



Sustainable Growing

FOR A SUSTAINABLE FUTURE

grodan[®]

Passionate about Precision Growing





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Corporate Sustainability Directions

As part of its strategy, Grodan® has implemented a sustainability programme that will guarantee continuous improvement in the field of sustainable development.

The Grodan corporate sustainable development programme sets out three fundamental long term directions for the Grodan Group. These directions are aimed at a making a serious contribution towards sustainable growing, limiting the impact of the manufacturing of our

products and putting in place sustainable end of life solutions. Each and every member of the Grodan team works on realising the goals we have set within our sustainability directions and helps to bring our sustainable development to the next level.

1 Grodan Group

Grodan offers its products together with tailor-made advice and tools to support Precision Growing. Precision Growing is the most efficient and effective method of growing, which leads to the sustainable production of tasty and healthy fresh produce for consumers.

Grodan solutions are used to grow a wide range of crops, including tomatoes, cucumbers, sweet peppers, aubergines, roses and gerberas. Sustainability is important at Grodan, from the production of Grodan substrates to end of life solutions. Founded in 1969, Grodan operates in over sixty countries worldwide and has its head office in Roermond, the Netherlands.

ROCKWOOL GROUP

The Grodan Group is part of the Rockwool Group, the world's leading supplier of innovative, stone wool based products and systems, improving the environment and quality of life for millions of people. Within the insulation industry, the Rockwool Group is a global leader.

Founded in 1937, it currently employs over 8,800 people in more than 30 countries worldwide.

SOLUTIONS FOR PRECISION GROWING


Grodan supplies innovative growing solutions comprised of clean and controllable stone wool substrates in combination with Tools & Services geared towards Precision Growing. Precision Growing is a growing method that helps growers and propagators achieve sustainable growing.

It is the most efficient and effective form of growing, focused on using the minimum of input materials to generate maximum output. By applying Precision Growing techniques, less

water, nutrients, crop protection products, energy and land are used. Growing costs decrease, crop yield and quality increase. In addition, this form of growing actively contributes to sustainable horticulture. Grodan shares its years of accumulated expertise and experience in Precision Growing with growers in the form of Tools & Services. As well as tailor-made advice from specialist crop consultants, Grodan also offers support via other channels, like: seminars, training courses, (digital) newsletters, articles in trade journals, calculation and measuring tools and user advice.

STONE WOOL BENEFITS

Stone wool is a natural product consisting of a volcanic rock called basalt. Use of stone wool has many benefits for the professional grower. Sterile production at extremely high temperatures guarantees a clean product with no pollutants, free of plant diseases. Additionally, this enables recirculation of water and nutrients, so there is no waste of input materials. Plants grow easily and well on this growing medium. The plant has all the room to root in and develop optimally in this airy growing environment. All the water and nutrients administered to the plant are available to the plant. Stone wool substrate does not lock up or release any substances, enabling the grower to apply precisely the right amount of water and fertiliser and thus optimise the growing result.



Stone wool can be recycled and reused in various production processes, ensuring efficient use of natural resources. It is an environmentally friendly product.

2 Grodan Group Strategy

Today's challenges in horticulture stretch further than increasing profit and decreasing costs. Global challenges, like an increasing need for food and resource scarcity, demand a more efficient and effective approach in growing. It's our ambition to help growers to achieve more with less in a better way.



THE GRODAN PASSION

Grodan is leading in stone wool substrate solutions for plant, grower and community.

Grodan substrate solutions are aimed at tackling key challenges:

- 1 Food shortages, natural resource scarcity and sustainable production methods.
- 2 Consumer preferences focused on convenient, healthy, tasty, affordable, sustainably and safely produced fresh produce.
- 3 Profitability of the horticultural sector, given the dynamic and constantly changing power fields.

1 Food shortage, resource scarcity and sustainable production

ENABLING GROWERS TO DO MORE

Current population growth exceeds the growth in agricultural food production, which will need to double by 2050 in order to meet the needs of the growing population¹. A grower can maximise his yields per square metre thanks to the fact that the growth of the crop can be steered precisely with Grodan products. All the water and nutrients administered to the plant are available to the plant. Grodan substrates don't lock up or release any substances, making it

easy to control and steer the growth of the crop and thus achieve higher yields.

ENABLING GROWERS TO USE LESS

Various key resources are becoming scarce and we cannot continue current consumption levels if we are to meet the needs of future generations. Declining resources which are impacted by horticulture are: water, phosphorus, energy and the availability of land. Grodan solutions enable growers to reduce the use of these key resources through Precision Growing.

¹Jacques Diouf, Head of the UN's Food and Agriculture Organisation

Less water: Agricultural irrigation accounts for 66% of total annual global water use. The World Water Council estimates that the world will require 17% more water than is available now to meet all its needs in 2020. Water consumption per kg of fresh produce, is considerably lower in stone wool based growing than when using other manufactured growing media and much lower than in soil-based growing.

Grodan stone wool substrates don't need to be flushed at the start of the growing season and

all water and nutrients remain available for use by the crop since, unlike most other growing media, stone wool holds water at very low tension. Stone wool is also ideal for 'closed cultivation systems' in which water is recirculated, purified and re-used over a longer period of time. Grodan actively encourages growers to switch to closed cultivation systems, enabling them to significantly reduce their water usage.

Fewer nutrients: Phosphorus is an essential plant nutrient. As the world's phosphorus supply is

running out, this poses an enormous challenge for global food production in the foreseeable future. Grodan stone wool does not lock up any nutrients, so all the nutrients applied are available for uptake by the plant whenever they are required. This gives the grower complete control over his cultivation and reduces the use of nutrients.

Grodan stone wool substrates also enable the recirculation of nutrients in closed cultivation systems. This increases the efficiency of phosphorus use and prevents pollution by phos-



phates draining into the soil or ground water.

Less energy: Worldwide energy consumption is expected to increase by 2% per year on average unless action is taken. Global oil consumption currently exceeds the discovery of new reserves. This and our reliance on only a few countries for our oil is a threat to our energy supply. Precision Growing on Grodan stone wool substrates results in lower energy consumption and CO₂ emissions in the greenhouse, per kilogram of product. Most crops grown on stone wool produce up to three times more than

crops grown in soil, meaning that energy input, for example to heat a greenhouse, is used much more efficiently.

Grodan continues to look for even better root zone solutions which allow the horticultural sector to adopt new techniques for greenhouse climate control, thus further increasing energy efficiency.

Less land: The migration of rural populations to our cities is a global trend. More and more people are living in cities, where there is little room for cultivation. In Asia, Northern Africa and Western Europe, arable land is

scarce. In other parts of the world where there is the space to create arable land, such re-development could destroy forests and put wildlife and biodiversity at risk. Stone wool allows horticultural production on land which would otherwise be unsuitable for traditional soil-based production systems. Since switching to cultivation on stone wool substrates also achieves significantly higher yield per square metre, less land is needed to produce the same quantity of end products.

Next to the reduction of the use of valuable resources, it is also important that the application of traditional crop protection is reduced as much as possible.

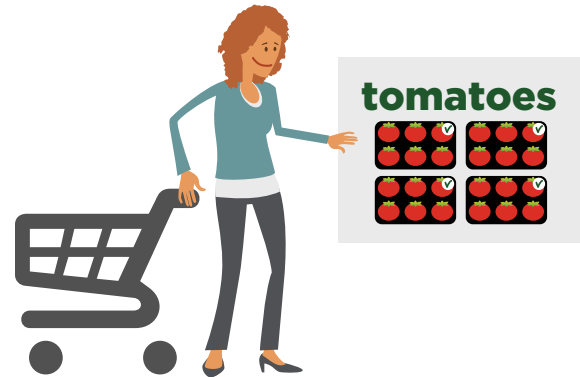
Less crop protection: New Grodan substrates are free of disease, weed seeds and residues of disinfectants. This guarantees a clean start to the growing season and promotes the growth of healthy, flavourful crops, requiring fewer crop protection products. Furthermore biological pest control can be used to combat harmful insects or micro-organisms.

2 Consumer preferences

Modern consumers are increasingly opting for quality produce which is healthy and safe, but which is also cultivated sustainably. Awareness of the relationship between eating the right food and staying healthy is growing amongst consumers. This requires transparency and safeguarded production in a controlled environment. Companies are expected to take the necessary measures to reduce their environmental impact. Not only with regard to their carbon footprint, but also relating to land depletion, use of raw materials, release of toxic materials, air and water pollution, etc. Considering the demand for an increase in transparency and an awareness of the critical consumer, producers who do not respond to this development, risk being 'punished' by consumers in future. Grodan solutions enable the production of high quality, healthy and safe fresh produce which is also cultivated in a sustainable manner.

3 Profitability of the horticultural sector

The horticultural market is very dynamic. Developments relating to internationalisation, enlargement of scale, changes in purchasing power and a cost-driven market have put pressure on the profitability of the horticultural sector. This could threaten further investments in sustainable production methods and potentially halt sustainable development in the horticultural sector. Grodan helps growers minimise



their growing costs by enabling the grower to cultivate maximum yield and quality with minimum input materials. In this way, further investments can be made towards sustainable growing.

CORPORATE STRATEGY

Social responsibility is one of the fundamental drivers of the Grodan Group strategy. For Grodan, social responsibility means contributing towards the most sustainable production of healthy, fresh produce for an affordable price, by delivering:

- **Solutions and support to help the grower grow sustainably through Precision Growing.**
- **Sustainable manufacturing, products and operations.**
- **Sustainable end of life solutions.**



3 Long term directions for sustainable development

CONTRIBUTE TOWARDS SUSTAINABLE GROWING THROUGH PRECISION GROWING

Definition of sustainability

Grodan follows the United Nations definition of sustainability (adopted at the Rio Conference in 1992) which is increasingly applied within the horticultural sector.

“Sustainability means meeting the needs of the present generation without compromising the ability of future generations to meet their own needs: environmental protection, economic growth and social development must be in balance”.

Sustainable growing through Precision Growing

Sustainable food production is becoming increasingly important as the world faces several

major challenges in the coming decades. Grodan is ready to help tackle these global challenges by offering high-tech solutions geared towards Precision Growing. Precision Growing is the most efficient and effective form of growing and helps growers minimise costs and maximise opportunities for sustainable growing.

Collaboration with chain partners

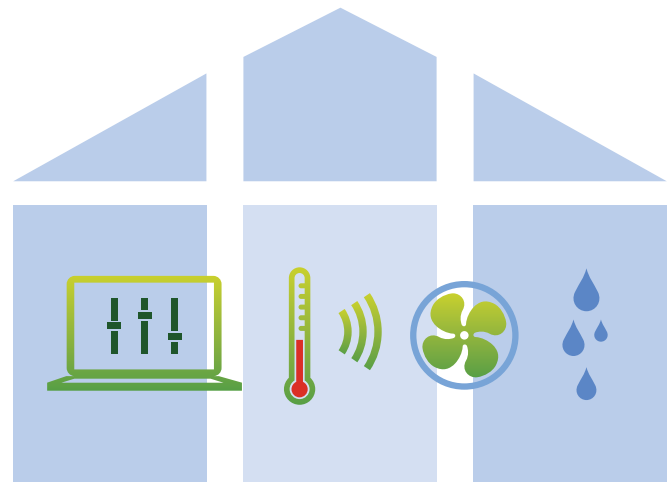
Three factors have a profound influence on the impact of Precision Growing: genetics, the greenhouse climate and the root zone area. These have to be properly correlated in order to achieve optimal results. For this reason, at Grodan we work towards collaboration with chain partners to make Precision Growing in its most optimal form a reality.

Development of Root Zone Management solutions

Within Precision Growing, Grodan focuses on Root Zone Management, or in other words, steering of the root environment. Everything that happens in the stone wool substrate has an impact on the functioning of the root environment and thus the development of the plant. So, Grodan continually investigates how its products, tools and services can respond perfectly to changing circumstances, so that the plant is given the very best care, without wasting resources.

DIRECTIONS

- Help the horticultural sector save water, energy, nutrients and other resources, especially those that are limited or costly for the environment.
- Help the horticultural sector reduce or eliminate emissions to water, air and soil.
- Establish new partnerships with relevant organisations to stimulate sustainable development in the sector (co-creation, strategic partnership).
- Influence and promote the sustainable development of high-tech horticulture.



Precision Growing in the high-tech greenhouse

REDUCE MANUFACTURING IMPACT OF GRODAN

Basalt quarrying

Grodan sources its stone wool from its mother company, the Rockwool Group, which complies with good manufacturing practices and has high standards in its care for employees. The basalt rock used in stone wool manufacturing is quarried according to strict environmental regulations and Grodan products are certified by the European Ecolabel.

Every year, volcanoes produce 38,000 times more new basalt than required to produce the entire global volume of stone wool for all purposes². Natural weathering processes and the recognised “geological cycle” means that basalt is available in an almost endless supply. One of the regions where most of the basalt is quarried for Grodan manufacturing is situated in Wetzlar, Germany. Here the basalt rock is located beneath 3-4 metres of top soil. The top layer of fertile soil is first excavated and then used to fill in former quarries. After filling, the area is returned to nature through reforestation using locally grown native plants and trees, in line with environmental legislation. Furthermore, for every tree planted, an addi-

tional tree is planted in another area. In other words, for each square metre of surface area quarried, twice as much forest is created. After the former quarries have been filled in, replanted and reforested, they quickly develop into areas of natural beauty, many protected by law, providing a natural habitat for a variety of animal and plant species that had previously disappeared from these areas.

Manufacturing

The manufacturing of Grodan products is certified according to ISO 14001 standards. This certification demonstrates that the manufacturing process of Grodan substrates complies with globally accepted environmental-assurance standards. The certification is focused on the control of environmental impact, reduction of environmental risks and continual improvement of environmental performance. It guarantees the maximum efforts to maintain a decent living environment, both now and in the future.

The manufacturing of stone wool simulates the production of natural stone wool resulting from volcanic eruptions. Liquid Basalt is spun into threads in spinning chambers and then compressed into solid form in a hardening kiln.

²The Scientist, May 2007. Table set up by Armin Reller (University of Augsburg) and Tom Greadel (University of Yale).

The new stone wool is then cut into slabs, blocks or plugs. Only one cubic metre of basalt is needed to produce fifty cubic metres of stone wool. During this process, Grodan minimises the environmental impact by limiting energy consumption and factory emissions.

DIRECTIONS

- Reduction of carbon footprint.
- Product innovation: increase sustainability aspects of product components which contribute towards the creation of Eco superior products.
- Improve environmental requirements for suppliers, their goods & services.

IMPLEMENT SUSTAINABLE END OF LIFE SOLUTIONS FOR 100% OF ALL MATERIALS USED

Recycling Partners

Grodan works together with various recycling partners who collect used stone wool substrate from the grower and gather it at special recycling sites each year at the end of the growing season.

Recycling Process

During end of life processing, the material is segregated into three residual waste fractions: plastic waste, the remains of plants and stone wool granulate. The organic waste can be used to make products such as compost. The shredded substrate slabs, blocks and plugs are recycled into raw material for various manufacturing processes like brick, cement, potting compost or soil improver production. Some of this raw material is turned into stone wool briquettes and used in the Rockwool factory to create new stone wool products. The plastic wrapping used for Grodan products is turned into plastic granulate and used in the plastics industry to manufacture products like refuse bags or plastic cups.



Recycling Solutions

Grodan offers structural recycling solutions in the following countries: the Netherlands, Belgium, France, Germany, Austria, Canada, Poland, Denmark, Sweden, Finland, Japan and the UK. In other countries, Grodan actively contributes to developing new end of life solutions, in line with local legislation. In the Netherlands Grodan already facilitates recycling of 100% of its sold products and is actively working to achieve this for 100% of its global sales volume in the coming years.

DIRECTIONS

- Increase the global recycling rate for discarded products and waste.
- Investigate and develop recycling solutions which have a higher position on the Waste Hierarchy model than current end of life solutions.

3x

sustainable

- Sustainable manufacturing
- Sustainable growing
- Sustainable end of life solutions



One cubic metre of basalt produces fifty cubic metres of stone wool - sufficient to grow 350,000 kg of tomatoes, 1 million cucumbers or 175,000 peppers in a sustainable manner. After use, the stone wool created from the one cubic metre of basalt can be used as raw material to produce 8 cubic metres of brick. At the same time this saves the use of clay or sand which would otherwise be used as raw material for brick manufacturing.



4 What we did in 2011: a selection

CONTRIBUTE TOWARDS SUSTAINABLE GROWING THROUGH PRECISION GROWING

A. Helping the grower do more with less

- Participation in setting out the four innovation themes for the Dutch horticultural sector in TopTeam tuinbouw (2020).
- Organisation of Green Export Platform workshops in which Precision Growing knowledge was further developed with partners in the chain.
- Horti Fair seminar on Precision Growing together with chain partners.
- Development of Tools & Services guidelines for a clean start to a new growing season.
- Organisation of 12 Precision Growing seminars to share knowledge in the area of Precision Growing.

- Collaboration with Horti Alliance, a partnership with 18 other greenhouse suppliers to better service our joint Dutch customers and help bring them to a higher level of efficient and effective growing.
- Cooperation with training facilities to support knowledge development in the area of Precision Growing.
- Sponsoring of charity: water, a non-profit organisation which brings clean, safe drinking water to people in developing nations.
- Organisation and participation in events focused on promoting & explaining sustainable growing methods to consumers.
- Sponsoring partner of Tomatoworld in the Netherlands.

B. Acceptance of growing on stone wool further down the value chain as a driver for the production of sustainable, healthy food

- Explaining the sustainable production methods of high-tech horticulture during the world's biggest consumer fair for food, agriculture and horticulture, The Grüne Woche, in Germany.

REDUCE MANUFACTURING IMPACT OF GRODAN

- Introduction of Vision technology with improved components. Up to 100% re-use of drain water is possible.
- The Rockwool factory in Roermond has switched over to green electricity for its operations.

IMPLEMENT SUSTAINABLE END OF LIFE SOLUTIONS FOR 100% OF ALL MATERIALS USED

- New recycling solution introduced to the UK market.
- Recycling solution developed for Canada.
- Recycling solution introduced in Poland.



5 A selection of planned activities for 2012-2013

CONTRIBUTE TOWARDS SUSTAINABLE GROWING THROUGH PRECISION GROWING

A. Helping the grower do more with less

- Develop and publish a “Growers Guide” with Precision Growing partners for the application of water and nutrients.
- Set up a Precision Growing training programme.
- Set up a Precision Growing centre in Australia.
- Give 20 Precision Growing trainings globally.
- Connect with chain partners and integrate Precision Growing into new horticultural developments.

B. Acceptance of growing on stone wool further down the value chain as a driver for the production of sustainable, healthy food

- Develop a benchmark of the sustainability perceptions of external stakeholders towards Grodan.
- Participate in suitable sustainability events and join relevant sustainability organisations.
- Continue scanning the market for new, relevant certifications within the sustainability area.

- Contribute to the development of norms and standards for sustainable horticulture.

REDUCE MANUFACTURING IMPACT OF GRODAN

- CO₂ emission assessment and the setting of CO₂ reduction targets for the manufacturing facilities.
- CO₂ emission assessment and the setting of CO₂ reduction targets for the transportation of Grodan products.

IMPLEMENT SUSTAINABLE END OF LIFE SOLUTIONS FOR 100% OF ALL MATERIALS USED

- Define a standard methodology producing solid documentation of recycling rates in all markets where Grodan offers recycling solutions.
- Continue to investigate better recycling solutions with partners, which have a higher position on the waste hierarchy model.
- Focus on eliminating local disposal solutions by 2015.

6 Networks

Grodan is member of the following branch organisations:



AVAG represents the common interests of its members and promotes horticulture in the Netherlands and abroad.

GLOBALG.A.P.

GlobalGAP Grodan is an Associate Member of GlobalGAP, a global organisation that promotes sustainable agriculture.



Green Farming is a programme aimed at promoting Dutch exports of goods, services, expertise and advice in the horticultural market in Kenya.



Greenport Holland International supports Dutch companies, knowledge institutions and governments from the Greenport cluster, in finding new forms of cooperation and optimally making use of the growth in world markets for horticultural projects.



Grow2gether encourages the Turkish demand for (Dutch) quality horticultural products in the chain, by improving the distribution infrastructure and promoting and providing practical knowledge of Dutch products and modern technologies.



HORTIALLIANCE

Horti Alliance consists of 19 leading horticultural suppliers who have joined forces to better service growers.



The Organisation of Horticultural Consultants and Researchers (OVTO) is an organisation for service companies, which specialises in consultancy and research in and around the horticultural sector.



SeraCulture aims to enhance the understanding of the Turkish market for horticulture related products and business like new technology, production inputs and trade contacts.

7 Certification

The pursuit of sustainability – in which economic, social and environmental interests are in balance – has resulted in various international environmental certificates and awards for Grodan. Grodan substrate solutions therefore satisfy the strictest environmental criteria.



European Ecolabel

Grodan was the first substrate manufacturer to be awarded the European Ecolabel. This means that our products comply with the European environmental criteria for growing media such as stone wool. Pursuant to these criteria, the raw materials may not be sourced from vulnerable nature areas. In addition, during manufacturing and recycling, energy consumption, soil, atmospheric and water pollution must remain within strictly defined limits.



ISO 14001

The ISO 14001 certification indicates that Rockwool/Grodan has set up an environmental management system to monitor emissions, energy consumption and waste flows and to check whether the environmental targets have been achieved and are in line with the current legislation and regulations. The system is focused on the control of environmental impact, reduction of environmental risks and continual improvement of environmental performance.



Kiwa Keurmerk

The Kiwa Keurmerk seal of approval means that Grodan products satisfy both the general and the product requirements set by Kiwa for substrate producers. The general requirements consist of safety requirements – focused on the intrinsic safety of the substrate and its safety for humans, animals and the environment – and transport requirements, for example. The product requirements include physical, chemical and biological requirements.



Lean and Green Award

Rockwool/Grodan has won a Lean and Green Award for their efforts to reduce fuel consumption and CO₂ emissions during the transportation of stone wool products by driving economical “ecocombis” (economical trucks) and seeking alternative forms of transport.

Summary

View the sustainability animation at www.3xsustainable.com

1 CHALLENGES

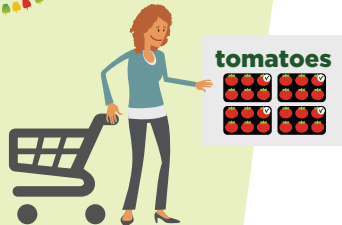


2x more with 2x less

In 2050 we will need two times more food than we need now. Produced with half the resources we use now. (pg. 9)

Consumer preferences

Today's consumers are increasingly opting for quality produce which is healthy and safe, but which is also cultivated sustainably. (pg. 11)



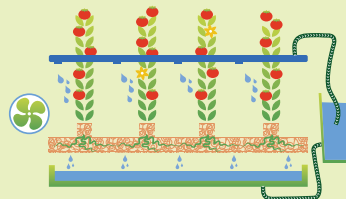
Profitability horticultural sector

Growers are under continuous pressure to minimise input materials and costs to ensure continuity and further investments in sustainable growing. (pg. 11)

2 HELP GROWERS DO MORE WITH LESS

Saving water and nutrients

Grodan products are ideal for 'closed cultivation systems'. Up to 100% of drained water and nutrients can be re-used. (pg. 9)



End of Life Solutions

Once the growing season is over, stone wool is recycled into raw material for the brick making industry, amongst others. (pg. 15)

recycling



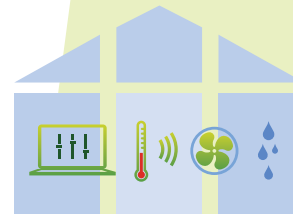
4 SUSTAINABLE END OF LIFE SOLUTIONS



Environmental management system

Basalt is extracted according to strict environmental regulations and the manufacturing of Grodan products is done according to certified manufacturing processes, increasing efficiency in manufacturing. (pg. 14 & 15)

3 REDUCTION OF MANUFACTURING IMPACT



How does Grodan do this?

By enabling a form of growing, called *Precision Growing*, which enables the grower to do more with less, in a better way. (pg. 12 & 13)



Saving land and energy

Crops grown on Grodan products produce up to three times more than crops grown in soil, leading to energy savings and more efficient land use. (pg. 10)



Grodan
Passionate
about
Precision
Growing



Today's challenges in horticulture

stretch further than increasing profit and decreasing costs. Global challenges, like an increasing need for food and resource scarcity, demand a more efficient and effective approach in growing. It's our ambition to help growers to achieve more with less in a better way.



Scan the QR code to visit the sustainability platform and view the video about sustainable horticulture

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