



How our products, vision, mission and goals align
with and support the United Nations
Sustainable Development Goals

**SUSTAINABLE
DEVELOPMENT GOALS**



FOOD AND AGRICULTURE ARE KEY TO ACHIEVING THE ENTIRE SET OF SDGs

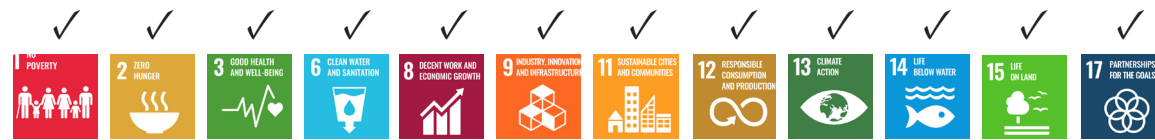
FAO, 2030 Agenda, 2015

Agriculture is acknowledged as a powerful tool to end poverty and hunger and bring about sustainable development.

The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs).

Agrispower Australia Limited is, in global terms, a small company. Its unique world class resource and agricultural fertiliser is directly related to improving food security and the food chain and has enormous potential to contribute directly and indirectly to the UNs SDGs.

The following outlines how.



Our Agrisilica® fertiliser product is related at a grass roots level to food security. From extraction and processing, through research and more than 500 trials worldwide to-date, to achieving a market ready product with international accreditation has been necessarily lengthy and expensive.

More so perhaps because Agripower is bringing new thinking - the 'science of silicon' - to the market as a game-changer for global agriculture. Discovered in the early 20th century, the science of silicon as a beneficial element is complex. Only a certain form of silicon is viable as a safe and highly efficacious agricultural input. The potential value of silicon in relation to crop and soil health been championed by Agripower's presenting extensively around the world educating government regulatory bodies, scientists, agronomists and growers on biogenic amorphous silica and its significance to the future of agriculture.

It is worth noting here that Agripower's Managing Director, Peter Prentice, addressed the UN's FAO Rome Conference March 2017 on the Red Palm Weevil (RPW) threat facing all palms, specifically date palm production. FAO were presented with the outstanding field trial results using Agripower's products that demonstrated the very high rates in reduction of the red palm weevil and without chemicals. Commercialisation trials planning is now underway with expectations that Agrisilica® will form part of a management plant to control this devastating pest.

How can Agripower contribute to a better world? How can Agripower claim to be working towards contributing – either directly or indirectly, to the Sustainable Development Goals of the UN? The following takes 12 of the UN's 17 SDGs which Agripower responds to and elaborates on how, where and why its Agrisilica® silicon fertiliser can produce positive outcomes in pursuit of our global community's shared goals.

1 NO POVERTY



8 DECENT WORK AND ECONOMIC GROWTH



Goal # 1 - Economic growth must be inclusive to provide sustainable jobs and promote equality.

Goal # 8 – Decent Work & Economic Growth: Sustained and inclusive economic growth can drive progress, create decent jobs for all & improve living standards.

Goal # 9 – Industry, Innovation & Infrastructure: Investments in infrastructure are crucial to achieving sustainable development.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



11 SUSTAINABLE CITIES AND COMMUNITIES



There is a lot of evidence that agriculture can contribute to poverty reduction beyond a direct effect on farmer's incomes. Agricultural development can stimulate economic development outside of the agricultural sector, and lead to higher job and growth creation. Increased productivity of agriculture raises farm incomes, increases food supply, reduces food prices, and provides greater employment opportunities in both rural and urban areas. Higher incomes can increase consumer demand for goods and services produced by sectors other than agriculture. This 'multiplier effect' enables developing countries to diversify to other sectors where growth is higher and wages better.

Agripower's contributions - direct and indirect to Goal #'s 1, 8, 9 & 11 :

- » Many farmers and farming communities are classified as poor.
- » In many countries whole communities depend on income from agriculture to sustain them.
- » Some may be farming in fertile areas, but many are farming land that is naturally poor or exhausted.
- » Many have no access to safe, low-cost soil conditioners or crop fertilisers.
- » If crops fail due to climate-related or pest/pathogen related issues (abiotic and biotic stresses), the farmer, even whole communities can suffer from both lack of direct food supply and lack of income.
- » If farming a single annual crop, then the loss means no income for a year.

Agripower can supply to vulnerable farmers, communities and regions a fertiliser that:

- » is affordable
- » is non-toxic / will not harm soils, water resources/potable water or their animals
- » will increase yield
- » will increase crop quality (size, weight, appearance) so they achieve better price at market
- » will assist crops resist abiotic and biotic stresses (ie: will reduce crop losses)
- » will reduce need for toxic and costly pesticides
- » will reduce chemical run-off and leaching into their waterways
- » will improve their economic net benefits and improve income security

Agripower, through education of the multiple benefits to crops, soils and the environment can provide a game-changing, affordable boost to the agricultural endeavours of developing countries by making available to farmers the means for improved, sustainable farming, increased financial resilience and economic growth.

The food and agriculture sector offer key solutions for development and is central for hunger and poverty eradication.



The UN has set a 2030 target of doubling agricultural productivity and the incomes of small-scale food producers. The same date has been set to achieve sustainable food production systems and the implementation of resilient agricultural practices that increase productivity and production, that help maintain ecosystems, strengthen capacity for adaptation to climate change and extreme climatic instances (drought etc), and that progressively improve land and soil quality. The UN also sees mitigation of extreme food price volatility as an essential element of zero hunger.

The life expectancy of Agripower's biogenic amorphous silica resource is around 200 years.

The UN has set goals for 2030 and 2050 – a relatively short time frame of thirty years. Through investment and sales, Agripower is seeking to further increase its export production capacity.

Agripower will invest in building market awareness – educating fertiliser producers, agronomists, growers and governments of the potential for agriculture if access to Agripower's Agrisilica® is readily available world-wide.

Agripower's contributions - direct and indirect to Goal #2 :

- » To-date every crop trialled and tested with Agrisilica® has shown increases in crop:
 - Yield
 - Quality (e.g. size, brix, protein, shelf life)
- » Better quality crops command better prices at market.
- » Additional benefits from Agrisilica® have shown all crops were better able to withstand abiotic and biotic stresses – that is, resist pest and pathogen attacks or loss from climatic conditions such as drought. This means more quality food makes its way to market, making more food available for consumers.
- » Higher and more reliable yields from the same land area mean more crops to market.
- » Combined the proven benefits from Agrisilica® mean better grower incomes and significantly, better food security.

51-82% OF CROPS ARE LOST ANNUALLY DUE TO 'CROP STRESS'

If we can reduce crop losses in the field, this will make a considerable difference to the gap between how much produce makes it to consumers now and what we will need by 2050. Abiotic and biotic crop stress is a significant cause of crop loss, and Agrisilica® can help reduce such losses caused by:

- » ABIOTIC stress (drought, salinity, poor soils, frost/heat, nutrient imbalances, nutrient loss, heavy metals etc)
- » BIOTIC stress (pests and pathogens both airborne and soil)
- » To feed a predicted 10 billion by 2050 means crop production must rise to meet estimated demands of 70-110%.
- » If crop production collapses, the UN predicts mass migration in the hundreds of millions and starvation.

From Agripower's table below, we are enabling farmers to significantly increase yield, and therefore income.

AGRISILICA® CROP RESULTS TABLE

CROP	COUNTRY	Agrisilica Application Rate Kg/H	% YIELD INCREASE	PROFIT WITHOUT AGRISILICA A\$/ha*	PROFIT WITH AGRISILICA A\$/ha* (after deducting cost of Agrisilica)	ADDITIONAL Net PROFIT INCREASE A\$/ha	ADDITIONAL % INCREASE in Net PROFIT	ADDITIONAL INCREASE in Net PROFIT. US\$	Cost of Using Agrisilica p/ha	Return Using Agrisilica
Apple	Morocco	800	50	22,200	37,400	15,200	68	9,880	480	21.6
Apple	Russia	400	102	22,400	45,500	23,100	103	15,015	240	63.6
Avocado	Australia	600	27	74,700	95,570	20,870	28	13,566	360	38.7
Banana	India	750	20	13,700	16,000	2,300	17	1,495	450	4.3
Banana	Morocco	800	26	35,400	44,000	8,600	24	5,590	480	12.6
Blueberry	Morocco	400	6	75,500	79,600	4,100	5	2,665	240	12.1
Cherry	Australia	250	20	87,500	104,800	17,300	20	11,245	150	76.0
Chilli	Australia	350	8	135,000	145,200	10,200	8	6,630	210	32.6
Citrus	Australia	500	9	112,300	132,300	20,000	18	13,000	300	44.3
Citrus	Spain	250	23	26,000	29,800	3,800	15	2,470	150	17.5
Cotton	India	100	21	1,640	1,930	290	18	189	60	4.1
Date Palm	Saudi Arabia	620	8	42,300	47,360	5,060	12	3,289	372	9.8
Grape	Turkey	600	34	17,200	22,800	5,600	33	3,640	360	11.1
Hazelnut	Turkey	600	70	30,000	64,000	34,000	113	22,100	360	62.4
Macadamia	Australia	300	30	16,740	22,130	5,390	32	3,504	180	20.5
Maize	Spain	300	20	3,520	3,950	430	12	280	180	2.6
Melon	Brazil	400	34	53,500	71,180	17,680	33	11,492	240	48.9
Melon	Morocco	500	57	12,500	19,200	6,700	54	4,355	300	15.5
Nectarine	Morocco	900	41	11,000	14,800	3,800	35	2,470	540	5.6
Olive	Spain	150	19	4,000	4,880	880	22	572	90	7.4
Onion	Australia	250	63	16,200	18,400	2,200	14	1,430	150	10.5
Pomegranate	India	300	31	12,500	16,060	3,560	28	2,314	180	13.9
Potato	Turkey	250	23	14,300	17,200	2,900	20	1,885	150	13.6
Raspberry	Morocco	300	23	70,000	86,000	16,000	23	10,400	180	58.8
Rice	India	300	34	2,200	2,750	550	25	358	180	3.0
Stawberry	Australia	1,000	54	100,000	135,000	35,000	35	22,750	600	38.9
Sweet Potato	Australia	200	47	28,000	41,000	13,000	46	8,450	120	71.4
Sugar Beet	Morocco	300	62	2,800	5,000	2,200	79	1,430	180	8.9
Sugar Beet	Turkey	300	17	4,200	4,800	600	14	390	180	3.2
Sugar cane	India	500	43	3,200	4,200	1,000	31	650	300	3.2
Tomato	India	500	20	21,000	25,000	4,000	19	2,600	300	9.7
Tomato**	Morocco	600	44	7,900	10,800	2,900	37	1,885	360	6.2
Wheat	Morocco	150	49	1,300	1,700	400	31	260	90	3.9
Zucchini	Spain	500	20	86,190	103,020	16,830	20	10,940	300	37.5

Ensuring healthy lives and promoting the well-being for all at all ages is essential to sustainable development.



The UN estimates an average 200,000 people die annually from exposure to toxic pesticides. The World Health Organisation estimates 4.9 million deaths annually (8.3% of global mortality) is attributable to environmental exposure and inappropriate management of selected chemicals.

It is believed that lead, is thought to be responsible for 3 percent of cerebrovascular disease burden worldwide. It has been reported that in 2001 arsenic-contaminated water caused 9,100 deaths and 125,000 disability adjusted life years (DALYs) in Bangladesh. In the USA alone, the estimated annual human health bill attributable to pesticides is a staggering USD\$1.1billion. These sorts of statistics are frightening, unsustainable and inhumane.

Agricultural practices have been the main source of heavy metals in soil such as lead, chromium, arsenic, zinc, cadmium, copper and nickel. Sources include chemical fertilisers, liming, sewage, manure, fungicides and pesticides. Toxicity contaminates our soils, drinking water, inland water systems, oceans and our food basket.

Plants can uptake toxic metals and have evolved defence mechanisms to avoid or minimize damages. Exposure to toxic metals can intensify the production of reactive oxygen species (ROS), which are continuously produced in both unstressed and stressed plants cells. Some of the ROS are highly toxic and must be detoxified by cellular stress responses, if the plant is to survive and grow. Heavy metals-contaminated plants cause losses in crop production and risks for human health as they enter the food chain.

Human health impacts include respiratory, skin conditions, cancers, cardiovascular issues, bone fractures, kidney failure, neurological impairment (including neo and post-natal), and even death. Thus, this review aims to compile some information about research work on concentration of heavy metals until they reach the food chain for transferring to crops.

Agripower's products directly contribute to Goal #3.

- » Reduces plant uptake of arsenic and cadmium by up to 40%.
- » Reduces the need for chemical pesticides/fungicides by up to 40-70% (safer for farmer, safer for crop consumer, safer for local water supplies)
- » Immobilises certain heavy metals in soil, thus reducing plant uptake
- » Stimulates plant antioxidant enzymes preventing heavy metal damage to plant cells
- » Reduces translocation of some heavy metals from roots to shoots
- » All of which contribute to healthier crops and safer food for human and animal consumption

Clean, accessible water for all is an essential part of the world we want to live in.



The UN includes in its targets for Goal #6 universal and equitable access to safe and affordable drinking water for all; improving water quality by reducing pollution and minimizing release of hazardous chemicals and materials; substantially increasing water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity; implementing integrated water resources management at all levels; and the protection and restoration of water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes.

Agripower's Agrisilica® offers some remarkable water-positive benefits. Added to soils, it is a natural 'wetting agent', able to store and release water at the critical root zone without causing waterlogging. This keeps soils moist for longer and enables plant uptake when and as needed, making it less susceptible to dry conditions. Uptake of Agrisilica® promotes a silicated layer on the crop's cuticle surfaces (leaves, crop 'skin' and stems) which effectively reduces cuticular transpiration or moisture loss. Research in Japan with rice shows transpiration reduction by as much as 30%. All of these benefits link directly to a reduction in irrigation needs and costs. This is particularly relevant to farmers where water is scarce and/or costly.

As mentioned in Goal #3, Agrisilica® can reduce the need for pesticide/fungicide usage which can contaminate drinking water and water ecosystems. Agrisilica® also reduces nutrient leaching and run-off by increasing fertiliser uptake by the crop. This can significantly reduce damaging pollution and its effects (eg eutrophication) in water-related ecosystems including our oceans.

Agripower's products directly contribute to Goal #6.

Agrisilica® can optimise clean, safe and more abundant water resources by:

- » Increasing soil moisture retention meaning lower irrigation requirements
- » Reducing plant transpiration, resulting in lower water usage / more water availability
- » Reducing chemical fertilisers entering water-ecosystems
- » Reducing pesticides which can assist in keeping drinking water and water-related ecosystems in better health
- » Because Agrisilica® is non-toxic and safe for animal and humans, it cannot contaminate water-ecosystems or cause toxicity-related human health issues

Responsible Consumption & Production



The UN includes among many recommendations for achieving this Goal, a number of areas in which agriculture intersects with achieving success including: sustainable production and the sustainable management and efficient use of natural resources; reducing food losses along production and supply chains, including post-harvest losses; environmentally sound management of chemical including significantly reducing their releases into air, water and soil in order to minimise their adverse impacts on human health and the environment.

Agripower's products directly contribute to Goal #12.

- » The availability of an affordable fertiliser that meets all sustainability criteria
- » The availability of a fertiliser that respects natural resources – even rejuvenates and restores them and does no harm to plants, animals or humans
- » The availability of a fertiliser that promotes plant cell strength and boosts photosynthesis which in turn delivers:
 - Crops less susceptible to abiotic or biotic stress losses
 - Crops with stronger cell structure which enhances their growth and preserves their state, appearance and durability in transit from farm to table
- » The availability of a fertiliser which is non-toxic and emits no greenhouse gas
- » The availability of a fertiliser which can actually reduce methane (CH₄) and nitrous oxides (N₂O) into the atmosphere, thereby minimising negative impacts in human health and the environment



Climate change is a global challenge that affects everyone, everywhere.



The UN includes a number of areas where Agripower products can demonstrate powerful solutions and /or mitigations towards global climate action. The UN calls for education, mitigation, adaptation and impact reduction.

Before proceeding to how Agripower's Agrisilica® can make a difference it is important to note the following facts in relation to Greenhouse Gasses (GHGs) and agriculture:

1. Agriculture is the largest contributor of non-CO₂ GHGs at 56%
2. Nitrous oxide (N₂O) is 300 times more potent than CO₂ and has a lifespan of 114 years
3. N₂O accounts for 40% of agri-emissions
4. Nitrogen losses can cost farmers up to 25% of their annual income
5. Nitrogen fertilisers account for more than 50% of human diet protein
6. More than 50% of applied Nitrogen is lost via leaching and run-off
7. Methane (CH₄) is around 36 times more potent than CO₂
8. Sugar production (~176.5mmt p/a) is one of agriculture's highest emitters of CH₄ and N₂O and a major contributor to eutrophication
9. Rice production (staple diet to 50%+ of the world's population) produces 50% of crop GHGs
10. 20 years of rice production emissions is equivalent to 1,200 coal plant emissions

Agripower's Agrisilica® is 100% natural and its extremely high biogenic amorphous silica and monosilicic acid content accelerates and enhances natural chemical and biological activity in soils and plants. Our farmers gain immediate results, productively and economically, while our three key environments – the air, land and water – benefit from immediate to aggregated longer term outcomes.

Agripower's products directly contribute to Goal 12.

Agrisilica® can reduce greenhouse gas emissions of:

N₂O

- increases nitrogen fixation
- reduces nitrogen volatilization
- increases soil nitrogen mineralisation
- promotes ammonium assimilation/nitrification
- increases nitrogen denitrification
- reduces nitrogen leaching & run-off by up to 40%

CO₂

- increases photosynthesis activity (CO₂ absorption)
- increases soil organic carbon content
- increases long term carbon sequestration for potentially thousands of years via amorphous silica generated Phytolith-occluded carbon (PhytOC), a highly stable carbon (C) fraction resistant to decomposition, important to long-term global C sequestration.*

* a highly stable carbon (C) fraction resistant to decomposition, plays an important role in long-term global C sequestration Parr and Sullivan (2005) found that PhytOC could contribute up to 82% of the total soil C pool after 2000 years decomposition in Numundo oil palm (Elaeis guineensis) plantations. It is also suggested that PhytOC makes up between 15 and 37% of the estimated global accumulation rate (24 kg C ha⁻¹ yr⁻¹) of stable soil C, demonstrating the significant potential of PhytOC in the long-term terrestrial C sequestration (Parr and Sullivan, 2005; Song et al., 2012a).



Careful management of this essential global resource is a key feature of a sustainable future.

Sustainably manage forests, combat desertification, halt & remediate land degradation & halt further biodiversity loss.



Revitalize the global partnership for sustainable development.



The UN includes a number of points where Agripower's products can demonstrate powerful solutions to both these Goals simultaneously. We have combined the issues and the benefits of applying Agripower's products. Toxicity and pollution caused by pesticides, fungicides and chemical fertilisers have many downsides when it comes to the life below water and life on land. Ecosystems are fragile as we have seen here in Australia with the explosion of 'crown-of-thorns' starfish and the devastation it has wrought on the Great Barrier Reef off the coast of Queensland. Declared a World Heritage Area in 1981. The sugarcane industry in particular is linked with this catastrophe due partly to nutrient run-off reaching the ocean. Let's look at a few basic facts and figures:

1. Of 28,000 species evaluated as threatened with extinction, agriculture and aquaculture are listed as a threat to 24,000 of them
2. Pesticides in particular are a direct threat to pollinators (birds, bees etc)
3. Eutrophication and acidification in waterways and oceans have already created 169 'dead zones' globally
4. 78% of global ocean and freshwater pollution is caused by agriculture production
5. 75% of the world's soils are degraded
6. 24 billion tonnes of fertile soils are lost annually by due to agriculture :
7. Deforestation and tillage practices
8. Constant high fertiliser usage causing 'soil exhaustion'
9. 50-70% of Earth's original stored carbon has been lost
10. It takes 3000 years to create 1mm of fertile soil
11. Soil is a finite resource

Agripower's products directly contribute to Goals 14 & 15.

- » Reduces leaching & run-off of chemical fertilisers by optimising plant uptake, thereby inhibiting and/or mitigating their pollution of groundwater, water-systems on land or reaching ocean ecosystems.
- » 100% safe to freshwater and marine life and may even promote coral regeneration (Agripower is currently in discussions with the Reef Foundation in relation to establishing trials)
- » Optimises plant & soil health to naturally defend against pests and pathogens attack
- » Mechanically (as opposed to chemically) reduces pest burdens while remaining 100% safe to pollinators
- » Deliver yield increases on same amount of land, negating need for deforestation
- » Increases cation exchange capability (CEC) in soil enabling higher retention of key nutrients and their uptake by plant
- » Is a powerful soil ameliorant (conditioner) and optimises soil rejuvenation, especially soils that have been exhausted by overuse of chemicals, and
- » Increases soil organic carbon and humic acid in soils

Agripower has a product that could be a substantially game-changer to the future of agricultural production and deliver many side benefits, direct and indirect.

To reach scale of both production and awareness (education) Agripower is open to partnerships that further the UN's goals. These may be with trials such as with the Reef Foundation, with universities or governments and other bodies interested in the benefits and solutions that Agripower and its products can deliver. Equally Agripower requires investment to optimise these opportunities.

To this end, Agripower's seeks to embody clause 17.16 and 17.17 of Goal 17 which seek to:

- » 17.16 - Enhance the global partnership for sustainable development, complemented by multi-stakeholder partnerships that mobilise and share knowledge, expertise, technology and financial resources, to support the achievement of the sustainable development goals in all countries, in particular developing countries
- » 17.17 - Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships

Agripower's products directly contribute to Goal 17.

Through its research, awareness building, funding opportunities and global outlook, understanding that we have but one planet. All nations, developed or developing, can – and we believe should be able to – benefit from our work now and for generations to come.



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