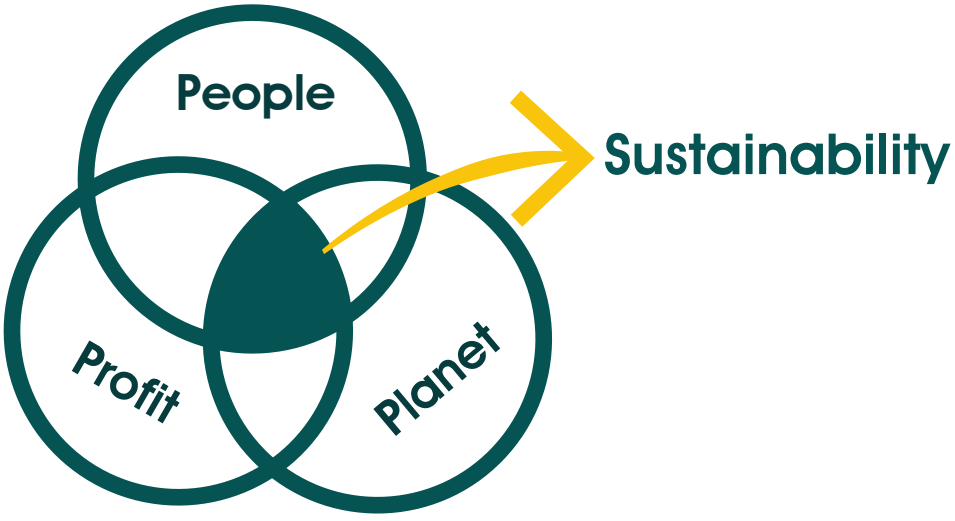
Primal Group's Green Economy

Industry Review: Agriculture



2020

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*The **BEST** way to*
PREDICT** the **FUTURE
*is to **CREATE IT**.*

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About Us

Evolving a Sustainable Future

The Primal Group is dedicated to establishing itself as a lead organization, driving change to create a more tenable future for our planet by ensuring environmental protection, social responsibility and value-creation, for generations to come.

A world beset with new challenges requires innovative thinking and a more imaginative approach. Sustainable businesses will be the only survivors in a world with rising environmental challenges, public awareness and accountability.

Primal

- *The very first,* ***original***
- *Primary in its* ***priority***
- *Primitive in its* ***simplicity***
- *Pristine in its* ***purity***
- *Paramount in its* ***importance***

Alternative investment specialists in emerging markets, the Primal Group focuses on the solutions needed to sustain a global population racing away to over 10 billion by 2050. By focusing on the Primal needs of man, our aim is to provide a lower risk profile offering better rewards than traditional asset classes.

In a world demanding and deserving of higher social responsibility, sustainable business will ensure a more conscious and profitable future for us all.

UN GLOBAL COMPACT

Welcome to the New Green Revolution

One of the greatest challenges of the current generation is to transform the archaic system of modern industry into one that guarantees that the needs of all are met in a safe, healthy and sustainable way. Primal enables a direct path towards the solutions to mankind's most significant challenges, by engaging in projects that ensure a secure, accessible and a long-lasting resource supply for all.

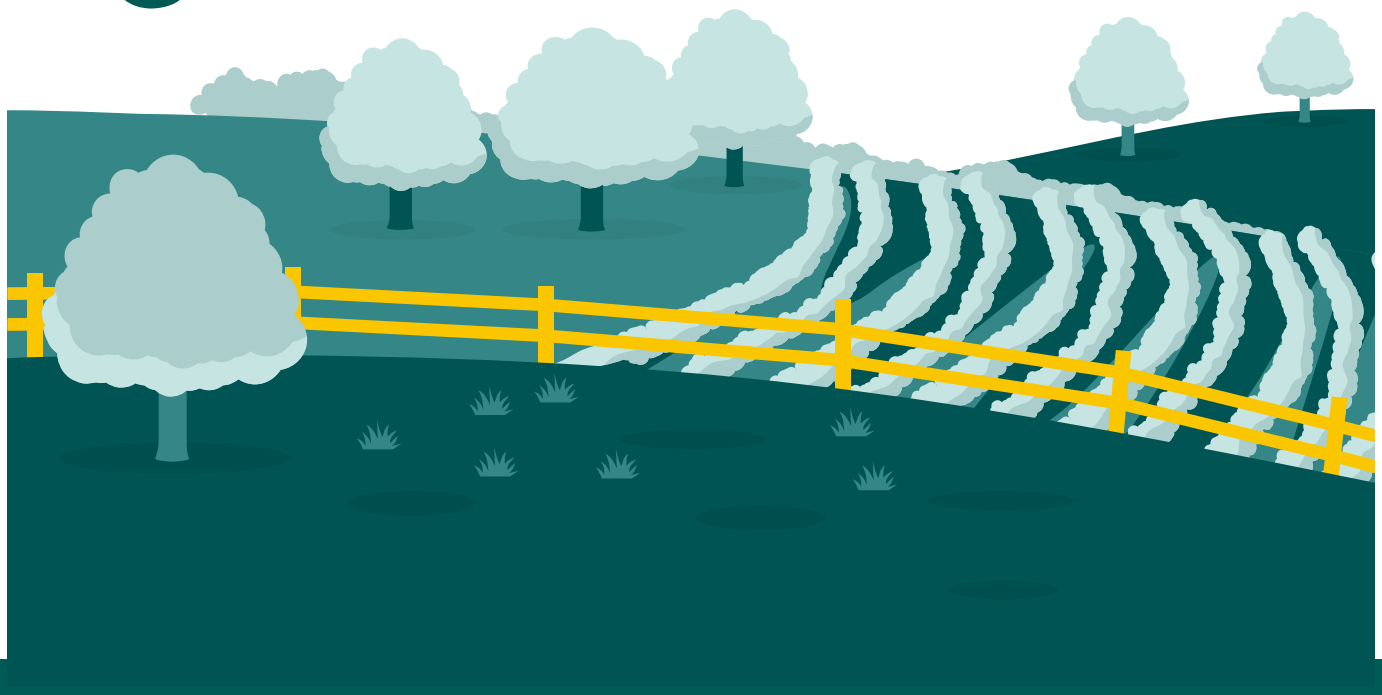
After generations of prioritizing maximum productivity over sustainability in our socioeconomic endeavors, mankind has caused unprecedented pressures on our most vital resources that require new and innovative solutions.

Neem is one great solution. Integral to the survival and prosperity of mankind, this marvellous tree is set to change from an underdeveloped gift of nature to a powerful and globally utilized resource. One of the most versatile trees on the planet, neem offers innovation where we need it most – across agriculture, healthcare, Beauty & Personal Care (BPC) and environmental protection. Referred to by the United Nations as the 'Tree of the 21st Century', this gift of nature is a cost-effective and non-toxic alternative to synthetic agrochemical use and offers a diverse range of applications for healthcare and cosmetics due to its high nutritional content as well as a variety of antibacterial, antimalarial, antiviral and antifungal properties.

A naturally diversified product with application across several of mankind's most essential industries, neem production is a rare and valued service in a world where supply is low and demand continues to increase. With the natural world strengthening our ability to solve some of mankind's most significant challenges, this 'perfect, complete and imperishable' gift of nature will become a comprehensive source of health and prosperity for generations.

Primal Group's Green Economy presents the fundamental drivers for Agriculture, Healthcare and Environmental Protection over the next century, while highlighting the incredible opportunity neem has in revolutionizing these essential sectors for the benefit of mankind and build a safe and secure model for economic growth, development and prosperity that can be applied worldwide.

Agriculture



In a world facing rapid population growth, a changing climate and the pervasive depletion of vital resources, long-term economic growth depends on meeting society's increasing needs for food in a safe and sustainable way.

Agriculture has reached a crossroads. In order to survive and thrive in this new century, a new Green Revolution is needed to ensure a secure, accessible and long-lasting food supply. Feeding the world in a safe and sustainable manner is a considerable challenge, especially with a global population expected to reach 10 billion by 2050. Such rising demand will require a 70% increase in food productivity and a doubling in protein production worldwide, at a time when arable land degradation is increasing at an unprecedented rate and crop yield growth is in decline.

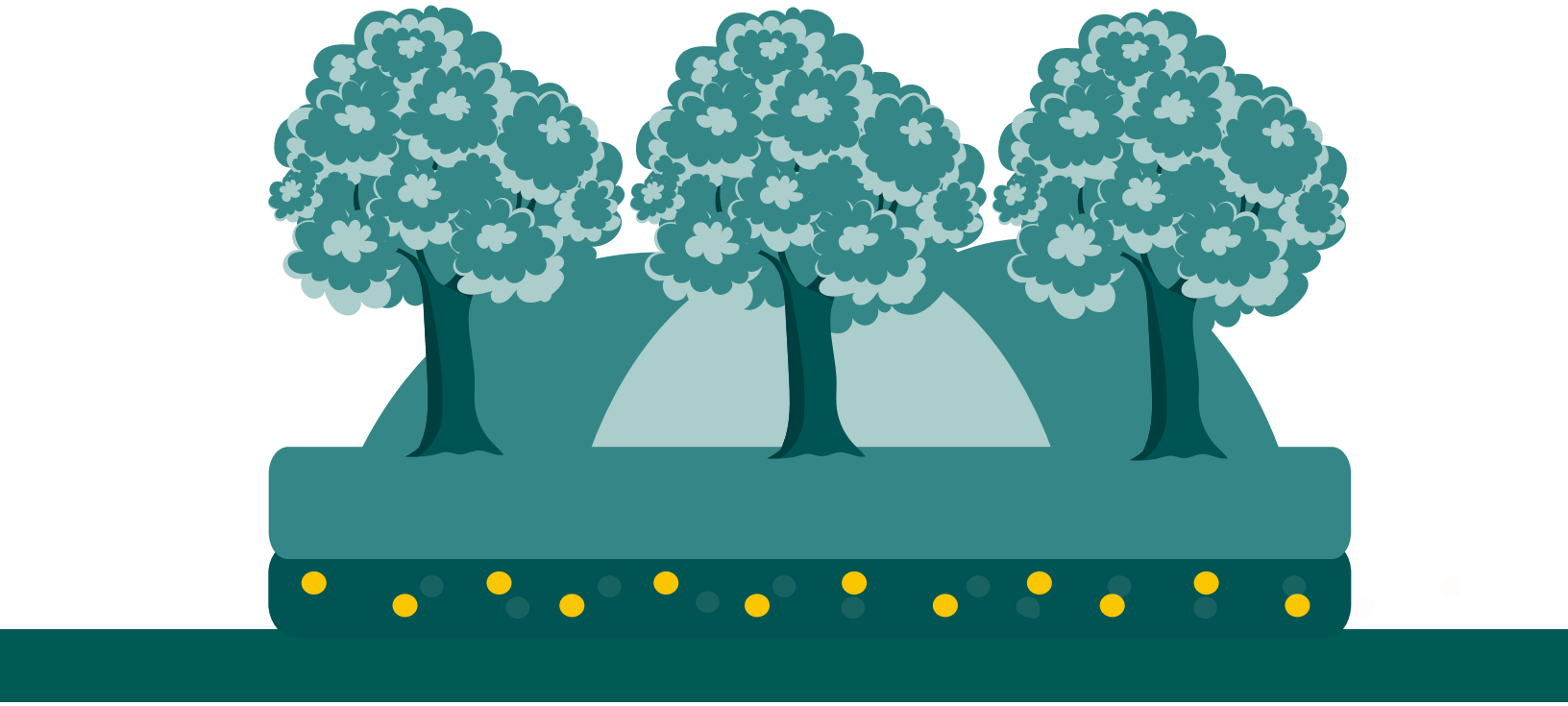
Ours is a time of global change, where strategies that emphasize stronger environmental, social and corporate government criteria will be fundamental in fulfilling mankind's most essential needs for the long term. One of the great challenges will be to transform the global food system into one that meets the nutritional needs of all, in a sustainable manner. Essential for life on this planet, agricultural farmland provides the services necessary to secure our global food supply, ensure global health and further strengthen the global economy.

We are entering a new age – one that will require a balancing act between the understanding of our impact on the environment and the need to invest in the solutions necessary for a sustainable and prosperous future. Despite the increasingly bleak scenario we face, there is a solution: the alignment of the human race and the planet's ecosystem by supporting a revolutionary transformation in global agriculture.

"We have the capacity to create a remarkably different future; one that can restore ecosystems, reduce carbon in the atmosphere and protect the environment while bringing forth innovation, prosperity, employment and security"

Anthony J. Archer, Chairman & CEO of Primal Group

Farmland Review



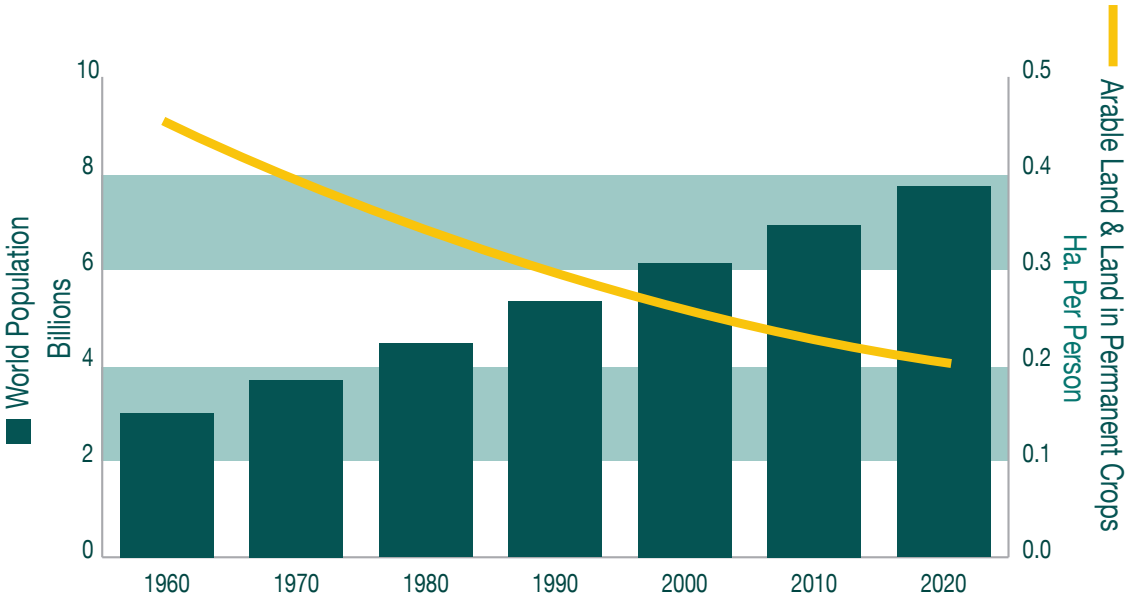
After almost a decade of impressive growth, marked by soaring and rising demand for food-based commodities around the world, agribusiness and farmland retains its incredible potential for profitable growth even during times of volatility and uncertainty in global financial markets. Why? Agriculture faces a significant global challenge that requires constant attention – feeding the expected 10 billion people on Earth by 2050 with steadying crop yields and decreasing amounts of arable farmland available. This places a vast premium on businesses that drive innovation and development in the sector.

The fundamental drivers for agribusiness remain unchanged – an expanding global population and a limited supply of the world's most fundamental resources.

The green revolution saved millions of lives from starvation and poverty, but compounding growth has had a severe impact on the population, and alongside synthetics, has ironically made it more difficult to achieve global food security.

The Powerful Supply / Demand Dynamics for Farmland

Arable Land Degradation is Ocurring at an Unprecedented Rate



Source: GS & PA Research, Food and Agricultural Organization (2012)

12 million hectares
of global arable land degradation per year

Decreasing Supply

The availability of farmland is shrinking worldwide. The United Nations estimate that the current rate of global arable land degradation of 12 million hectares a year (equivalent to 29.6 million acres) is 30 to 35 times the rate experienced during the mid-twentieth century. This costs the global economy $490 billion per year due to lost production. Rising urbanization, damage resulting from chemical pesticides, deforestation, overgrazing and the impact of global warming are all contributing to the process by which farmland loses its productivity and vegetation cover disappears, affecting the ecosystems that play a critical role in maintaining the environment and biodiversity.

The heavy use of synthetic fertilizers has degraded soils across the world, with arable land degradation occurring at a pace of up to 100 times greater than the rate of soil formation and recovery.

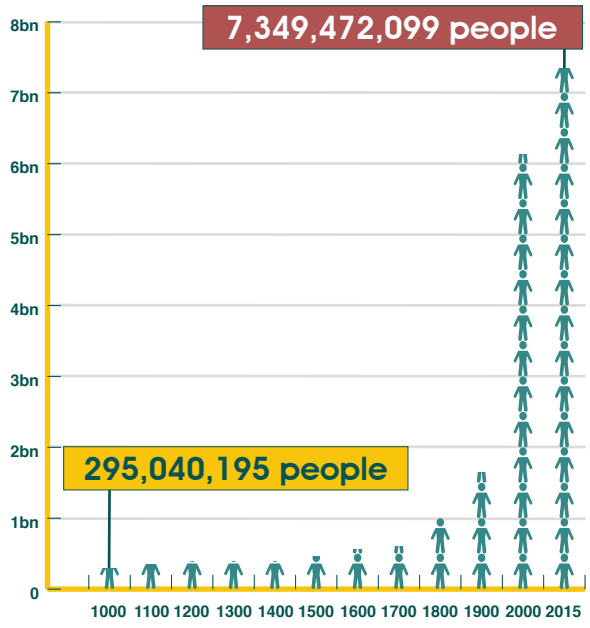
The Powerful Demand

The unprecedented rise in the global population is exponentially increasing the global demand for food. The Food and Agriculture Organization (FAO) forecast that a 60% expansion in global food production is needed by 2050, due to a relentless rise in the global population. The UN continues to revise its population forecasts upwards; the latest revision suggests that by 2050 the world's population will reach 9.6 to 10 billion. During the last 50 years, global population has nearly tripled from 2.5 billion to 7 billion people, and has more than doubled since 1970.

10 billion people

The world's population by 2050 according to the UN

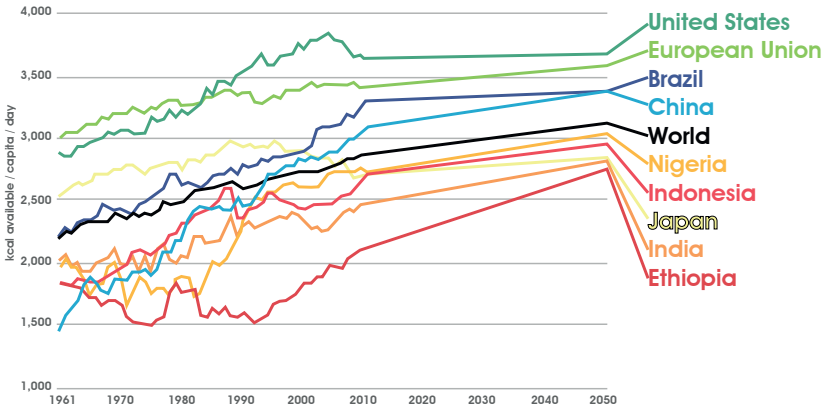
Population Growth (1000 - 2015)



Source: Our World in Data (2016)

Rising Populations are Consuming More Calories

Dietary changes are also adding extreme pressure. As global incomes rise and urbanization expands, especially across the developing world, there is a simultaneous transition to more resource heavy and protein intensive diets. Much of this population rise will come from India and China, and both countries are set to comprise one-third of the world's population by 2050. The subsequent increase in the global demand for cereals, for both food and animal feed, is projected to increase by nearly 50 percent on current levels to 3 billion tons in the same period, thereby increasing the pressure on global food production and land prices.



Source: World Resource Institute (2016)

A Lucrative Asset Class That Will Save Lives

Agricultural farmland provides the necessary services to support a thriving economy and ensure global health. The case for increasing exposure to alternative assets such as agriculture is simple. Food is one of mankind's most primal needs and it offers an added benefit of diversification from more traditional assets.

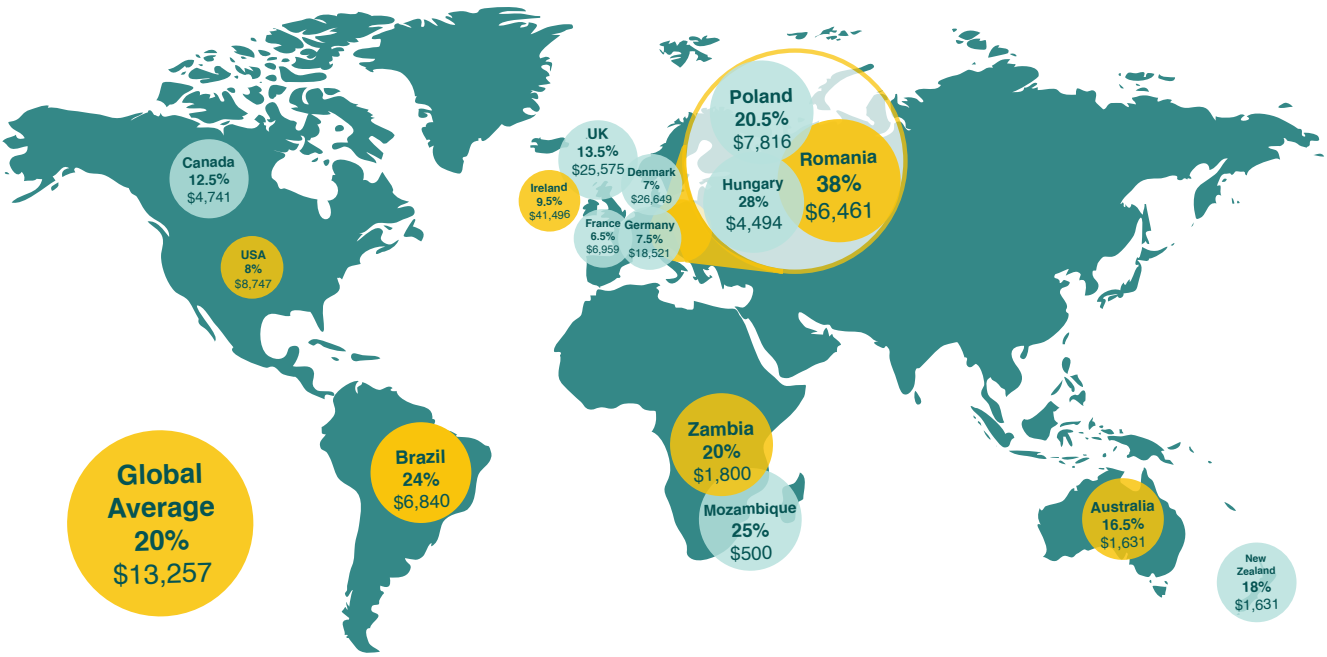
Rising consumer demand for food, together with shrinking levels of available farmland are forecast to drive the value of farmland and food prices higher. The conflux of factors above will be responsible for a 60% price increase in food and commodity staples such as corn, wheat and rice by 2050.

Agricultural farmland is set to become one of the most fundamental and lucrative alternative assets. The Savills Global Farmland Index has increased by 14.8% each year since 2002 and 6.6% from 2010-2015.

According to TIAA CREF, one of the world's largest institutional investors in farmland, US agricultural land values outperformed domestic stocks and bonds between 1970 and 2013 (generating average annual returns of 10.3% vs 6.2% for the S&P 500 and 7.3% for 10-year Treasuries).

In Brazil, soon to be the world's largest foods exporter, land prices have risen by an average 20% between 2013 and 2016. The Brazilian nationwide average farmland price, not including agricultural facilities or machinery, was pegged at $2,530 per acre, versus just $627 ten years ago. That's a compound annual growth rate (CAGR) of 15%. This growth will only increase in pace as there is a current push in Brazilian congress to ease regulation on foreigners owning large amounts of Brazilian farmland.

Annualized Farmland Values Increase (%) and Capital Growth of (USD per ha.) (2002 to 2012)

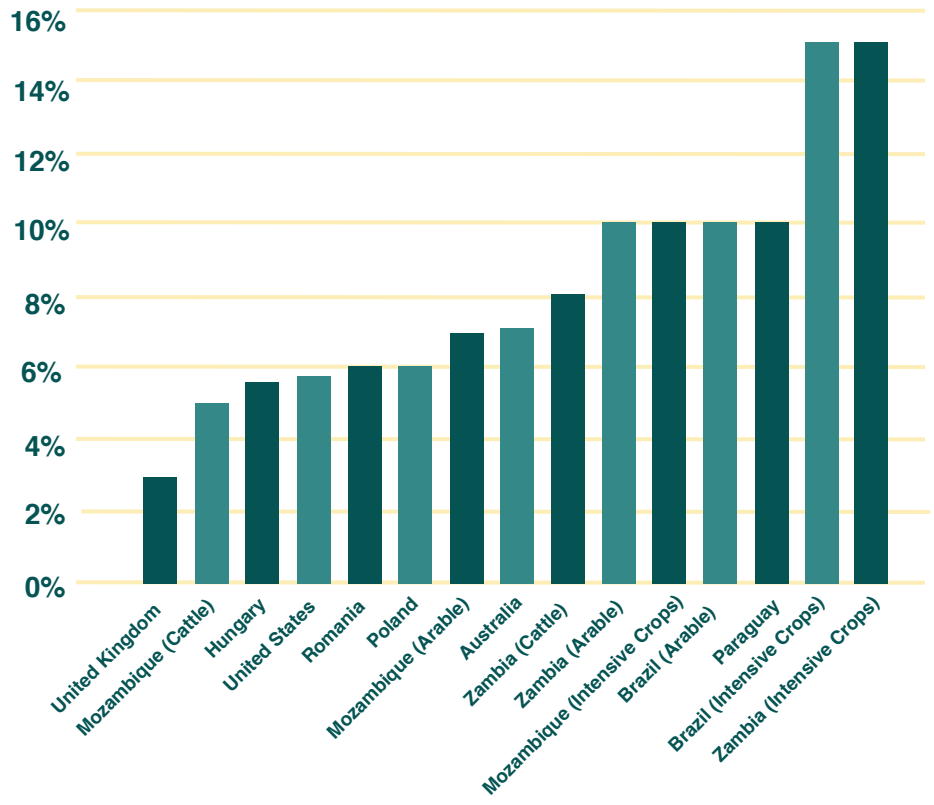


Source: USDA (2015)

Investing in Agriculture for Economic Growth

According to the UN, investing in agriculture is one of the most effective strategies for economic growth, poverty reduction and promoting global sustainability. There has been a significant increase in global agricultural investment over the past decade. Alternatives such as agriculture are forecast to contribute up to 40% of revenues for the global asset management industry by 2020, despite comprising just 15% ($14.7 trillion) of total investment industry assets presently. Even governments are getting involved. According to the Organization for Economic Cooperation and Development (OECD), the world's 49 main developed and emerging governments spent a combined annual average of $601 billion on agricultural support and innovation projects between 2012 and 2015.

Investment Performance of Agricultural Operations by Nation (% YOY Growth)



Source: Savills Research (2014)

Why Brazil is Still the Best Place for Agriculture

With more freshwater and arable land (300 million hectares) than anywhere else in the world, Brazil is already the top producer of multiple crops and foodstuffs globally. The industry represented 5.6% of Brazil's $2.2 trillion GDP in 2015, acquiring $86 billion in exports (36% of the total) and utilizing an impressive 15% of the total workforce. Agribusiness in the country reached a total $476 billion in 2015 (the value of which has doubled in the last decade alone). Currently the 4th largest agricultural power in the world, the United Nations Food and Agricultural Organization expect the country will become the world's largest as soon as 2020.

Agriculture offers a rare example of a Brazilian sector that is globally competitive. The country's largely inefficient industrial manufacturers are still heavily protected by tariffs and import taxes, but the government took the opposite approach with agriculture. Starting in the 1990s, it reduced subsidies and eliminated export taxes while increasing investment in agricultural research. EMBRAPA, the government agricultural research institute founded in 1973 is world renowned for taming the climatically hostile Cerrado region in central Brazil. This transformed what was an arid region fertile and then into one of the most productive agricultural regions in Brazil. Farmers responded with a rapid expansion of the area under cultivation and a burst of investment that made them among the most productive and efficient producers the world has to offer.

In 2015, the agricultural sector grew 1.8%, a stark contrast to the performance of the macroeconomy (-3.8%). Agriculture is the one area that, quite wisely, successive governments have steered away from interfering with. The figures speak for themselves; agricultural volume output doubled between 1990-2013, while livestock production trebled over the same period. Agricultural based exports accounted for 36% of total exports in 2013 ($86 billion) and that figure will continue to rise, particularly while the currency remains highly competitive.

The economic and political transition taking place in Brazil, combined with the current softness of the Brazilian Real, represents an exciting opportunity for those looking for an ideal entry point. After all, true profit is in the purchase price and not the selling price.

Investing in agriculture in what is set to become the world's biggest agricultural player during a period of currency weakness is quite simply a savvy strategy.

The First Step Towards Sustainable Farmland

Sustainability refers to the ability of biological systems to remain diverse and productive indefinitely. If anything is unsustainable it will come to an end, which is simply not an option when referring to agriculture and global food supply.

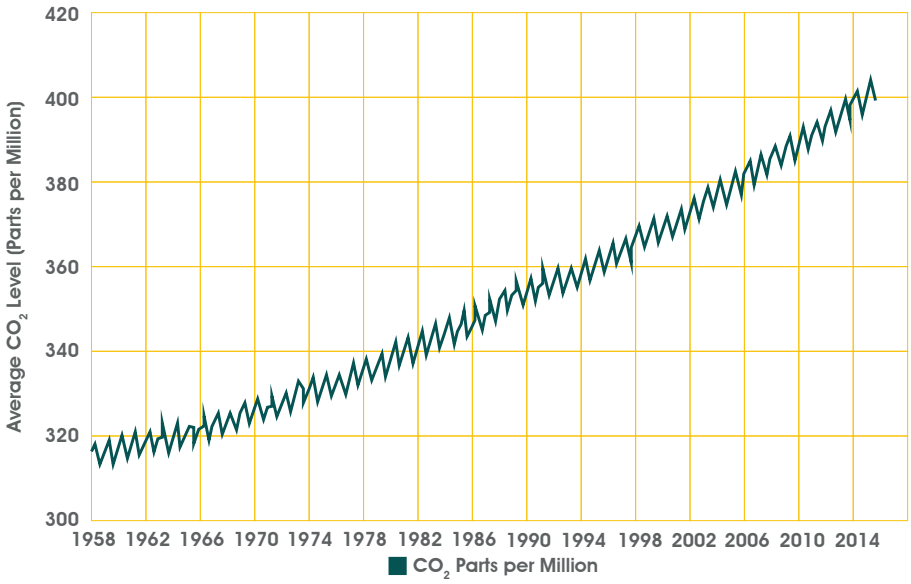
More than half a trillion tons of carbon, from coal, oil and gas, have been burned since the Industrial Revolution, and the level of CO2 in the atmosphere has risen by 40% in the past 250 years. Half of this increase has occurred during the last 50 years, and the Intergovernmental Panel on Climate Change (IPCC) has estimated another 500,000 tons of carbon will be consumed over the next three decades due to our insatiable demand for resources such as food and energy.

The last time so much greenhouse gas was in the air was over 3 million years ago, when the arctic was ice-free, savannah spread across the Sahara desert and sea levels were up to 40 meters higher than they are today. Global surface temperatures have risen by almost two degrees Fahrenheit over the last century, with the rate increasing by 0.3 to 0.8 degrees per decade since 1970. Sea levels have risen by 20cm since 1880, an amount unmatched by any period in the past 6000 years, and arctic summer sea ice is expected to disappear completely by 2100, unless we make a concerted effort to change.

One of the more practical and achievable ways of cleansing our environment and ensure an equitable future is to lock up or sequester more carbon from the atmosphere through the simple process of planting more trees worldwide. By utilizing available atmospheric CO2 in photosynthesis, trees provide a simple and effective natural 'sink' for manmade pollutant activities. In fact, forests across South America, Africa and Asia already absorb one-fifth of the planet's fossil fuel emissions. This is one of the most effective solutions to the one of the foremost issues for sustainability and environmental protection in the present day.

At the end of 2013, 26.5M hectares of forest plantations were supported by carbon finance, according to NGO Forest Trends, with $212 million injected into the sector during the previous year. This represents growth of 9% y-o-y and is based on coverage of 162 projects across 58 countries. Part altruism, part commercial, this was financed by the sale of 28 million tons of carbon offsets.

Global CO_2 Emissions (1958 - 2014)



Source: NASA. Global Climate Change: Vital Signs of the Planet (2015)

Primal Group's Focus on Sustainable Agricultural Management

Understanding the major principles for safe, effective and sustainable crop care is essential for developing an evolved agricultural system that focuses on productivity in the long term.

Leading the Way for Sustainable Crop Care

In order to further secure the optimal fertility of the soil and the protection of crops on the plantations for generations, Primal deploys its own culture and systems of organic and integrated pest management, crop care and irrigation. These are derived from some of the most innovative ecological practices of plant nutrition and environmental conservation. By applying technical knowledge specific to each pest and disease, alongside an expert understanding of the nutrients necessary for optimal crop development, Primal Group formulates the most effective blend of natural pesticides and fertilizers for use on its plantations. Naturally, a major ingredient in this blend is neem.

Primal also adopts a rotational grazing system on the plantations, where livestock regularly and systematically move around the land to maximize the quantity and quality of forage growth. Grazed lands allow new vegetation to renew energy reserves, rebuild shoot systems, and deepen root systems, ensuring long-term and maximal biomass production. This improves the natural fertility of the soil while reducing any costs associated with alternative treatment.

Safeguarding the Global Water Supply by Example

By investing significantly in water management, ranging from responsible on-site eco dams, reservoirs and pump houses, Primal strengthens its water reserves to supply the needs for the whole plantation at the lowest maintenance and environmental cost possible.

With state of the art (Netafim) equipment and sustainable crop care practices, Primal Group is able to conserve the highest amount of water while ensuring the appropriate levels of hydration for the trees on the plantations come rain or shine.

Utilizing the World's Most Powerful Energy Resource – the Sun

Energy for growing and harvesting crops is one of the most expensive and environmentally damaging factors of plantation management. Rather than proliferating the global use of fossil fuels, Primal is developing the capacity to harness the lasting and clean power of the sun across all of its projects where possible. Ensuring that all infrastructure on the plantations has been designed to receive a photovoltaic supply of solar power, the ultimate objective is to meet the demands of the on-site facilities and irrigation systems in an entirely sustainable and environmentally friendly manner.

The first phase of Primal Group's Zero Carbon Footprint Plan, currently under installation, will involve a 26.5-kilowatt peak system generating 42.3-megawatt hours per year (24% of the expected energy consumption across the same period). The Solar PV system will generate 1,772 MWh of electricity over course of its life, equivalent to 12,452 metric tons of Carbon Dioxide Equivalent. Our objective is 100% total energy independence.

Understanding the major principles for safe, effective and sustainable crop care is essential for developing this evolved agricultural system that focuses on productivity in the long term. Our greatest challenge is to transform the archaic system of modern agriculture into one that guarantees the nutritional needs of all are met in a safe, healthy and sustainable way. In order to achieve this objective, Primal continuously preserves and restores critical habitats, carefully manages its resource supply and naturally improves the condition of its soil and crops. Primal secures high yields, protects soil productivity and maintains environmental quality in the long term through the expert understanding and practice of sustainable agriculture across all of its projects.

The Life of Neem

Named 'Arista' in Sanskrit - meaning 'perfect, complete and imperishable'

Leaves

Containing most active ingredients found in the seeds but in a much lower concentration, the leaves are considered the most versatile part of the tree. Now used as a pesticide, fertilizer and animal feed, the leaves were originally used as a medicinal tea in Indonesia

Flowers

The flowers are the part of the tree with fewer uses, however, given the flowers' sweet, honey-like smell, the flowers are used in aromatherapy for a calming and restorative effect

Twigs

Whilst used in commercial toothpastes and mouthwashes, twigs have most widely been used as brushes for generations in India

Oil

Extracted from the kernels inside the seeds, where a single seed may contain up to 50% oil by weight, the oil is recognized and valued as a safe and effective bio-pesticide for organic farming. The oil has also been widely studied due to its medicinal properties and is also used in a variety of cosmetic products such as creams, soaps and shampoos

Bark

Neem bark contains spermicidal properties and research is undergoing to approve its potential use as a sexual contraceptive for both women and men

Cake

After the seeds have been pressed for oil, the resulting by-product is the neem cake. Neem cake is used across the agriculture sector as an effective pesticide, fertilizer and anti-bacterial, anti-fungal organic alternative to antibiotics in livestock

Roots

The roots of a neem tree also have different medicinal properties due to being antiseptic, antibacterial, anti fungal and germicidal. They are also used as a pesticide and to control fleas and ticks on pets

Pesticide

Neem-based organic pesticides are effective against 600 insect species. As a fertilizer, neem also reduces soil alkalinity and ensures optimum fertility

Medicine

All parts of the neem tree can be used for the treatment of inflammation, infection, fever and skin diseases

Cosmetics

Containing a high level of antioxidants, neem is used in organic soaps, shampoos and hydrating creams

Cattle feed

Neem is used as an organic and nutritional supplement that is effective against internal nematodes

Fertilizer

Neem improves the nutritional value of the soil while protecting plant roots from pests and diseases

Timber

Derived from the mahogany family, Neem is an extremely durable wood ideal as a construction material

The Neem Opportunity in Commercial Agriculture

One of the most versatile trees on the planet, this single tree offers innovation where it is needed the most – across agriculture, healthcare and environmental protection. An evergreen and part of the Meliaceae (Mahogany) family, neem has been celebrated for its remarkable healing properties as far back as 5,000BC by the Harappa and Monejo civilizations. Described in ancient Indian Ayurvedic texts as 'sarva roga nivarini' (the universal healer of all ailments) and 'nimba' (giver of good health), neem's name in Sanskrit is 'Arista' – meaning 'perfect, complete and imperishable'. Fast-forward to the present day and neem is finally being utilized around the world to protect crops, increase soil nutrition, boost livestock health and strengthen global health. While still in its infancy in western society and big agriculture, the neem tree has been a feature of community life throughout Asia for centuries and will inevitably become renowned worldwide for its incredible contributions to our sustainable future. The very nature of neem also makes the tree ideal for reforestation and carbon sequestration efforts. Fast growing, with a large surface biomass and thick foliage, neem has an impressive capacity to capture carbon in the atmosphere with a sequestration capacity of 12.27 tons per tree per year. One of the most resilient, hard wearing and durable timbers on the planet, with a lifespan of up to 200 years, neem is an obvious choice for protecting and restoring the environment through long term carbon entrapment.

Range of Organic Carbon Sequestration by Tree

Common Name	Species	Organic Carbon Sequestration (ton/tree/yr)
Moringa	Moringa oleifera	15.78
Neem	**Azadirachta indica**	**12.27**
Royal Poinciana	Delonix regia	12.25
Copperpod	Peltophorum ptecocarpum	9.58
Acacia	Acacia nilotica	9.25
Indian Rosewood	Dalbergia sissoo	7.21
Palash	Butea monosperma	3.55
Lebbek Tree	Albizia lebbeck	2.42
Nagpur Teak	Tectona grandis	1.92
Lemon Eucalyptus	Eucalyptus citridora	1.81

Source: North Maharashtra University, India (2014)

Invest in Farmland Solutions

In a world facing rapid population growth, a changing climate and the depletion of vital, finite resources, long-term economic growth depends on finding a sustainable way to meet society's increasing demands. Essential for life on this planet, agricultural farmland provides the services necessary to secure our global food supply, ensure global health and further strengthen the global economy. Distilled to its base elements, the aim for governments, corporations and investors in this new world should be the same as it is for individuals - survival. There is a primal need for food, and with arable farmland in decline around the world ONLY sustainable solutions will enable us to survive and to thrive.

Crop Care Review

The model of agricultural production used today is unsustainable in the face of the new food security challenges of the 21st Century. Making agriculture greener and more efficient will be achieved by new agricultural procedures supporting the use of natural resources that tackle climate change, safeguard biodiversity and ensure a sustainable food supply for everyone. We must look towards innovation in agriculture to ensure the needs for everyone are met in a safe and environmentally sustainable way.

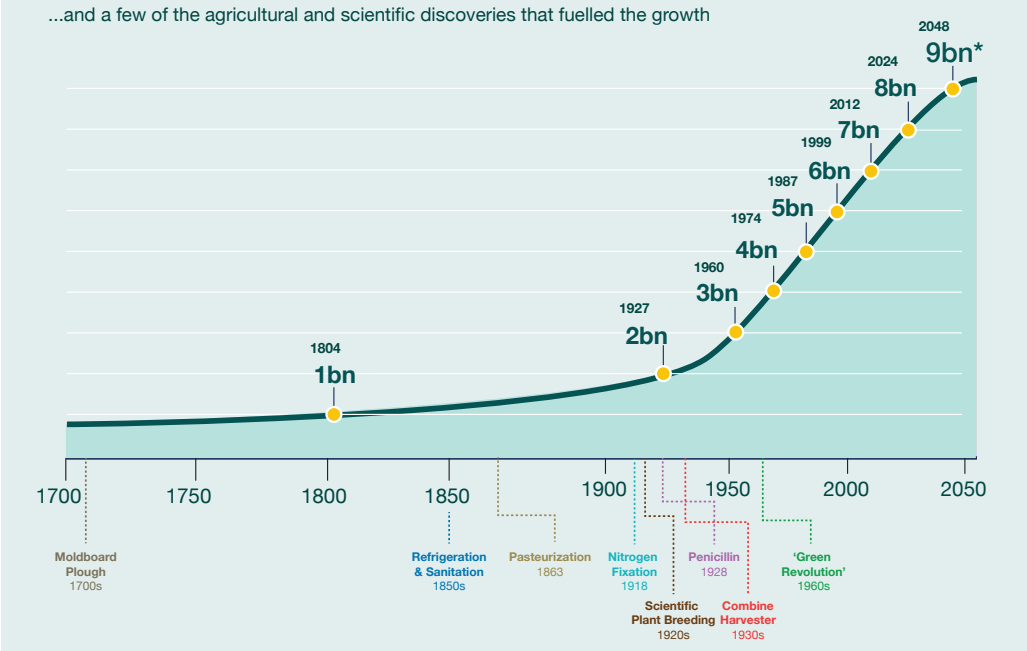
During the 20th Century, incredible developments in agriculture led to dramatic yield breakthroughs that supported the unprecendetd expansion of the global population. Improved agronomy, advanced irrigation technology and the development of synthetics were the main factors responsible. With greater yields, farmers led a general increase in demand for goods and services that stimulated industry. Real per capita incomes around the world doubled between 1970 and 1995, and 675 million people were lifted out of poverty. This significant period in our history, referred to as the Green Revolution of the 1960s, was responsible for catalyzing a new lifestyle and global economic framework focused on growth.

Fast forward to the present day and polluted waterways caused by fertilizer runoff affect the majority of the planet, harmful growth hormones can be traced in meat, malnourishment persists across developing nations, a profound obesity epidemic exists in first world economies and several million pounds of food are unnecessarily wasted every year. Synthetic agrochemicals are causing unprecedented impacts for global health including but not limited to birth defects, cancer and autism. The highly centralized and industrial system of producing cheap and commoditized food is unsustainable and therefore will not last. Innovation in agricultural practice is inevitable and this new era of sustainable practices will soon be known around the world as the New Green Revolution.

One of the primary obstacles to sustainable food security today is an economic model and thought system, nurtured throughout the industrial revolution, that views social progress as the ability to produce at maximum capacity and at ANY financial or environmental cost. We now know that our current food production habits are in fact unsustainable in the face of depleting resource supplies. Only now are we beginning to truly understand the very consequences of such drastic interference with our environment, particularly through the proliferated use of synthetic agrochemicals in agriculture.

Strengthening our food system not only carries significant benefits for global health, but also serves as the foundation to achieve sustainable economic growth. The International Food Policy Research Institute has found that food security bring economic growth and not the other way around.

Expansion in the World's Population Over the Past 300 Years



*UN's Medium Variant | Source: The Atlantic Magazine (2013)

9.7 billion people

The world's population in 2050 according to the UN

"Civilization as it is known today could not have evolved, nor can it survive, without an adequate food supply"

- Norman Borlaug (1970) -

On the Verge of Another Global Food Crisis

In 2016 the Food and Agriculture Organization (FAO) estimated that 795 million people suffered from 'chronic undernourishment'. This is equivalent to one in every eight people on the planet. Although food production has so far kept up with population growth, agricultural yields are beginning to show a decline. Researchers from MIT, the University of Hong Kong and Colorado State University estimate that global crop yields of rice, wheat, corn and soy will see a 10% decline in the years to 2050.

The pervasive use of synthetic chemicals in crop care during the first Green Revolution saw increased crop and livestock yields, improved food security as well as reduced labor, increased energy use and environmental degradation. There still remains a great need for effective crop care in modern agriculture. Up to 40% of the world's potential crop production is already lost annually because of the effects of weeds, pests, disease and lower fertility. These crop losses would be doubled if existing pesticide and fertilizer use were abandoned completely.

Lives would be lost and huge environmental damage would be incurred if there were a reversion to traditional farming methods, not to mention the higher financial cost associated with life without crop care and the potentially catastrophic conflicts as humans fight over precious food.

Only now are we realizing the true consequences of such drastic interference with our environment, particularly through the proliferated use of synthetic agrochemicals in agriculture. Designed to kill destructive organisms while synthetically increase yields, they are released into the environment in a broad-scale approach that results in significant runoff. In fact, over 98% of sprayed pesticides, 95% of herbicides and 65% of fertilizers reach a destination other than their target, causing chronic impact to human health, livestock, wildlife, pollinators and beneficial insects – all of which are essential to a stable, healthy and productive ecosystem.

Rising urbanization, damage resulting from synthetic agrochemicals, deforestation, overgrazing and the impact of global warming are all contributing to the process by which the soil loses its productivity and cover vegetation disappears. The process of agricultural topsoil erosion is irreversible and the consequences are profound. 40% of the world's agricultural soil is classified as degraded or seriously degraded and if they continue to be used for agriculture the result will be a production decline of 30% over the next half century. The farmland currently being lost around the world due to degradation is equivalent to nearly half of all arable land in California disappearing every 18 months. The new out-dated and dangerous productivity based model has contributed to the loss of roughly three quarters of plant genetic diversity since the 1900s. So today, just 12 plants and five animal species supply 75% of our food, making our sustenance unnecessarily vulnerable to climate change and disease.

A vicious downward spiral is being created whereby ever-increasing levels of chemical pesticides and fertilizers result in more pollution and arable land degradation in turn necessitating higher and higher levels of inputs.

The Move Away from Synthetic Towards Organic Crop Care

Biotech seeds and crops were originally engineered to thrive alongside a single, all-purpose and often same-brand agrochemical pesticide and fertilizer. Monsanto and other agrochemical giants charged a premium for these seeds and inputs, theoretically sharing savings with farmers who would thereby spend less on other chemicals and labour. Despite this claimed objective, seed prices have increased up to 305% over the last thirty years while crop prices have risen by a comparatively low 31%. Crop yields simply have not kept up with the rising costs of GMO seeds or their synthetic agrochemical inputs, and farmers around the world are realizing that they just do not justify the price. After all, small-scale farmers feed around 70% of the world's population and do so mainly with seeds saved from one generation to the next.

The world's major food and agrochemical institutions lost $4 billion in market share in 2015 and have lost $18 billion in market share since 2009 as shoppers and farmers shift towards organic alternatives. A new influx of smaller agricultural firms is now winning a greater share of the market as they offer the ever increasingly educated consumer more engaging, environmentally safe and sustainable products. Yet another challenge for the synthetics is in terms of innovation as it costs the best part of $250 million and 11 years to successfully bring a new GMO or synthetic agrochemical product to market. General Mills saw its net profits from GMO products plunge by 24% in 2015 owing to the drying up of their production pipeline. In an effort to keep up, the food giant doubled its organic purchases in 2016. There are simply more gains to be had in the organics market. As an example, Soper Farms has increased its net income from $180/acre with GMOs to $578/acre with organics. It is also important to note that operational costs for running a farm fall by as much as 40% once it is organically certified, as it no longer requires expensive patented seeds or synthetic inputs. **Sustainable and organic inputs, despite requiring 2.5x more labor than conventional farming, are environmentally safer, produce crops with higher nutritional value and yield on average 10x the profit.**

Synthetic vs Organic Crop Care

The Reported Dangers of Synthetics and Benefits of Organics

The Synthetic Option

HAZARDOUS
Travels outside the intended area of use and contaminates the air, soil and water

STALLS LONG TERM GROWTH
Synthetic fertilizers acidify the soil over time and deplete its nutrients

REDUCES BIODIVERSITY
Synthetic pesticides damage the nervous systems of animals and compromise their ability to survive and reproduce

HARMS PUBLIC HEALTH
In extreme cases, the nitrates in synthetic fertilizers have prevented oxygen use in infants

DAMAGES SOIL
Reduces the amount of vegetative cover on the ground, promoting soil erosion

The Neem Way

SAFER
Entirely biodegradable, no hazardous residue is left on land or water

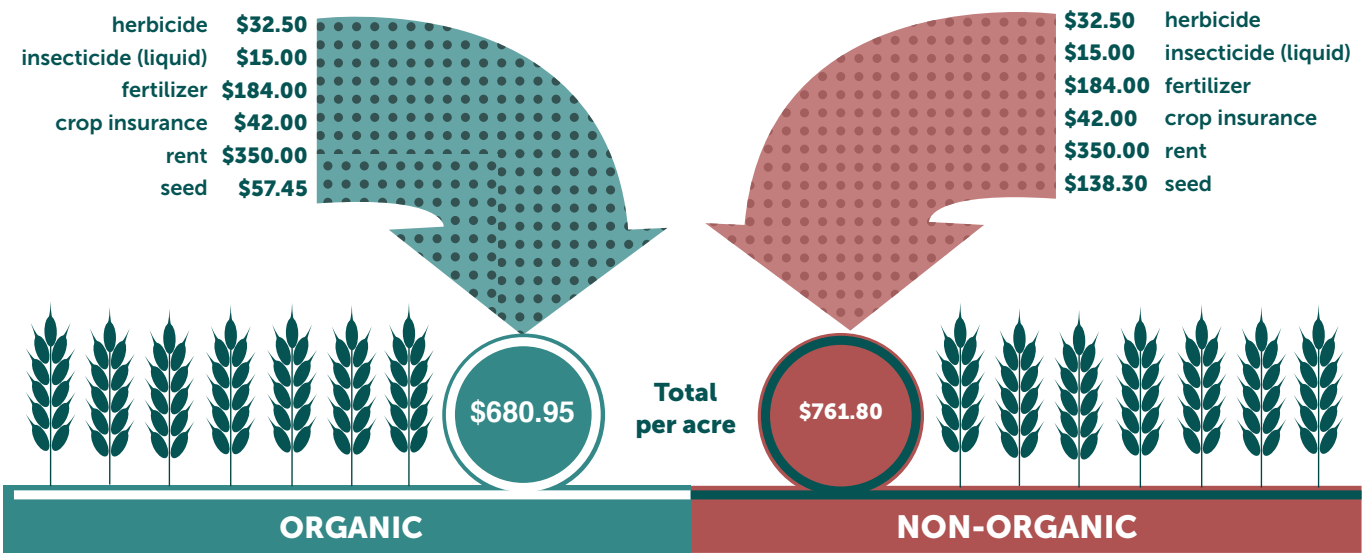
MORE NUTRITIOUS
Organically grown food contains up to 40% higher levels of nutrients

COST EFFECTIVE
Compareable pricing to their synthetic alternatives

HIGHLY EFFECTIVE
Neem-based pesticides provide multiple protective layers against insects

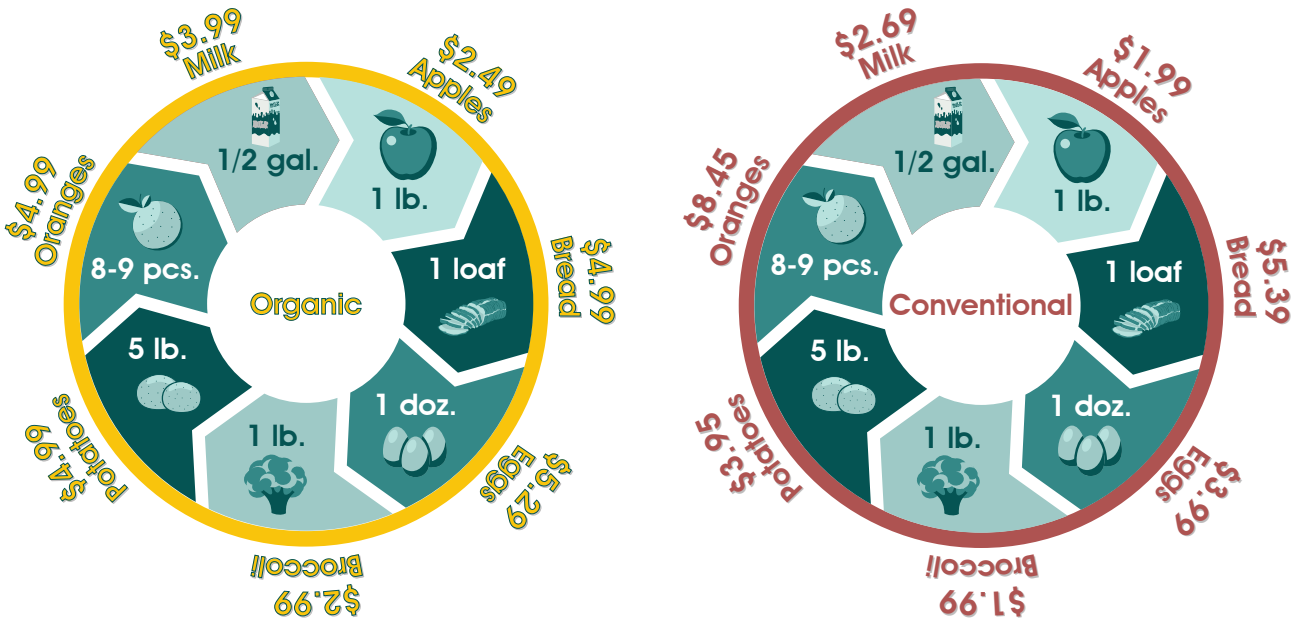
IMPROVES SOIL
Neem cake enriches the soil by increasing airflow and water retention while reducing the growth of pests and bacteria

The Economic Case for Natural Crops



Source: Modern Farmer (2013)

Retail Price Differentials Between Organic and Conventional Foods



Source: Wal Mart (2017)

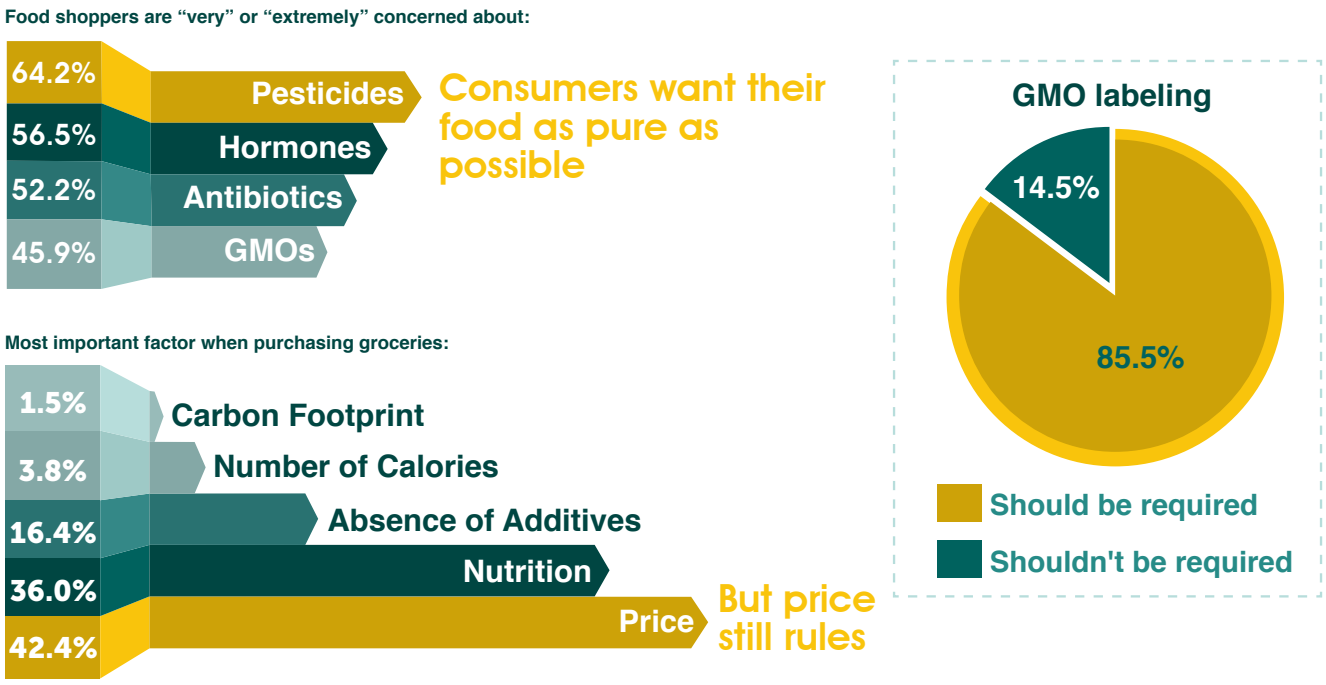
Big Food has Become Bad in the Eyes of Consumers

Global populations are still buying more food than ever before, but they are often choosing brands that ensure safe, natural and recognisable ingredients. For the first time, organic brands are appearing in the major distributors such as Target, Wal-Mart and Walgreens. Rather than carry traditional products with declining sales, they are actively dedicating shelf space to a variety of new and organic players.

Organic crops — ranging from carrots and broccoli to apples and blueberries — have substantially higher concentrations of a range of antioxidants and other potentially beneficial compounds equivalent to eating between 1-2 extra portions of fruit and vegetables a day. Organic dairy and meat contain about 50% more omega-3 fatty acids than their conventional counterparts. These omega-3 fatty acids are linked to reductions in cardiovascular disease, improved neurological development and function as well as better immune function.

50% more Omega-3 in organic food than in its conventional counterpart

Back to the Natural Way



Source: Fortune

Source: Fortune (2015)

From Niche to Mainstream in the Organics Market

The global organics market, worth $80.4 billion in 2015 (and having increased five-fold since 1999) is expected to double to $161.5 billion by 2018. With key demographics, particularly Generation Y, Z and millennials, keen on the move towards a natural lifestyle, the demand is present for the long haul and validates organics as a clear and profitable opportunity. The demand for organic food has increased by nearly 50% every year for the past five years.

Natural practices such as biological crop care and organic farming generate environmental, nutritional and socioeconomic benefits that far outpace their conventional counterparts. This innovative method in modern agriculture ultimately produces healthier yields, enhances natural capital through the restoration of agricultural land and has far greater climatic resilience. This is achieved through a shift in focus from mass production at any cost to the preservation of soil health, eradicating the use of synthetic and dangerous inputs for crop care, recycling nutrients and energy as well as safeguarding the benefits of biodiversity. Preventing potential health hazards imposed by synthetic pesticides and fertilizers, while providing better living conditions to animals, organic crop care ensures natural land productivity and global health.

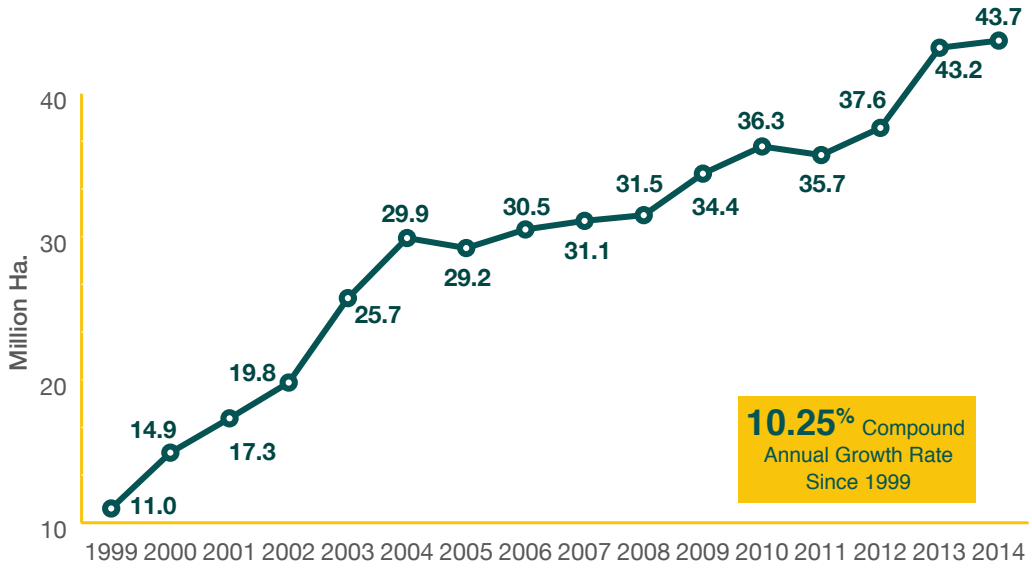
Organic Farming Greatly Increases the Nutritional Value of Food

Minerals (in milliequivalents)

	Calcium	Magnesium	Potassium	Sodium	Manganese	Iron	Copper
Snap Beans							
Organic	40.5	60.0	99.7	8.6	60.0	227.0	69.0
Conventional	15.5	14.8	29.1	0.0	2.0	10.0	3.0
Cabbage							
Organic	60.0	43.6	148.3	20.4	13.0	94.0	48.0
Conventional	17.5	15.6	53.7	0.8	2.0	20.0	0.4
Lettuce							
Organic	71.0	49.3	176.5	12.2	169.0	516.0	60.0
Conventional	16.0	13.1	53.7	0.0	1.0	1.0	3.0
Tomatoes							
Organic	23.0	59.2	148.3	6.5	68.0	1.0	53.0
Conventional	4.5	4.5	58.6	0.0	1.0	15.5	0.0
Spinach							
Organic	96.0	293.9	257.0	69.5	117.0	1584.0	0.0
Conventional	47.5	46.9	84.0	0.8	1.0	19.0	0.5

Source: Rutgers University (1995)

Growth in Global Organic Agricultural Land (1999 - 2014)



Source: FIBL & IFOAM (2016)

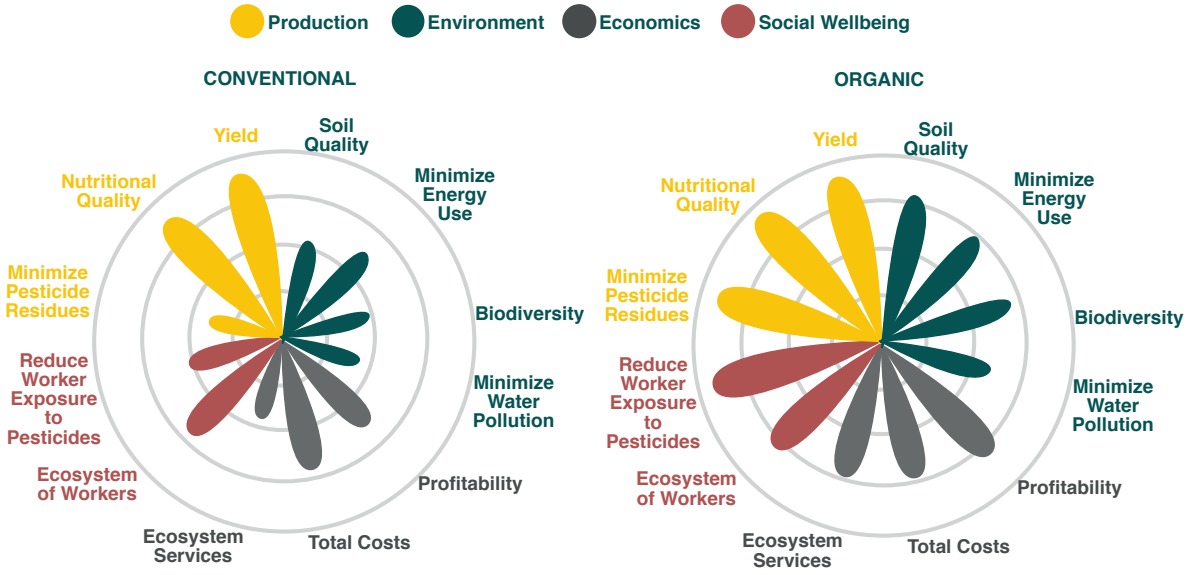
The Profound Growth in Organic Farmland

Increasingly popular for consumers, highly profitable for producers and extremely beneficial to our health and environment, organics are making their way to the mainstream.

Our current food production habits, although integral to saving one billion people from starvation during the Green Revolution of the mid 20th Century, are unsustainable in the face of depleting energy and water supplies, as well as the drastic effect these practices have on global health and our environment. Organic food production, the sustainable alternative, prohibits the use of synthetic pesticides, fertilizers, antibiotics or growth hormones for the development of crops or animal produce. Relying on natural strategies such as the use of biological pest control, nutrition and crop rotation, organic farming is considerably safer for the environment due to its beneficial impact to natural habitats. These practices allow the soil to maintain its natural (and healthier) condition. In other words, organic food is produced using environmentally and animal friendly farming methods.

Organic farming not only has a positive effect on the quality of food we eat, but also on our personal wellbeing as well as being beneficial to the environment. Preventing potential health hazards imposed by synthetic pesticides and fertilizers, while providing better living conditions to animals, organic farming ensures natural land productivity and global health. This will be the major drive for an increase in agricultural legislation, as an informed public demands a more natural, healthy and sustainable global food system.

Organic Farming Outshines Conventional in Almost Every Way



Source: The Guardian (2016)

The Regulatory Environment is in Favor of Organic Crop Care

As consumers become more educated and aware of agriculture's more dangerous traditions, pressure is placed on producers and their governments to change archaic policies, in favor of organics, further expediting the industry's transition to safer and sustainable practices. This is already occurring within the United States, with the Environmental Protection Agency restricting the use of synthetic pesticides, fertilizers and antibiotics in modern agriculture. The results of one of their latest scientific comparisons between GMO and non-GMO crops found that the former not only contained glyphosate, but also formaldehyde. Non-GMO crops, meanwhile, contained far more calcium, potassium, and zinc than its genetically modified cousin, further calling into question the claims of a nutritionally superior genetically modified product.

Roundup, the most common glyphosate containing synthetic pesticide, currently in the market today, with 9.4 million tons utilized since 1974. That is enough to spray half a pound of Roundup onto every cultivated acre of land on the planet, despite the World Health Organization labelling the chemical as 'probably carcinogenic to humans'. Environmental scientists worldwide even argue that it kills all plants, algae, bacteria and fungi in a crop's vicinity, creating drastic chain reaction effects for biodiversity. As a result, two-thirds of the European Union is supporting a ban on glyphosate. The European parliament voted to oppose its approval where alternative methods exist, in pre-harvest agricultural use as well as in public parks and in playgrounds.

The EU, keen to promote a greater degree of responsibility in relation to its Common Agricultural Policy – at 40% the largest component of its overall budget, provides a layer of financial support to farmers who enhance sustainability in their management of natural resources. 87 countries around the world have now introduced legislation that supports the practice of organic agriculture.

With land and other agricultural resources under pressure, the critical importance of agriculture is being rediscovered by projects focused on managing farmland in a way that improves soil fertility, combats crop disease and increases yields, all to solve one of mankind's most significant challenges – feeding the additional 3 billion people expected on Earth by 2050.

The EPA is now requiring more than 100 certified and approved scientific studies before they consider welcoming a new synthetic pesticide to the domestic market. Two-thirds of the EU supports a ban on glyphosate, one of the most popular synthetic pesticides on the planet. Similar actions are also being made against neonicotinoids, an active ingredient of almost one-third of synthetic pesticides used globally. Known to be one of the major reasons behind 'colony collapse disorder' in beehives around the world, the ingredient is also responsible for damaging a host of other beneficial pollinators and insects. The EU has imposed a ban on three types of neonicotinoids pending study and the EPA is currently re-evaluating the environmental risks of neonic pesticides. Major retailers such as Lowe's and Home Depot are now phasing out their sale of these pesticides.

87 countries have introduced legislation that supports the practice of organic agriculture

Colony Collapse Disorder is a multi factor condition that has affected honeybees since the beginning of the millennium. The use of neonics has always been suspected of playing a key role in the phenomena, but it wasn't until recently that a compelling body of evidence clearly demonstrated that the widespread prophylactic use of these chemicals caused acute and chronic impacts on global biodiversity. These neurotoxins can persist in the soil for years. They accumulate in water, pollen and nectar, causing impaired learning and navigation, increased mortality rates, compromised immune system function as well as growth impairment in bees, bumblebees and other beneficial and non target species. We need more natural, biodegradable, environmentally friendly and highly efficient alternatives to crop protection such as neem.

Welcome to a new era in global agriculture, where the amount of research and investment dedicated to organic practices is on the increase due to the abundance of associated environmental benefits, lucrative market opportunities and consumer-driven demand. Organic agriculture not only creates more profit for producers, but also yields healthier and more nutritious food for the world, thereby increasing its prominence as a valuable solution to the modern challenges of global food security.

Dissecting the Bio Crop Care Market

Increasingly popular for consumers, highly profitable for producers and extremely beneficial to our health and environment, organic crop care is making its way to the mainstream.

The global organics market, worth $80.4 billion in 2014 (and having increased five-fold since 1999) is expected to double to $161.5 billion by 2018. Sustained demand from the 43 million Americans who buy organic products every week supports a domestic market worth $35.9 billion in 2015. Markets in Germany, France and the United Kingdom have also reached a cumulative $17 billion in 2015. Approximately 80% of the total of 2.3 million organic producers around the world are based in developing countries, with the majority coming from India, Uganda, Mexico and Tanzania. In Brazil, the market has grown by 35% in 2015 to $2 billion today.

The global markets for agricultural biologicals such as biopesticides and biofertilizers are also showing impressive levels of growth. The global biopesticide market reached $3 billion in 2015, and will account for 5% of the global crop protection industry. Forecasts place the biopesticide market value at $6.6 billion in 2020, with a compound annual growth rate (CAGR) of 15%. The global biofertilizer market size was estimated at $538 million in 2014 and is expected to reach $1.8 billion by 2020 at a CAGR of 14%. As of 2013 there were approximately 400 registered biological active ingredients and over 125 registered biological products in crop protection. By 2050, biologicals will equalize with synthetics in terms of market size.

The exceedingly high cost associated with developing synthetic crop protection chemistries is a significant factor in driving growth for bio crop care solutions. A novel synthetic typically requires $250 million and nine years for development and regulatory approval while biological products need less than $10 million and four years for the same process. With a less expensive and quicker development process, investment in the biopesticide and biofertilizer space has proliferated, creating a competitive arena for innovation. Whereas the majority of synthetic crop protection has been managed by 10 multinationals, biological developers number in the hundreds, with more than 50 companies combining for just 60% of the total market. The combination of chemistry, biology, agronomy and physiology needed to excel in biopesticide and biofertilizer development and commercialization calls for efficient development through successful partnership.

What Options Do We Have for Bio Crop Care?

Biopesticides—also known as biological pesticides—are pesticides derived from natural materials such as animals, plants, bacteria, and certain minerals. As of 2013, there were about 400 registered biopesticide active ingredients with more than 1250 registered biopesticide products. Biopesticides target specific pests and generally pose little or no risk to humans or the environment. Traditional pesticides, by contrast, are synthetic materials that not only affect the targeted pest, but also unintended organisms, such as beneficial insects, surrounding vegetation and wildlife. Biopesticides fall into three major classes:

Microbial Pesticides

A microorganism (e.g., a bacterium, fungus, virus, or protozoan) serves as the active ingredient to control pests. Microbial pesticides can control many different kinds of pests, although each separate active ingredient is relatively specific to its target. The most well-known and widely used of all biopesticides are based on Bacillus thuringiensis, commonly referred to as “Bt.” Approximately 75% of all biopesticide use consists of Bt-based products and they have been on the market for 50 years.

Due to the ability of bacteria, viruses and fungi to adapt quickly, they can be damaging to beneficial insects and even for the crop itself. Every species requires a different strategy/product and therefore microbial pesticide production is very knowledge-intensive. Microbial pesticides are also highly prone to resistance.

Taking into account the driving factors behind the push towards sustainability, microbial pesticides do not have the potential to dominate the biopesticide market.

Plant-Incorporated Protectants (PIPs)

PIPs are pesticidal substances that plants produce from genetic material that has been added to the plant. For example, scientists can introduce the gene for the Bt pesticidal protein into the plant's own genetic material. Then the plant, instead of the Bt bacterium, manufactures the substance that destroys the pest. The protein and its genetic material, but not the plant itself, are regulated by Environmental Protection Agency.

BT corn and cotton are the most commonly utilized PIPs on the market today although they are losing market share due to the target pest's ability to develop resistance. The genetic modification of seeds needs to change constantly as pests have shown a strong ability to adapt to these chemicals and PIPs therefore do not have the potential to be the dominant biopesticide of the future.

Biochemical Pesticides

Biochemical Pesticides are naturally-occurring substances that control pests by non-toxic mechanisms. Traditional pesticides, by contrast, are generally synthetic materials that directly kill or inactivate the pest. Biochemical pesticides include organic substances such as plant extracts. Others, like semiochemicals (hormone mimics) disrupt natural processes like feeding or growth.

Biochemical pesticides are some of the most effective on the market as they offer a combination of the following modes of action:

Insect Growth Regulation: Plant extracts that prevent insects from reaching the reproductive stage.

Feeding Deterrence: A compound that, once ingested by the insect or pest, causes it to stop feeding and eventually to starve to death.

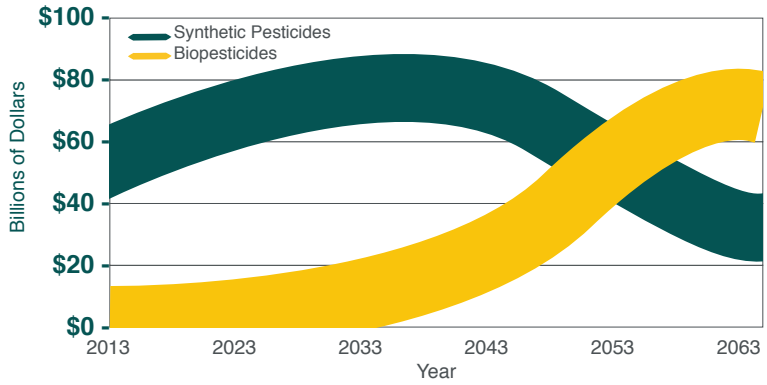
Repellence: Compounds that release odors that are unappealing or irritating to insects.

Fungicidal Control: Some plant extracts act as contact fungicides. These disrupt cell membrane integrity at different stages of fungal development, while others inactivate key enzymes and interfere with metabolic processes.

Induced Resistance: Crops treated with plant extracts produce and accumulate elevated levels of specialized proteins and other compounds, which inhibit the development of fungal and bacterial diseases. In effect, the crop's immune system is triggered to defend against destructive diseases.

Due to the driving factors behind the push towards sustainability, biochemical pesticides are primed to dominate the biological pesticide market. Neem is proven to be one of the most effective and harmless of scalable biopesticides available on Earth. Whilst there are other, effective biochemical pesticides, there does not exist any other known biochemical pesticide that combines both the efficacy and scalability of neem-based biochemical pesticides.

The Biopesticide Market is Expected to Overtake Synthetics



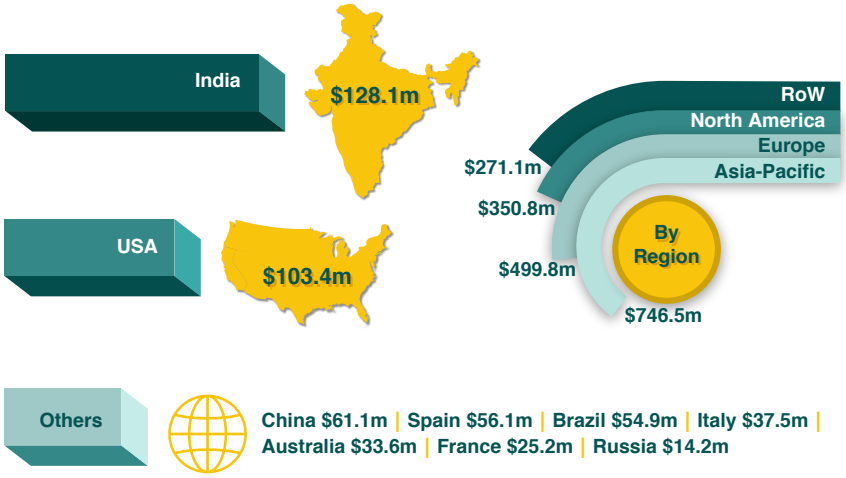
Source: Lux Research, Inc.

The Neem Opportunity in Crop Care

Neem boasts a complex chemical structure, with the seeds containing approximately 200 biologically active compounds of which azadirachtin, nimbin, nimbidin and nimbolides are major molecules. Many of these derived products have anti-feedancy, ovicidal activity, fecundity suppression as well as insect growth regulation and repellence against insects.

The agriculture segment accounted for 40% of the total neem market at $261.48 million in 2015. By 2022, this segment is expected to reach $742.6 million at a compound annual growth rate of 16.2%.

Neem Extract Market in Regions Worldwide



Source: P&S Market Research Analysis (2016)

The Strength of Neem as a Natural Pesticide

At a utilitarian level, neem oil offers a cost effective and non-toxic alternative to a number of synthetic pesticides. Effective against an estimated 600 species of insects, neem oil acts on the hormonal systems of pests and therefore does not lead to the development of resistance in future generations.

Azadirachtin, a chemical compound found exclusively in the neem tree, holds the secret to organic and sustainable crop care. Biodegradable and non-toxic to mammals, azadirachtin disrupts the growth cycle of insects and deters them from feeding on plants. A naturally occurring substance that belongs to an organic molecule class called tetranortriterpenoids, azadirachtin has a chemical structure that is similar to the insect hormone 'ecdysones.' These are hormones that control metamorphoses, and are disrupted when exposed to azadirachtin, neem's most active pesticidal ingredient. By affecting the hormonal balance of insects, azadirachtin reduces their rate of reproduction and inhibits normal feeding behavior. As neem-based products must be ingested to take effect, only insects that feed on plant tissues are susceptible to azadirachtin, thereby eliminating any risk towards pollinators and other natural insects that are beneficial to our environment and our food supply.

The Extension Toxicology Network, a co-operative of the University of California, Cornell and Oregon State University, state that the active ingredient in neem, azadirachtin, is an organic alternative to synthetic and toxic pesticides. Rather than acting as a poison, normally the case with many other pesticides, azadirachtin is taken up by insects much like a natural hormone and acts on them by introducing antifeedant, repellent and growth inhibiting behavior. Neem oil is also proving to be an effective fungicide for the prevention and control of many plant diseases such as powdery mildew, black spot, mildew, rust, leaf spot and botrytis.

Azadirachtin is effective against pests including, but not limited to the following:

Orthopteras
Grasshoppers, crickets and locusts

Homopteras
Aphids, leafhoppers, psyllids, whiteflies, scale insects, mealybug

Thysanopteras
Thrips Coleoptera: Mexican bean beetles and cucumber beetles

Lepidopteras
Moths, armyworms, fruit borers, corn borers caterpillars, pink boll worm, cutworm, Stem borers, Semi loopers, diamond black moth, plum moth, leaffolders and tobacco horn worms.

Dipteras
Leafminers, pod flies, fruit flies, horn flies and houseflies

Hymenopteras
Sawflies (mustard saw flies)

Heteropteras
Ear head bugs, milkweed bugs, rice bugs, green vegetable bugs, East African coffee bugs, red cotton bugs and lacewings bugs

Mites
Carmine spider mites, citrus mites and two spotted spider mites

Azadirachtin is effective on crops including, but not limited to the following:

Crop Family	Crops
Berries Group	Blackberry, Blueberry, Currant, Elderberry, Gooseberry, Huckleberry, Loganberry, Raspberry (black and red), Note: For Strawberries – see miscellaneous.
Bulb Vegetables	Garlic, Leek, Onion (dry bulb, green and Welch), Shallot
Cereal Grains and Grains Group	Barley, Buckwheat, Corn, Millet (pearl and Proso), Oats, Popcorn, Rice, Rye, Sorghum (milo), Teosinte, Triticale, Wheat, Wild rice
Citrus Fruits	Calamondin, Citrus citron, Citrus hybrids, Grapefruit, Kumquat, Lemon, Lime, Mandarin (tangerine), Orange (sour and sweet), Pummelo, Satsuma mandarin, White Sapote, Uniq Fruit
Cotton and Tobacco Cucurbit	Chayote, Chinese waxgourd, Citron melon, Cucumber, Gherkin, Gourd (edible), Muskmelon, Pumpkin, Squash (summer and winter), Watermelon.
Forage Crops	Including but not limited to: Alfafla, Clover, Trefoil or Vetch.
Fruiting Vegetables	Eggplant, Groundcherry, Cucumber, Pepper (including bell pepper, chili pepper, cooking pepper, pimento, sweet pepper), Tomatillo, Tomato.
Herbs and Spices Group	Allspice, Angelica, Anise (anise seed and star), Annatto (seed), Balm (lemon balm), Basil, Borage, Burnet, Camomile, Caper buds, Caraway, Caraway (black), Cardamom, Cassia bark, Cassia buds, Catnip, Celery seed, Chervil (dried), Chive, Chinese Chive, Cinnamon, Clary, Clove buds, Coriander (cilantro or Chinese parsley – leaf), Coriander (cilantro-seed), Costmary, Coriander (leaf and seed), Cumin, Curry (leaf), Dill (dillweed and seed), Fennel (common, Florence), Fenugreek, Grains of paradise, Horehound, Hyssop, Juniper berry, Lavender, Lemongrass, Lovage (leaf and seed), Mace, Marigold, Marjoram, Mustard (seed), Nasturtium, Nutmeg, Parsley (dried), Pennyroyal, Pepper (black and white), Poppy (seed), Rosemary, Rue, Saffron, Sage, Savory (summer and winter), Sweet bay (bay leaf), Tansy, Tarragon, Thyme, Vanilla, Wintergreen, Woodruff, Wormwood.
Legume Vegetables	Bean, Broad Bean, Chickpea, Guar, Jackbean, Lablab bean, Lentil, Pea, Pigeon Pea, Soybean, Sword bean
Leafy and Brassica (Cole) Vegetables	Amaranth, Arugula, Broccoli, Broccoli raab (rapini), Brussels Sprouts, Cabbage, Cauliflower, Cardoon, Celery, Chinese Broccoli (gai lon), Chinese Cabbage (bok choy, Napa), Chinese mustard Cabbage (gai choy), Chinese Celery, Celtuce, Chervil, Chrysanthemum (edible-leaved, Garland), Collards, Corn salad, Cress (garden, upland), Dandelion, Dock (sorrel), Endive (escarole), Fennel (florence), Kale, Kohlrabi, Lettuce (head and leaf), Mizuna, Mustard Greens, Mustard Spinach, Orach, Parsley, Purslane (garden, winter), Radicchio (red chicory), Rhubarb, Spinach, Spinach (New Zealand, vine), Swiss Chard, Turnip Greens
Miscellaneous	Asparagus, Avocado, Banana, Coffee, Cocoa, Cranberry, Fig, Globe artichoke, Grape, Hops, Kiwifruit, Mango, Mushroom, Okra, Olives, Papaya, Pawpaw, Peanut, Persimmon, Pineapple, Pomegranate, Strawberry, Tea, Water chestnut, Watercress, and all other food crops
Pome Fruits Group	Apple, Crabapple, Loquat, Mayhaw, Quince, Oriental Pear, or Pear.
Root and Tuber Vegetable Group	Arracacha, Arrowroot, Artichoke (Jerusalem, Chinese), Beet (garden, sugar), Burdock (edible), Canna (edible), Carrot, Cassava (bitter and sweet), Celeriac (celery root), Chayote (root), Chervil, (turnip-rooted), Chicory, Chufa, Dasheen (taro), Ginger, Ginseng, Horseradish, Leren, Oriental Radish (daikon), Parsley (turnip-rooted), Parsnip, Potato, Radish, Rutabaga, Salsify (oyster plant, black, Spanish), Skirret, Sweet potato, Tanier, Turmeric, Turnip, Yam bean (jicama, manoic pea), Yam (true)
Stone Fruit Group	Apricot, Cherry (sweet and tart), Nectarine, Peach, Plum (Chickasaw, Damson, Japanese), Plumcot, Prune
Tree and Nut Group	Almond, Beech nut, Brazil nut, Butternut, Cashew, Chestnut, Chinquapin, Filbert (hazelnut, Hickory nut, Macadamia nut (bush nut), Pecan, Walnut (black and English), Pistachios.
Tropical Fruits	Papaya, Black Sapote, Canistel, Mamey Sapote, Mango, Sapodilla, Star Apple, Guava, Feijoa, Jaboticaba, Wax Jambu, Star Fruit, Passion Fruit, Acerola, Lychee, Longan, Spanish Lime, Rambutan, Pulasan, Sugar Apple, Atemoya, Custard Apple, Cherimoya, Ilama, Soursop, and Biriba.

The Strength of Neem as a Natural Fertilizer

Neem seeds that have gone through the oil extraction process do not go to waste; the residue, known as 'cake' still contains vital nutrients necessary for plant development that can be returned to the soil to nourish plants and crops. Being totally natural, it is compatible with soil microbes, improves rhizosphere micro flora and hence ensures fertility of the soil. Improving the soil's organic content while protecting plant roots from pests, diseases and nematodes, the cake benefits soil texture and increases water retention. Packed with nutritional value, neem cake has more nitrogen, phosphorous, potassium, calcium and magnesium than ordinary farmyard manure. It is used to fertilize rice, cotton, sugarcane and a wide variety of other crops, including but not limited to coconut trees, tomatoes, eggplants, chilli, okra, tobacco, spinach and potatoes. Neem cake has been found to give a 15-25% increase in yield when compared with all other natural fertilizers.

The Strength of Neem as a Natural Additive in Livestock Feed

Natural additives for livestock feed such as neem cake are gaining popularity in farms worldwide. Containing essential nutrients such as protein, calcium and carotene required for healthy growth in livestock, neem also has the ability to eradicate microbes that cause infections and disease. Neem also helps to fight bacteria and alleviates the pressure of rising antibiotic resistance, by offering a 100% natural antibacterial, antimicrobial and antifungal for use in livestock care.

Neem cake is a critically important byproduct as 700,000 people are killed every year due to drug-resistant infections, a death toll that, if left unabated, is expected to increase dramatically to 10 million by 2050. Antibiotic resistance has evolved to a point where we rely on one or two antibiotics in many parts of the world to fight our most severe infections and conditions. The UK Review on Antimicrobial Resistance deems over half of all antibiotics prescribed in medicine today as unnecessary. The proliferation of antibiotic use is even more severe in agriculture. In the United States, more than 70% of antibiotics are used for agriculture and the majority of these drugs are considered as 'last resort' treatments across global healthcare. Therefore, the risk of antibiotic resistance is very high. Consequently, McDonald's, Walmart and Costco amongst many others, are placing restrictions on antibiotic use of their suppliers. These are only a selection of many real, tangible examples of industry leaders changing policy to drive solutions to this increasingly critical issue.

The neem tree offers an exciting opportunity in this area owing to the very high protein concentration and low fibre content it provides. Neem offers livestock sufficient nutrients and macro/micro minerals for growth throughout the year and has even been recommended to replace up to 50% of soy feed to improve general nutrition and to reduce the use of medications for parasites, bacteria and fungi.

Invest in Crop Care Solutions

We are in great need of innovation and technology in crop care to supply food for our rising population. For the past century in global agriculture, the most damaging solutions were also the most accessible, cheap and globally utilized. Today, focusing on short-term gains over the long-term health of our planet is no longer a viable option. Consumers worldwide are calling for action. As people become more educated and aware of agriculture's more dangerous traditions, pressure is placed on producers and their governments to change archaic policies in favor of organics. This will further expedite the industry's transition to safer and sustainable practices around the world.

Key Market Factors

1. The New Green Revolution is upon us ...born of necessity for mankind's survival.
2. Arable land degradation is occurring at an unprecedented rate, and is a finite resource.
3. Optimal Market Dynamics – A decreasing supply of arable land compounded by a rising global population
4. Planet earth has reached critical point and humans must stop polluting and go natural in order to survive. A sustainable food supply is the only option.
5. Organic crops make economic sense.
6. Organic farming maintains and enhances the nutritional value of food, unlike conventional farming.
7. Neem is the only proven, viable and scalable biochemical pesticide, fertilizer and alternative to antibiotic use in livestock available in modern agriculture.

Neem's Role in Agriculture

Increasing food pressure, climate change and dangerous levels of pollution are all compounding reasons to evolve strategies for a sustainable future, and the neem tree is a legitimate and lucrative response to the challenges that have so far characterized the 21st century.

The neem tree is our latest and most exciting venture, offering organic and innovative solutions where we need it the most – across agriculture, healthcare and environmental protection. This breakthrough will deliver positive impacts for people, maximize the value of all forms of capital (including human and natural), connect economic, social and environmental systems as well as ensure true sustainability and value creation.

The significance of and appetite for sustainable solutions across every aspect of our lives has never been higher. This particularly applies to agriculture and our global food supply, where farming techniques that currently rely on an unsustainable amount of water, energy and agrochemicals are inadequate in meeting the needs of an exponentially increasing global population. Solutions ranging from organic inputs and precision technologies are driving innovation in this field. In global health and personal care, the combination of increasing regulation in pharmaceuticals and a return to organic products in beauty will drive demand for healthy, natural and most importantly recognizable ingredients in our medicines and cosmetics.

Primal Group is designed to be disruptive, innovative and to manifest the nucleus of change that will drive a culture that combines social responsibility with sustainable value creation. All of us as citizens, consumers and investors, must guide innovation and the change that comes with it through the decisions we make every day. By opting for sustainable solutions across all industries and sectors, we will grasp the opportunity to shape the Fourth Industrial Revolution and direct it towards a future that prioritizes mutual prosperity.

*In a world **DESPERATELY** needing*
SUSTAINABLE solutions,
*the **ONUS** is upon **US** to **MAKE HISTORY**,*
*or we will be **VILIFIED** by it.*

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