: Pakistan Bureau of Statistics; Ministry of Consumer Affairs, India; Management Information System and Monitoring, Bangladesh; National Bureau of Statistics of China.

Maize Wheat and Rice
Account for **50%**
Of the world's consumption of
Plant protein



Dunam of wheat

Total: 400-600 kg of seeds per dunam per year

Total **54 kg protein** per dunam per year

Total: Cost of 1 kg of seeds: 0.27\$

Total: 1 kg of protein: 3\$

Total: Cost of **15.9 tons of protein (15,900 dunams): 47,992\$**

Dunam of wheat germ

Total: 53,000 tons of sprouts per square dunam per year

Total: **15.9 tons of protein** per square dunam per year

Total: Cost of 1 kg of sprouts: 0.0549 cents

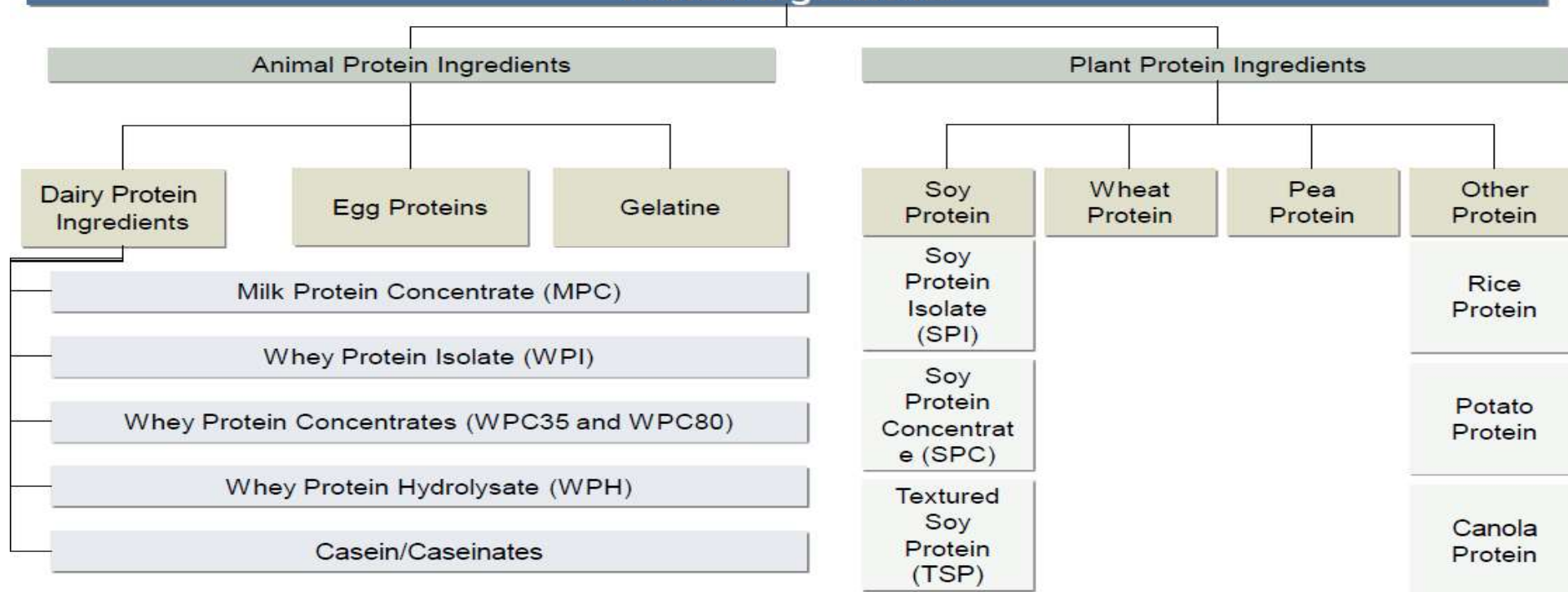
Total: Cost of 1 kg of protein: 0.1811 cents

Total: Cost of **15.9 tons of protein (1 dunam): 2,617\$**

Market Segmentation of the Global Protein Ingredients Market

The protein ingredients product space is highly fragmented, where there is a lot of competition for a limited number of end applications. This makes the importance of quickly identifying and addressing opportunities and threats critical.

Protein Ingredients



Plant Protein Ingredients Market Engineering Measurements Dashboard

Sensory properties are key to successful penetration of plant protein ingredients into the applications dominated by animal proteins, as well as to develop new applications.



Global Market Volume

1.7 M
Metric Tons
(2012)



Revenue CAGR

5.0 to 5.5%
(2012-2018)



Decreasing



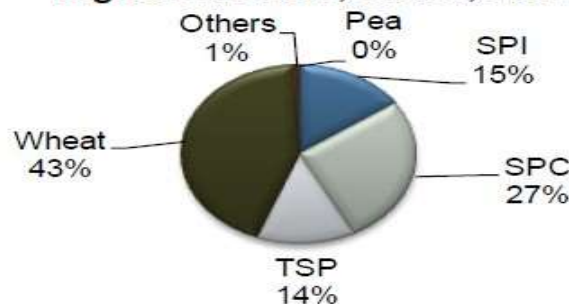
Stable



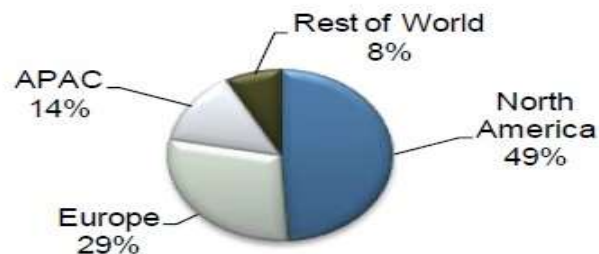
Increasing



Ingredient Share, Global, 2012



Region Share, Global, 2012



Note: All figures are rounded. The base year is 2011. Source: Frost & Sullivan analysis.

Top Three Growth Factors

1

Marketing spend—the soy industry has enjoyed success by proactively positioning itself as a sustainable food/protein source

2

Low consumer awareness of non-soy proteins restrains growth of other key plant proteins

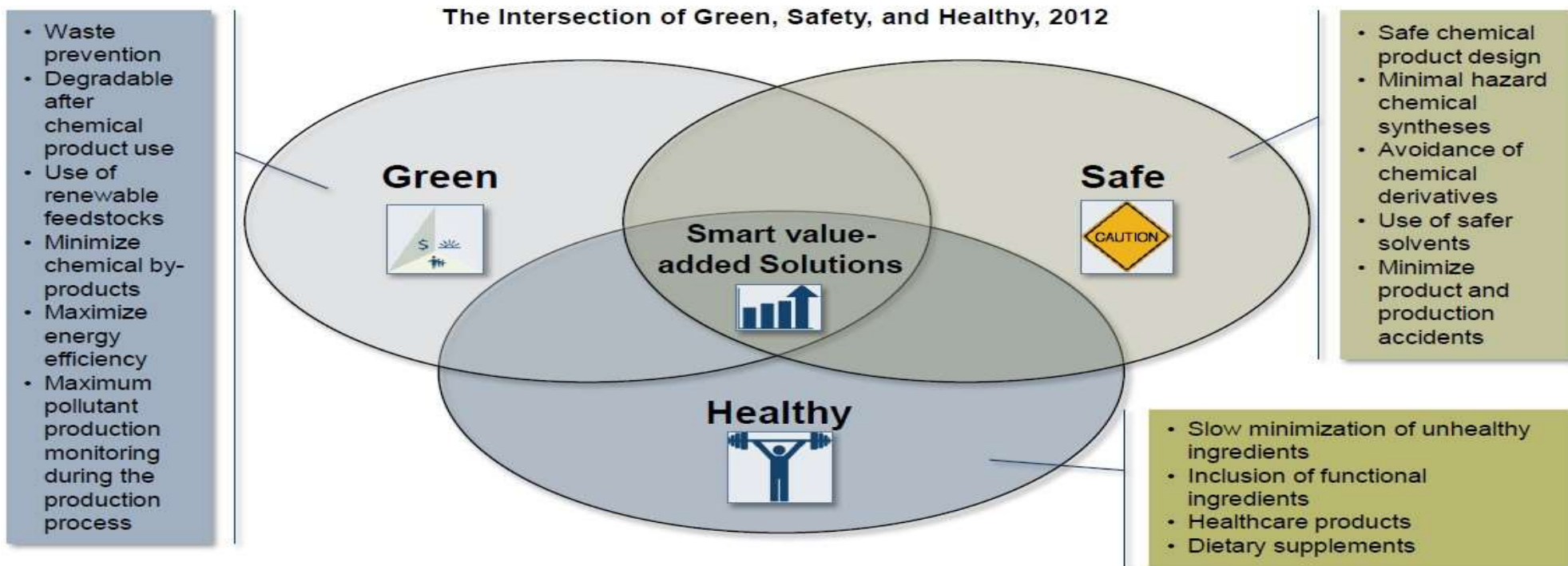
3

Cost competitiveness—this is a low impact driver despite the cost difference between plant and other proteins being significant (between 30% and 50%).

Being Green, Safe, and Healthy—A congruence of trends that expands your company's potential opportunity space

As long as a company communicates its green, safe, and healthy initiatives as being more beneficial or less costly than its competitor's product offering, customers will be willing to pay a premium for it.

The Intersection of Green, Safety, and Healthy, 2012



Source: Frost & Sullivan analysis.

Health & Wellness Trends are the Primary Engines of Growth in the Protein Ingredients Market

Among all functional ingredients, proteins score very high in terms of future potential due to their unequivocal health benefits and greater consumer recall of this benefit.

Weight management is a fast growing segment.

Positioning as a satiety ingredient is a key advantage for protein ingredients.

Proteins are perceived as a natural ingredient.

"gluten free" or "soy free" are possible to create with animal protein ingredients

Environmental impact of animal derived, mainly dairy proteins has been the subject of debate

Price fluctuations due to supply instability has been a regular feature

Regulations around sourcing, processing, packaging and labeling are being tightened

This is advantageous for animal proteins which have had ample time to stabilize their position vis a vis regulations



Source: Frost & Sullivan analysis.

So What?—SWOT Analysis of the Plant Protein Industry

Strengths	Weaknesses
• Excellent nutritional profile. • Lower carbon footprint and higher sustainability. • Low price.	• Lower score on sensory properties. • GM is an issue for greater acceptance in Europe
Opportunities	Threats
• Increased potential for dairy and plant proteins in blended formulations. • Growing market for condition-specific nutrition, as well as satiety and weight management nutrition. • New opportunities for improving protein delivery through further R&D.	• Dairy protein ingredient have the first mover advantage and greater consumer acceptance.

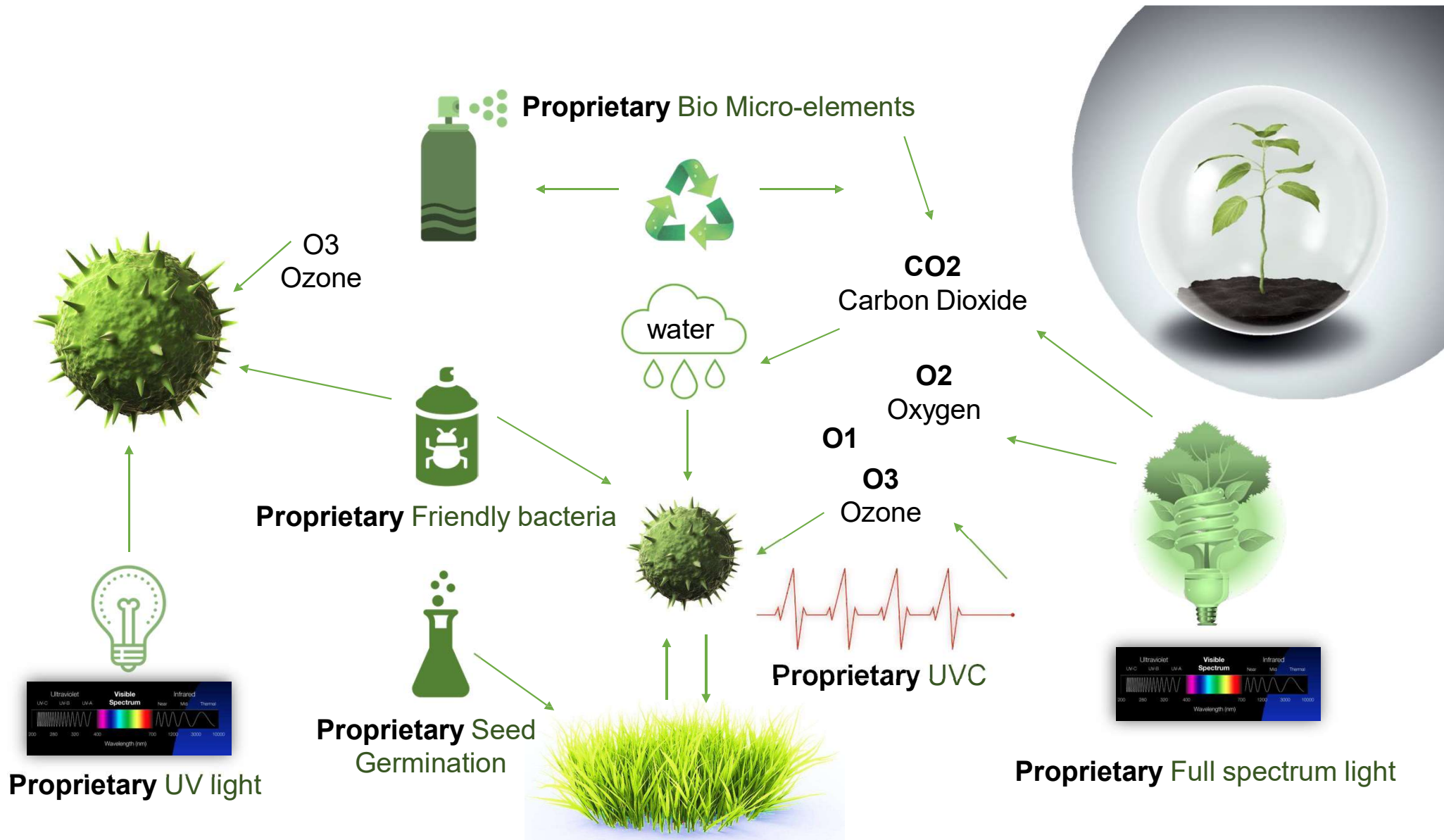
Source: Frost & Sullivan analysis.

BIO DOME FARM

Indoors controlled climate system

- GMO Free
- Pesticides Free
- Herbicides Free
- Hydroponic Free
- Soil Free
- Fertilizer Free
- Yeast and mold Free
- Sun Free
- 95% water saving for the same grow



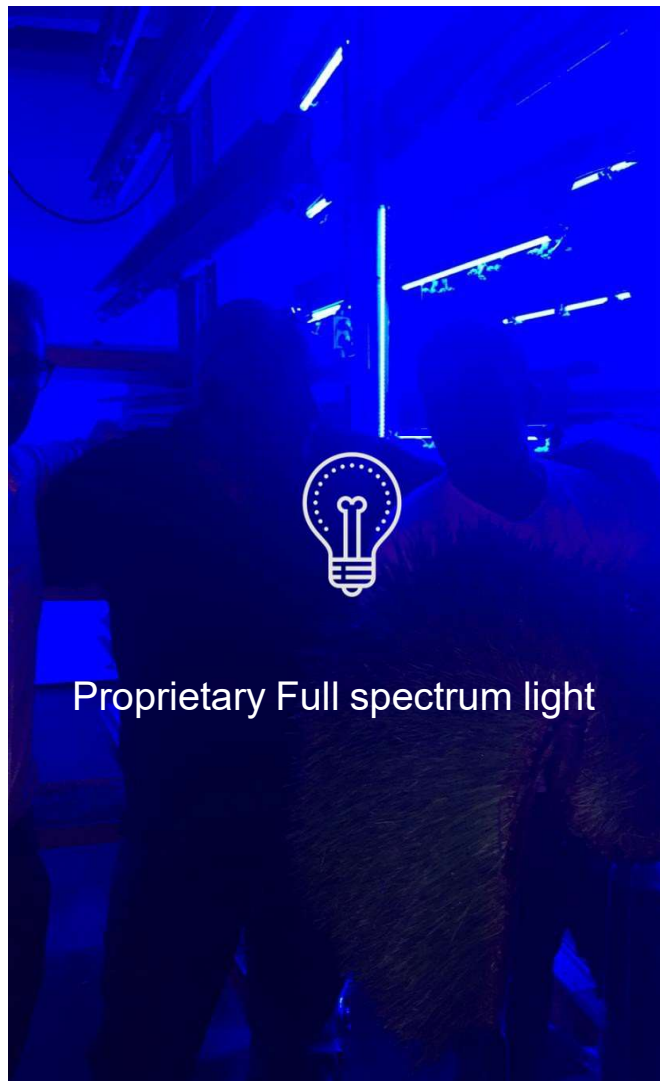


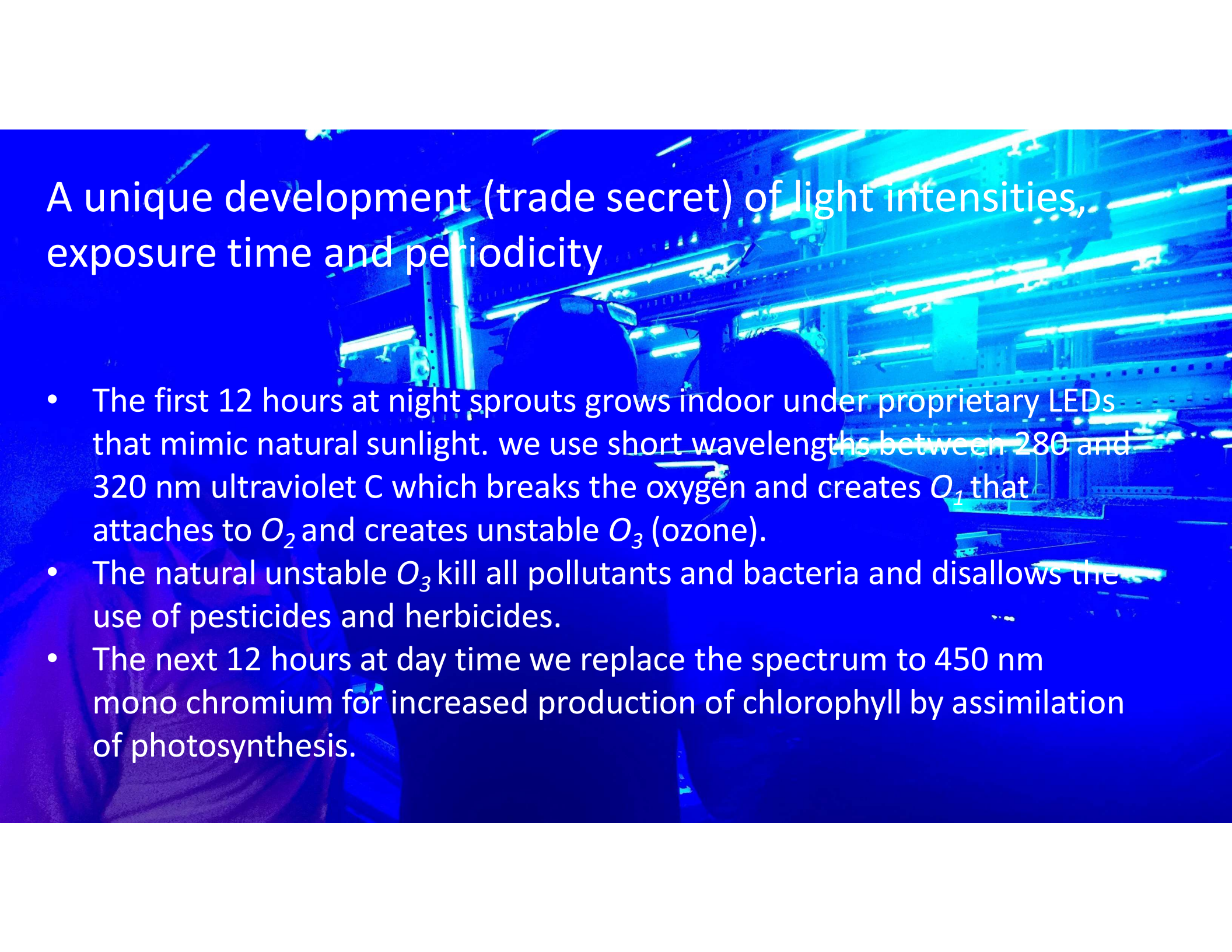
We replicate the optimal conditions in nature to a controlled environment

- We encourage the seeds to initiate a biochemical process within by a unique method and protocol (a trade secret), in part by using gases, temperature and exclusive technology.
- We are able to significantly shorten germination time and reach 99% germination.
- We have been able to achieve a cycle of 7-12 days, depending on the type of the seeds.
- We have grown working protocol to 40 different seed types.



Proprietary Seed
Germination





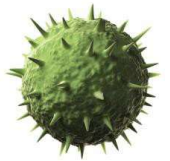
A unique development (trade secret) of light intensities, exposure time and periodicity

- The first 12 hours at night sprouts grows indoor under proprietary LEDs that mimic natural sunlight. we use short wavelengths between 280 and 320 nm ultraviolet C which breaks the oxygen and creates O_1 that attaches to O_2 and creates unstable O_3 (ozone).
- The natural unstable O_3 kill all pollutants and bacteria and disallows the use of pesticides and herbicides.
- The next 12 hours at day time we replace the spectrum to 450 nm mono chromium for increased production of chlorophyll by assimilation of photosynthesis.

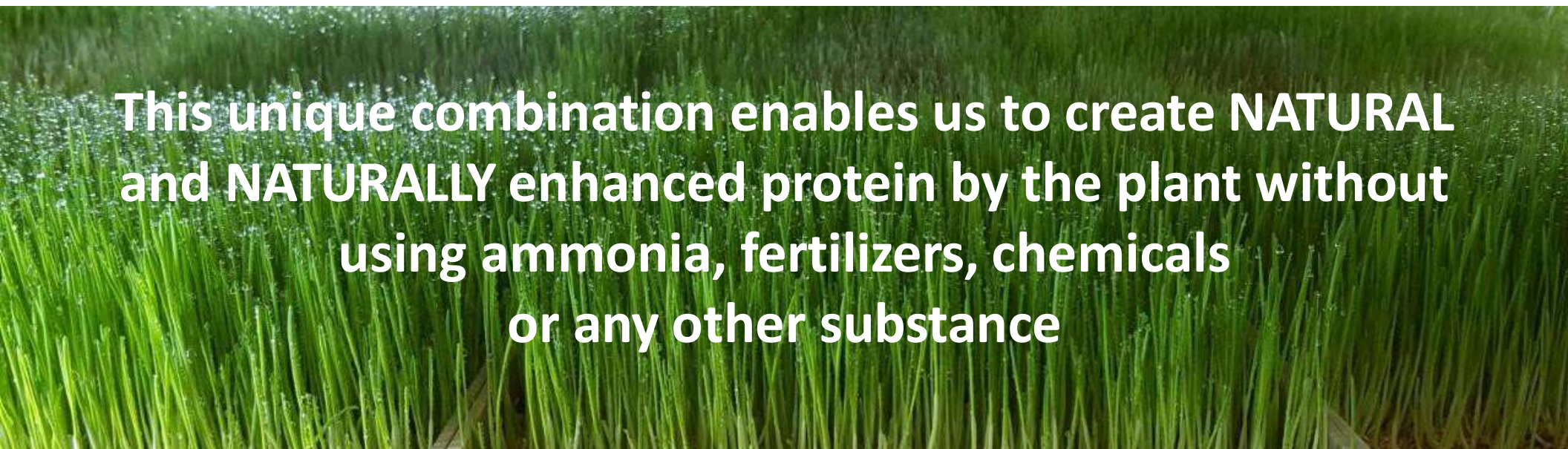
We developed a unique method (trade secret) for the use of various microbes that contributes significantly to plant protection



Proprietary Friendly bacteria



The bacteria we use are pro-biotic bacteria and approved for use in food. The uniqueness of the biological solution and the use of the bacteria we have developed is in the interaction of the bacteria with natural microelements and with the artificial light system



This unique combination enables us to create NATURAL and NATURALLY enhanced protein by the plant without using ammonia, fertilizers, chemicals or any other substance

Since the plant does not grow on a substrate it does not invest energy in the absorption of water but rather receives it from the air

The Micro-elements is naturally obtained through the bacteria that make the growing material available for the plant

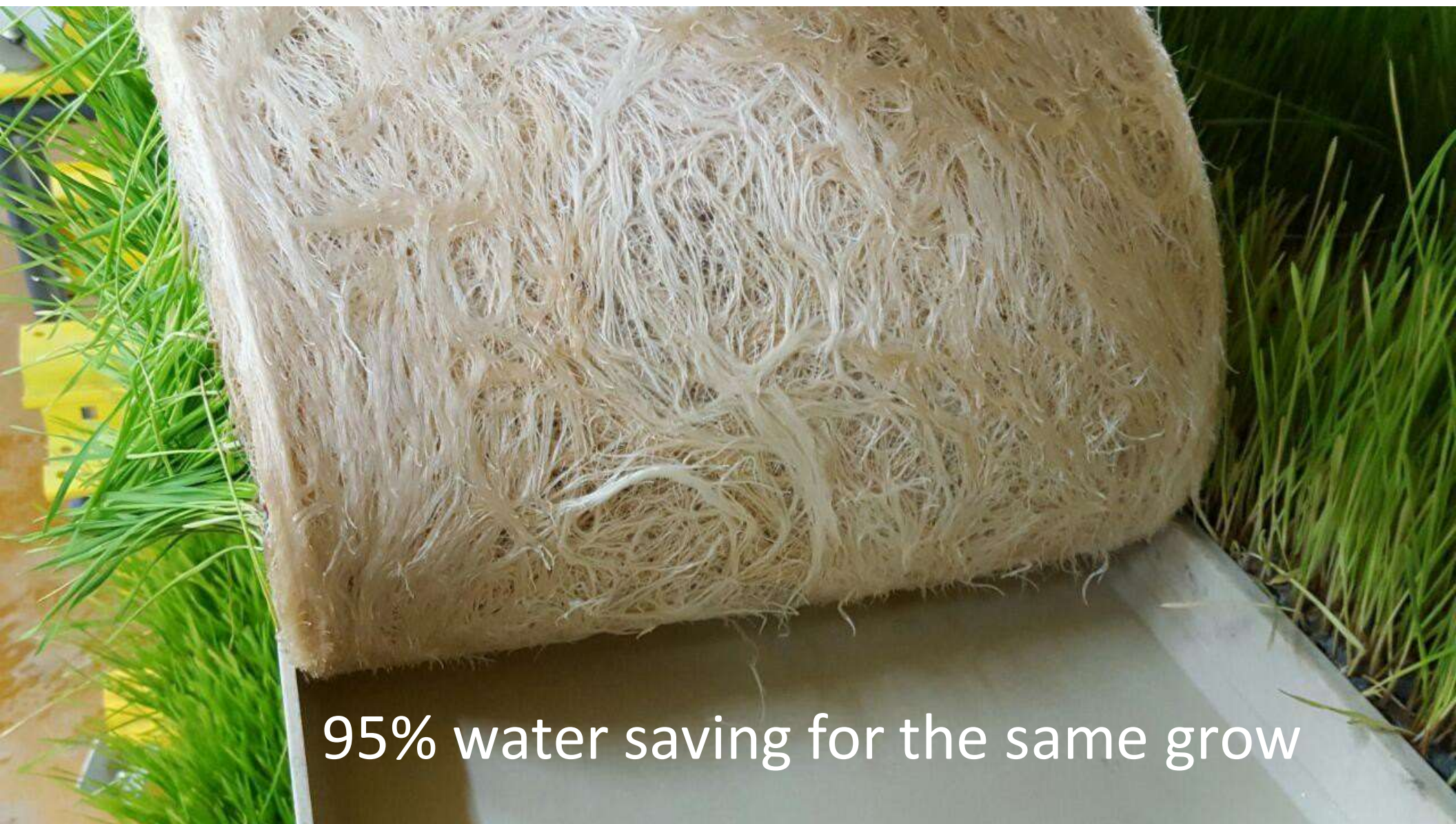




We can grow indoor from one hectare 1,000
tons of sprouts protein



Hydroponic Free, Soil Free, Fertilizer Free



95% water saving for the same grow

7 Days of grow to harvest 365 days a year



For the first time in the world
We can achieve a reduction in the cost of protein
production to feed humans and animals
by hundreds of percentages
while preserving the environment and natural values

