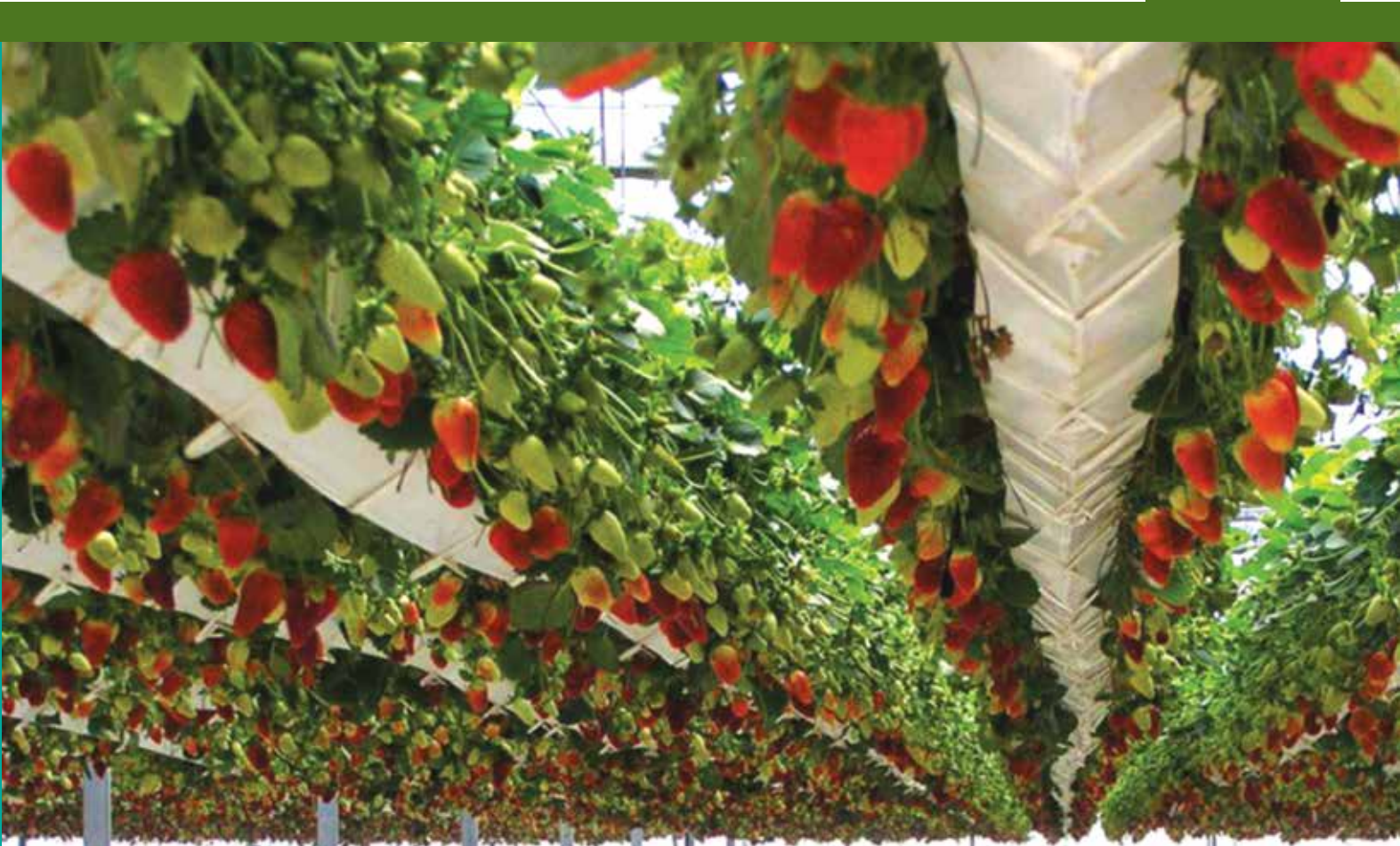


INDIA **Soilless Gardening** magazine

Dedicated to the Soilless Gardening Industry of India



***COMMERCIAL HYDROPONICS
Increases Food Supply which
Decreases Impact on Nature***

read in this issue:

VENTSnl | AutoPot Watering Systems | Greenfield Hydroponics Systems

Hydroponic Greenhouse Technologies India Private Ltd.



MISSION

"It is our Mission to take Hydroponics, as a technology, to every Indian household by reducing the barriers to entry for all. It is our dream to see every home and land owner adopt this technique in India in the next fifteen years".

VISION

Our vision is to see India as a power in the field of horticulture. To wipe the woes of every farmer in India in the next twenty years by providing cutting edge technology. We want every Indian Farmer to say it with pride "I am proud to be a farmer!"



PRODUCTS AND SERVICES OFFERED

1. Training in Simplified and Commercial Hydroponics
2. Consultancy Services and installation of Urban Roof Top Hydroponic Gardens
3. Consultancy Services for Agronomy
4. Turnkey Installation of Commercial Hydroponics Greenhouses
5. Turnkey installation of Large scale Hydroponic Animal Fodder Systems (5-100 Tons/day)
6. Supply of world class Hydroponic Nutrients
7. Supply of Simplified Hydroponics Hobby Kits
8. Supply of Coco Peat for Commercial Growers (RHP Quality)
9. Supply and Installation of Simple Backyard Greenhouses
10. Water Analysis Facilities

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Deaf Readers



Aditya Chaudhary
Publisher



Sandesh Shingote
Co-founder

In this issue of Soiless Gardening – India you will find the latest in news and events, company profiles, soiless technologies, and facts and opinions from both India and all over the world.

We are also extremely excited to announce our first annual conference and min-expo in Mumbai, India. The Soiless Gardening – India Conference and Mini-Expo will be a two-day event starting on February 7th to 8th, 2014. There will be a “History of Hydroponics in India”, round-table discussions, conference programs, and much more.

In saying this, as India’s very own industrial magazine, we ask you, the readers, for both input and questions. Our goal is to help India’s new industry grow quickly, and implement achievements from all over the world. In doing so, we ask you to contact us with any questions – whether it be specific techniques, “how to’s”, product information or even general inquiries. We will answer your questions via e-mail and publish those that are relevant in the June issue of Soiless Gardening – India.

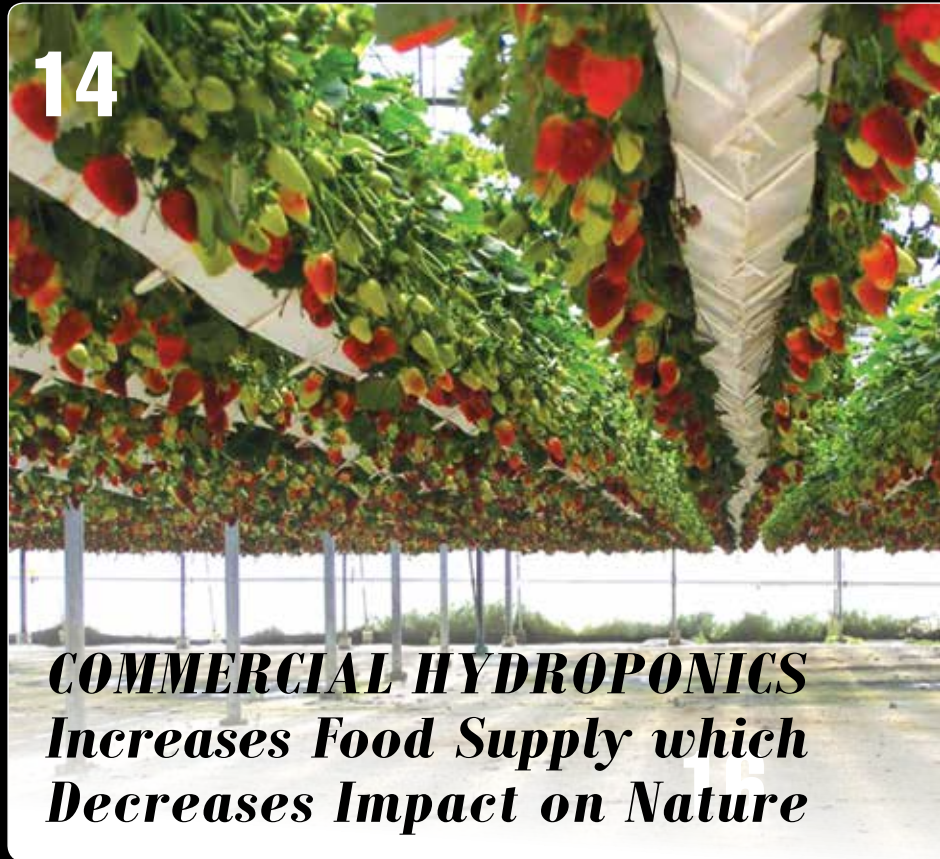
Hope you enjoy this month’s issue!

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Soilless Gardening **India**
Conference and Mini-Expo
February 7-8, Bombay Convention & Exhibition Centre, India



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Soilless ^{INDIA} Gardening magazine

2014

Soilless Gardening ^{India}

Conference and Mini-Expo

February 7-8, Bombay Convention & Exhibition Centre, India

2 days

unlimited businesses ideas

2014
FEBRUARY
7-8

We are inviting you to attend the 2014 Soilless Gardening (India) Conference and Mini-Expo organized in Mumbai, India

At the conference you will learn the important aspects of the hydroponic industry, ranging from the history of hydroponics, questions "How to start?" and "What kind of fertilizer to use?" to information about professional systems used in hydroponic growing.

Within the conference and expo, you will have the opportunity to meet and get acquainted with the renowned industry companies, such as General Hydroponics, which will attend the conference and expo in person and exhibit their products.

We invite all the companies engaged in agriculture & gardening, garden hobbyists and enthusiasts, professional agricultural businesses to attend the event in Mumbai, India.

www.soillessgardening-india.com

2014
FEBRUARY
7-8

India *Soilless Gardening* Conference and Mini-Expo

Feb. 7, 2014

09:00—10:00 Registration of Visitors (Each visitor will receive a gift bag from our sponsors)
10:00—10:45 History of Hydroponics
11:00—11:45 History of Hydroponics in India
12:00—13:00 Lunch break
13:00—13:45 The hydroponic «Family Farm»: not only a concept, but also a practical reality
14:00—15:30 Round Table Discussion
15:30—16:00 Coffee break
16:00—17:30 Round Table Discussion

Free, but only based on online registrations!

ROUND TABLE SUBJECTS:

- Hydroponics in the Modern Economy
- Animal feed and hydroponics technologies in India
- Family hydroponics farms in India; challenges and solutions.
- Indian hydroponics shops
- Presentation of the Institute of Simplified Hydroponics
- Bio stimulants; For or Against?
- General Industry Discussions

Please, do not hesitate to send us your proposals for round table subjects.

Feb. 8, 2014

10:00—18:00 Mini-Expo

Mini-Expo attendance is complete free and everyone is welcome!

CONFERENCE PROGRAM:

The entrance to the conference room is only after preliminary online registration.

- 13:00—15:00 Presentation and book signing of William Texier book "Hydroponics for beginners"
- Hydroponics. What is it and how can you start?
 - Differences between soil and hydroponics cultivation (physical, chemical etc.
 - Different technologies regrouped under the word hydroponics
 - Different substrates used in hydro
 - Nutrition and supplementation: clear definition of each category and rapid overview of supplements.
 - Lighting of Plants (photo-culture flowers, vegetables, salad, sprouts)
- 15:00—18:00 Hydroponics training course for beginners

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IQ Intell USA

Computer-Controlled Farms Change the Game in Urban Agriculture



Along a desolate stretch of a Brooklyn waterfront that was once one of the nation's great industrial centers, a military warehouse from around 1916 has sat unoccupied for years. This year, the crown of the building will begin a second life as the world's largest rooftop farm – a 100,000 – square-foot, computer-controlled greenhouse that will grow up to 1 million pounds of produce each year.

With global food demand expected to double over the next four decades and consumers increasingly concerned with the carbon miles used to transport produce, innovators around the globe are fashioning new methods for growing large amounts of food in population-dense urban centers.

“Farming is the most common economic activity on the face of the earth. It’s incredibly

important,” said Intel Labs researcher Richard Beckwith. “Over half of all economically active people are involved in agriculture.”

The Brooklyn project is the work of BrightFarms, which Fast Company named one of the "World's 10 Most Innovative Companies" in the food industry. BrightFarms builds highly automated, hydroponic greenhouses to grow urban produce year-round, and at far more efficient rates than traditional farms. The company just opened its first hydroponic greenhouse near Philadelphia, and is also constructing greenhouses and farms in St. Paul, St. Louis, Oklahoma City, and Kansas City.



Sensors throughout the greenhouse will feed information back to a central computer system, which is programmed to make intelligent decisions about growing factors such as temperature, humidity, and wind speed. If the greenhouse becomes too hot, roof vents will automatically open. If it remains overheated, fans switch on; and if that's still not enough, a shade will draw down. The computer even knows what conditions are like outside, so it won't open the roof if it's raining.

"Not only does this let the farmers focus on farming and not worry about changing conditions, but it also conserves energy and increases efficiency by eliminating human error," said Zak Adams, BrightFarms' Director of Engineering. "Traditionally, farmers have to make their own decision about when to hand-crank open the vents; but the point at which it feels too humid to a person may not necessarily be too humid for plants."

The predictive algorithms programmed into BrightFarms' system eliminate that type of human error and significantly boost productivity. "By being able to effectively control the ambient air and roots around the plants," said Adams, "we create



an atmosphere in which the yield of vegetables per square foot is about ten times that of traditional greenhouses."

While the upcoming Brooklyn greenhouse is the largest of its kind, this type of intelligent farming is cropping up in many different settings around the world. In Tokyo, a massive underground farm grows 100 types of produce, from tomatoes to rice, using white LED lights, high-pressure sodium lamps, and a computer-regulated heating system. Consumers can now even grow their own plants inside a USB Greenhouse that plugs into your home computer.

In Oregon, Intel's Beckwith developed a system of 65 wireless sensors for vineyards to control irrigation of grape vines (video below). These sensors "characterize the

compositional chemistry of the grapes. This would allow for much better control over fruit quality," Beckwith said. "This, in general, increases the value of the crop."

Such innovations "can help you predict when a crop should be harvested, what crops your land will support, which pests you may need to watch for," Beckwith continued. "So much of what farmers care about is invisible. These technologies can give a farmer a window onto things that they really care about."

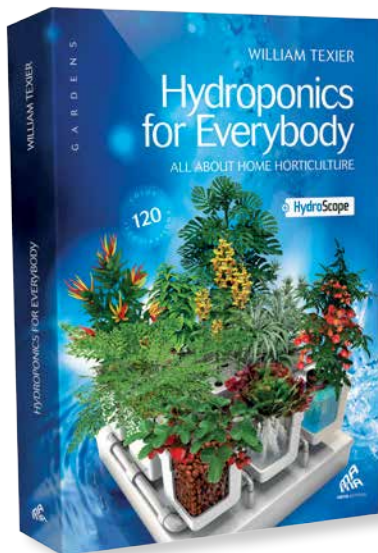
And so, as urban farmers continue to invent more high-tech methods that expand their productivity, it's not far-fetched to think that before long, the majority of what city-dwellers eat will be grown minutes from our homes, rather than hundreds of miles away.▲

➔ Images courtesy of BrightFarms.

HYDROPONICS for EVERYBODY

All About Home Horticulture

William Texier | Series: **GARDENS**



264 pages

120 illustrations

17 x 24 cm

600 pro contacts

ISBN 978-2-84 594-081-9

35 €

Coming out

SEPTEMBER 23rd 2013



**PUBLIC RELATION
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This richly illustrated bible of hydroponic gardening will increase your indoor harvests to levels you never thought possible.

This richly illustrated bible of hydroponic gardening will increase your indoor harvests to levels you never thought possible.



THE AUTHOR

William Texier was born in Paris. He first studied at the Institut national de Gemmologie in France, then with the Geological Institute of America in Los Angeles, before discovering hydroponics, which became his passion in 1985. He and Lawrence Brooke, his longtime friend, developed aero-hydroponics. A few years later, he began his first assignment in research and development at the White Owl Waterfarm in Sebastopol, California. In 1994, he moved back to France and created General Hydroponics Europe with his wife, Noucetta Kehdi.

William Texier is a true innovator in the hydroponics industry. In 2004 he developed and patented « bioaponics » (organic hydroponics). Currently, he manages research and development at General Hydroponics in Europe and internationally, with a team of researchers drawn from different departments of the University of California. He publishes articles and conducts seminars around the world. With thirty years in the field, he is considered one of the most knowledgeable hydroponics experts worldwide. Hydroponics for Everybody has been translated into half a dozen languages. ▴



➔ More info on the book: <http://www.mamaeditions.net/catalogue.html#9782845940819>

Feedback Interface Organized – ASEAN–INDIA Farmers Visit to Malaysia



The Farmers' Feedback Interface was organized for farmers' delegation visit to Malaysia during under the Farmers Exchange Programme between ASEAN member states and India at NASC Complex on 24 April 2013.

Dr S Ayyappan, Secretary, DARE and Director General, ICAR appreciated learnings by the farmers from the visit which will be practically used by them and will facilitate fellow farmers. This will lead to solving the key problems in agriculture in their respective states. He expressed hope that integration of technologies, conducive policies and

programs and quality consciousness will take Indian agriculture to futuristic path.

Dr K D Kokate, Deputy Director General (Agricultural Extension), in his welcome remarks stated that 18 farmers from 17 states accompanied by two officials visited the Malaysia and appreciated farmers for successful visit that enriched their knowledge with enhanced responsibility.

Dr. A M Narula, Zonal Project Director, Zone-I, Ludhiana shared the experiences of the visit of delegation in terms of various highlights of specific programs and subject matter

areas, field visits covered during the visit.

Farmers shared their feedback in terms of Good Agricultural Practices, Integrated Farming, Marketing linkage including export and Agro-tourism. Also, indicated their learnings of useful technologies like hydroponics, cage fish culture, fruits and vegetables processing, coconut jelly, mushroom food park, polyhouse etc., Dr P Adhiguru, Principal Scientist (Agricultural Extension), Agricultural Extension Division, ICAR who also accompanied the delegation, offered formal vote of thanks. ▴

➔ Source: ICAR

Walk About a Rooftop Aquaponics Food Garden in Kolkata, India



Welcome to Urbagrow, an urban, Aquaponic, soil free, food garden in Kolkata. Located in South Suburban Kolkata on a 1000 sq ft rooftop.

The garden displays a variety of aquaponic systems growing a variety of vegetables and Tilapia and cat fish. The symbiotic relationship between the fish and plants along with the temperate climate of Kolkata allows us to grow a wide variety of seasonal vegetables and edible fish. The garden is a display for systems of various sizes and growing techniques, all designed to occupy open spaces in urban environments like roof tops and balconies which receive adequate sunlight to grow healthy plants and electricity is easily available.

The systems use less water than traditional land gardening, require less work in man hours and can grow vegetables in greater density (more per sq ft) than a traditional soil based

food growing endeavour. All our systems are appropriately indianised, hand made and cost less to build and run than most other aquaponic systems available worldwide.▲



Collective-evolution.com | USA

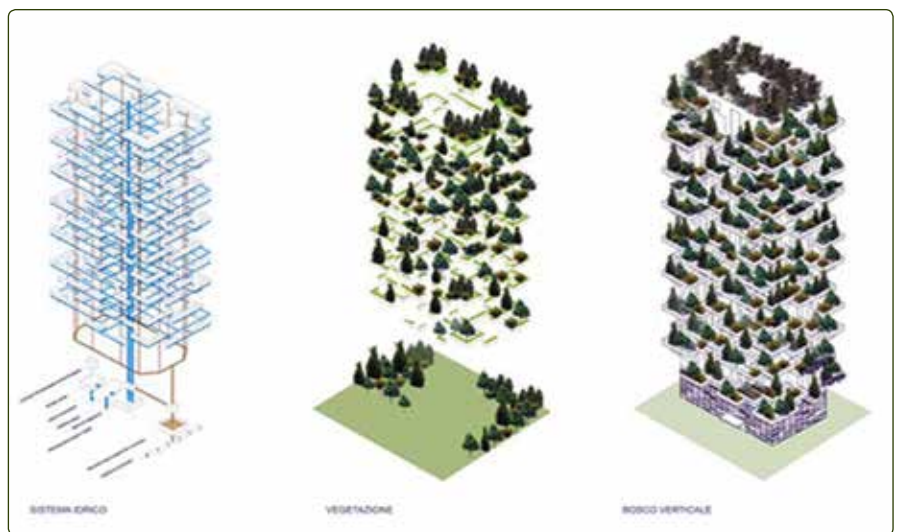
Milan's Awesome Vertical Forest

Written by: Joe Martino

In an age where harmonious innovation is becoming more celebrated, Milan brings us a vertical forest designed by Stefan Boeri Architects. When complete, the Bosco Verticale will be the greenest building in Milan! Considering Milan is one of Europe's most populated cities, this is a solid innovation in bringing clean air to the city center while introducing a beautiful design.

The BioMilano vision promises to incorporate 60 abandoned farms into a greenbelt surrounding the city and as part of this vision the Bosco Verticale finds its way into fruition. The building's design boasts a stunning green facade planted with dense forest systems to provide a building microclimate and to filter out polluting dust particles. Along with that, the living bio-canopy helps to absorb CO₂, oxygenate the air, moderate extreme temperatures and lower noise pollution. Not only is this visually pleasing but it also helps to lower living costs.

In the building, each apartment balcony will feature trees (900 plantings are planned for the two buildings) that will provide shade during the summer months, only to drop their leaves in winter to allow for winter sunlight. Plant irrigation is provided via a grey-



water filtration system. Grey-water is used water that goes down the sink or used in the shower. Additionally, photovoltaic power generation will help provide sustainable power to the building.

This is a forward thinking design and implementation of nature that is not only helping our surrounding environment but also help in bringing us back to harmony and nature.

Before ending off the research on this post I was able to find a progress update. Here are a some images of the building near complete. You can see the freshly planted vegetation which gives us an idea of what things might look like. ▀

METROP | Netherlands

Plant Growth Troubles

PURPLE STEMS:

Sometimes you see purple leaf stems, on grower's plants. This comes from one thing only, shortage of phosphorus.

Phosphorus is the 2nd most important building stone of a plant and a shortage of this will result in another chemical reaction from the nitrogen in the plant.

The causes of the shortage of the phosphorus in the plant could be:

1) COLD:

With a temperature under 20 degrees Celsius Phosphorus moves less in the plant and with a temperature under 17 degrees Celsius stops moving all together.

The Phosphorus stops moving which creates a shortage. The plant almost does not grow any more either with a temp under 17 degrees Celsius.

Note: also at night a plant grows and therefore the temp should not be below 20 degrees. Every time it reaches a lower temperature it will reduce your harvest.

2) PH TOO HIGH:

If the PH in the medium reaches 6.0 or above phosphorus will be absorbed less. Does it reach 6.5 or higher, it will almost not be absorbed at all.



3) WRONG FERTILIZER:

Phosphorus comes in different qualities, this has to do with the origin of the nutrient (where phosphorus is made out of).

The quality determines the absorption, the concentration and the mix ability.

Most food suppliers use cheap phosphorus through which no high concentrations are possible and it will attach to other elements. Like: crystallizing, crusting on the medium. Shortages are supplemented with a phosphoric acid to be used as a PH-.

A shortage of phosphorus is often seen if the grower uses nitric acid as a PH- with the mother plants. A certain competitor sells this as a growth PH-.

This is completely wrong, especially if you use the plant food from the same competitor.

LIGHT LEAVES AND BURNING LEAVES:

Leaves that both burn and are light of color, is a common problem. Most common cause: PH too high or too low.

If the PH in a medium reaches for instance, under 5.2 or above 6.2 a lot of salts will not be absorbed by the plant anymore.

The bigger the difference from the ideal PH, the less absorption. The plant will have a shortage and the leaves become lighter of color.

Although all this time the plant was fed and the concentration of nutrient salts piled up. The balance is gone, so water will be retracted from the leaves, back into the medium. This is called burning leaves.

The first warning for this is that the leaf will curl up, or turning yellow from the leaf edge. The plant notices the change in balance with the medium and will as a reaction to this, close its stomata on the outside and under the leaf.

THE PLANT FRUIT/BUD BECOMES HARD, BUT WILL NOT GROW:

A common problem with indoor vegetation is that the fruit start will harden but not grow. Growers spend a fortune on

suction and ventilation systems, but forget that what goes out needs to come back in.

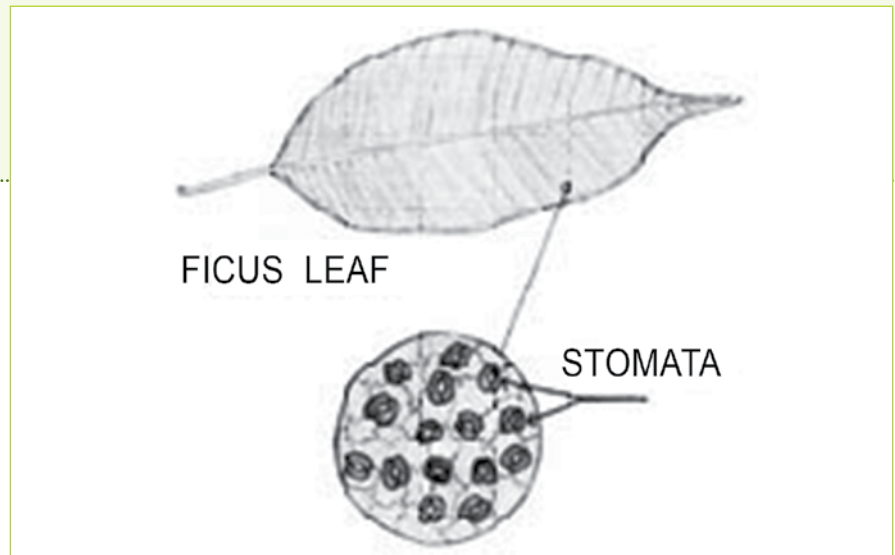
Often the inlet of air is too small against the suction or no inlet of air at all, but a small opening some where.

This way you create a big under pressure and the plants will gasp for fresh air (CO₂). Would you crack the door for a week, the plants will grow twice as big after this week. Just the right air inlet or a bigger inlet will solve this problem.

FRUIT/BUD HAS AIRY CONSTRUCTION:

- To much heat.
- Growers sometimes are growing volume but without contents.
- This happens in climates where the temperature around the leaf is 32 degrees Celcius or higher.
- The ideal room temperature is around the 24 degrees Celcius to get the ideal inner leave temperature.

But when the temperature gets to high, the plant wants to cool more to do all his processes. The plant react by vaporizing more water under the leave and want to drink more water. But if there is a full ammount of nutrients in the water, the plant can not drink more because it will



get to much and to fast nutrients that it can not handle yet.

The second option for the plant than is to create more "skin"

The plant create more skin in the bud, so it can lose some temperature. This buds look sometimes bigger, but weight nothing.

All of this also depends on the genetics of the plant of course, one plant will be more sensitive for this then another.

CURLING LEAVES:

Growers can see their leaves, mostly on the side and on top, curl. Skin mouths with which the plants breath are on the bottom of the leaf.

For the absorption of water and nutrients, these skin mouths need to evaporate water.

If there is a disruption thru which the plant will evaporate less water, then some of the skin mouths will close on the outside

of the leaf. The leaf edges will then curl. The bigger the disruption, the more mouths will close, the more the leaf will curl.

CAUSES OF DISRUPTION COULD BE:

1) Too much evaporation under the leaf.

Thru heat, low humidity or a blower that blows too hard, the plant will evaporate more then he can absorb.

2) Too much salts in the medium by over feeding or a wrong PH.

The medium will want to compensate the in balance of salts in the plant and in the medium by holding water or even retract it from the leaves (leaf burning).

3) The plant will receive less or no water and will close it's mouths in order not to lose more water. Air shortage in the medium will hinder the movement of the elements. ▀

COMMERCIAL HYDROPONICS

INTRODUCTION

HGTIPL, Bangalore, India, www.petbharoproject.co.in introduces its revolutionary concept of a Hydroponic Food Park system. The dwindling availability of fertility of soil, clean and surplus water, availability of farm labour, drought conditions and the vagaries of global warming, comes a drastic reduction in availability of food and basic nutrition. HGTIPL, who are the pioneers of Hydroponics in India, have a solution that can change the way horticulture is done and this is a solution that can be adopted by big ticket corporate and public sector companies, including high net worth entrepreneurs.

Even India's neighbour Pakistan has started exporting hydroponic produce into Middle East and some countries of Europe.

Developed after in-depth research and study of food supply chains in Australia and in

other developed countries over several years by its Founder and Chief Visionary, the modern hi-tech system is designed to grow vegetables, herbs and fruits and other foods much more efficiently and with greater food value than in conventional agricultural field conditions.

The Hydroponic Food Parks system will demonstrate the following characteristics:

- Produce approximately 5—20 times the normal production volume for field crops
- Will use just 5—10 % of the normal water requirements for field crops
- Can be built on non-arable lands and close to major city markets
- Works in a variety of environments: urban, suburban, countryside, desert etc.
- Does not use herbicides or pesticides
- Will have very significant operating and capital cost savings over field agriculture
- Will drastically reduce transportation costs to market resulting in further savings,

higher quality and fresher foods on delivery, and less transportation pollution

- Is easily scalable from small to very large food production situations.

FOOD PARKS — THE SOLUTION

In a rapidly urbanizing world where the majority of people now live in cities, localization requires that food and fuel be produced in an urban context. At present, there are no examples of a locally sustained urban community anywhere in the world. Urban sustainability is yet to be realized primarily because urban agriculture presents a number of technological challenges. The main challenge is a lack of growing space.

The Food Park idea is a new idea currently emerging in the sustainability discourse which offers great promise for increasing urban-peri urban food production. Hydroponic Food Park systems have been proposed as possible solutions for increasing urban food

Increases Food Supply which Decreases Impact on Nature





supplies while decreasing the ecological impact of farming. The primary advantage of Hydroponic growing is the high density production it allows using a much reduced physical footprint and fewer resources relative to conventional agriculture. Vertical growing, hydroponics and greenhouse production have now been combined into an integrated commercial production system, a system that has major potential for the realization of environmentally sustainable urban food and fuel production.



COMPONENTS of a Hydroponic Food Park

WHO WILL BENEFIT?

Retail Chain ,Defence establishments, Private Individuals, Public Sector Companies, Hotel Chains, Fast Food Chains, Processed Food Industry as Backward Integration, Railway Catering companies, Corporate Hospitals, FFV Exporters, Large land owners, NGO's, Foreign Retail Companies (Outsourcing), Public-Private Partnerships.

Special Processing and Testing Rooms

- Cold rooms
- Cleaning /Washing area
- Sorting area
- Grading area
- Packing area
- Food testing lab area
- Gamma Irradiation Bay

Administration area

- CEO's Office and Retinue
- Main Office
- Finance department
- Consulting rooms/
- Marketing department
- Security Office
- Nurseries

- Nurseries for seedlings and small plants
- Medical Facilities with Paramedics 24/7

Transport Bays

- Goods Inward
- Goods Outward
- Transport Parking Bay

Captive Power

- Generator rooms
- Solar Power
- Wind power
- Biomass Power

Storage tanks

- Nutrient tanks
- Rain water harvesting tanks
- Fresh water tanks



Seeds

- Storage Bay
- Distribution Bay

Knowledge Bays

- Hydroponics Library
- Hydroponic Training Tunnels
- IT Support Office

Other amenities

- Motorable Roads
- Drainage and Sewage water systems
- Street and Pathway Lighting
- Power Station
- Signboards
- Tunnel Maintenance Centre
- Tunnel spares and equipment warehouse

Auction Points

- Auction Bays

COMMERCIAL HYDROPONICS: SOME YIELD ONE ACRE HYDROPONICS GREENHOUSE SYSTEM

Hydroponics offers the promise of feeding the millions of starving people around the world. Many greenhouse operations are actually hydroponic in nature – that is they are merely called “greenhouses” whereas they should really be called hydroponic growing facilities. Some of the high yields

we refer to are greenhouse results. Hydroponic and greenhouse yields are commonly 5 times the field yield or a two crop per year field harvest and 10 times the field yield for a one crop per year field harvest.

Soil VERSUS Soil-less Cultivation-Few yields – examples

CROP	SOIL	SOILLESS
Soya	600 lb	1,550 lb
Beans	5 tons	21 tons
Peas	1 ton	9 tons
Beets	4 tons	12 tons
Potatoes	8 tons	70 tons
Cabbage	13,000 lb	18,000 lb
Lettuce	9,000 lb	21,000 lb
Tomatoes	5—10 tons	60-300 tons
Cucumbers	7,000 lb	28,000 lb

CONCLUSION

These Hydroponic Greenhouses set up in the food parks or even as standalone units can produce hundreds of thousands of tons of world class, nutritious food in small acreages. It is expected to be a catalyst in the coming green revolution. It is these kinds of technologies which are expected to change the future of Indian agriculture. It is no longer an option, but an imperative.

RECOMMENDED PRODUCE TO START WITH

- Lettuce Iceberg
- Bell Peppers (Colored)
- Strawberry
- Herbs▶

➔ By Lt Cdr (retd) CV Prakash (Author is CEO, of HGTIPL Bangalore)

COMMERCIAL CROPPING: AUTOPOT WATERING SYSTEMS



The easy2grow system from UK based manufacturer AutoPot is recognised by commercial growers worldwide as an easy to maintain and infinitely expandable hydro system that produces awesome results.



Whether growing 2 plants or 2000 plants, AutoPot offers the commercial horticulturalist a watering solution that allows them to deliver optimum levels of water and nutrient to a huge volume of plants. Reducing their watering workload without the need for pumps or electricity and – most importantly – with zero waste.

It is the only watering system that allows the plant to be in control of its own requirements.

The proof is in the pudding, so let's have a look at some of their commercial installations...



AutoPot Commercial Case Study: Brill View Farm, United Kingdom



Last year's AutoPot chilli trials at Brill View Farm in Oxfordshire, England, saw some huge harvests.

Following several delays in the growing schedule throughout the summer, due to the heavy rainfall and below-average temperatures, 960 plants went into the main greenhouse area in the AutoPot system.

Although the weather conditions did not improve, the quantities produced were impressive – we harvested over 3968lbs of chillies in an area of 1250 square feet – which was a great return bearing in mind the measures put in place to combat the unfortunate weather conditions.

AutoPot will be continuing the trials at Brill View this year with chillies and aubergines, so fingers crossed for an improved return this season, with a little bit of help from the British Summer, of course!



AutoPot Commercial Case Study: Harvest On The Hill Farm, Barbados

Simon Cannon – owner of Harvest On The Hill Farm – has been growing commercially in Barbados for the last 3 years, using AutoPot systems, and since then has achieved some incredible results. Here's what he had to say about his experience of growing with AutoPot, his successes and the produce he has grown:

“We had no prior knowledge of growing vegetables, but are now successfully growing English Cucumbers thanks to the high level of technical support and after sales service offered by AutoPot. We have 2700 AutoPot systems on site, with plants growing in three 4000 square foot poly tunnels. We produce a continuous harvest of between 800 to 1600lbs of cucumbers per week.

“Producing at a local level allows us to harvest, shrink wrap and deliver on the same day. We have a blossoming customer base including a large supermarket chain and various cruise ships that dock in Barbados. We make an effort to make the most of our natural resources – all the water we use in our growing systems is harvested off the roof of our poly tunnels. Using the AutoPot system in this climate has not had any negative impacts on our growing - despite the high levels of UV sunlight, the pots are showing no signs of deterioration. The system just keeps on working!”

Check out the video of Simon's farm

http://youtu.be/_faMSRz633M

If you have any questions on the performance of AutoPot Watering Systems, we are sure that Simon would be happy to answer them! Contact him via YouTube.



How It Works

At the heart of every AutoPot Watering System is the AQUAvalve; once connected to a water supply (reservoir) this unique device will automatically control the flow of water to the plants.

Insert AQUAvalve video – <http://youtu.be/K1Dn-1V8Za4> – embed using the code from YouTube

By simple gravity pressure from a reservoir the AQUAvalve will flood the tray to $\frac{3}{4}$ inch and will not re-open until the plants have used all of the water, this ensures that the plants go through a wet and dry cycle. Once the plants have used all of the water in the tray, the

AQUAvalve will refill the tray to $\frac{3}{4}$ inch automatically, without the need for pumps, timers or electricity. At AutoPot we call this PCI; Plant Controlled Irrigation.

Save Water... Grow Beautiful Plants

Water conservation, self-sustainability and the reduction of carbon emissions are worldwide concerns. AutoPot Watering Systems offer a sustainable, environmentally friendly method of crop production as every drop of



water is used by the plants, with zero waste. In trials with Valley Grown Salads – a major supplier to UK supermarket chains Waitrose and Co-Op – conclusive results showed that AutoPot Watering Systems reduced water / fertiliser usage by 45%.

AutoPot systems require no electricity, pumps or timers to operate and work on the natural gravity pressure created from a reservoir/tank.▲

➔ For more info, visit www.autopot.co.uk



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VENTSnI is the Dutch subsidiary of "VENTS". We trade the complete range of VENTS worldwide.

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About VENTS Manufacturing Facility

VENTS is the worldwide ventilation leader. The VENTS manufacturing facilities are located at more than 60 000 m². Each of 16 workshops is tooled up in compliance with international standards to cover the fully-featured production cycle. The enterprise engages more than 2000 professionals. Their team work is aimed to provide ready ventilation products from idea and design development up to the ready high-tech product. VENTS ongoing development strategy is based on implementation of innovations and application of advanced technologies in climatic equipment.

The VENTS product range includes above 10 000 items for residential and industrial ventilation, specially cut for different target audiences and various climatic areas. All our products meet to the latest stringent requirements of the main countries worldwide. We are looking forward to explore with you the Indian hydroponic market.▲

⇒ VENTSnI team

GROWING LYCIUM BARBARUM in HYDROPONICS

By Noucetta Kehdi – GHE

Lycium barbarum, or Wolfberry, is most commonly known as “Goji berry”. It originates in South East Asia and China but grows today on all continents.

We grow our Gojis in the South West of France since 2008. We never tried to produce it on a large scale, but only for our own consumption, considering how beneficial it is for human health. And the experience we gained from growing it for the past years allows us to be confident that they grow and thrive happily in hydroponics. So, if you’d like to experiment, or prepare a future project; if you’d like to produce your own consumption or to complement an herbal garden for yourself or for commercial purposes, this information might interest you.

Lycium barbarum is an evergreen shrub from the Solanaceae family, which culture expands regularly to different parts of the globe

because of its high adaptability. It likes full sun and an alkaline, well-drained, rich soil. It loves temperatures going from 15°C to 25°C, but it can live in hard climatic conditions, and temperatures going as far down as -22°C. Lycium is actually quite easy to grow and requires little care after it has established (around 6 months). It propagates through seeds and Lycium cuttings love hydroponics. The plant grows into a bushy kind of shrub going anywhere from 6 to 8 feet tall. Flowering starts in spring and all through the summer and the first fruit appear from early summer till beginning of fall. True, bountiful yields appear only after 3 years from planting.

We started our Gojis inside the greenhouse first, then outside, as they seem to prefer cooler weather and seasonal changes. We grew them in a Panda “Hydro” with Flora Series, Diamond Nectar, and Mineral Magic. No pH regulators are



needed, as Lycium prefers an alkaline environment, and generally tap waters used for nutritive solutions have a high enough pH naturally.

When mature, Goji berries are small, oval, and bright orange, with a sweet and sour taste. Harvest starts in July and August and goes until the first frosts. The plants are quite fruitful. Despite very little care and attention on our part, this year at GHE we harvested our first real crop, some 400 grams from 8 bushes every 6/7 weeks ! I dried them at home, and we have been eating them all along the winter.



Useful Details:

ml / 10 L	EC	Flora Gro	Flora Micro	Flora Bloom	DN**	MIM	pH
Seedlings	0,3 – 0,6	2,5	2,5	2,5	20	4 g/l	>7.0
Vegetative	1,4 – 1,8	20	25	12,5	20		
Flowering & fruiting	1,9 – 2,5	20	25	15,5			

Since a few years you can find Goji berries in most organic health and food stores. They are considered to be rich in antioxidants and are sold to improve health and extend life expectancy.

In the Encyclopedia of Medicinal Plants written by Li Shizhen from the Ming dynasty, you can read the following: “The entire Goji plant is a treasure. The goji berries strengthen the kidneys and vital energy, maintain the liver, clarify the eye sight, and extend life expectancy.”

Goji berries have been used for 6,000 years by herbalists in

China and India to:

- protect the liver
- help eyesight
- improve sexual function and fertility
- strengthen the legs
- boost immune function
- improve circulation
- promote longevity

In traditional Chinese medicine, goji berries are eaten raw, brewed into a tea, added to Chinese soups, or made into liquid extracts. Here in Europe, they are generally eaten as a dried fruit, which is the easiest and most economical way. In recent years, Goji juice has become popular as a health

beverage. Although dried Goji berries are not too expensive, Goji juice is, which makes it an interesting crop for a hydroponics commercial operation. Considering that a 32-ounce bottle of goji juice (about an 18-day supply) can run as high as \$50 USD, I let you do the math ... (<http://altmedicine.about.com/od/completeazindex/a/goji.htm>**).

So, when starting a hydroponic operation, these plants represent a particularly interesting cash crop. To know more about our Goji production experience, have a look at our video on www.ghe-blog.com/blog/2013/02/05/goji-berries.▲



April 2008, indoors



October 2011, outdoors



Dried goji berries&

Bountiful production August 2012



Harvesting August 2012



400 g every 6/7 weeks



* Last minute information (http://en.wikipedia.org/wiki/Lycium_barbarum):

«Importation of *Lycium barbarum* plants may be submitted to customs regulations in some countries, due to the possibility they could be vectors of diseases attacking Solanaceae crops, such as potato or tomato». Which makes me think that, depending on where you live, the hydroponic propagation of Goji plants represents a very attractive market.

** I cannot resist the temptation of quoting the above link again: «Companies marketing goji juice often mention the unsupported claim that a man named Li Qing Yuen consumed goji berries daily and lived to be 252 years old...» Want to try?

More info on our activities on www.ghe-blog.com.

GREENFIELD HYDROPONICS SYSTEMS Inc

"NECESSITY IS A MOTHER OF INVENTION"

During 1985 to 1987 consecutive three years drought in most of the states in India that destroyed valuable livestock that motivated Canada based Non-Resident Indian (NRI) Kashyap Bhatt to develop solar powered portable greenhouse to grow green fodder round the year. In 1987 the first prototype was built in India and since then research and development continued to create automatic system that can grow various crops under controlled climatic conditions in +50° Celsius to -50° Celsius ambient temperature.

Our "STATE OF THE ART", US & Canadian patented solar & wind powered portable greenhouse justifies its need for the countries having shortage of agriculture land, water, electricity and / or having adverse climatic conditions to grow field crops due to global warming.

Greenfield Hydroponics Systems Inc. is the manufacturer of US and Canadian patented solar photovoltaic and wind powered portable and fixed structure greenhouses. Our eco-friendly and self sufficient greenhouses are capable of growing

organic crops. We believe this revolutionary technology is the key to fighting drought, starvation and famine across the world in the most cost efficient way.

Mr. Kashyap Bhatt has also formed Greenfield Foundation, with the mission of combating starvation and deforestation worldwide. Foundation provides financial and technical support for women in the rural areas to help them creating self-employment by introducing Solar/Wind powered portable and fixed structure greenhouses.

OUR ACHIEVEMENTS:

- In 1989 first commercial Hydro Fodder Farm was sold in India with the State Bank of India Bank Finance
- In 1994, We are winners of the "Market Entry for Energy Efficient Technology" (MEET) of Ontario Ministry of Environment & Energy, Canada. Our technology is proved user and environmentally friendly.
- Technology received US & Canadian patents.
- In 2009, we are winners of the "Development Marketplace" DM2009 global competition of the World Bank,
- Our technology qualifies for CDM funds and Carbon Credits.
- Our turn-key projects are



Kashyap Bhatt
President / Inventor

techno-economically viable for the bank finance in absence of any grants or subsidies available from local governments.

Greenfield has developed systems and provides consultation in various projects. We have expert teams and proven technologies to meet your requirements.

COMMERCIAL PRODUCTION OF HERBS, BROCCOLI & OTHER BEAN SPROUTS

We have developed portable greenhouse "**Hydro Baby Greens**" for growing sprouted beans in a greenhouse environment. You will certainly appreciate the effectiveness of greenhouse cultivation and of producing and supplying fresh green sprouts which can be

grown throughout the entire year, is low in fat, high in fibres, hygienic, highly nutritious, rich in energy and a good source of essential vitamins, minerals, protein, and amino acids.

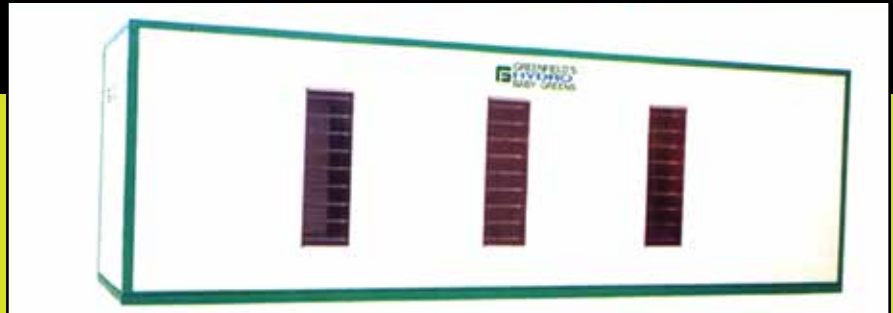
In our greenhouse we use only freshwater, which is recycled for 24 hours. Hydroponically grown sprout is also free of dust and other agriculturally related contaminants and toxins. **"Hydro Baby Greens"** is grown in an environmentally controlled, fully automatic greenhouse and is capable of sprouting **broccoli, radish, alfalfa, barley, buck wheat, clover, corn, cress, white bean, kidney bean, lentil, mung bean, oats, pea, Soya bean, sunflower, wheat etc.**

COMMERCIAL PRODUCTION OF WHEAT AND BARLEY GRASS JUICE

Barley and wheat is grown hydroponically. You will enjoy producing fresh green grass which can be grown throughout the entire year, is low in fat, hygienic, highly nutritious, rich in energy and a good source of essential vitamins, minerals, protein, and amino acids.

BEEF, PIG AND GOAT BREEDING AND DAIRY PROJECT

Greenfield has developed a beef, dairy cattle, pig and goat breeding project to meet with the local market demand of meat, milk and dairy products



as well for the export of it to the international market in association of expert partners in each field concern.

Greenfield will supply U.S & Canadian patented solar photo voltaic powered portable greenhouse to grow fodder and has acquired the services of other Canadian companies and agencies to supply genetics, livestock, lab equipments, composting system, bio mass energy production and rural refrigeration systems, pre fabricated buildings, dairy equipments, etc. and to provide technical, financial, project management and marketing expertise that this project

requires. Greenfield can provide you a turnkey project including training of your personal.

Based on your requirements we provide turnkey project. We provide consultation and a project report on a minimum US\$2000.00 non-refundable retainer fee. The consultation charges will vary based on the type and size of the project. The consultation fees we will compensate against the purchase of the equipment and / or licensing arrangements.▲

LET US WORK TOGETHER FOR BETTER TOMORROW...

☞ For more info, visit www.greenfield-hydroponics.com

TEMPERATURE & ENERGY

SOILLESS GARDENING 101 BY METROP HYDROPONICS

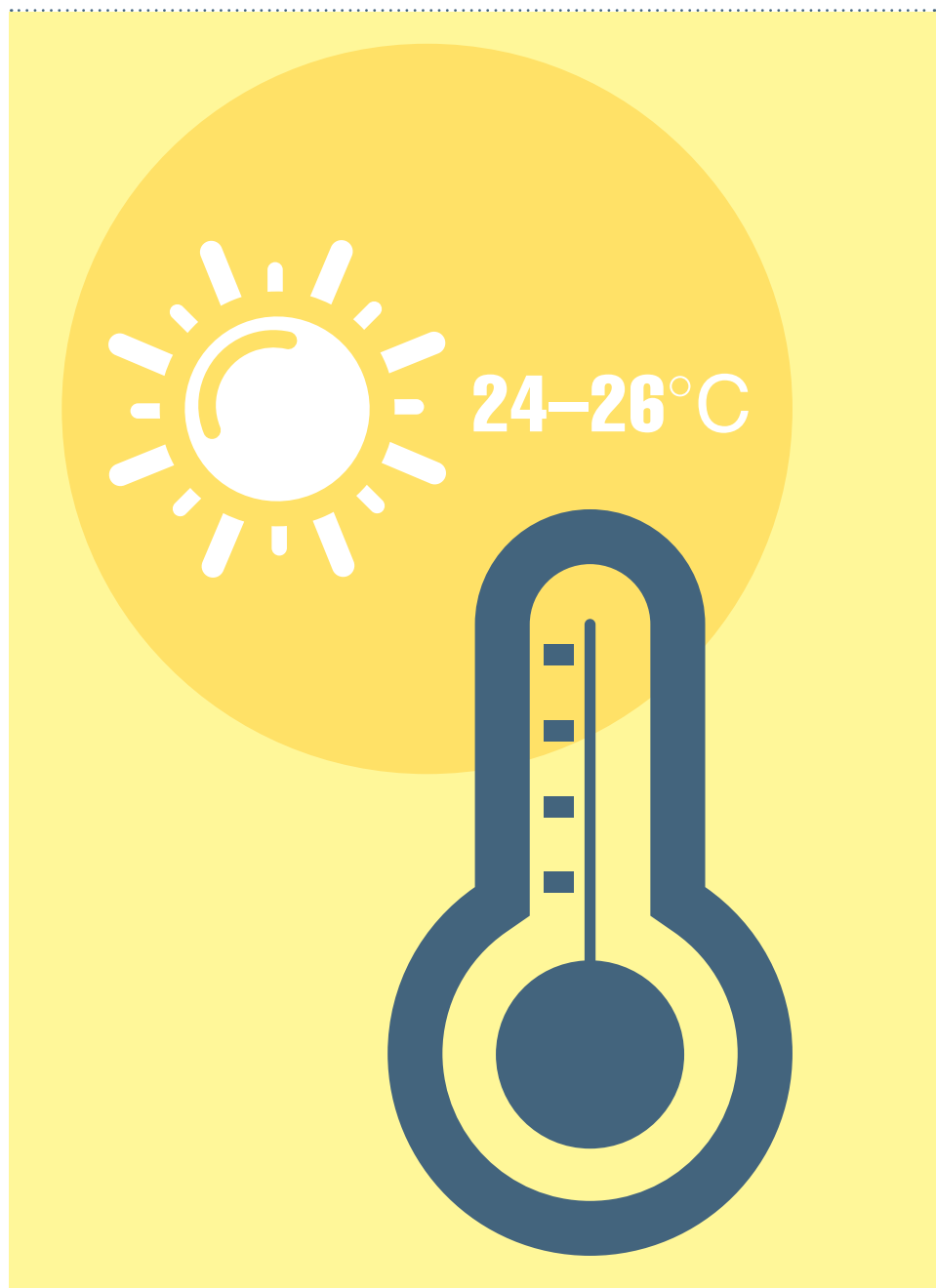
Temperature is an important determining factor. If the temperature is not right, the plan will grow less or not at all.

Science has taught us that the best temperature around the leaf is 24—26 degrees Celcius for all vegetation, for a maximum of growing and blooming day and night.

During the day the plan makes energy to grow (assimilation) and at night the plant uses energy to grow (breathing).

The art of growing is to make sure that during the day the plant makes as much energy as possible and that at night uses the least amount of energy possible.

We can stimulate this during the day by adding more CO₂ and more light, and to stimulate the evaporation under the leaf (with mature plants) by air circulation.▲



GREEN Your TERRACE

News Agency | INDIA

Srinivasan Raghavan enjoys organic gardening during his leisure hours. Over the past year, he has grown several vegetable plants on the second floor of his home. His family does not buy most of the vegetables from the market, but gets it fresh from his garden. Srinivasan even develops his own compost using food waste which act as manure to his plants.

If your house is blessed with a terrace, convert it into a quaint garden.

HERE ARE SOME IDEAS:

Ensure the space is strong enough to carry the weight of the garden. Check for leakages and fix them before you start work. Effective drainage is essential. Make a detailed plan involving a balanced mix of lawns, shrubs, small trees and garden cover. Opt for fibre-rooted plants rather than the tap rooted ones which may grow through the building and cause harm. Choose the correct soil. Ideally blend together soil rite or peat moss with garden earth and manure. Play with lights and watch the mood change as evening falls. You can try hydroponics for your terrace garden using which you can grow plants without using soil.

HERE ARE SRINIVASAN'S TIPS FOR PEOPLE WHO WANT TO DEVELOP A TERRACE GARDEN:

- Ensure the terrace is waterproof
- Certain seeds like capsicum and brinjal need grow trays in a coco peat medium while lady's finger and beans can be sown directly
- Select the size of the grow bag based on the vegetable. An 18 inch would do for most of plants.
- Wider grow bags will allow the roots to spread well and yield better
- Use old wooden boxes and cans
- Use 2 soil and 1 compost for the mixture
- Water regularly and look for health of plants and insects
- Add compost when fruiting and other milestone
- Spray Neem oil, soap solution to get rid of insects every week
- Ensure that you spend 30 minutes a day and 3—4 hours during week end to take care of your plant.▲

IT is NOT DIFFICULT to GROW YOUR OWN VEGETABLES at HOME

The Hindu | INDIA

Last June, Chitra Krishnaswamy, a home maker, decided to take up terrace farming. What began as a hobby soon grew into a passion. Six months later, Chitra's terrace garden has grown in to a full-fledged farm with 14 types of greens, varieties of tomatoes, chillies, radishes, ladies finger, pineapples, and sapotas. Now Chithra spends almost the entire day on her terrace, tending to her greens and fruits.

Her family has not bought any vegetables from the market, for the last two months, says Chitra. "At times we get so many vegetables that I end up gifting them away. There is a big difference in taste between these and the ones you get in the market. These are so fresh and juicy!"

More than terrace gardening, what caught her interest was kitchen waste composting. She ordered around 30—40 terracotta kambas (jars) from Daily Dump, an organisation based out of Bangalore. In a shed outside her house, she



has around 38 kambas and 100 leave-it pots for storing the manure. "These have holes that facilitate the process of aeration, which is essential for composting." Chitra is the only dealer for these containers in the city.

Chitra says every house-hold can reduce the garbage in the neighbourhood, if they made use of their kitchen wastes. "Many families hesitate to make manure out of kitchen wastes as they feel storing these wastes



will produce a bad odour or it is unhygienic. However, they can't be more wrong. The minute you mix it with dry leaves and microbes and leave it for composting, the bacteria start their work. In a day it turns into compost and, there won't be any foul smell. ”

Anyone can grow a container garden in their terrace or on a balcony. However, you need to take some precautions too, she warns. “You should be careful that the containers are kept in such a way that rain water falls gently or just drizzles into the pot. If the water falls too heavily into the soil, it can affect the plant.”

Chitra also demonstrates how to manufacture kitchen manure and start terrace gardens to school students and house wives.

She says, “If we put our minds to it, we can do it. Nature gives us so much. We need to give something back. And this way, our future generations can have nutritious vegetables that do not contain pesticides or fertilizers.”

MANURE OUT OF KITCHEN WASTE

- Collect previous day's kitchen waste, including vegetable and fruit peels and egg shells.
- Do not use fruits that are maggot-infested, as they can affect the quality of the manure.
- Put the wastes into a colander or any container with holes in it.

Add dry leaves to this. This will prevent the worms and maggots from thriving on damp kitchen waste.

- Add compost accelerator. It could be a packet of microbes or even cow urine or cow dung.
- Mix well and store the mixture in the containers.
- Turn over the mixture once every four days so that the bottom half also gets enough oxygen required for composting.
- The manure will be ready in 40 to 45 days.

HOW TO CREATE A CONTAINER GARDEN:

- Mix 50 per cent of coir pith, 25 per cent of red soil and 25 per cent of manure to prepare the growing medium.
- Lay this inside the container in which you are planting the seeds.
- Plant the seeds.
- Keep the container in an area where there is enough sunlight and water.

In the coming months, Chitra recommends cabbages and cauliflowers. Monsoon is the best time to grow these vegetables as the pests called aphides that attack them will be washed away by the rain. She also suggests adding a dash of colour to the garden by growing radishes, keeraais, beetroots and carrots. ▀

WORMS WORK HARD SO YOU DON'T HAVE TO. GIVE THEM SOME CREDIT!

Simon Hart, Grotek Europe

We all want to use items that increase our garden's fertility in the hopes of explosive yields. With that as our aim, there is one item that stands out as a must-have for all soil and soil-less gardens: worm castings. Vermicomposting is the use of worms to break down organic material. Worm castings are the result of their digestion process. This process will give you some of the highest quality castings available and help you create a more technical and successful garden experience without a lot of effort.

Current research show extremely complex benefits from the use of worm castings in agriculture. A green technology, vermicomposting is the epitome of reduce, reuse, and recycle. Research continues and our knowledge of these unsuspecting creatures in the soil shows a fascinating connection between the worms and overall ecosystem health. Their effects on soil biology, nutrient availability, and the complexity of their decomposition of organic



materials are just some of the things being studied. Although we are just starting to understand the relationship between earthworms and healthy soils, worms have been fascinating people for millennia.

Cleopatra, queen of the Nile, decreed that worms were sacred and were not to be harmed. The Greek philosopher Aristotle declared them to be the guts of the soil. The great biologist, Charles

Darwin, who may be best known for his theory of evolution, started his scientific work looking at earthworms. In fact, he spent the latter part of his scientific career looking at nothing but earthworms at Down House, his country estate just outside of London. He was fascinated by them and utterly convinced that worms were among the unsung heroes within the natural world; in 1881 he published his life-long research on earthworms. In one project detailed



in his work, he took small coal stones, spread them over a field, and left them for 20 years. He then dug a trench to see how far down the worms had moved the coal. Talk about long-term research.

Worm castings are an amazing soil amendment, but go easy on them! They typically contain 5 times the normal levels of nitrogen found in regular soils, 7 times more phosphorus, and 11 times more potassium! Worm castings also contain calcium, magnesium and other micro-nutrients as well as tons of beneficial organisms and microbes that help to restore soil life and begin recreating the soil food web. Worm castings rule!

The industrious nature of worms is a power that can be unleashed on all unsuspecting gardens. While all urban gardeners are familiar with worm castings, most buy their castings at their local shop because it is very convenient. But given just a little space, time, and knowledge it is possible to grow your own castings. Not convinced that it's worth the effort? Have a look at the benefits and then the actual work involved in growing worms and supplying your own rich, microbial super-charged soil amendment.

Research shows that vermicompost stimulates plant growth even when plants are already receiving optimal nutrition. Improved seed germination, accelerated growth and development, and increased productivity and yield are all scientifically validated claims. There are new theories, such as the possibility of transient plant growth regulators being absorbed by the humates which form in rich worm castings. Other benefits, such as disease prevention and the ability to repel pests, are possibilities, but there needs to be more study to understand the mechanisms behind these potential benefits.

When compared to regular compost, vermicompost stands out as the winner. Higher levels of plant-available nitrogen, phosphorus, potassium, sulphur and magnesium make vermicompost nutritionally superior.

Microbiology is also more complex in vermicompost than standard compost. Why? First, vermicompost is processed at a moderate temperature range that never comes close to the 140 degrees Fahrenheit (60 degrees Celsius) or higher achieved in thermophilic digested compost. This means that your worm castings will have more

microbes meant to live at normal temperatures when compared to compost. Although the process is not entirely understood, it is also clear that worms release more microbes than they ingest, meaning that they are actually creating microbes during their constant eating.

Many composters will tell you that you need a thermophilic reaction (140 degrees Fahrenheit / 60 degrees Celsius or higher) or pathogens will not be destroyed. Research has shown that castings produced in pathogen-rich environments, such as human biosolids (I'm glad I don't research sewage) contain no pathogens. Dissections show that something happens within the first quarter inch (5 mm) of the worm that completely removes pathogenic substances. That being said, I do not recommend that any gardener feed their worms biosolids.

There are estimates that there could be over 1,800 species of worms worldwide. Many of the worm castings available in retail shops are produced by African nightcrawlers. However, for the urban gardener looking to start vermicomposting, this is probably not the right choice of species due to its specific growing requirements.



Eisenia Fetida, more commonly known as a Red Wiggler, is indigenous to most parts of the world. This particular worm is extremely tough and adaptable, able to handle a temperature range from 32—95 degrees Fahrenheit (0—35 degrees Celcius), and the eggs or cocoons can survive short periods of complete freezing. This species is commonly used in commercial vermicomposting and is easily accessed by hobby gardeners through Internet sales. Before you order your worms, you had better have somewhere for them to live. There are many small home-sized worm farm units available. Some are more efficient and complicated than others. Remember that vermicomposting is a type of farming, not an industrial process, so bigger isn't necessarily better. A savvy gardener will want to master the basics prior to a significant investment in equipment.

My first experience with vermicomposting began when, to the horror of my colleagues, I placed a worm bin in my office. My boss was quick to inform me that if it started to smell that would be the end of it. The pressure was on, so I put in my bedding and a half pound of worms and started the feeding frenzy.

I placed approximately 44 pounds (20 kg) of food waste in the bin over 14 weeks. I was amazed at how quickly the worms processed material and everyone in the

office was stunned that there was essentially no smell other than a mild earthy aroma. This first batch of quality vermicompost got me hooked, and I would like to pass this concept along as a suggestion from one gardener to another.

I have moved on from my office bin, which in the end was too small. I am going to move my worm adventures outdoors into a very straightforward continuous flow wedge. Essentially I am going to build a three-sided open-end structure made from straw bales. To begin, I will add material and then worms against the back wall. After that I will continue to put in bedding and food sources. Once the pile reaches the open end I will take the straw bales from the closed end and move them to the open end. At this point I will harvest the oldest material to use as vermicompost and begin moving the pile in the opposite direction. This will get rid of the issue of removing the worms from my compost because they will move into the fresh material as you take away the digested castings. This was an issue with my office bin where I had to take the castings out and create small piles, then remove the top layer as the worms retreated to the base of the piles. Follow this with taking the base of each pile (which contains most of your worms) and put it back in the bin with fresh bedding and food. You can always buy new worms every time you renew your bin, but this adds cost

to the exercise. That money can be better spent on other things by keeping your worm population healthy and productive.

GIVING YOUR WORMS A HOME

To manage your worms properly you need to consider five essentials:

1. A hospitable living environment: the best worm farms have the best bedding. Things like straw, peat moss, coir, newsprint, cardboard and even dried leaves all make excellent bedding and can provide different benefits when blended together. You are looking to create a moist environment with lots of air pockets and a high carbon to nitrogen ratio. I have found a blend of straw and coir to be an excellent mix. A pH range of 5—9 is acceptable with a level of 7 being ideal.

Adding grit to your bedding can help worms process more material. Inputs such as soil, powdered limestone, rock dust, egg shells and zeolite can provide this abrasive material that worms use in their gizzards. Note that all of these items will also provide extra benefit when added to your soil-less mix as well.

2. A good food source: worms are what they eat, so your food source is very important. Vegetable and

fruit peelings are excellent, and coffee grounds are great when available. Kelp meal is a good choice, but remember that worms are sensitive to salt. Corrugated cardboard is also a good food source because of the high protein glue used to bind it. Commercially, there are many more food sources, including manures; but for the urban gardener it's fine to stick to what you might put in a standard compost bin.

3. Adequate moisture: worms need a damp environment to get the job done and be happy while doing it. The moisture content in the bedding should be somewhere around 70—90 percent. This means you may have to add water at the start, but as you pile the kitchen scraps into the bedding the moisture should balance out to a good range.

4. Worms need to breathe, so make sure there is a good level of oxygen. If bedding becomes too compact it will force worms out by creating an anaerobic environment, which kills worms and will smell like something you don't want in your garden.

5. Protection from extreme temperatures. The Red Wiggler is a perfect worm for vermicomposting because of its temperature range. However, you need to keep direct sun off your bin or pile because it can overheat the environment. Remember, also, that direct sun is toxic to



worms. Outdoor vermicomposting does require some shelter planning, especially in Canadian winters that sometimes spill into the northern states too.

Space is premium in small urban gardens, but many worm bins are small enough to fit under the kitchen sink or under your flood table. Most common small units use a top feed bed where you are adding food material into the worm bedding as it becomes available. Looking to upgrade? Consider a vertically stacked tray system for even more castings out of the same area.

So now you want to use some of the black gold that has been growing in your worm bin. The finished product will range from 10—50 percent of the original weight of the material. But don't worry because the best ratio to mix into your growing medium is about 10 percent. You can add up to 40 percent, but using over 40 percent seems to decrease its value, and castings can

then actually slow the growth of plants. Use it as a top dressing or mix it directly into your medium. As a growing tip, if you are simply looking to enhance the microbial diversity in your rhizosphere, then consider the use of an aerobic compost tea to enhance the levels of various bacterial species. Remember that vermicompost has a much broader diversity of microbes than standard compost, and they reproduce rapidly at room temperature, so to use it in an aerated tea is an exceptional way to stretch its value in your garden. Without question, the addition of worm castings provides urban gardeners with accelerated plant growth. And to those urban gardeners up for the challenge, small-scale worm farming produces a growth accelerator while decreasing the waste that leaves your house for the landfill. I hope that you see some of the benefits now, and will experiment to bring vermicompost into your urban jungle.▲

➡ www.grotek.net

Cleaning and Checking the IRRIGATION SYSTEM



About Grodan

For forty years Grodan has been the global market leader in the supply of a wide range of integrated substrate solutions to professional growers endeavoring to achieve the optimum cultivation of high-quality vegetables and plants. Grodan represents reliable and sustainable substrate solutions for the high tech cultivation of vegetables and plants.

www.grodan.com

A. BEFORE

PREPARING FOR THE NEW CROP 2–3

Grodan takes its position in respect to sustainable cultivation seriously. Before cleaning the greenhouse please ensure that appropriate steps have been taken to minimize the emission of cleaning agents to the environment. For more information on emission and environmental policy where it applies locally we advise that you contact your local Environmental Officer.

Use chlorine bleach (against organic organisms) and nitric acid (against inorganic pollutants).

- Check if your drippers can stand a chlorine/acid treatment (if not, ask your dealer for the cleaning procedure).
- Carefully read the labels of the chemicals prior to use.
- Prevent contact between these substances (danger of lung burning and explosion).
- Prevent the irrigation lines from becoming dry.



b.1



b.2



b.3

B. PREPARATION

1. Clean the mixing tanks and the irrigation system.
2. Solution can be made in the mixing tanks: remove pH meters and put them in a pail of water, also remove the EC electrodes.
3. If you have a drain system, fill up the drain basins with clear water so that the concentrated chlorine or acid will not affect the concrete.
4. Mix 4.5 liters of 10% concentration chlorine or 3,0 liters of 15% concentration chlorine in 100 liters of water. This solution has an EC above 10 and a pH between 10 and 11.
5. Add 3 to 5 liters nitric acid (38%) to 100 liters of water. A solution of 3% gives a pH of 1.5 and a solution of 7% gives a pH of 1.0 (depending on the quality of the water). The EC is between 7 and 9.



c.3

c.4

C. CLEANING

1. Flush the main and secondary pipes with clean water.
2. Apply the chlorine solution: ready when the last dripper has pH >10.
3. Leave the system filled for 24 hours, do not irrigate.
4. Flush after the chlorine solution: rinse the pipes and mixing tanks with clean water, irrigate for some time.
5. Add nitric acid and trickle shortly once per 3 hours to flush out chalk precipitation. Only run the irrigation system when the pipes are clean of any organic matter and the drippers dirty.



c.7

6. Flush the system thoroughly with clean water, no residues of cleaning product may remain.

7. Dip the irrigation pins in disinfectant solution for 5—10 minutes (when very dirty up to 30 minutes).

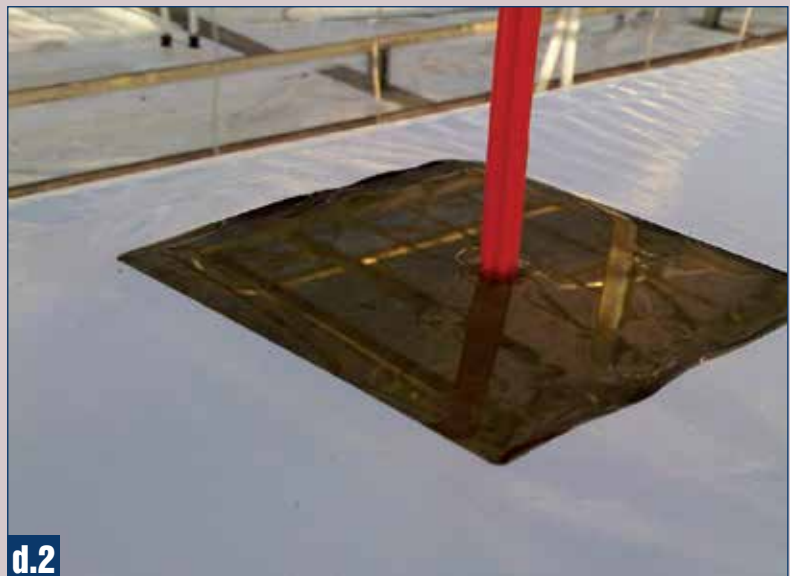
D. CHECKING THE LEVEL OF VARIATION

When clean and before the new plants arrive it is a good idea to check the uniformity of the distribution system.

1. Select 10 drippers from the first, middle and bottom irrigation line of a chosen irrigation section.
2. Place irrigation pins into empty bottles at various locations in the greenhouse.
3. Irrigate two or three times. Then use a measuring cylinder to record the volume of the solution in each bottle
4. Adding up the volume of these 30 drippers provides a good insight into the output per section.
5. Go to www.grodan.com/irrigation and enter the data on the 30 drippers to calculate the variation:

- 5% variation is good, no action is required.
- 5% to 10% variation is poor, it is recommended that action is taken to correct this.
- More than 10% variation is extremely poor and will result in uneven slab water contents and poor water management capabilities if action is not taken. ▴

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WHERE FARMING & GARDENING IS HEADING



Evan Folds has a BS in Biology and a minor in Religion from the University of North Carolina at Wilmington. He resides with his wife and child in Wilmington, North Carolina, USA.

His interests include: balancing the benefits and necessities of business with that of the balance of sustainable systems and making sense of food production.

Evan is the founder and president of Progress Earth, an international wholesale hydroponic, organic gardening and wellness product distribution company, with a focus on integrating sustainable and moral concepts into a modern economic model.

www.progressearth.com

Evan Folds, Founder of Progress Earth

What's more important than food? Arguably, nothing. Yet we take it for granted. So much so that the majority of our supermarkets do not even contain real "food" to begin with. This goes for everything in a box, with a list of ingredients more than one, and even "fresh squeezed" juices.

Consider orange juice. The book *Squeezed*, by Alissa Hamilton sheds light on this massive industry that has marketed its place into almost every home refrigerator. Almost 2/3rd's of U.S. households buy orange juice. Consumers have bought hook, line, and sinker the industry propaganda of "pure" "fresh squeezed", "natural", etc. but in reality don't know what they are drinking.

Concentrate orange juice was invented in the 1940's for soldiers in WWII, and in that context it was a major breakthrough. However, orange juice is not real "juice". This is hard for some people to hear, but it's the truth.

Even the brands such as Tropicana that promise their juice is "pure", "natural" and "fresh" have been heated and processed, stripped of their volatile flavor-producing and nutritive chemicals, held in tanks for up to a year and then engineered by perfume companies to taste good. This is done to give the "juice" a shelf



life of 60 days and year-round availability. The reality is that real juice would have a shelf life of no more than 5–7 days. The majority of processed orange juice now comes from Brazil. Leave you feeling a little cheated?

NOW APPLY THIS TO “FOOD” IN GENERAL

During the past 40 years, our food system has changed more

than in the previous 40,000 years. We have gone from changing the types of fertilizers used to grow our food (natural and artificial) to changing the fundamental nature of the food that we are growing (natural and genetically modified organisms, or, GMO's).

Any form of processing denatures food. We use preservatives and flavor-enhancers as a means of convenience and economics, not nutrition. Before this massive re-engineering of food, generally, if it tastes good it was good for us. Sugar was produced by Nature, not refinement. We've now become

so good at tricking our taste buds that we can no longer tell good from bad.

To make matters worse, our lives are so busy we don't have the time to dedicate to cooking fresh meals from whole foods and we convince ourselves that fresh foods cost more. The truth is that in the average packaged product there is more cost in the packaging and marketing costs associated with the foodstuff than the “food” itself.

Production costs, or the raw commodity that is raised or grown, are typically called the “farm value” of food. The farm value for meats and dairy

products is around 28%, for poultry around 41%, for cereals around 5%, for fresh fruits 16%, and for fresh vegetables 19%.

As consumers demand more highly processed foods, foods from distant places, and foods ready to eat, the farm value falls as a percentage of the retail price. Marketing costs rose 3.5 times faster than the farm value between 1990 and 1999. At 39%, labor is the largest portion of the cost of food, rising 56% during the 1990s. Packaging costs comprise about 8% of total food costs, and they increased almost 40% in the 1990s. This increase is a function of the cost of paper and plastics and the demand for more conveniently packaged foods. Package design changes and packages that can be used directly for cooking and for eating or drinking increase the cost of packaging relative to the basic food.

Raw commodities (farm value), labor, and packaging comprise 67% of the cost of food. The rest of the costs are in transportation, advertising, rent, profits, energy, business taxes, depreciation, interest payments, miscellaneous costs, and repairs.

So the large majority of what we eat is not food. Its gasoline, taxes, advertising, profit to large corporations, and the package that it comes in. It's bad enough that the average meal travels over 1500 miles to your plate, but the bigger picture is even worse.

The more homogenized our food system, the lower the quality of food. Food is not a piece of machinery that can be constructed as the sum of certain parts; farming is a living dynamic endeavor that takes intention and attention to detail. When the bottom line trumps nutritional value, we all lose.

For instance, the U.S. has the most expensive health care system in the world and nowhere near the healthiest population. Many people comment that the obesity apparent in U.S. cities is far worse than when they travel overseas. This is a direct result of the U.S. processed diets.

HERE ARE SOME STATISTICS THAT ILLUSTRATE HOW DESTRUCTIVE OUR MEAT EATING HABITS ARE IN THE U.S.:

- The average US citizen eats 273 lbs (~125 kg) of meat every year

- It takes an entire acre of land to produce only 48 lbs (~22 kg) of beef
- For reference, 1 acre of land = 60,000 lbs (22,000 kg) of pineapple or 40,000 lbs (15,000 kg) of potatoes
- Crops for farm animals require 50% of the water and 80% of farmland (USDA)
- If beef production was not subsidized in CA it would cost \$35 per lbs
- Meat animals eat 95% of oats, 90% of soy, 80% of corn, and 70% of grain crops in US annually
- 800 million people could be fed just off the grain used to feed livestock each year
- Meat animals account for more than 1/2 of synthetic fertilizer use in US
- Meat animals account for over 70% of the antibiotic used (on mostly healthy animals) in the US each year

This isn't pro-vegetarian propaganda, it's a wakeup call for how we produce food. Pay attention to what you eat. We can't get away with this for much longer.

Business is trumping health. For example, in 1970 the four largest meatpacking companies slaughtered about 21% of America's cattle; today the four largest companies slaughter about 85%. The large feedlots created to support this type of business are toxic wastelands that breed E. coli and other "superbugs" we are told to be scared of.

The reality is that E. coli is in the soil in our back yard. We

create legislation that allows for these toxic wastelands, and then develop processes such as pasteurization (nice word for irradiation) that allow us to get away with it. The problem is that these processes denature the nutritional value of food.

All this being said, food prices are soaring, faster than at any time in history. This is true for commodities and premium foods. In 2010:

- Corn = Up 63%
- Wheat = Up 84%
- Soybeans = Up 24%
- Sugar = Up 55%

IN 2011:

The USDA projected that fresh-vegetable prices will increase 4.5% to 5.5% this year, up from a prior forecast of 4.0% to 5.0%.

Tomato prices up 24% compared to last winter, broccoli prices up 73% and lettuce up 221%, according to USDA data. (SOURCE: Wall Street Journal and NY Daily News)

Some Arab countries spend upwards of 70—80% of their budget on food. In the U.S. it's more like 10—20%. This is said to have contributed to the Arab Spring of 2011. When food prices go up in the US, we complain. When food prices go up in third world countries, it starts a revolution.

OPPORTUNITY

When we don't get enough calories in our diet we get hunger pangs. One can eat a Big Mac or a bunch of Twinkies and be calorically satiated, but we all know this does not nourish us. Because our bodies never expected to be tricked, we do not get a nourishment pang when eating bad food. We normally don't realize we're malnourished until we get sick.

Evidence of people's buying habits changing is illustrated in the fact that organic food is outperforming the conventional food market by a wide margin.





The Organic Trade Association (OTA) reports in their 2011 Organic Industry Survey that the organic food industry grew at an 8% rate in 2010. This is much faster than the overall food industry which had sales growth of less than 1%.

Organic fruits and vegetables enjoyed an 11.8% dollar gain in 2010, with the total value of organic fruits and vegetable sold in 2010 estimated at \$10.6 billion, compared with \$9.5 billion in 2009, according to the survey. The OTA said organic fruits and vegetables account for 39.7% of total organic food value and nearly 12% of all U.S. fruit and vegetable sales. These numbers are rising.

The survey also found that 78% of organic farms plan to maintain or increase organic production levels in the next five years. Roughly 40% of organic operations added jobs in 2010, and the survey found that 96% of operations plan to maintain or increase employment opportunities in 2011. Those are pretty strong numbers for the worst recession in US history. While impressive, the 2010 growth range of organic fresh produce of better than 10% was still less than half what it was in the two or three years before the recession. In 2005, for example, the Organic Trade Association reported the overall U.S. organic food industry grew at a 17% clip.

The organic farming movement is growing, but many people are paying more attention to the local movement. The food found closer to you is likely to be more nourishing than "organic" food. Consumers now have growing options for farmers' markets. But many are growing their own food. The ultimate local is the back yard, and this market is literally exploding. Seed companies cannot keep up with demand and garden centers are poised for record growth.

In a survey of 27,688 professional and recreational gardeners conducted by Garden-Share.com, 20.6% of respondents said "vegetable gardening" is the most popular gardening trend. "Small-space gardening" was selected by 17.1% and "organic gardening" was chosen by 16.3%. Interestingly enough, the "Eat Local" gardening trend was chosen by 12.6% of respondents.

John Mitchell, founder of Garden-Share.com, says, "Vegetable gardening has enjoyed a surge in popularity due to the economy, the price of gas and consumer concerns about the origins of the food they eat. Add to that the personal satisfaction you get by growing your own food and it is no wonder vegetable gardening is the most popular trend."

HERE ARE SOME OTHER FINDINGS IN THIS SURVEY:

- 43.6% responded that "yes, you can save money by vegetable, fruit and herb gardening." Another 28.2% said "it doesn't matter, it's enjoyable."
- 56.9% said tomatoes, though technically a fruit, are their "favorite vegetable to grow." At 8.1%, peppers were second.
- Basil was chosen by 35.6% as "most favorite herb to grow." Rosemary at 12.2% and chives at 8.0% were other favorites.
- 45.8% of survey respondents cited "relaxation and enjoyment" as their main reason for gardening. 25.8% chose "garden for beauty and decoration."

SO WHAT'S THE BIG OPPORTUNITY?



Simply to sell product to all of the humans waking up to how expensive and convoluted our food production has become in the world. Soon people will be growing their own food because they have to, not because they know it's nutritious for them. But there are plenty doing this as well. Food is no longer our vitamin, and many of us know it.

Our opportunity as an industry lies in getting out in front of the inevitable. In almost every supermarket it is not uncommon to find a \$5 red bell pepper. Homeowners can easily grow 30 of them for \$5 with your help.

Hydroponics offers growing systems that can help people grow their own food easily. You might be surprised to find out how many people never considered home food growing as an option.▲

ENVIRONMENTAL BENEFITS OF HYDROPONIC GROWING



By Advanced Nutrients, Canada

As global warming becomes a bigger issue for the average citizen, consumers and government leaders are always looking for better ways to cut down on carbon dioxide emissions and help the environment. Perhaps one of the greatest ways countries can cut back on harmful greenhouse gasses is through examining how they produce and distribute their food supply. Hydroponic growing has numerous possibilities to not only produce, larger, better tasting vegetables, but also help the environment. Here are the main ways that hydroponic growing may be the way to "go green" in the future.

HYDROPONIC GROWING USES LESS LAND

It is estimated that approximately 10 million hectares of arable land

is lost every year for a variety of reasons. With farmers being increasingly pinched on the amount of land that can be used for traditional soil gardening, hydroponics may prove to be the solution. Because every element of this style of growing can be closely controlled, it can produce larger yields, making the same amount of vegetables in just 1/5th of the space.

HYDROPONICS CAN GROW VEGETABLES ANYWHERE

This is important because it cuts down on the distance that food may have to travel to reach its destination. Whenever a vegetable is out of season in one part of the world, it is in season in another part. So these vegetables are often crated and shipped to those areas where they are not in season, where the scarcity can drive up prices. This means the

transportation of the food requires a great deal of fossil fuel because of the flights. With hydroponics, you can grow virtually any vegetable in any season in any part of the world, so they can be grown closer to their sale point and use up less gas. They usually taste a lot better too, because the shorter distance that they have to travel means that they can be picked when they are ripe.

HYDROPONICS USES LESS WATER

When watering a typical soil garden, much of the water used gets lost in the soil, which means a lot more water has to be used. In a hydroponic garden, the water is recycled. This puts a lot less stress on the increasingly strained water supply.

LESS LAND EROSION

Traditional farming requires one to till the land, which can

contribute to land erosion. Since hydroponics uses no soil, and therefore makes no significant changes to the land, this problem can be completely averted.

FEWER PESTICIDES

While pests are by no means completely absent in hydroponics systems, the closed, controlled environment can eliminate many of pesticides that are often necessary to keep bugs from destroying traditional crops. This means less poison on plants, in rivers, and more importantly, on the food we eat. All of these factors, plus the improved taste that can result from this style of growing has made hydroponics the choice of many large-scale greenhouses. As the benefits of hydroponics become more obvious over time, more greenhouses are sure to follow suit.

BENEFITS of HYDROPONIC GARDENING

Hydroponic gardening is exploding in popularity, with more and more people choosing to convert their spare room and basements into a source of vegetables, flowers, and other plants. Part of the reason is that hydroponics can allow anyone, in any geographic locale, experience the joy of gardening. But there are several other ways that hydroponic gardening benefits the gardeners personally. Here are just a few of the reasons why people choose hydroponic gardening as a hobby.

REDUCES STRESS

The satisfaction that comes from running a successful hydroponic garden can make it easier to deal with everything else you do in life. Learning a new skill has long been known to reduce stress, because it raises your confidence and allows you to take your focus off of whatever it is that gives you stress. Seeing a project to completion, such as turning seedlings into healthy plants, also gives you a sense of accomplishment, which can reduce your stress levels.

FANTASTIC TASTING VEGETABLES

If the only vegetables that you have tasted are the kind at the supermarket, you don't know how good vegetables can be. They are often picked long before they are ripe halfway around the world, crated, and then shipped to your hometown. Because they ripen off of the plant, they lose out on a lot of the sugar that give vegetables their flavor. And since large-scale farmers are paid by weight, not the flavor of their produce, their vegetable plants are often bred for maximum yield rather than optimum taste. They are also often refrigerated to slow ripening, which kills some of the taste. When you grow your own vegetables in your closet or basement, you can pick them right before you are ready to eat them, thus eliminating the early picking, rough handling, and refrigeration that renders store bought vegetables relatively tasteless.



CREATIVE OUTLET

Growing your own flowers or vegetables through hydroponic gardening is a very personal thing. You choose which plants to grow, you choose how to grow them, and even choose which plants are worthy of cloning. Every hydroponic garden is as much a reflection of its creator as a painting or song is. As you become a more skilled gardener, you can further change and alter your garden to suit your personality.

EXERCISE

Growing in your own garden doesn't really sound like exercise, because we typically associate exercise with unpleasant work. But with hydroponics, you get in a lot of physical activity just the same. Hauling your medium to your buckets or grow trays, filling your reservoir, and squatting and stretching to connect your fittings and lights all involve some amount of physical activity, which burns calories and gives you a healthier heart and lungs. Some studies even suggest that doing forty-five minutes of gardening is the equivalent of doing half an hour of moderate aerobics. What's even more, is that since gardening is a pursuit you will probably actually enjoy, you are much more likely to head off into you grow room than drive down to your local gym. ▀

QUESTION

WHAT is the DIFFERENCE BETWEEN ORGANIC FARMING and HYDROPONIC FARMING?

Asked by ABC, PUNE

Organic Farming is a method of growing plants using materials that have not been processed and changed from their original natural state into something chemically produced and that 'hydroponics' is a type of farming involving no soil and nutrients are supplied by mixing with water.

In order to be considered organic, plants cannot be nourished with mineral salts or any other refined substances, even though these are of a higher purity than most organic fertilizers. Only unrefined minerals can be applied to organic crops. In organics, the nutrient availability depends on the organic nutrient source, the environment and the microbial population that is necessary to convert the organic nutrients to inorganic forms. Plants can absorb their nutrients only in inorganic ionic forms. The growth and yield performance of a plant depends not only on how much nutrients is available in the root zone but also on the root and shoot environment. The basic goals of organic growers include controlling pests naturally and without the toxic pesticides that are harmful for humans and animals, replenishing our nutrients a chemical that an organism needs to live and grow or a

substance used in an organism's metabolism which must be taken in from its environment. Organic farming is more expensive than normal farming. Main benefits of using Organic farming are not using chemicals, which may be harmful for human body. Organic farming is as good as hydroponic farming but having very low and slow productivity.

Hydroponics is relatively new technology of farming, where plants are grown in controlled environment. We can control the nutrients feeding as per the requirement.

Hydroponic farming has completely eliminated the need for soil and its micro-organisms. This has resulted in better crop quality, higher growth rates and much healthier produce, all without soil erosion or water supply contamination. The fertilizers used in hydroponics are much more pure than those utilized in organic growing, and they also leave no residue in cultivated produce. The result is that more people can be fed, less precious natural resources are used, and the produce is much healthier and flavorful.▲

"Please, share your questions with us at support-us/cd/eu@soillessgardening-india.com or support-asia@soillessgardening-india.com"

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