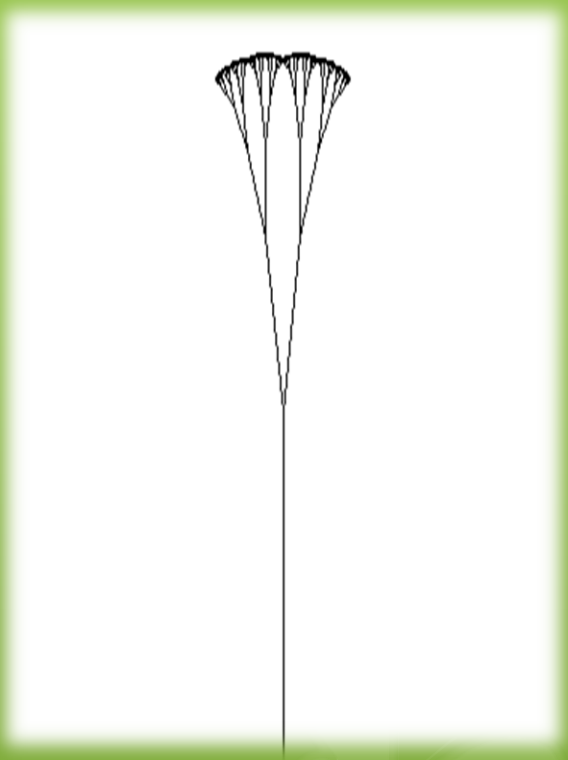
Organic-Quantum Seed Production

By Pamela G. Fernandez
UPLB



Last revision: April 25, 2012

http://seeds.soggycreek.com/knowledge.html

The slides used in this set had been put together for a presentation and were later modified for browsing by anyone interested in the subject. I am very grateful to those who posted in the internet some photos which I used (and mostly not cited), but only to make the slides more catchy, graphic or illustrative. Your photos are already part of the ripple effect in the world change process.

April 25, 2012

Started talk with a prayer-song
By Zeta Sanchez:
"Anak ng Hangin"
http://www.youtube.com/watch?v=51vX-hRuSoc

http://www.youtube.com/watch?v=d-kuQdZUz4E

Organic-Quantum Seed Production

National Seed Summit
March 27, 2012
Bu.of Soils and Water Management
Quezon City, Philippines

The new Call, new Impulse:

Law on Organic Agriculture

Need for …

Certified Organic

Late 1990's:

An ORGANIC PRODUCE must have been derived from ORGANIC SEED

And it is now 2012 !

ftp://ftp.fao.org/paia/organicag/organic-seed-conf_proceedings.pdf

To increase organic coverage …increase the volume of organic seed!

- As countries strive to increase area devoted to organic crop, companies also scramble to supply the need for seed.

- Organic seed has great prospect (a booming business?) in these countries

Besides the LAW, what drives organic?

- The **science** behind the criteria for ORGANIC crop and seed production?
- The **economics** of organic seed production?
- The **certification mechanism** for organics?
- The **consumers' demand** for organic products?

News news news !!!

No to GMO !!!

France restores ban on GMO maize crops

Fri Mar 16, 2012 5:20pm GMT

http://af.reuters.com/article/commoditiesNews/idAFP6E8DT00B20120316?sp=true

Yes to GMO !!!

US government approves Monsanto seed experiment across America

http://www.digitaljournal.com/article/321268#ixzz1pLIFmQVA

Do we understand that…

He who controls the seed… controls life and human destiny?

Do we believe that…

He who provides good organic seed is blessed ?

Do we understand that… *Organic is for our food security?*

Bees are the engines that keep the earth in bloom.

And bees have been telling us…

In 1923, Rudolf Steiner, an Austrian scientist, philosopher & social innovator, predicted ***that in 80 to 100 years honeybees would collapse.***

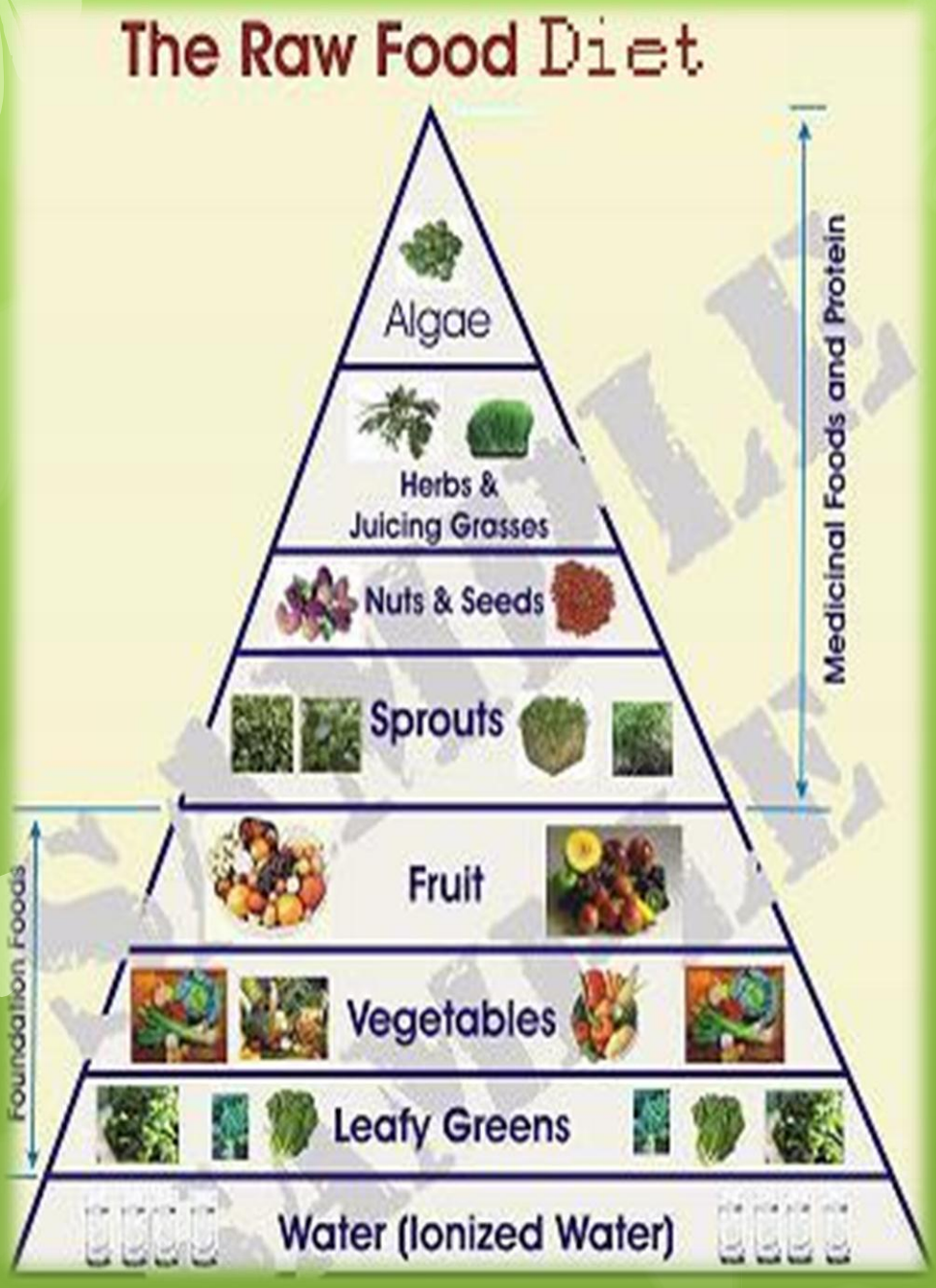
http://www.queenofthesun.com/

This is now happening globally!

Does organic seed really make a difference in the performance of the crop and beyond?

http://rawlivingfoods.tumblr.com/page/4

When eaten, seed should at least be free from chemicals !



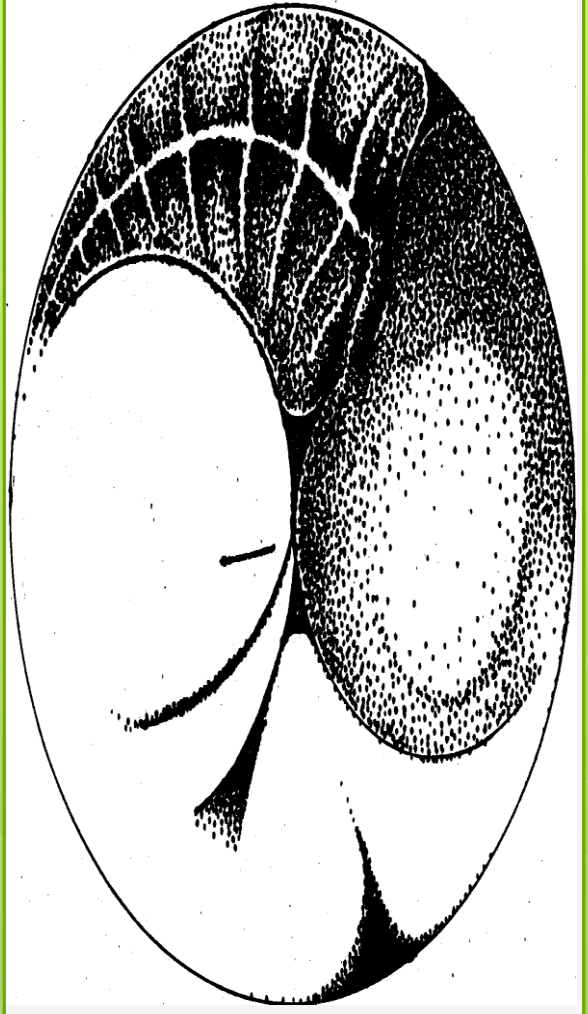
Where seeds are used

Http://panacea-bocaf.org/organicrawfoodnutrition.htm

Organic-
Quantum
Seed

my biography:

"Sustainable"… 1990
"Ecological"… 1995
"Organic"… 2000
"Quantum"… 2005



Organic Seed: Implications for Sustainable Agriculture

2001 Professorial Chair Lecture

http://www.cabi.org/gara/FullTextPDF/2009/20093019285.pdf

Seed Sourcebook 2002

Sourcebook and Proceedings of a National Seed Congress for Sustainable Agriculture… 2000. Held in Cebu and Negros for 10 days

Review

- **Local Seed Systems for Genetic Conservation and Sustainable Agriculture Sourcebook . Edited by Pamela Fernandez et al, UPLB-CA, 2002, 678pp.**

- **This sourcebook is a collection of symposium presentations, field visit discussions, workshop outputs and exhibit materials from a 10-day National Congress on Local Seed Systems for Genetic Conservation and Sustainable Agriculture in the Philippines held in April 2001. The congress brought together a diverse group of would-be practitioners, practitioners and advocates of sustainable agriculture throughout the Philippines.**
  The diversity in experiences is highlighted in more than 30 concrete grassroots experiences and ground level initiatives on sustainable agriculture presented in the congress and contained in the sourcebook. Although some sections are written in mixed English-Filipino language, readers can still get some valuable insights from the discussions and exchanges during the field visits and workshops which were also captured in the sourcebook. Readers may find information on some of the issues affecting sustainable agriculture a bit out to date, but overall the sourcebook offers a wealth of information for sustainable agriculture practitioners and advocates alike. It will be especially valuable to those who are involved in grassroots works and just beginning to shift to more sustainable farming systems. The sourcebook is a bit bulky (more than 650 pages!) but it is also available in CD format at half the paper price (8 US$).

- Price: Php1,000 - (approx. US$ 20) Fax: +63 49 536 2468

http://www.grain.org/fr/article/entries/351-resources

My 2 Organic-Quantum Solutions in Agriculture…

considered by many as our our last chance

Biodynamic

Agnihotra - Homa Farming

A poster of an event that planted and nourished the seed of quantum transformation

QUANTUMIZING AGRICULTURE,SEED,ANDFOOD FOREARTHANDHUMANHEALING; ANDTHESCIENCEOFANCIENTFILIPINOWAYS BEINASEAOFNEWCONCIOUSNESS,NEWSCIENCE, NEWAPPROACHES,NEWSEED.CONTRIBUTETOCHANGE INSOCIETYTHROUGHYOURUNIQUECAPACITIES.LEARN TOCHANGEYOURREALITYTHROUGHYOURTHOUGHTS. ATTENDASCIENTIFICSUNRISESUNSETPRACTICE THATQUANTUMLYHEALSALLAROUNDIT.KNOWTHE REASONFORSEEMINGLYMIRACULOUSSUPERSTITIOUS PHENOMENA.SCIENCECANEXPLAINTHEM.KNOWHOWTO QUANTUMIZEFOODANDEARTHFORHEALTHAND GREATERCONSCIOUSNESS.

ANDMANYMORE

ENJOY
FEELWELL
GET
INSPIRED

EXHIBIT-FAIR
AGRONOMY
CROPSCIENCEBUILDING
UPLB,COLLEGE,LAGUNA
SEPTEMBER29-OCTOBER2,2009(TUESDAY-FRIDAY8AM-6PM)

FOR MORE INFO: 09193744287 or 5362466 / 2468 / 2217

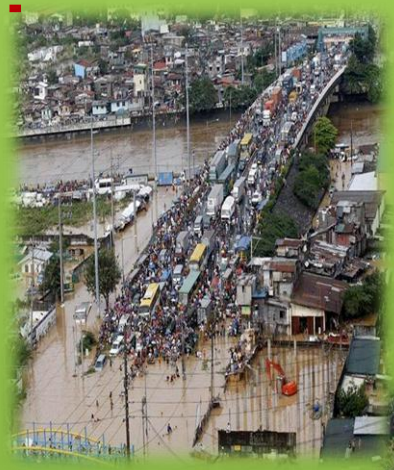
Sunset agnihotra with students

Seed… and… Organic Seed's pivotal role:

… agent of deep, holistic change

But first, why the organic global movement?

- **Earth !**
- **Health !**
- **Life !**
- **Security !**
- **Consciousness !**
- **Will power !**



- **Production**

with responsibility !

- **Economic viability !**

Earth challenges ...

overriding force

The role of humans:

continued destruction

… or…

GREAT SOLUTIONS
(synthesis level, multi-dimensional) **... to overriding challenges:**

...Earth health

...Climate change

...Human "paralysis"

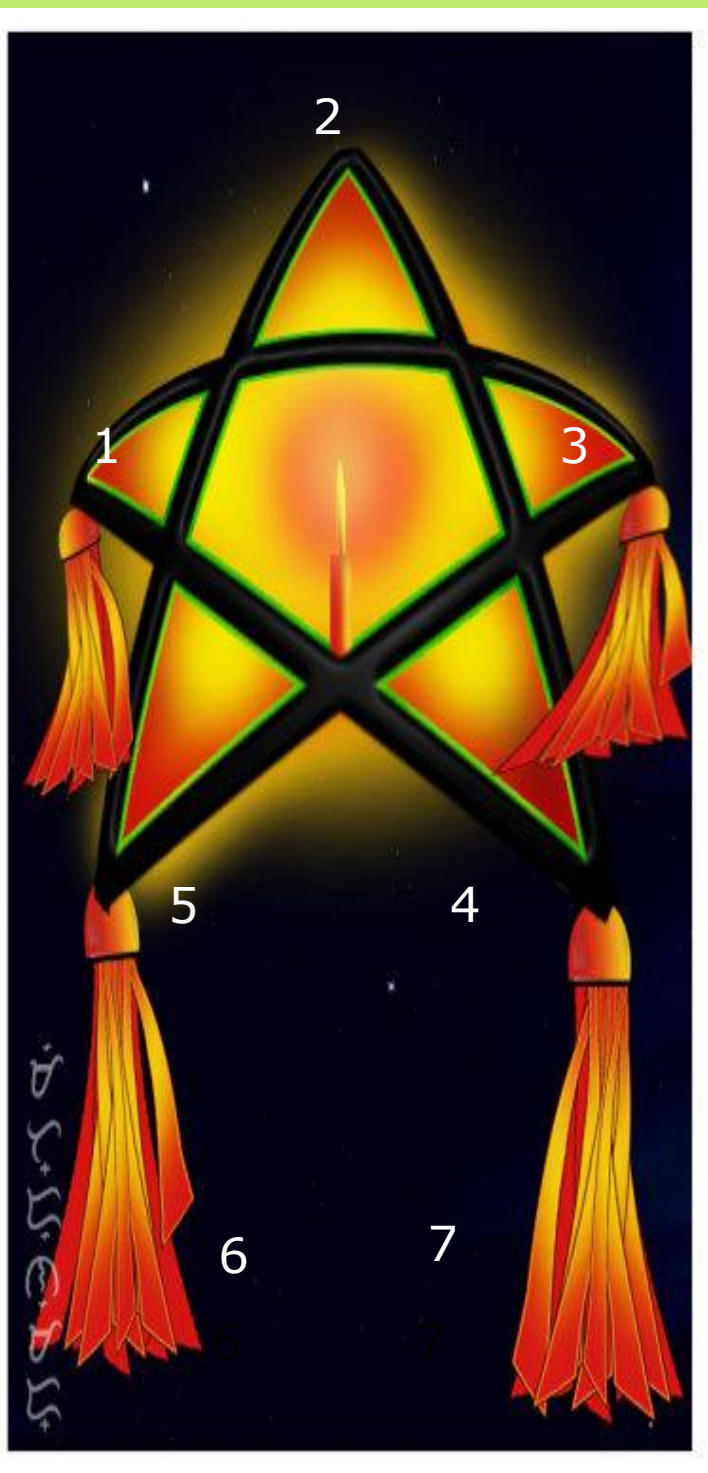
Apathy

Cynicism

Hopelessness

Deeper Agriculture:

Organic or Quantum!



The same framework of Philippine Agenda on Sustainable Development

We continue to Deepen the framework of SUSTAINABLE AGRICULTURE

1980's

1. Ecology
2. Economics
3. Social justice, humaneness, equitability, empowerment
4. Cultural appropriateness
5. Appropriate technology
6. **Grounded on Holistic & Integrative science...** *challenge to accept, imbibe*
7. **Development of full human potential...** *forgotten, token*

Holistic, Back to Nature Sequel to the Green Revolution:

Time Tested SA Solutions

- *LISA, LEISA – still allows chemicals*
- **'Organic' agriculture**

- **Permaculture *(landscape design)***
- **Nature Farming *(microbials, soil quality)* –** *the gateway to quantum realm*
- **Natural farming *("do nothing")- nature will do the work for you, after you prepare self and the farm***
- ***Etc.***

QUANTUM:

- **Biodynamic farming *(life forces)* *First certified organic***
- **Agnihotra-Homa farming**
- **Energy farming**
- **Intuitive farming** *(heightened consciousness)*
- **Other quantum – cosmic approaches**

Solutions are available, but constraints remain

To Go Organic…

Need to go back to Nature's laws…

…to the deeper and hidden aspects of nature

…to honor ancient knowledge … this has strong connection to natural laws and to science

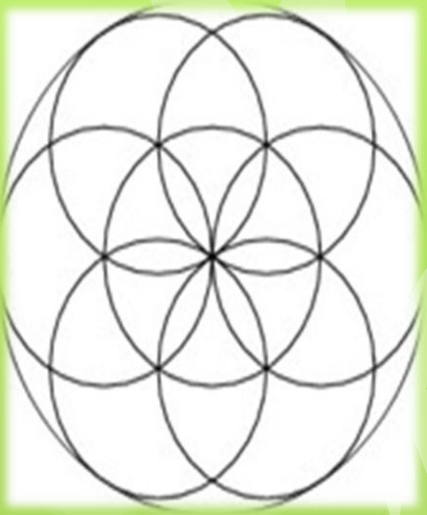
Nature is not our possession.

Nature has us in its possession.

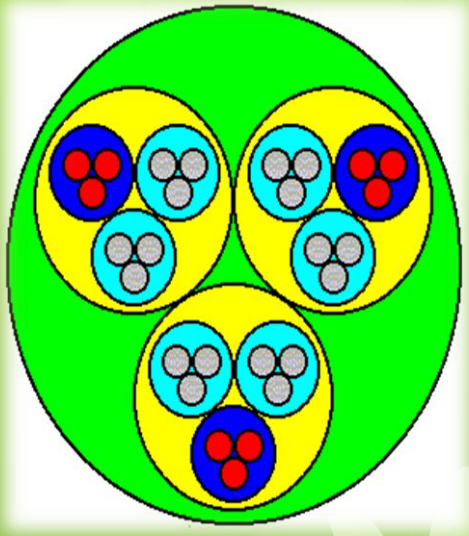
Nature does not draw life from us.

We draw life from nature.

Need mental REFRAMING to go deep into organic …



- **Develop a Holistic view**
- **Harness the Right brain**
- **Delve into Nature's laws and mysteries …**
- **Appreciate Subtle forces and sacred geometries**



Organic and Nature's Laws ...
Quotes

"No act contrary to nature remains without consequences.

Good agriculture is only possible through

conformity with nature's laws.

No natural principle can be breached without its being punished, no natural order of things be dispensed with without danger to ourselves.

To go deep into organic …

… is to see the world, the seed with NEW EYES…

… is to accept that Science evolves

… And that we have 12 senses, not 5!

… Humans also have the physical self AND MORE!!! *(energy body (chi), feeling body, thinking and spirit body).*

… ***Food is also for these other aspects of humans.***

Organic through **Nature**

Organic through the **Heart**

Organic through the **Seed** …

Deep seed appreciation leads to greater intuitive knowledge about the plant…

the Goethean science method

Organic seed will help us in the journey of change…

Deepening of seed connection deepens seed production

Connect through the heart

Heart intelligence is more holistic than the head brain

Seeds are intriguing...

Viviparous

Polyembryonic

Heart on the seed!

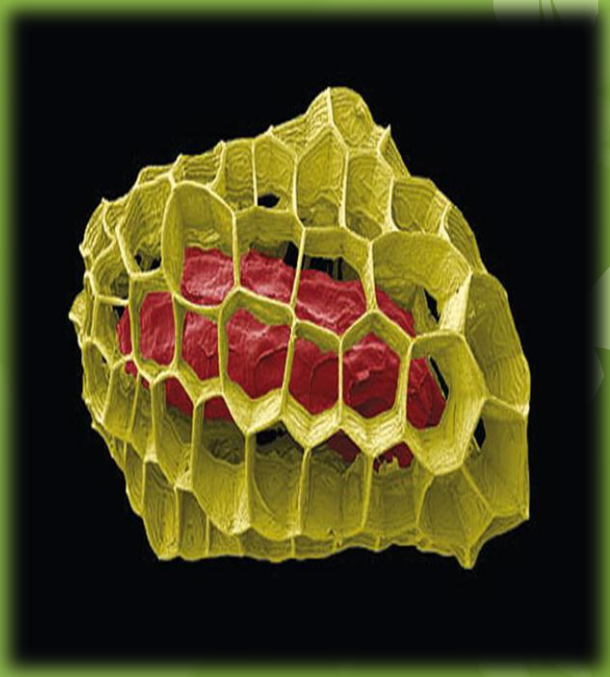
Biggest seed- Double coconut

Makapuno

Seeds are beautiful...

some are invisible

hidden



http://pinterest.com/iolanthe/sensational-seeds/

Seeds *are medicinal, mystical and sacred*

2-eyed coconut

Even ordinary seeds have secrets…

Dragon fruit

http://www.youtube.com/watch?v=McIp5nuKH9U

Tomato… The hairs secrete a mucus that appears as a clear membrane at the edge of the seed…. natural insecticide, keeps it moist, and anchorage in the soil.

Seeds... can have greater use *(Revalue and redefine use*

Kamansi seeds taste like chestnuts

Job's tears or tigbi/panyas like corn; medicinal

Malunggay seed oil

Pilit nut oil

Durian seed chips

Millet- more drought resistant and nutritious than rice

Seed Sprouts...

add great value to the seed, and to our health!

Radish sprouts:

Vitamin Mineral Factory

Radish sprouts have **25x more Vit C than milk** (29 vs 1 mg) and **4x the vit A** (391 vs 126 IU). These spicy sprouts have **10x more calcium than a potato** (51 vs 5 mg) and contain **more vit C than pineapple**... If you examine what is happening during germination it looks like a Vit factory. While mature radishes contain 10 IU/100 g of provitamin, the radish sprouts contain 391 IU, 39 times more!

http://natureswonderland.com.au/Biodynamic/Radish

Popularly sprouted…

http://www.living-foods.com/articles/sprouting.html

Grains

- Amaranth
- Barley
- Buckwheat
- Corn
- Millet
- Oat
- Quinoa
- Rice
- Wheat
- Rye

Other seeds

- Almond
- Fenugreek
- Cabbage
- Kale
- Flax
- Psyllium
- Chia
- Mustard
- Pumpkin/squash/cucurbits
- Radish
- Sesame
- Sunflower

Legumes

- Alfalfa, Clover
- Garbanzo
- Peanuts, peas, blackeye
- Mungbean, adzuki and other beans

Large beans

- Soya, kidney and other beans (best cooked after)

Best soaked but not sprouted

- Fennel, Celery, Caraway, Cardamom, Poppy
- Pecan, Walnut
- Macadamia
- Pili
- Other nuts

Need explore local seeds

http://turmericsaffron.blogspot.com/2010/03/samanoo.html

http://www.nandyala.org/mahanandi/archives/category/5/

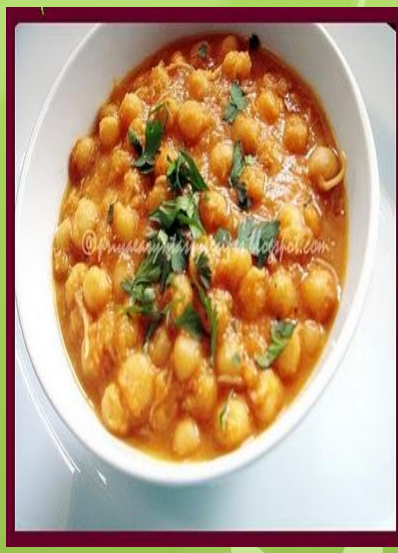
Other sites to visit for sprouts

http://www.ehow.co.uk/how_7685780_store-sprouts-refrigerator.html

http://www.google.com.ph/imgres?q=SEED+GRAIN+sprouted+dried&start=89&num=10&hl=tl&biw=1366&bih=667&tbm=isch&tbnid=u1PLiuoegkkZjM:&imgrefurl=http://www.ehow.co.uk/how_7685780_store-sprouts-refrigerator.html&docid=FelFCqbQCZz-rM&imgurl=http://img.ehowcdn.co.uk/article-new/ehow/images/a07/ah/kk/store-sprouts-refrigerator-800x800.jpg&w=400&h=300&ei=S2SLT9X7DbGPiAfF6dXRCQ&zoom=1&iact=rc&dur=460&sig=109321639220797562759&page=5&tbnh=149&tbnw=187&ndsp=25&ved=1t:429,r:6,s:89,i:17&tx=59&ty=94

Soaked *(pre-germinated)*
then
re-dried seeds... ***healthier...***
eaten raw or cooked... ***newer***
business opportunities!!!

Organic sprouted grains



Sprouted Brown Rice is very digestible with lots of vitamins, minerals, and enzymes produced during the sprouting process. Great for milling into fresh flour or for cooking to accompany your favorite dishes.

To Your Health Sprouted Flour Co. offers organic sprouted grain flours and organic sprouted whole grains for home milling. Our flours are sprouted, dried, and milled on site. We always mill our flours fresh per order; they don't sit on a shelf or in a warehouse. We hope you will be ordering these nutritional flours and grains for yourself and your family.

The sprouting process converts the natural starches in the grains into digestible, simple vegetable sugars so YOUR BODY DIGESTS SPROUTED BREADS, FLOURS, AND PASTAS SIMILAR TO A VEGETABLE! Sprouting increases the grains' vitamin C & carotene content, produces B vitamins & enzymes, & removes naturally occuring toxins that are present on the outside of all grains.

http://thewellseasonedcook.blogspot.com/2010_06_01_archive.html

http://www.localharvest.org/organic-sprouted-brown-rice-C16854

http://www.culturesforhealth.com/baking-supplies/sprouted-grain.html

Seed food (snacks) or Food topped or mixed with seeds

Science of Organic-Quantum Seed

Includes the realms of the …

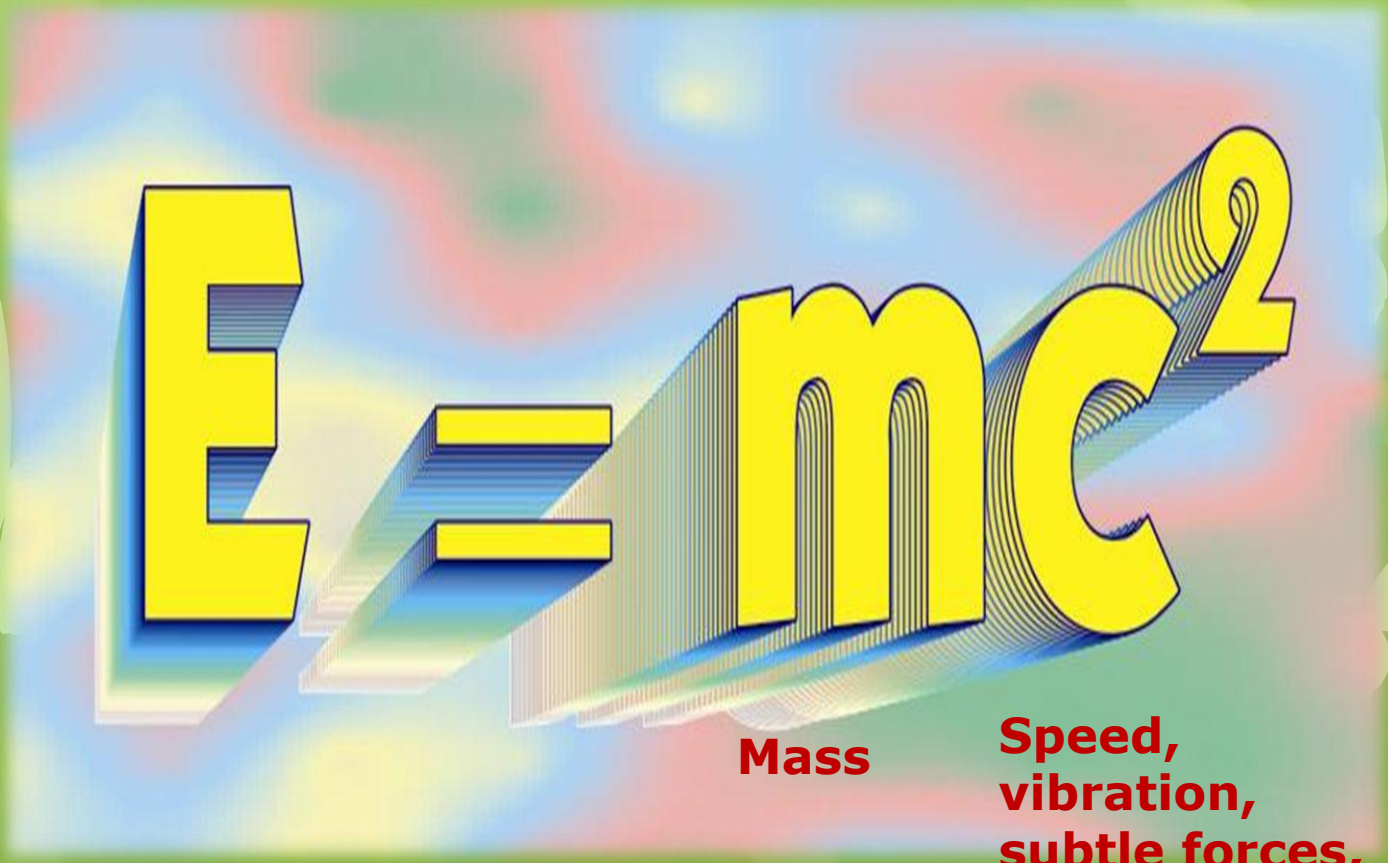
… material
… non-material

… subtle forces

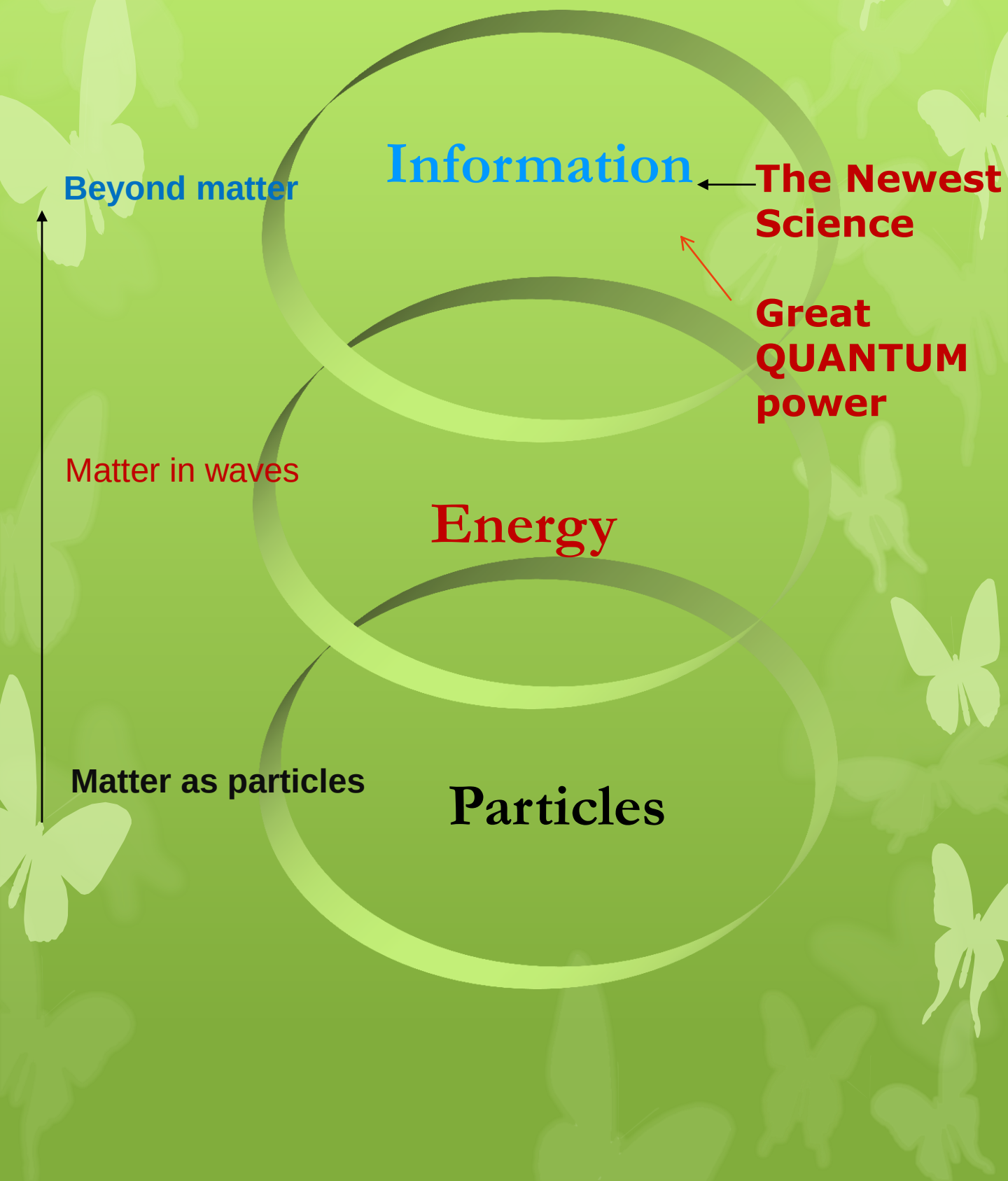
As above, so below… seed is a hologram of the universe…

Nature is outside and inside us.

In MATTER: visible and invisible; Polarity. When we reduce mass or matter, speed, energy and/or the information level compensates.



ASPECTS OF NATURE, MAKE-UP OF TH



Science continues to evolve

old : "Materialist" Science 17th- 9th century Darwin, Newton… based on physical reality

new : **Non-materialist Science** 20th - 21st century…

THE SECOND SCIENTIFIC REVOLUTION

"Quantum science"

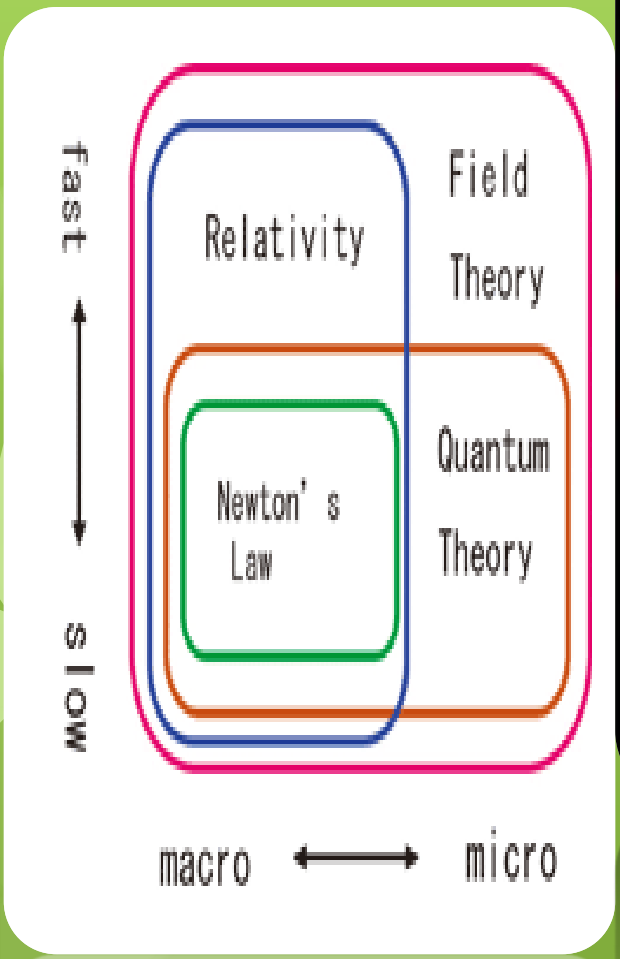
1) Relativity of space and time and dual nature of matter; about the macro-universe … *Einstein* E=mc2 →

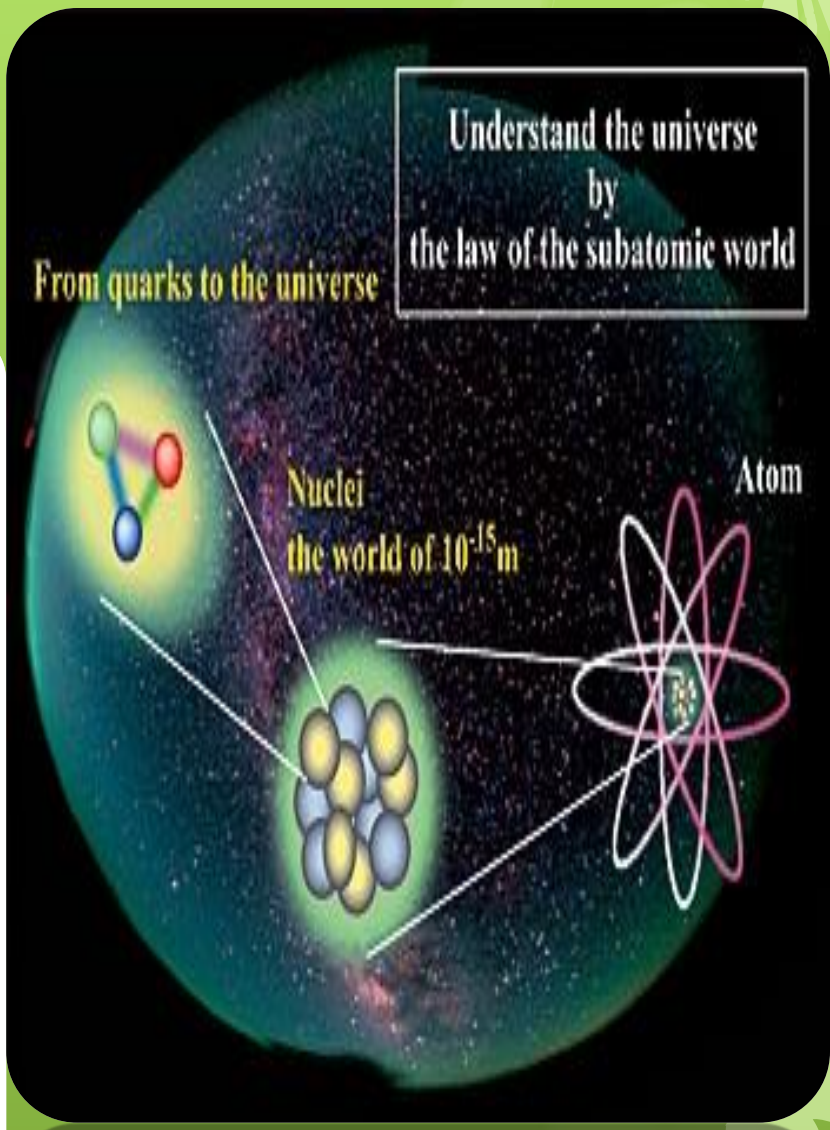
2) "Quantum" Physics – about the subatomic or micro universe →

3) Unified field *(1+2)* →

4) Super strings

Science evolves… *beyond Einstein, beyond matter*





Science and practices are jeopardizing seeds... SEEDS lost their connection to Nature... *threatening human and earth existence!!!*

- **Weak seeds**
- **Unadapted seeds**
- **Pampered seeds**
- **Terminator seeds**
- **Seeds mismatched to our true nature**
- **Seeds inappropriate to our deeper culture**
- **Seeds in the hands of the few; under monopoly; externally controlled**
- **Seeds that are product of reductionist science**
- **Seeds that threaten sustainable agriculture**

http://www.australianreclaiming.org.au/sacredearth/?tag=earth-based-spirituality

Seed is a holon, a complete image of the bigger picture… Thus, weak seed- weak country

In the seed is the image of the whole universe…

Rudolph Steiner

To change the seed is … to change the whole farm and farming system, the farmer, the community and the world.

Transforming the Seed...

using New and Old science... Change your thought and you change the world... The heart of the revolution is the revolution of the heart...

It is only with the heart that one can see rightly; what is essential is invisible to the eye.

Albino Strawberry?

"Allegedly sourced from an endangered strain in South Africa and have been cultivated for the past decade, now available for limited commercial purchase in Europe. Genetically the same as a strawberry, but are white with red seeds and **taste like pineapples."**

Take a peek at …

Plant and seed secrets, their true nature…

Everything has life… Nature is alive

Anything that exists is formed by a blueprint… this in turn is activated and materialized by some formative force

Forces are on and beyond earth…

Impulse of creation is to be whole, to reproduce

The seed contains the image of the whole organism

Seed and Fruit are the Fire element in the plant. It is where cooking and thus transforming happens.

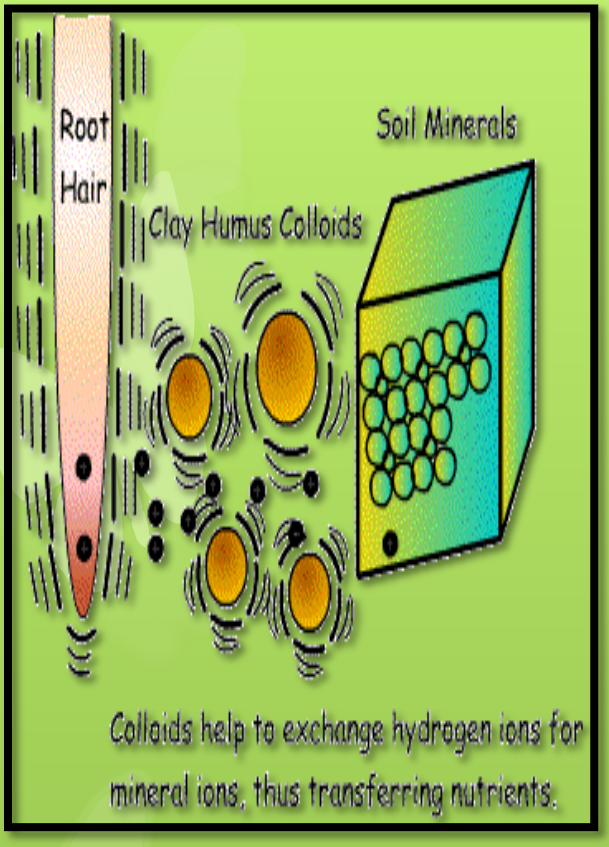
Epigenetics: the environment and experience of the plant defines its subsequent seed; DNA is altered in one growing season.

Plant must eat and drink properly, and be given the other necessary conditions, for the seed to be properly formed…

Nature's intelligence… only now that modern man is starting to understand.

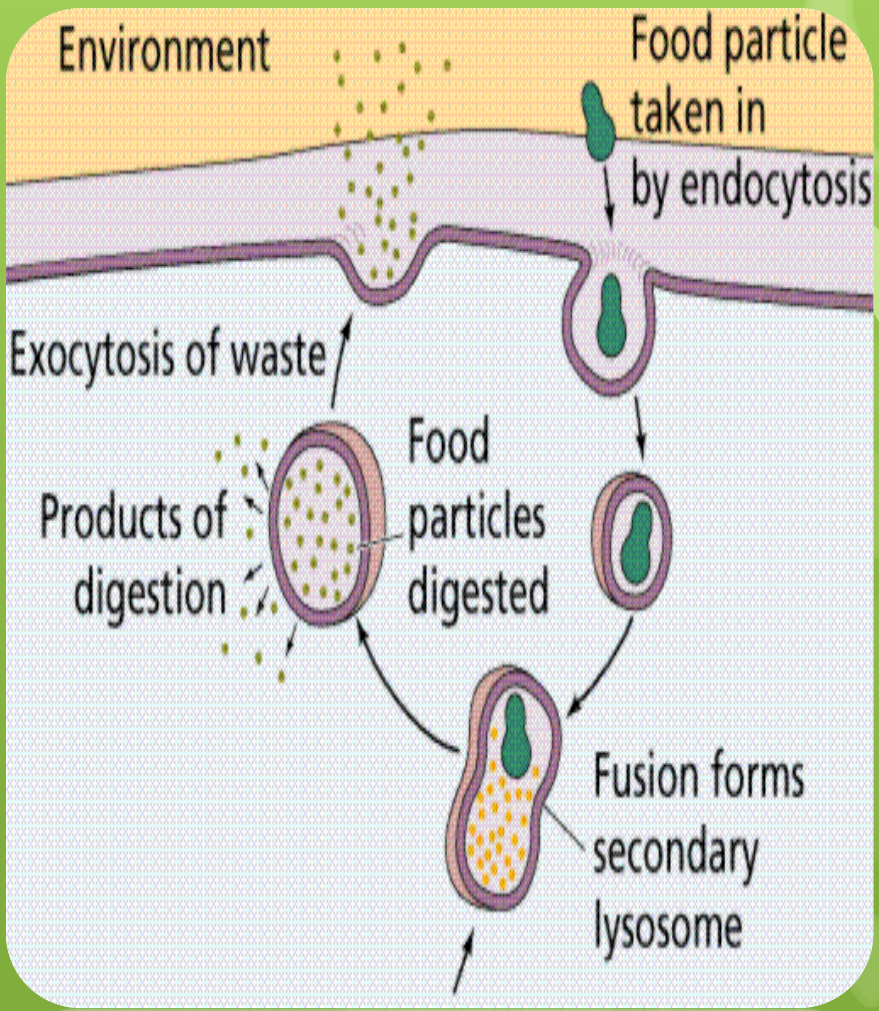
- How does a plant really eat, drink?
- How does it know how to grow?
- How does it develop into flower, fruit, and seed?

- How does it get ill?
- What are the manifestations of imbalance?
- How does it heal and repair itself?



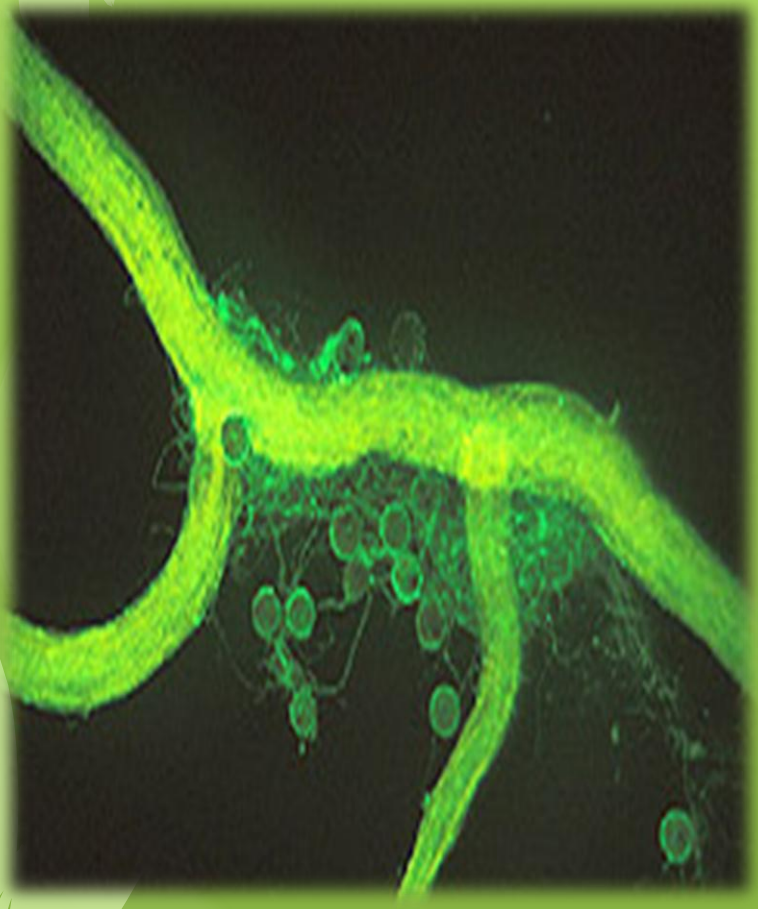
Plants EAT… not DRINK their food

Humic substances are ingested by root cells, with the help of mycorrhizae, by ENDOCYTOSIS.



Mycorrhiza are helpers in nutrient sourcing and absorption

Mycorrhizal fungus on corn roots



MINERALS disrupt this feeding … they get dissolved in water and are then drank by the bigger roots, instead of being eaten by the finer roots.

…And we regard being big as good!?

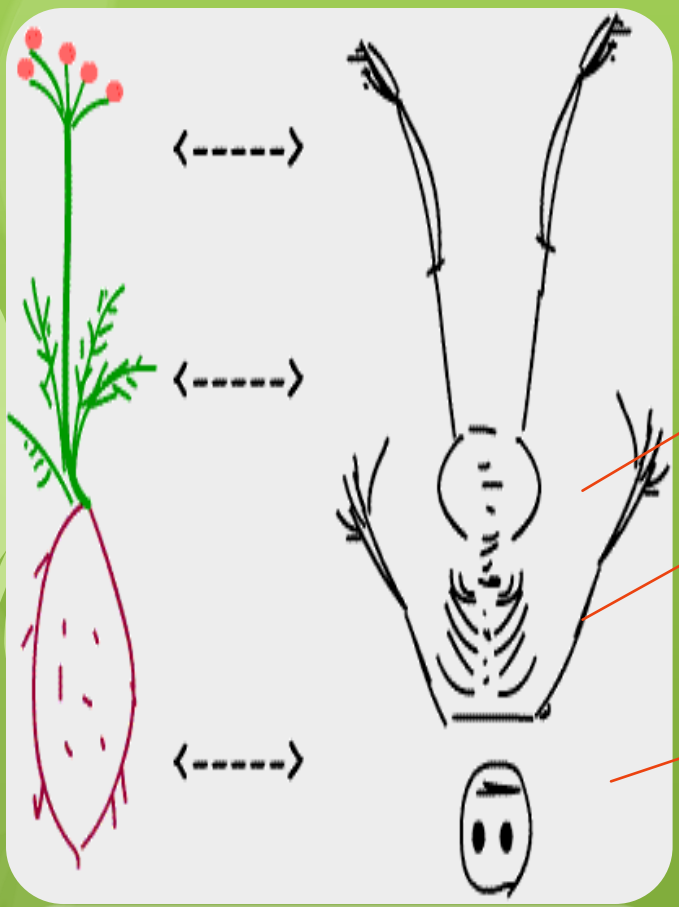
Result is perennially thirsty but bloated cells…

Did you know that…

One cubic inch of soil can contain 300 miles of mycelium, an associative neural network carrier of information structured much like the Internet, according to the book Mycelium Running.

Did you know that the plant ... *is an inverted human?*

its intelligence is in the roots, earth, soil ?



Metabolic, digestive= limbs

Rhythmic= heart

Thinking= head

Criteria for Organic Seed *deal with…*

Soil- current and previous
Inputs
Variety development and choice
Seed (& other planting materials) production and treatments
Crop Care
Farming system
Farmer
Community
Consumers
Industry

IFOAM Basic Standards

IFoaM Position on the Use oF organic seed and Plant ProPagation Material in organic agricUltUre. Approved by the IFOAM World Board in August 2011

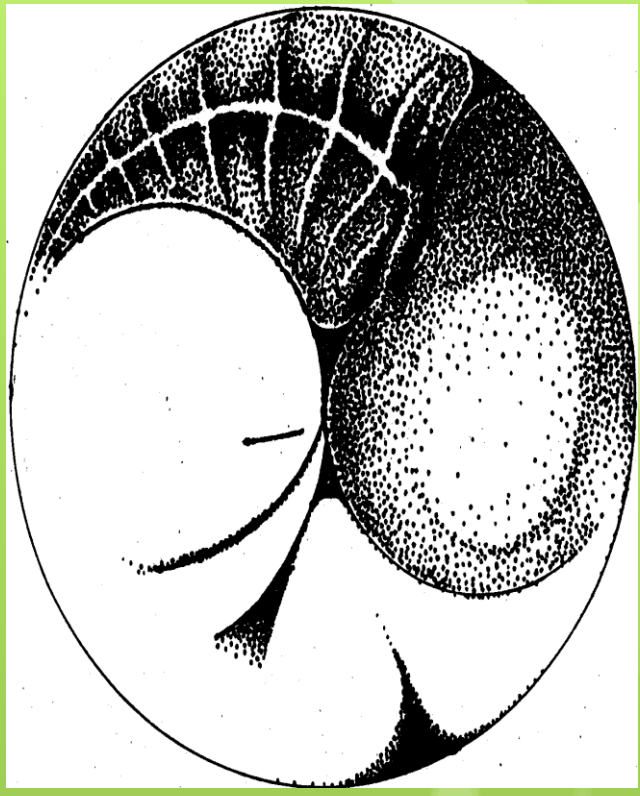
- http://www.ifoam.org/press/positions/Seed_Position_Paper.pdf
- http://cms.standardsmap.org/publish/itc_standards/ifoam/Resources/files/867/Final_IFOAM_EN.pdf

EU-Regulation on Organic Agriculture

http://www.bioland.de/fileadmin/bioland/file/bioland/qualitaet_richtlinien/Bioland_Standards_2009-04-27.pdf

Bioland Standards as of April 27th 2009

Organic Seed



- had been produced, grown or managed using **organic inputs & practices**

- one that is **for organic farming**

What is ORGANIC?

NOT JUST THAT WITH CARBON !... *that which contains* ***carbon*** *and thus include manufactured chemicals and synthetic fertilizers ??? XXX!*

Alive (is, had been)! *those being, or having been derived from, once living organisms*

Have (had) **complex organization** or are organized as a system of interrelated parts, reflecting that of living things

A a substance or approach that leads to **enhancement of natural processes**

International Organic Movements

The IFOAM has come up with international organic standards for certification which are to be adapted by each member country according to their own realities.

Basis: ***Biodynamic Agriculture***
Nature farming

Their science is well articulated

IFOAM: International Federation of Organic Agriculture Movements

Mutual tasks of organic biological cultivation consist of:

- caring for the natural basics of the life of the soil, water and air
- producing foodstuffs of a high health value
- carrying out active nature protection and the preservation of species
- avoiding to damage the environment
- keeping animals according to the needs of its species
- making a contribution towards solving the world-wide energy and raw materials problems
- creating the basis for the maintenance and development of independent farming structures.

To truly embrace organic is to acknowledge that Organic is

… a total paradigm shift

… changing mental model

… transforming the total self!

"Organic" ... *General Stipulations bear on...*

- Genetic Engineering
- Location
- Air, Soil and Water Protection
- Use of machines and equipment from other operations
- Renewable Energy Sources
- Social Responsibility

Specifics for…

- **Crop production**

  Others:

  - *Animal Husbandry*
  - *Horticulture and Permanent Crops*
  - *Storage*
  - *Processing*
  - *Marketing*

And zoom in further:
Crop Production-> Seeds

- Soil Fertility
- Crop Rotation
- Soil Preparation
- Fertilisation and Humus Management
- **Seeds, Seedlings and Plant Materials**
- Plant Protection
- Weed Regulation
- Wild Collection

Seeds, Seedlings and Plant Material… *Organic*

Basic Principles: SPECIES and VARIETIES

- plants which are best suited for the conditions prevailing at the location… **ADAPTED**
- should not easily be subject to disease and be of a high physiological nutritional quality. **HEALTHY and RESISTANT TO STRESSES**
- typical for the area should be used in preference to hybrid varieties. **LOCALS OVER HYBRIDS**
- The use of CMS hybrids originating from cytoplast fusion is forbidden in vegetable growing. **No USE of CMS HYBRIDS**

Treatment of Seeds- POSTHARVEST

- **NO CHEMICALS AFTER HARVEST**… Seeds and plant materials may not be treated after the harvest with chemical synthetic pesticides (e.g. disinfectants).

- **NO HARMFUL CHEMICALS IN CONDITIONED SEEDS**… Care is to be taken when using conditioned seeds (pelleted seeds, seed plates, etc.) to ensure that the materials used are harmless in the sense of these standards.

Requirement on seed use…

… Organically Produced Seeds and Plant Materials

- **When certified seeds and plant materials of suitable varieties are available from organic propagation, then these must be used.**

- **Any other sources require the express exceptional approval by …** *the ____??? Or any national body… Organic certifier??*

Exception to use of organic seed…

organic production requires the use of organic seed, unless…

it can be proved that at the time of purchase, there is no stock of organic seed for the variety

??? Philippine setting???

- when farmers can show that such organic seeds are not available
- Computerized databases for the registration of commercially available organic seeds.
- Farmer has to show that no variety similar to what he/she wants is available on the database

GE (genetic engineering)… Not Allowed

outside/against organic farming principles

… considered unnatural approach… produces product that is dissimilar to conventionally bred varieties.

… a one-dimensional and drastic intervention in a plant's genetic make up.

… disconnection with nature.

… isolates the cell from the plant.

Why not GE and GMO's?

they are against Organic Farming Principles

GE is a one dimensional and drastic intervention in a plant's genetic make up

It destroys connection with its natural environment

Start with cell, and eventually reconstituted through tissue culture techniques

Bypass the whole plant x natural growing environment interaction

- There is insufficient knowledge of the risks of these reductionist methods

-Capital intensive breeding methods that inevitably lead to patenting practices; development of multi-national breeding corporations , restrict free exchange of genetic material, threaten genetic and cultural diversity

BUT ALLOWED (in special cases)

DNA diagnostic techniques (enable selection at DNA level), a form of gene technology but not involve genetic modification of DNA biochemical and molecular markers

Need special laws to supplement direct selection method in the field

-Chemically grown seeds of some non-GE variety if organic seeds are not available

Source: EU Regulation 2092/91 on organic production

When is GE allowed?

Only in special cases is genetic engineering allowed, but **only at the level of DNA diagnostic techniques**, which enable selection at DNA level. Such is a form of gene technology, but **does not involve modification of DNA or genes** to produce a new plant form or variety. However, special laws are required to supplement direct selection method in the field.

Other issues in the exemption…

- **Change to other variety**… The government may decide that there are sufficient varieties and quantities of seeds for a particular species on the database for organic farming supply, thus can close exemptions for that species.

- **Record of no organic seed supply**… If farmer uses non-organic seed, then must keep a journal of organic seed research, log calls to seed suppliers (*date, supplier, result*), and log searches of seed catalogue or websites

- **Only from registered varieties**… It is illegal under current seed laws (in Europe) to trade or sell seeds from varieties that are not registered

Other issues*; Caveat in the exemption and use of inorganic…*

Switch to non-organic varieties… seed users would be encouraged to switch to other varieties (e.g., non-organic varieties), where they can claim that there is no available organic seed.

Enforcement challenge… can easily take place in the absence of effective organic seed enforcement.

Certification challenge*… Organics could also take up 20% of the time in certification of organic seed supply, for example in verifying non-availability of seed (Organic Consumers Association). Their realities could very well happen, and are in fact happening, in Europe.*

Politics within the Organic Seed movement

- **Some organic advocates can't get away from GM …**
- ***Still talk about Co-existence of Organic and GM Agriculture…***
- ***Pressure from foundations (chemical) supporting the organic movement…***

The case of IFOAM in its FirstWorld Conference on Organic Seed: *Challenges and Opportunities for Organic Agriculture and the Seed Industry* IFOAM/FAO/ISF (July 2004, Rome)

Tissue culture … not organic

Tissue culture is used as means to regain the organism but… the whole plant x natural growing environment interaction is bypassed.

Leads to forms that are… highly detached from the natural processes and environment.

Hybrids… highly restricted because of…

? Variety and seed generation system

? Genetic/varietal uniformity or diversity

? Seed source

? Seed management

? Seed adaptation or lack of it (to soil, climate and resistance to environment and to pests and diseases; to diverse conditions, recycling, and organic inputs)

Other ORGANIC SEED criteria

- **Soil … uncontaminated**
- **Fertilizers … organic**
- **Grown naturally; in natural habitat**
- **Pollen… No unwanted pollen around during growth-development**
- **Harvest… from fully developed/ripened seeds**
- **Storage… done properly**
- **True to label**

Bargyla Rateaver 2001

BOX 1

Organic Seed Criteria (highly expanded)

Genetic Conservation	Breeding/Crop Improvement	Seed Production/ Multiplication/Propagation	Crop Production	Crop Processing/ Distribution
GENERATION OF ORGANIC SEED/VARIETY			**UTILIZATION OF ORGANIC SEED/VARIETY**	
■ maintained germplasm under natural conditions and through community seedbanks ■ farmer controlled/ managed	■ adapted, local parents ■ diverse parents; managed by farmer-friendly breeding methods ■ conventional breeding (e.g., population breeding); restricted for in vitro; no protoplast fusion, no induced mutation; no GE ■ parents grown organic for at least: - 1 generation for annuals or - 2 growing seasons for perennials ■ if institutional, given to farmers for testing at early stage of breeding (e.g., F_2, F_3) ■ tested in resource-poor farmer's fields ■ selection criteria according to farmer's culture (compatible with farmers'/ community's culture); adaptability, pest resistance/tolerance ■ horizontal, polygenic resistance (i.e., not just to one type of pest and disease) ■ can produce seed and in sufficient quantity/ decent seed yield (not sterile) ■ does well under low and organic inputs ■ variety NOT strictly Distinct, Uniform and Stable ■ multiline, pureline, OPV (open-pollinated varieties); clones are limited/restricted; no hybrids (otherwise parents have been grown organic for several generations); no CMS (cytoplasmic male sterile) hybrids without restorer genes; reusable seeds ■ not patented (or given any other form of IPR) ■ farmer controlled/ managed ■ according to standards of organic inspection/ certification bodies	■ local "organic" inputs ■ local cultural practices ■ non GMO ■ uncontaminated with GMO, pesticides, NO_3's, etc. ■ follow or adapted to ecological agriculture principles: - biodiversity which include genetic/varietal, species, ecosystem, cultural, functional - integrated (components including animal integration) - soil health - recycling; managing energy and resource flows - conservation of natural resources - appropriate pest management - appropriate variety/ species (taps synergy and complementarity in genetic resources) ■ good seed quality (germination, vigor, authenticity, cleanness, adaptability to local soil and climatic conditions, resistant to pests and diseases, etc.) ■ plants grown in local, natural, healthy soil ■ plants allowed natural interaction with other species and environment ■ plant fully mature when bore fruits/seed ■ fruits fully mature upon harvest ■ seeds fully mature upon extraction ■ processed and stored properly ■ good purity (according to farm standards and heterogeneity of variety and seedlot) ■ energy conservation, minimized use of external energy, e.g., for processing, grading, storing, germination testing and health mgt. ■ "detoxed" (grown in organic system over several generations) ■ not patented (no IPR) ■ not controlled or traded by TNCs or big, monopolistic private companies ■ not stored long in bulk ■ not produced in very large quantities to cause displacement of other varieties ■ adapted to ambient storage ■ not traveled long distances ■ exported if for sale (reasonably priced) ■ exchanged freely but responsibly ■ farmers get their fair share of the proceeds ■ farmer controlled/managed ■ "certified" organic; true to label	■ avoid use of prohibited practices/inputs (use only allowed practices/inputs; limits use of restricted practices/inputs ■ follow IFOAM standards (as modified for the country) including: - no GMO/product - no irradiation (products) - no sewage sludge - no manure compost, mulches from factory farms/other farms - no antibiotics; hormones/ growth promoters - no synthetic chemicals; pesticides - no toxic "inert" ingredients - no food processing off-site - no factory farm style intensive confinement of farm animals (as manure source) - no products labeled "organic" if 70% of ingredients are modified organic, or labeled "natural foods" and with 50% organic ingredients even if rest is GE, irradiated, etc. ■ uncontaminated with GMO ■ decent crop yield ■ organic feed production ■ farmers get fair share of produce/profit ■ include other practices listed under seed production ■ "certified" organic	■ follow IFOAM standards as adapted for the country ■ satisfy household food security ■ shared to others ■ farmer controlled/ managed ■ excess may be marketed but controlled to avoid genetic erosion or displacement of genetic diversity ■ local, village/community level processing ■ good market but with fair trade ■ farmer-friendly technology/system ■ quality food and feed ■ farmers get good farm gate price ■ traders/middlemen do not get unfairly high profit ■ truthfully labeled ■ "certified" organic

Holistic concern of Organic Seed

Seed production, Multiplication

Collated from various sources. Those italicized under each category are minimum standards of IFOAM.

ORGANIC SEED

- local "organic" inputs
- local cultural practices
- non GMO
- uncontaminated with GMO, pesticides, NO_3^-'s, etc.
- follow or adapted to ecological agriculture principles:
  - biodiversity which include genetic/varietal, species, ecosystem, cultural, functional
  - integrated (components including animal integration)
  - soil health
  - recycling; managing energy and resource flows
  - conservation of natural resources
  - appropriate pest management
  - appropriate variety/ species (taps synergy and complementarity in genetic resources)
- good seed quality (germination, vigor, authenticity, cleanness, adaptability to local soil and climatic conditions, resistant to pests and diseases, etc.)
- plants grown in local, natural, healthy soil
- plants allowed natural interaction with other species and environment
- plant fully mature when bore fruits/seed
- fruits fully mature upon harvest
- seeds fully mature upon extraction
- processed and stored properly
- good purity (according to farm standards and heterogeneity of variety and seedlot)

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- processed and stored properly
- good purity (according to farm standards and heterogeneity of variety and seedlot)

- energy conservation, minimized use of external energy, e.g., for processing, grading, storing, germination testing and health mgt.
- "detoxed" (grown in organic system over several generations)
- not patented (no IPR)
- not controlled or traded by TNCs or big, monopolistic private companies
- not stored long in bulk
- not produced in very large quantities to cause displacement of other varieties

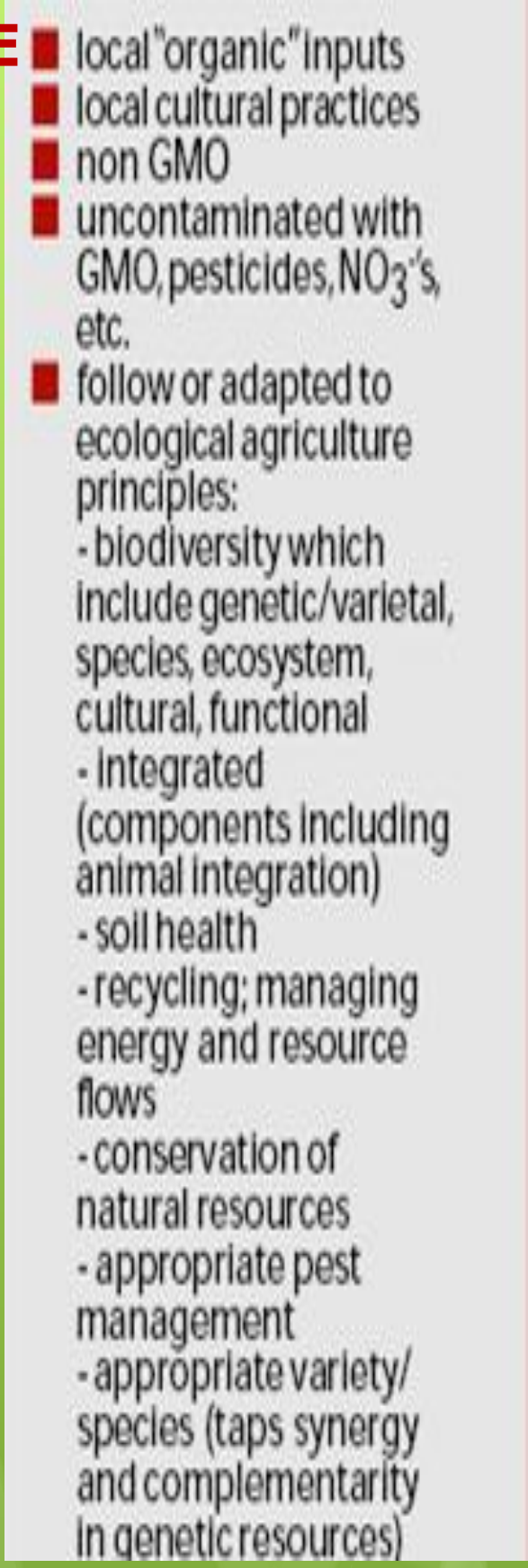
- adapted to ambient storage
- not traveled long distances
- not expensive if for sale (reasonably priced)
- exchanged freely but responsibly
- farmers get their fair share of the proceeds
- farmer controlled/managed
- "certified" organic; true to label

Comparison of F_1 Hybrid Seeds and Local Seeds

	F_1 hybrid seeds	Local seeds
Cost	■ Expensive	■ Cheap
Recyclability	■ Cannot be reused as seed stock; traits are no longer true-to-type and are variable in the succeeding generations; need to get fresh stock each cropping season to get the original performance	■ Traits are still stable after many generations/ crop seasons; can generate true-to-type seeds
Performance	■ Requires heavy inputs (fertilizer, pesticide, water) and management ■ Requires highly controlled or artificial conditions, consequently considered as "generally adapted"	■ Generally adapted to low external input and management ■ Specific adaptation
	■ Hybrid vigor is only expressed in certain environments (especially high input ones); performance is inferior to traditional/local seeds under marginal environments	■ Better if not as good as hybrids under low input or marginal environments
	■ Unstable performance in variable or mixed environments ■ Seeds of some varieties are very light, owing to their small specific gravity; farmers who are unaware of this mistakenly discard large portions of light although viable seeds that float during pre-soaking	■ Stable performance in a specific (and variable) environment
Genetic diversity	■ Genetically uniform parents, plants and seeds; grown in monoculture	■ Genetically diverse parents, plants and seeds grown as multilines or multivarieties and with other species in mixed culture

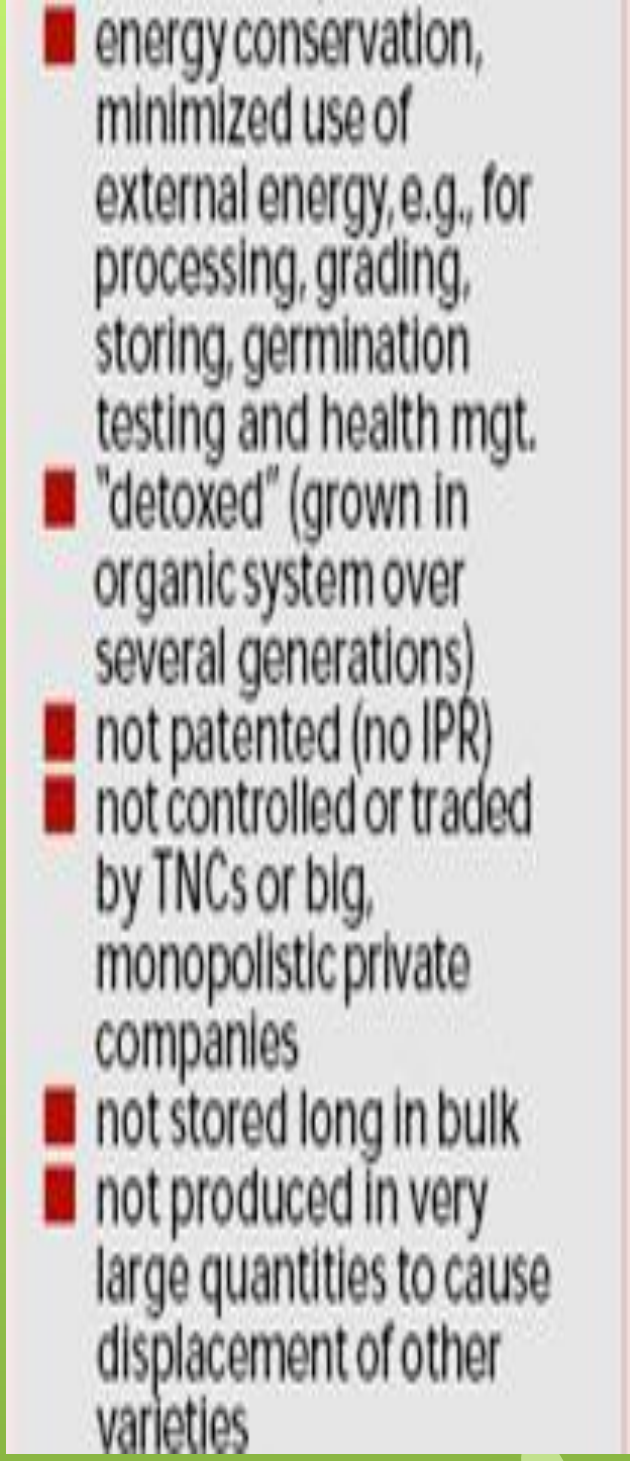
MORE COMPREHENSIVE CRITERIA

- Local "organic" inputs
- Local cultural practices
- Non GMO
- Uncontaminated with GMOs, pesticides, NO3's, etc.
- According to ecological principles



- Good seed quality
- Plants grown in local natural healthy soil
- Plants allowed natural interaction with other species
- Plant fully mature when bore fruits/seed
- Fruits fully mature upon harvest
- Seeds fully mature upon extraction
- Processed and stored properly
- Good purity

- Practice energy conservation, use minimization
- “detoxed” seed
- Not patented
- Not controlled by big companies
- Not stored long in bulk
- Not produced in large quantities; not displace other varieties



- Adapted to ambient storage
- Not traveled long distances
- Not expensive if for sale
- Exchanged freely but responsibly
- Fairly traded
- Farmer controlled/managed
- “certified” organic; true to label

Organic seed… *finer criteria*

- **Growth rates… slower** *(notice that fast growth and mass/yield are not priority in organic, although could be made so)*

- **Physiological maturity… greater** (not in a hurry)

- **Storage life… Longer** (maybe due to lower free amino acid content which is attractive to bacteria, decomposers; a difference in moisture content may also be a factor)

- **Respiration rates and enzyme activity… lower** *(of organically produced vegetables)*

- **Perishability… Longer; lower degree of shrivelling; colonization of epiphytic microorganisms, peroxidase activity, nitrite formation and vitamin C breakdown**

- **Dry matter levels… Higher**

- **Density… Greater**

Source: N. LAMPKIN. 1990.

Is there a difference?

Organics vs Conventional…

1. Chemical and nutritional quality
2. Brix readings
3. taste/flavor and or feel after eating
4. performance of product
5. feeding responses of animals
6. health effects (long term)
7. soil, air and water quality
8. others

Is there a difference? Organics from Conventional… common parameters

1. **Chemical and nutritional quality**

- presence and levels of undesirable substances such as pesticide residues, nitrates, toxins and other contaminants
- presence of favorable substances such as essential minerals, vitamins, antioxidants, hormones and other compounds.

2. **Brix readings** (for sugars) using refractometers, atomic absorption and paramagnetism (for other substances)

3. **taste/flavor and or feel after eating**, most especially by health conscious individuals or yoga practitioners, or by hypersensitive individuals (e.g., through skin reactions)

4. **performance of product**, such as storability, processing suitability, yield, dry matter

5. **feeding responses of animals** such as preference for, or avoidance of, certain food or feed stuff

6. **health effects (long term)**

7. **soil, air and water quality**

8. **others such as** *integrity of source, certified, labeled*
   (granting the system works well)

Source: N. LAMPKIN. 1990. Organic farming. Farming Press Books. United Kingdom. 701 p.

ORGANIC VS CONVENTIONAL

Minerals

Vegetables Type of Soil Management	Minerals (in milliequivalents)						
	Calcium	Magnesium	Potassium	Sodium	Manganese	Iron	Copper
Snap Beans							
Organic	40.5	60.0	99.7	8.6	60.0	227.0	69.0
Conventional	15.5	14.8	29.1	0.0	2.0	10.0	3.0
Cabbage							
Organic	60.0	43.6	148.3	20.4	13.0	94.0	48.0
Conventional	17.5	15.6	53.7	0.8	2.0	20.0	0.4
Lettuce							
Organic	71.0	49.3	176.5	12.2	169.0	516.0	60.0
Conventional	16.0	13.1	53.7	0.0	1.0	1.0	3.0
Tomatoes							
Organic	23.0	59.2	148.3	6.5	68.0	1938.0	53.0
Conventional	4.5	4.5	58.6	0.0	1.0	1.0	0.0
Spinach							
Organic	96.0	293.9	257.0	69.5	117.0	1584.0	0.0
Conventional	47.5	46.9	84.0	0.8	1.0	19.0	0.5

Research conducted by Firman E. Bear at Rutgers University in the Natural Gardener's Catalog (1995)

Taste and Storage Loss Differences Between Organic and Conventional (Mineral System) Produce

Comparative taste tests on vegetables produced organically and conventionally (10-yr. ave)

	% better score than conventional	
	Fresh	Stored
Celery	11	29
Carrots	-4	-8
Beetroot	19	15
Cabbage	17	n.s.

Storage losses (%) for vegetables grown with different fertilizers

	Fertilizer Type	
	Mineral	Organic
Celery	45.5	34.5
Carrots	50.5	34.8
Beetroot	59.8	30.4
Cabbage	46.2	30.0

Review by: Lampkin, 1990.

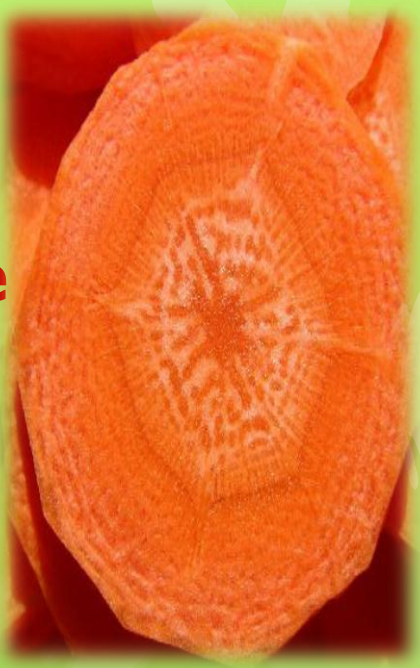
Relative Yield and Composition of Vegetables Grown with Composted Manures Compared with Mineral Fertilizers (results of a 12-year experiment)

Yield:	24%	
Desirable Components:		
	23%	higher dry matter
	18%	more protein
	28%	more vitamin C
	19%	more total sugar
	13%	more methionine (an important amino acid)
	77%	more iron
	18%	more potassium
	10%	more calcium
	13%	more phophorus
Undesirable Components:		
	12%	less sodium
	93%	less nitrate
	12%	less free amino acid

Original source: Schuphan (1975); cited by Lampkin, 1990

Life Formative Force
Biological Organizing Force
expresses the blueprint

Differences can be visible



Conventional	Biodynamic	Homa-Agnihotra

Chromatograms depicting differences between Organic and Conventional Products

Chemically treated soil.

vs.

A typical good organically treated soil

Oats-young green leaves grown on chemically treated soils.

vs.

Oats-young green leaves used in Greenlife and Springreen, grown or organically treated soil.

Synthetic sugar-glucose (dextrose) mostly used in presweetened foods.

vs.

Molasses-old fashioned.

Chemically treated soil.

vs.

A typical good organically treated soil

Oats-young green leaves grown on chemically treated soils.

vs.

Oats-young green leaves used in Greenlife and Springreen, grown on organically treated soil.

Formative force in Water Crystal Formation

Hiroshima

Amour

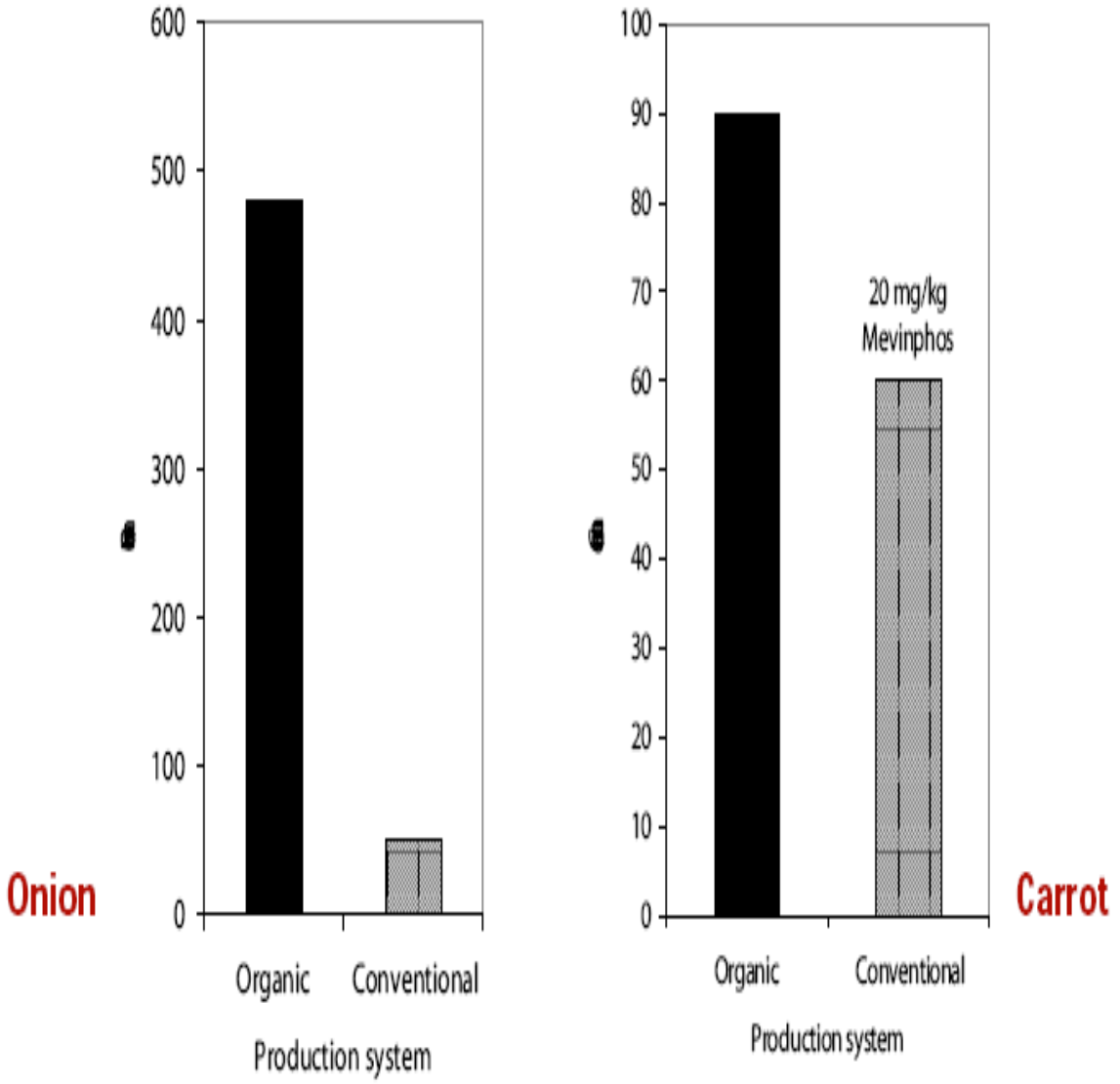
Agnihotra water

Bach

Lourdes

http://www.google.com.ph/imgres?hl=tl&sa=X&biw=1680&bih=949&tbm=isch&prmd=imvns&tbnid=0-mp39ge-wVYLM:&imgrefurl=http://www.unitedearth.com.au/watercrystals.html&docid=KeUyCCcmZwJayM&imgurl=http://www.unitedearth.com.au/water%252520toxic%252520fujiwara%252520dam%252520buddhist%252520prayer.jpg&w=320&h=240&ei=OpeYT9_nDMuhiAeSltDgBQ&zoom=1&iact=rc&dur=653&sig=109321639220797562759&page=1&tbnh=120&tbnw=157&start=0&ndsp=44&ved=1t:429,r:10,s:0,i:85&tx=81&ty=69

Photon Emissions from Organically Produced Onions and Carrots

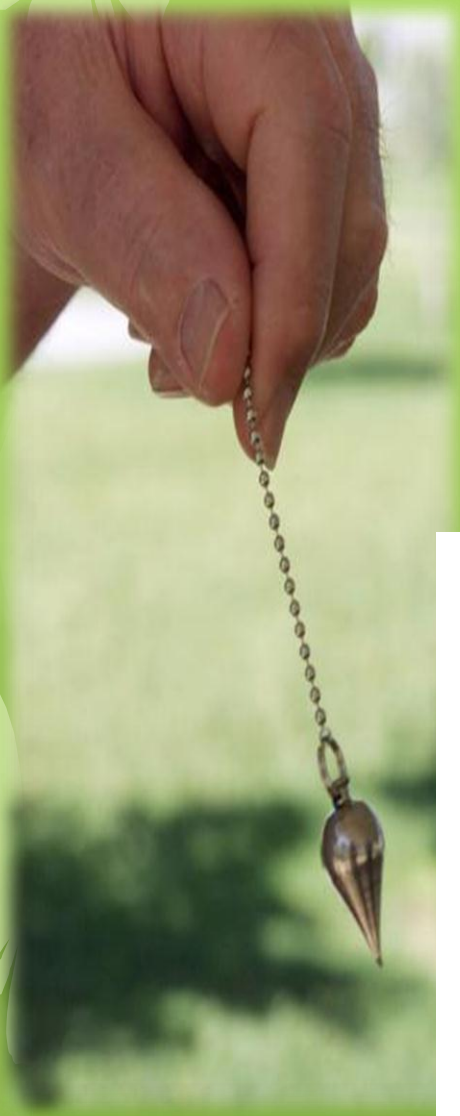


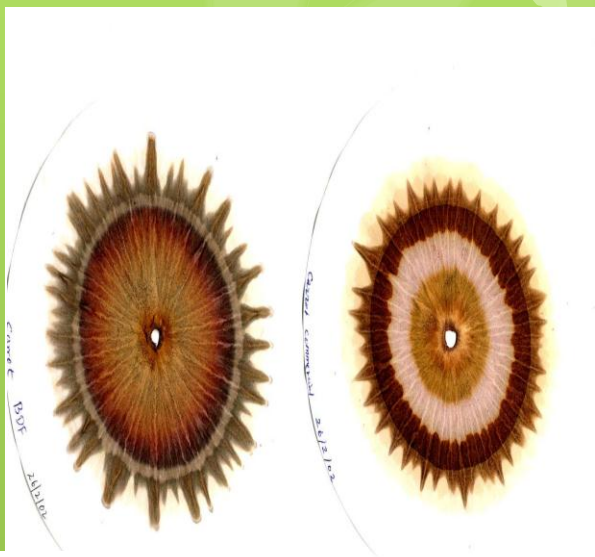
"Every living organism emits **biophotons** or low-level luminescence (light with a wavelength between 200 and 800 nanometers). This **light energy is thought to be stored in the DNA during photosynthesis** and is transmitted continuously by the cell. It is thought that the higher the level of light energy a cell emits, the greater its vitality and the potential for the transfer of that energy to the individual which consumes it. Significant differences have been found in favour of organically produced food, but differences also occur with respect to location, freshness and stage of maturity (ripeness)."

Source: LAMPKIN, N. 1990.

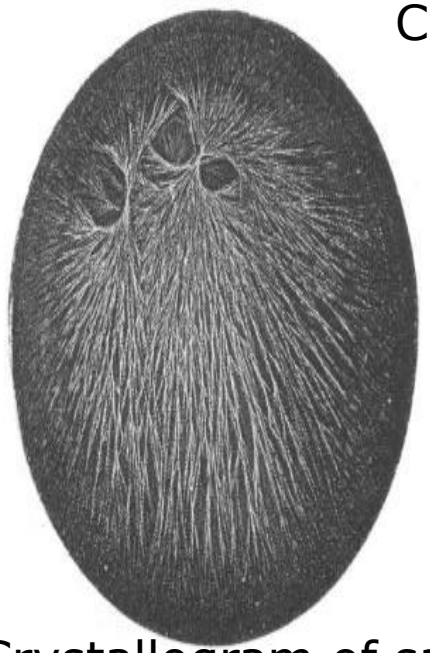
Or detectable through dowsing, chromatography, crystallography

Biodynamic vs commercial carrot





Chromatogram of sap

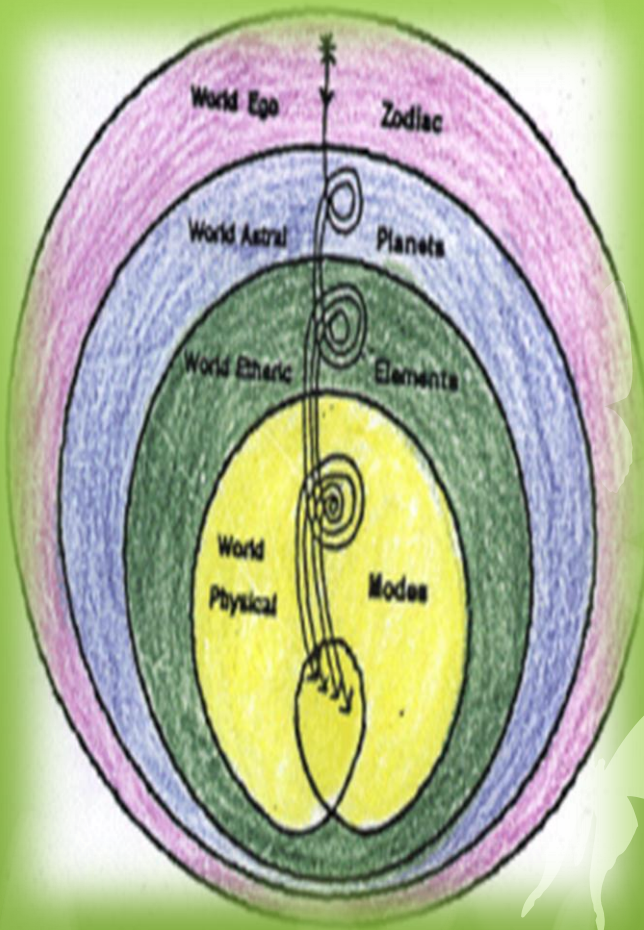


Crystallogram of sap

Back to the question…Does being Organic of the seed really matter… ***Seeds are so small, and way far back in the whole scheme of production?!***

Seed has memory:

In the seed is the blueprint of the whole plant species and the variety.



The seed also carries the vibration and life (organizing) force of the place.

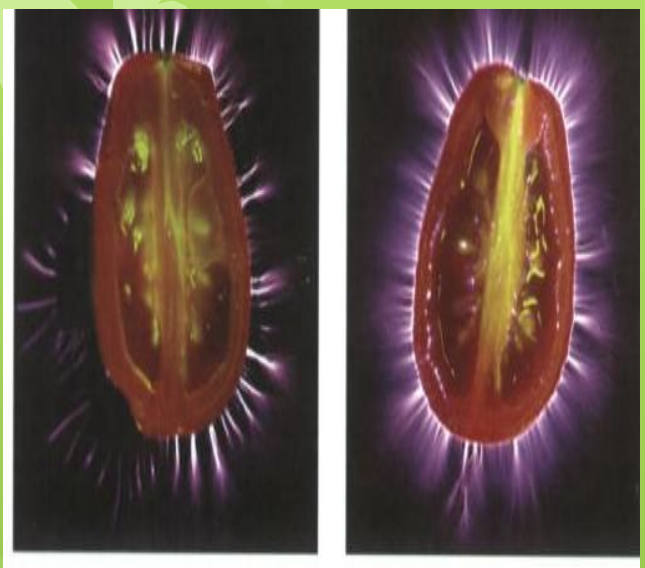
The seed is a child of the universe

Never underestimate the power of the small and the invisible

THIS IS QUANTUM POWER!

The more subtle, the more powerful… it permeates the blueprint and information system, the creative source.

Life Force, subtle formative force



Slightly Cooked Organic Tomato *(Kirlian Image)*

Raw Organic Tomato *(Kirlian Image)*

Medium-Rare Cooked Meat *(Kirlian Image)*

Raw Meat *(Kirlian Image)*

Biodynamic Agriculture… first certified organic; now basis of being organic

Rudolph Steiner 1861-1926

Sprouting seed's life force seen through Kirlian photo

Bios - *Life*

Dynamis - *Force*

Farming with life forces… Quantum farming

Biodynamic much needed in modern times… Hopeless “Tungro” ?

cured by biodynamic through horsetail !!

BD 508

Pest epidemics? Do "Peppering" or ashing

For hard to solve pest problems… *weeds, vertebrates, insects, etc.*

Like cures like:

Applying the same "pest" in extremely high dilution

A tbsp of ash in water that is enough to cover a hectare, but first vortexed in 2 directions for about 20 min

Why Biodynamic?

Biodynamics is an organic, holistic, and regenerative practice that focuses on soil health, biodiversity, and on the integration of plants, animals and the cosmos.

Farming at the synthesis level; includes cosmic power.

Biodynamic features

Use of …

Biodynamic calendar

cosmic configurations and rhythms

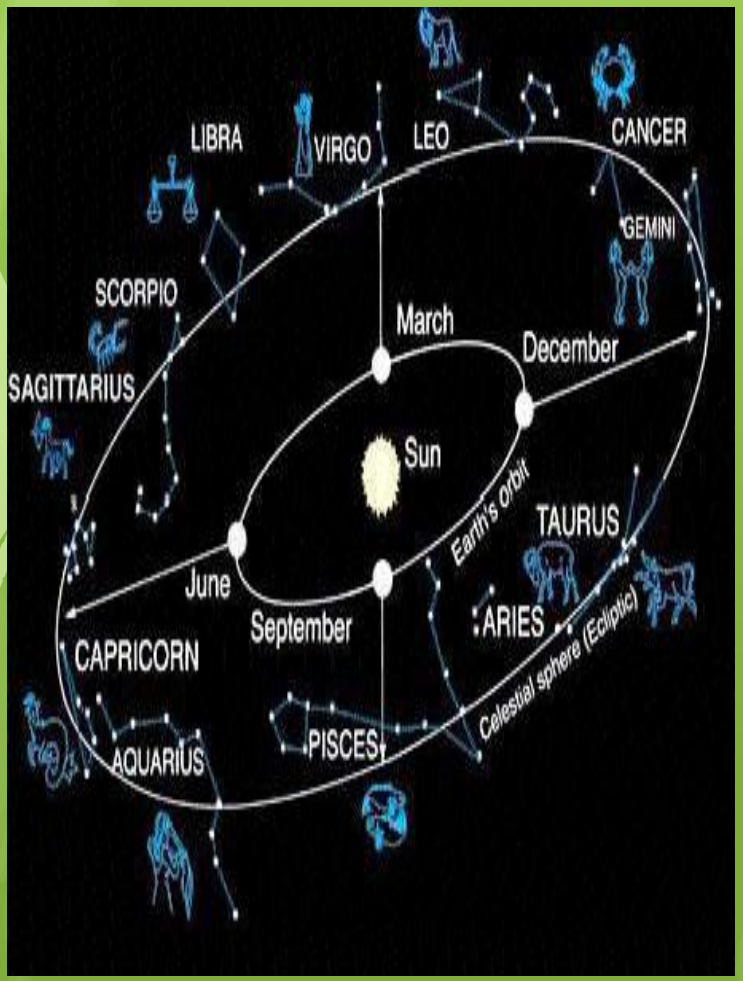
moon, planets, constellations

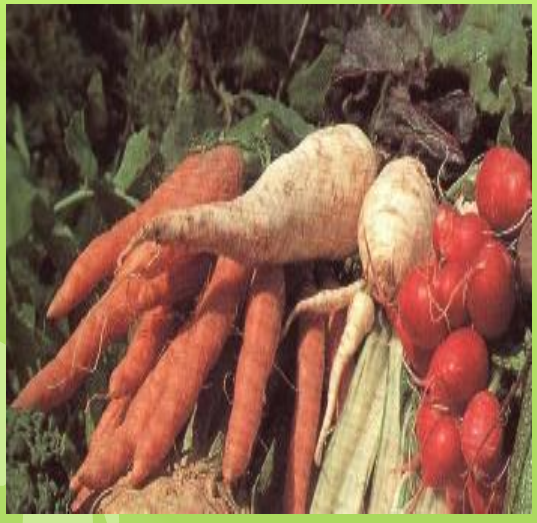
Biodynamic preparations – for soil quality, plant life, moderation/regulation of biological processes, the life (etheric) forces of the farm.

The preparations are used in homeopathic (*super diluted*) quantities

Biodynamic

Cosmic rhythms & configurations





Root or Earth day
Virgo
Capricorn
Taurus

Planting time determines what part of the plant develops well at later stages

Leaf or Water day
Cancer
Scorpio
Pisces

Flower or Air/Light day
Gemini
Libra
Aquarius

Fruit/Seed or Fire day (Warmth)
Sagittarius
Aries
Leo

MERCURY 1-9 ♓ 9-21 ♈ 21-31 ♉
VENUS ♉ (R 15-31)
MARS ♌
JUPITER 1-15 ♈ 15-31 ♉
SATURN ♑ (R)
URANUS ♓
NEPTUNE ♒
PLUTO ♐

May 2012

US Time

12 hr difference from Philippine time

Virtue of the Month:
INNER BALANCE BECOMES PROGRESS
Opposite: EXTERNALS TAKE OVER, TOO BUSY

Calendar of the Soul: Verses 4–8

DATE	☉ IN ZODIAC	☾ IN ZODIAC	♃ ♄	Ag Pg	♋ ♉	☾ PHASE	CONJUNCTIONS, OPPOSITIONS, & EVENTS	AM 1 2 3 4 5 6 7 8 9 10 11 12	PM 1 2 3 4 5 6 7 8 9 10 11 12	WORK NOTES
1 TUES	♈	♌					☾☌☿ 0 ☾☌♂ 4	Fruit		
2 WED	♈	♌ ♑ 13						Fruit	Root	
3 THUR	♈	♑					☾☌♅ 8	Root		
4 FRI	♈	♑					☾☌☿ 10 ☾☌♄ 14	Root		
5 SAT	♈	♑ ♎ 14		♇ 23		24	☿☌♄ 21 ☉☍☾ 24	Root		
6 SUN	♈	♎ ♑ 24					☾☌♃ 8	Flower		
7 MON	♈	♑			♋ 6			L Leaf		
8 TUES	♈	♑ ♐ 21	☽				☾☌♀ 11	Leaf		
9 WED	♈	♐					☾☍♅ 14 ☿♈ 10	Fruit		
10 THUR	♈	♐						Fruit		
11 FRI	♈	♐ ♐ 3						Root		
12 SAT	♈	♐				18		Root		
13 SUN	♈	♐ ♒ 3					☉☌♃ 9 ☾☌♆ 13 ☿△♂ ☾☌♂ 24	Root ☾ Fruit		
14 MON	♉ 0	♒ ♓ 18					☿△♅ 4	Fruit ☽	Flower Leaf	
15 TUES	♉	♓					♃☿ 22 ♀R 11	Leaf		
16 WED	♉	♓					☾☌♄ 8 ♂△♅ 12	Leaf ☾ Fruit	☽ Leaf	
17 THUR	♉	♓					Ascension ☾☌♄ 18	Leaf		
18 FRI	♉	♓ ♈ 7						Leaf Fruit		
19 SAT	♉	♈		Ag 12				Fruit		
20 SUN	♉	♈ ♉ 6				20	☾☍☿ 1 ☾☌♃ 9 ☉☍☾ 20 Solar Eclipse	Fr		
21 MON	♉	♉			♍ 5		☿☌♉ 9	Root		
22 TUES	♉	♉	♎ 7				☿☌♃ 2 ☾☍♀ 17	Root		
23 WED	♉	♉ ♊ 8						Root	Flower	
24 THUR	♉	♊					☾☍♅ 2 ☿☌♇ 9		Fl	
25 FRI	♉	♊ ♋ 19						Flower	L	
26 SAT	♉	♋						Leaf		
27 SUN	♉	♋ ♌ 6					Pentecost ☿☌☉ 7	L	Fruit	
28 MON	♉	♌				16	☾☌♆ 8		Fruit	
29 TUES	♉	♌ ♍ 22					☾☌♂ 2		Fruit	
30 WED	♉	♍					☾☌♅ 20		Root	
31 THUR	♉	♍					☾☌♄ 22		Root	

Influences of the ZODIACS , PLANETS, SUN, MOON

Zodiac Influences on Plants

Element	Zodiac	Sign Influence
EARTH	Taurus Virgo Capricorn	Influences development of roots
WATER	Pisces Cancer Scorpio	Influences development of leaves
LIGHT	Gemini Libra Aquarius	Influences development of flowers
WARMTH	Aries Leo Sagittarius	Influences development of fruit (seeds)

Planetary and other Heavenly Bodies Influences

Element	Planet/ Heavenly Body	Plant Type
Warmth Water Earth	Jupiter	Oaks
Water Warmth	Mercury	Creepers
Heat Light Earth	Saturn	Conifers
Warmth Light Water	Moon	Cacti
Heat Light Water	Mars	Shrubs
Light	Venus	Mountain flowers
Light	Sun	Grasses

Biodynamic Preparations, Sources and Representation

Preparation/ Sources		Representation
500	cow manure	Earth
501	quartz	Sun
502	Yarrow (asteraceae)	Venus
503	Chamomile (asteraceae)	Mercury
504	stinging nettle (urticaceae)	Mars
505	Oak (sterculiaceae)	Jupiter
506	yellow-flowered dandelion (asteraceae)	Jupiter
507	Valerian (valeriaceae)	Saturn
508	Horsetail (equisitaceae)	with the cometary forces

BD Preps
500-508
Sources & Representation

Biodynamic preparations, Source and Function

PREPARATION	SOURCE (PLANT PART)	PROCESS	FUNCTION(S)
500	Cow manure	Cow manure buried in cow horn during winter	Serves to relieve plants of stress; promotes root activity especially of fine root hairs to stimulate soil micro-life and increase beneficial bacterial growth; invigorates the soil
501	Quartz	Quartz crystals buried in cow horn for several months	Helps bring sunlight to the leaves; stimulates fruit and seed formation; improves the flavor, keeping quality nutritional value of crops as well as making them resistant to diseases and pests; acts as supplement to BD 500
502	Yarrow (blossoms) (Achillea millefolium)	Blossoms are buried for a year in a bladder of a stag (male young horse)	Regulates potash process with the help of sulfur; allows plant to take up the proper trace elements essential for growth and seed formation
503	Chamomile (blossoms) (Chamomilla officinalis)	Chamomile buried in a cow's intestine	Regulates calcium process also with the help of sulfur; aids in stabilizing the nitrogen content of plants; helps the plant to find the right relationship between silica and potassium, enabling the soil to take in the right amount of silica from the atmosphere and from its cosmic surroundings
504	Stinging nettle (whole shoot in bloom) (Urtica dioica)	Buried for a year or more	Multiple functions; similar to heart in human organism; regulates potassium, calcium and iron with help of sulfur; makes manure inwardly sentient and sensitive; makes the earth itself intelligent and permeates it with reason; soil individualizes itself and allows proper relationship between soil and specific plants; helps keep the N content of the compost from evaporating; as liquid manure, it enhances the vegetative growth of plants, especially the dry weather
505	Oak (bark) (Quercus robur)	Buried in a skull of a domestic animal	Calcium regulation; helps control plant diseases
506	Dandelion (flowers) (Taraxacum officinale)	Buried in a cow's mesentery (stomach)	Stimulates transmutation of chemical elements; for example potassium to nitrogen; helps regulate cosmic influences; sensitizes plant to environment; plants are stimulated to draw in what they need and not just from soil environment; helps regulate the formative life energies coming from the cosmos or the stars and planets beyond the earth
507	Valerian* (flowers) (Valeriana officinales)	Extract juice	Regulates posphorus process; aids in the compost fermentation process
508	Horsetail * (Equisetum arvense)		Prevents rust and other fungal diseases; can be used as spray against mildew, rust, scab, and other soil-borne pathogenic fungi; improves protein content and ratio of vitamin C in the plants

Biodynamic preparations are from…

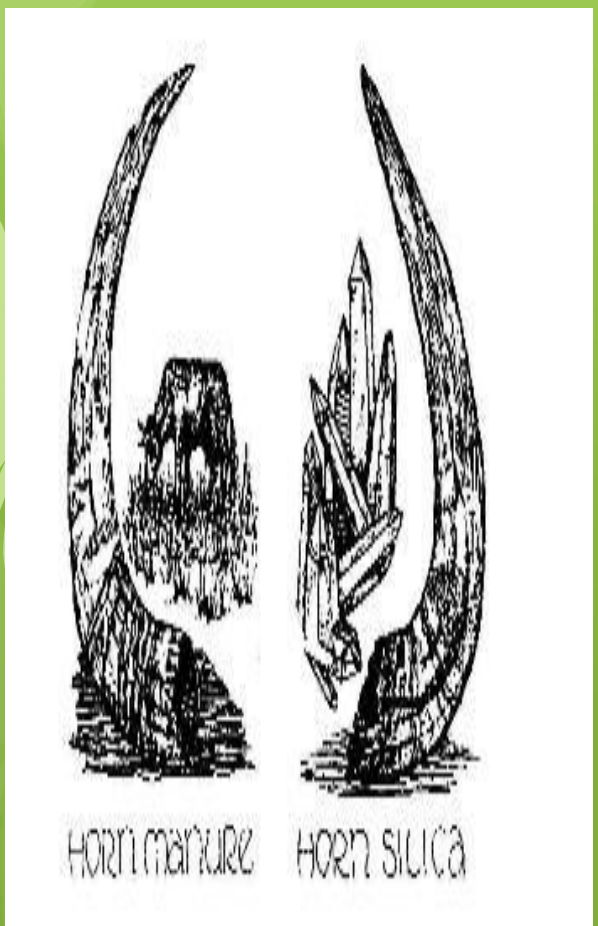
- Cow / carabao manure
- Minerals (quartz-silica)
- “Weeds” and other plants

BD 500 : *cow manure in cow horn*

BD500 burying and harvest

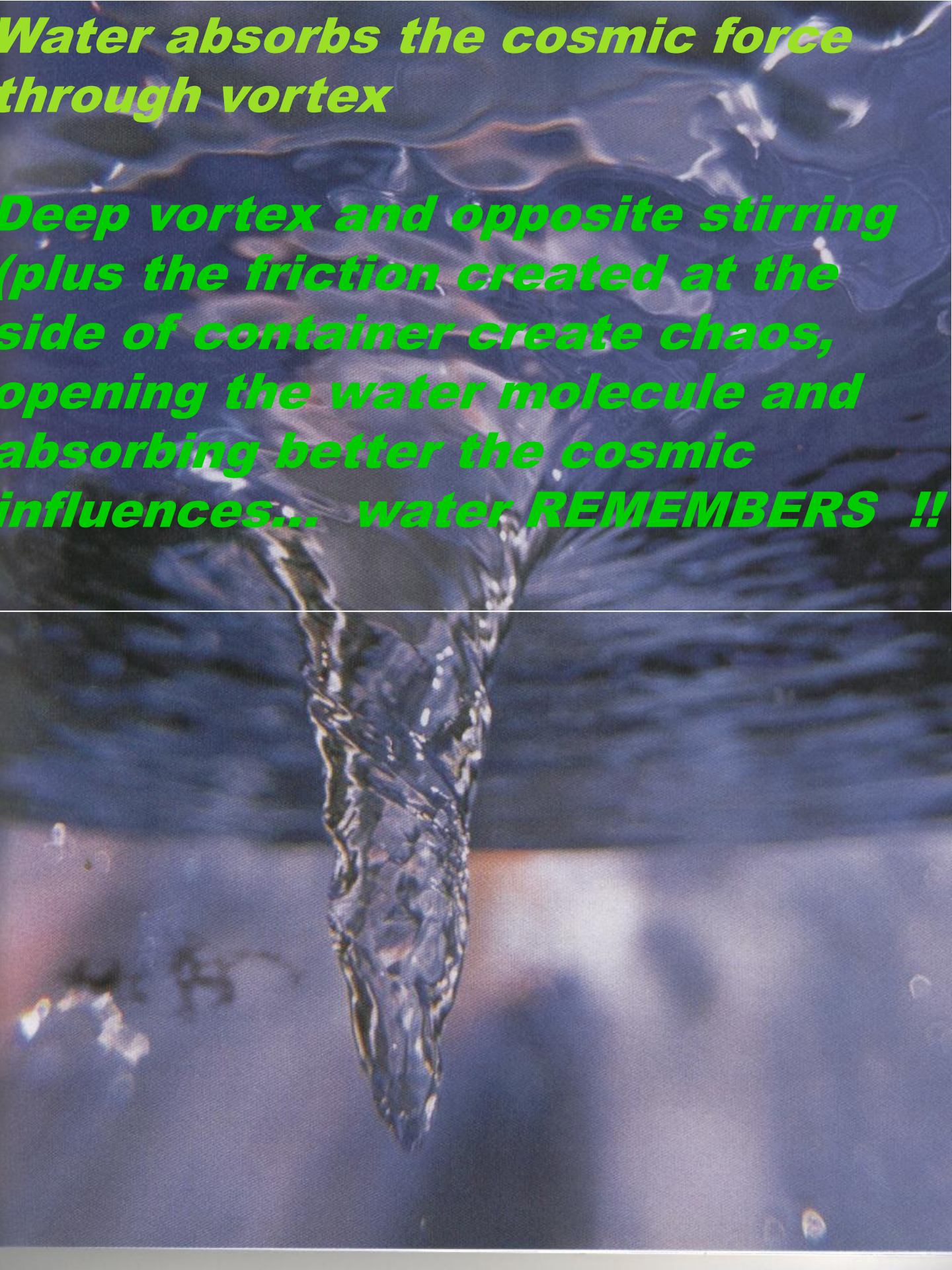
BD 501

Quartz in cow horn



Potentizing, Vortexing, Chaos

Stirring BD 500 in 2 directions… manually or through a flowform


Water absorbs the cosmic force through vortex
Deep vortex and opposite stirring (plus the friction created at the side of container create chaos, opening the water molecule and absorbing better the cosmic influences... water REMEMBERS !!

Opposite times and direction of application

BD 500

PM GROUND

BD501

AM CANOPY

BD COMPOST

BD COMPOST PREPS

Plants made into BD 502 - 507 for making compost

502 yarrow

503 chamomille

504 stinging nettle

505 oak

506 dandelion

507 **valerian**

BD 508

Horsetail or Equisetum … cures tungro and other diseases

Why Biodynamic?

- **Food Quality, Sustained plant health**
- **Earth repair**
- **Economics: 1 g per hectare**

The quality and life forces of the plant we eat highly influences the quality of our thinking, feeling and interaction with people and nature. Steiner

The continued evolution of mankind hinges on nutrition. Steiner

For CONSCIOUSNESS and WILL development

Moon Schedule

... *also a practice among local folks*

Compost Making
Best during Descending Moon period

Compost Spreading
During Descending Moon period
in cool weather depending on soil conditions and crop requirements

Cultivation & Soil Preparation
Best during Descending Moon period
when weather and soil conditions permit
NOTE: Cultivation and working the soil when it is wet can cause structual damage

Transplanting Seedlings, Container Grown Plants, Trees and Shrubs
Best during Descending Moon period
at appropriate season

Harvesting
Best during Ascending Moon period, **except** for roots and potatoes,
which are best during Descending Moon Period

Fruit, green vegetables, hay and silage
keep better and maintain quality in storage if harvested during an Air/Light Flower period:

Gemini or Aquarius

Grains and Seeds for saving
best when harvested during a Fire/Warmth seed period:
Sagittarius or Aries

Roots and potatoes
best harvested in a Descending Moon period when the Moon is in the Earth root sign Virgo

AVOID Harvesting at Full Moon, Perigee and during a Water constellation leaf day, such as Pisces, since these are times of more water in the Earth, so the crops would hold too much water for satisfactory storage.

Liquid Manure Application
Best just before Full Moon
in the afternoon several times during crop growth, as needed

Plant Potatoes
Best during Apogee

Fungus Control

During Full Moon and Perigee
Spray with BD 508 prior to & during these days
These are stress times, they bring watery influences to the Earth which can lead to fungus attacks, esp. during warm weather.
ALSO
On Moon opposite Saturn
Spray with BD 501 in the early morning (sunrise) which will strengthen the plant to resist fungus

Pruning

Best during Descending Moon period
Fruit trees & berry shrubs at appropriate season on a Fire/Warmth day, if possible
Leo or Sagittarius

Flowering shrubs and roses at appropriate season on an Air/Light day, if possible
Gemini or Libra

Peppering

At Full Moon, several times during the growing season
Best when Sun in following constellations for specific pests:
Sun in Aries for larvae
Sun in Taurus for hardshell insects
Sun in Gemini for flies
Sun in Cancer for snails & slugs

Biodynamic Breeding

1) Breeding should take place on certified Biodynamic fields, or equivalent breeding grounds. Where this is not possible, breeding can be carried out as described in point two below.

2) If breeding activities do take place on organically certified, but not certified Biodynamic fields, it must be guaranteed that the Biodynamic preparations are used in such a fashion that their influence can be expected to reach the plants and the soil. This shall be regulated in writing with the certified organic farm in question using for example a contract which ensures the required production parameters.

3) The breeding enterprise, as well as the all aspects of the breeding activity itself, must be accessible for Demeter inspection at any time.

4) Breeding a new variety begins with accidental or intentionally initiated cross pollination or a mutation in the sense of an inheritable alteration, with a subsequent selection procedure. A minimum of four years subject to Biodynamic conditions as described in number one and two of this section are required. This applies to both labelling forms:
”From Biodynamic Breeding”
”From Biodynamic Seed Variety Maintenance”

5) The following breeding methods are prohibited:

- **All plant breeding methods prohibited by IFOAM**
  - Hybrid breeding irrespective of the hybridization method
  - Production of double haploid varieties or polyploidisation
  - Varieties bred using protoplasm or cytoplasm fusion techniques

6) The use of hybrid or double haploid varieties as parents for a Biodynamically bred variety is allowed.

7) New Biodynamic varieties must be recognized as such (for example by registration at the respective plant variety registration office) if the seed is to be sold to third parties in an area with a valid seed marketing law.

8) If official registration of a new variety is not required due to its production and use within a closed system, application can be made to Demeter e.V. for recognition of the variety as "From Biodynamic Breeding". This is only possible if the varietal descriptor leads to the expectation that the seed meets the legal seed variety requirements of distinctiveness.

Organic Seed Sources… examples

- Well developed abroad.
- Big business, as countries aim to be 50% or 100% organic.
- Other initiatives aim for genetic conservation and regaining heirloom varieties.

http://www.seedsofchange.com/about/organic_seeds.aspx

All of Our Seeds are 100% Certified Organic:

We Grow Our Seeds Organically

We Do Not Use GMOs

We Preserve Heirloom and Traditional Varieties

We Research What We Sell

ORGANIC seed ALLIANCE

http://www.seedalliance.org/

http://www.highmowingseeds.com/

The online home of Peaceful Valley

GrowOrganic.com





Organic Seeds

Organic Seeds


Categories

1. Organic Heirloom Seeds
2. Organic Sprouting Seeds
3. Organic Vegetable Seeds
4. Organic Herb Seeds
5. Organic Bulk Seeds
6. Organic Hybrid Seeds
7. Organic Cereal Seed

http://www.groworganic.com/seeds/organic-seeds.html

Heirloom Organics Non-Hybrid Seeds

Non-Hybrid or **Open-Pollinated** seeds allow the gardener to collect seeds from a crop for future planting. Hybrid seeds do not. All Heirloom Organics Seed Packs are 100% Non-Hybrid AND Non-GMO (genetically modified) and **specially sealed for long term storage**. Use now AND save for emergency. All from the same hermetically sealed pack!

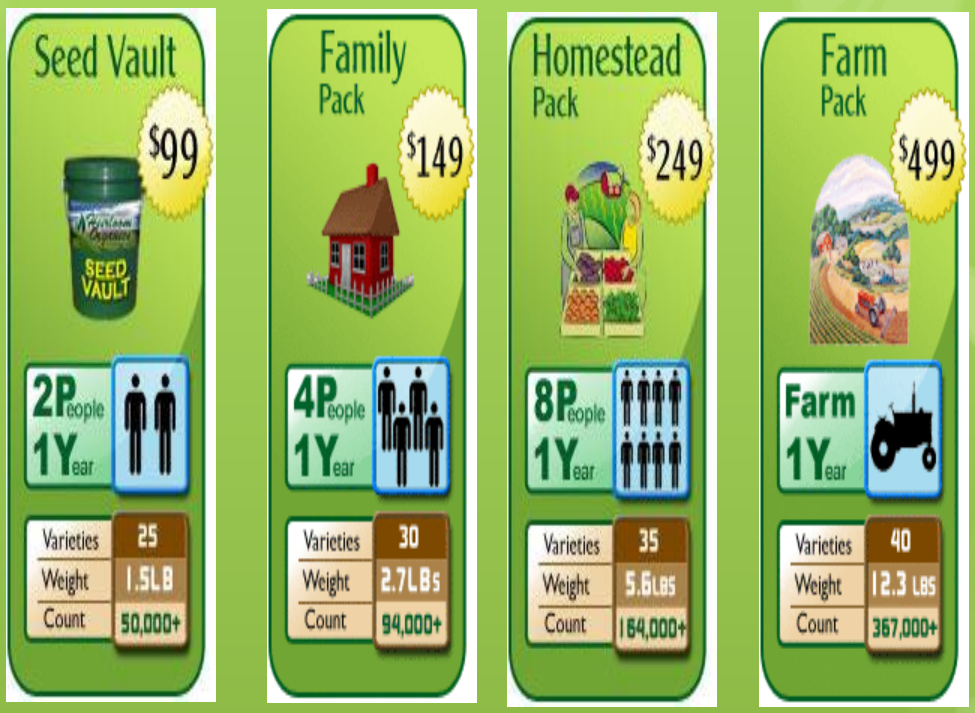
Why Use Non-Hybrid Seeds?

Q: **Why should I use non-hybrid (open pollinated) rather than hybrid seeds?**

A:

•**Better Nutrition** – Commercial Produce lacks nutrition, research has shown.
•**Sustainable Gardening** - Saving Seeds is only possible with open-pollinated seeds
•**Economic Security** – In recessions and depressions, FOOD IS ECONOMIC SECURITY
•**Food Supply Independence** – If food supplies are challenged, home gardening is freedom.
•**Crop Diversity** – Participate in saving the original strains from extinction
•**Investment Hedge** – Seeds are an excellent alternative investment to paper money, stocks and securities, even gold if the markets were to dive long-term.

Heirloom Organics Non-Hybrid Seeds Packs



Seed Savers Exchange

Our mission is to save North America's diverse, but endangered, garden heritage for future generations by building a network of people committed to collecting, conserving and sharing heirloom seeds and plants, while educating people about the value of genetic and cultural diversity.

seedsavers

Saving seeds with farmers and gardeners

Etc. etc.

Philippines??

- Self-saved seeds
- Adapted seeds
- Farmer-bred and local seeds
- Local plant/crop seeds
- Wilderness and "weed" seeds
- Heritage seeds

- INDUSTRY-GOVERNMENT seeds ?
- **Chef's seeds ???**

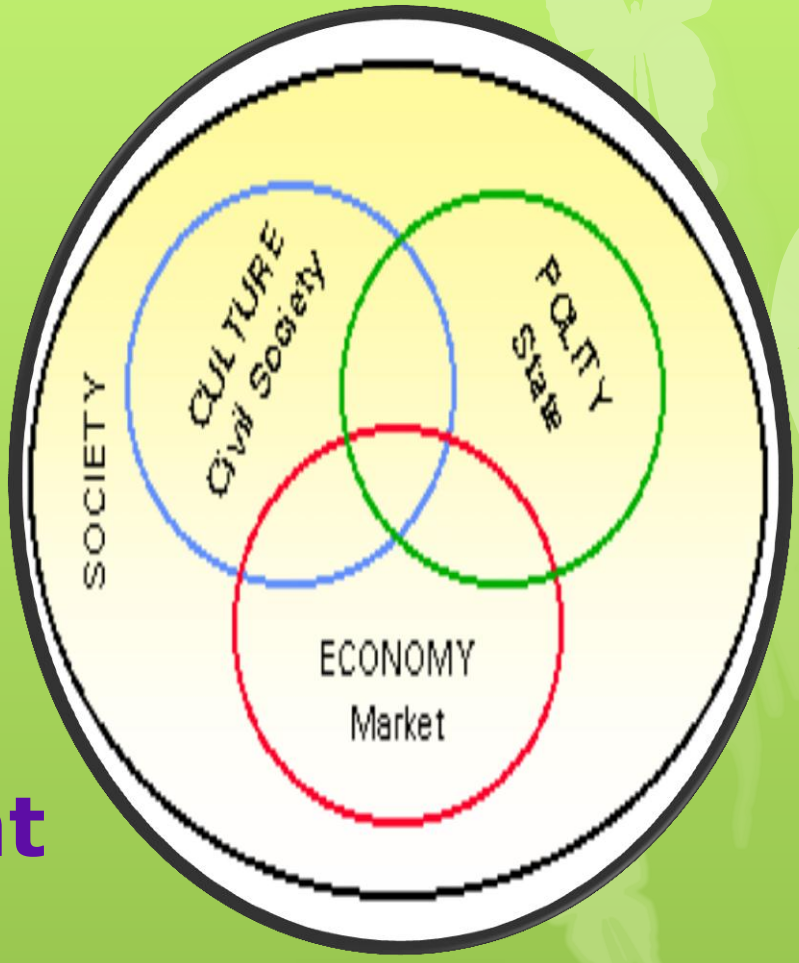
Organic Seed and Sources

- **Imported ?**
- **Foreign but adapted crops; Locally produced**
- **Local crops!**
- **Wild/ non-mainstream plants**
- **Fairly traded**
- **Heritage seeds/ for genetic conservation**
- **Farmer-saved seed**
- **Fit into the ecological and the sustainable agriculture system**
- **Not a product of monopolistic scheme**
- **High life force**

For organic seed to flourish…

need add value to seed, to organic seed!

Organic Seed Drivers



- Government
- Industry, Private seed suppliers
- Certification of organic produce
- Farmers, Farmers' Organizations
- Consumers, food providers

Organic Seed for a Quantum *Leap* in Agriculture, Food, Healing, Earth Care

- Driven by Consumers !
- Responded to by Farmers
- Equitably participated in by industry
- Helped by certifiers
- Supported by government

Organic seed will boom only if…

1. **Organic produce are required to be, and certified as, organic …**

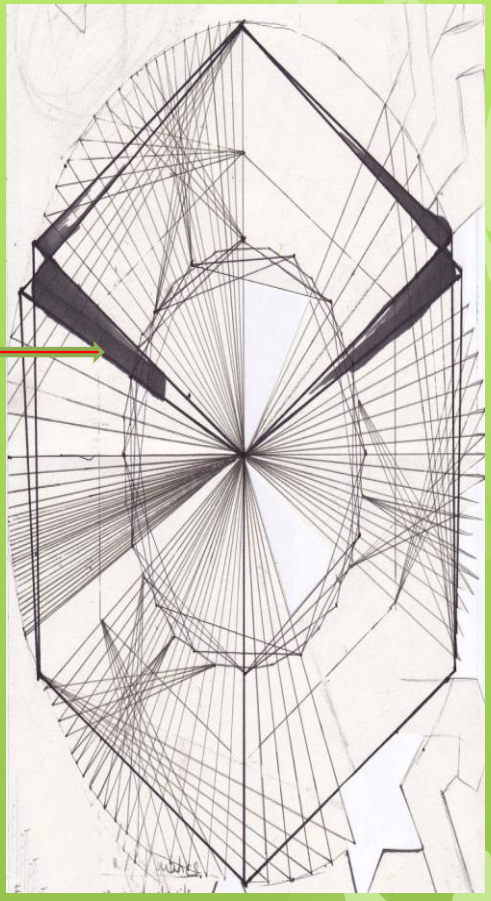
2. **Certification requires the use of organic seed**

3. **Healthy raw eating and seed sprouting become more popular and mainstream !!!**

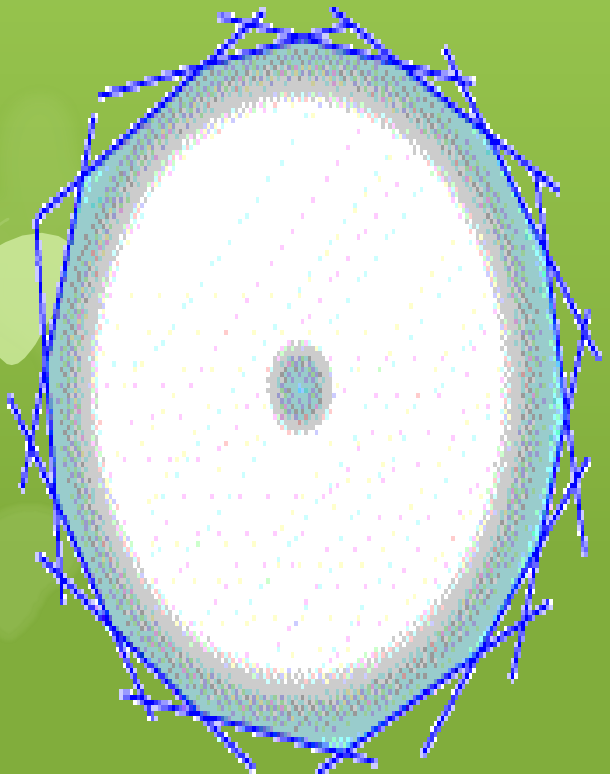
How to create reality: 2

Formative forces:

To make a circle, use…



1) those coming from the center point **(THE LAW, GOVERNMENT)**
2) those coming from the outside or periphery, converging on the center point **(THE CONSUMERS, THE INDUSTRY).**



To drive organic seed, which should we harness?

G

ORGANIC SEED !!!

R

W

Thank you

Appendices

Criteria of appropriate technologies...

... At the stage when technology is ready for use and especially at the research and development stage.

Obvious criteria: should not be harmful or toxic

Other criteria: They should ...

- respect human rights and ethical concerns of society
- not compromise the conditions of life for future generations while benefiting the present.
- be affordable and genuinely improve the lives of all, and not just the rich.
- *not so obvious ...* should not compromise people's autonomy and choice, that is, people should not be coerced into using the technology...

  ... This is particularly relevant to genetic diagnostic tests targeted at "defective genes" that discriminate against individuals or the unborn, or DNA databases that compromise people's rights to privacy. Other situations might involve nano-technological implants that cannot easily be removed by the user.

Other concerns, Barriers in promotion of Organic Seed...

Fernandez 2001. Prof Chair Lecture

- **Lack of awareness of organic market opportunities**
- **Lack of understanding of production practices**
- **Lack of research**
- **Lack of infrastructure support**
- **Regulatory cost of getting certified organic seed (ave. $300/yr/farm)**
- **Attitudes (consumers, producers, etc)**

Some Attitudes

- Too much hassle to produce
- Not enough to fill world needs
- Seed does not matter as much as the growing conditions
- There should not be any difference
- More expensive (can cost an additional 25% or more)

More concerns

- Poor link between organic crop production and organic seed (breeding and production)
- Low demand and supply of organic products
- Unsuitable breeding methods and strategies
- Leaning of formal seed system toward conventional/modern agriculture (e.g., Department of Agriculture, Seed Act and National Seed Industry Council or NSIC)
- Mainstream research and extension is unintegrated and majority is still based on chemicals, monocropping, genetic uniformity in crops and seeds which are mostly non-local
- Non-existence of policies and support services for the organic sector
  - -financial (e.g., credit, crop insurance)
  - -advice
  - -marketing and standards
  - -education
  - -research and variety development
  - -training

More concerns

- Misconceptions and attitude about organic farming (as in sustainable agriculture)
- Underdeveloped system of ascertaining (certification and implementation of) organic source of product
- Unintegrated efforts in organic farming
- Lack of information about the organic industry (SWOT, technologies)
- GMO testing (approved by the non-approving but recommending body, the National Committee on Biosafety of the Philippines or NCBP)
- Weak commitment of agencies for organic agriculture but strong support for GE and hybrid varieties (PhilRice, DA, DOST)
- Cost of production, certification
- Emphasis on commodity yields rather that systems yields and benefits

Price issue

"Those who ask why organic seed is more expensive forget that in the conventional system one of the primary goals is to reduce expenses by any means necessary," noted Johnson, whose company offers 25 certified organic hybrids ranging

from 75- to 115-day maturities… "Pesticides and herbicides are used in the conventional system and do lower some

production costs. That helps make the price of conventional seed cheaper."

Organic seed, of course, absorbs the cost of environmental protection, whereas conventional seed defers those costs to health care institutions and government environmental protection programs.

http://www.acresusa.com/toolbox/reprints/Aug04_Seed%20Corn.pdf

Some studies

Thesis: Biodynamic & Agnihotra…

Invigorating peanut seed

Add quantum enhancers to water, potentize or vortex, mix with seeds then plant

Thesis

Productivity & Seed Quality of Rice Cultivars Under Synthetic, Organic & Biodynamic Farming Practices

Rene E Valdez - PhilRice

Pamela G Fernandez – UPLB

Philippine Journal of Crop Science (PJCS) issue of April 2008, 33(1): 37-59

ECONOMICS OF RICE PRODUCTION

COMPARISON BETWEEN BIODYNAMIC, ORGANIC AND CHEMICAL FARMING

Simple economics or cost and return analysis gave a positive returns in all production practices and varieties where yield data was taken. PSB Rc82 turned out more beneficial than PSB Rc72H. This could be further amplified if the analysis will be extended beyond paddy rice. Organic production practice obtained the highest rank in net returns at 16% and an ROI of 30%. Biodynamic followed organic. Tungro was controlled by biodynamic preparation 508. Organic tended to get high scores than synthetic. Overall, organic proved the best performer in the study.

Total production costs of two modern rice varieties grown under different production practices

VARIETY	PRODUCTION PRACTICES				AVERAGE
	Control	Synthetic	Organic	Biodynamic	
PSB Rc82	16,925.00	25,925.00	18,825.00	17,600.00	19,669.00
PSB Rc72 H	17,475.00	26,475.00	19,325.00	18,150.00	20,356.00
Average	17,200.00	26,200.00	18,775.00	17,875.00	

Gross return of two modern rice varieties grown under different production practices

VARIETY	PRODUCTION PRACTICES				AVERAGE
	Control	Synthetic	Organic	Biodynamic	
PSB Rc82	23,925.00	37,270.00	32,272.00	27,448.00	30,357.30
PSB Rc72 H	28,064.00	41,441.00	36,090.00	31,222.00	34,207.40
Average	25,998.70	39,360.20	34,434.20	29,336.30	

Net Profit of two modern rice varieties grown under different production practices

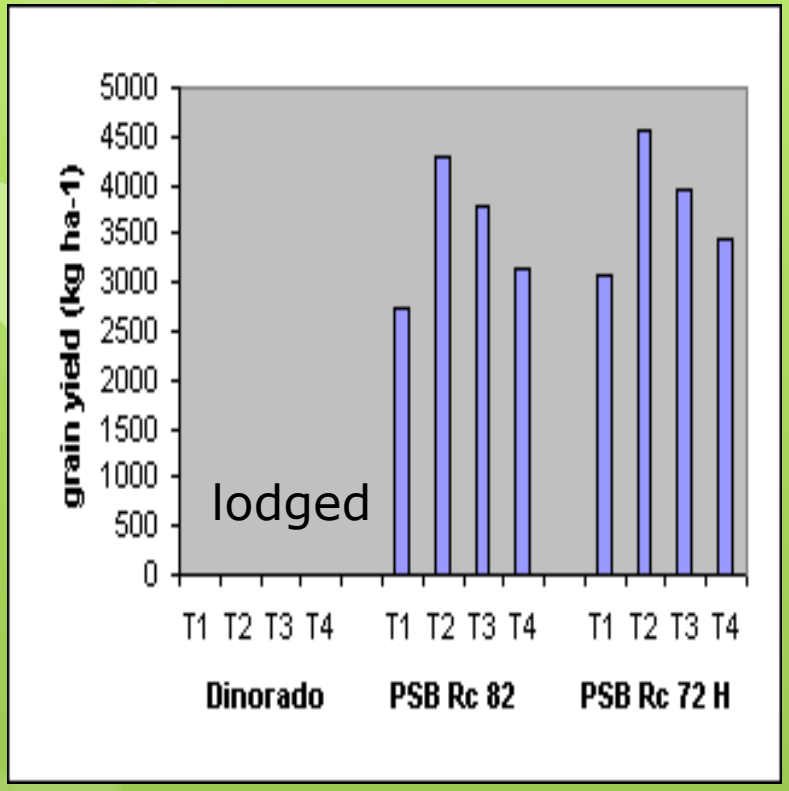
VARIETY	PRODUCTION PRACTICES				AVERAGE
	Control	Synthetic	Organic	Biodynamic	
PSB Rc82	7,000.00	11,345.00	13,974.00	9,848.00	10,493.50
PSB Rc72 H	10,589.00	14,966.00	16,765.00	13,072.00	13,882.70
Average	8,888.70	13,160.00	15,314.20	11,281.30	

Return of investment (%) of two modern rice varieties grown under different production practices

VARIETY	PRODUCTION PRACTICES				AVERAGE
	Control	Synthetic	Organic	Biodynamic	
PSB Rc82	41.35	42.85	74.23	55.95	53.29
PSB Rc72 H	60.59	56.52	86.75	72.02	68.86
Average	50.99	50.15	80.20	62.97	

Source: Valdez, R.E., 2007. Productivity and seed quality of rice (Oryza sativa L.) varieties under synthetic and organic production practices. Masteral thesis. UPLB, Los Baños, Laguna.

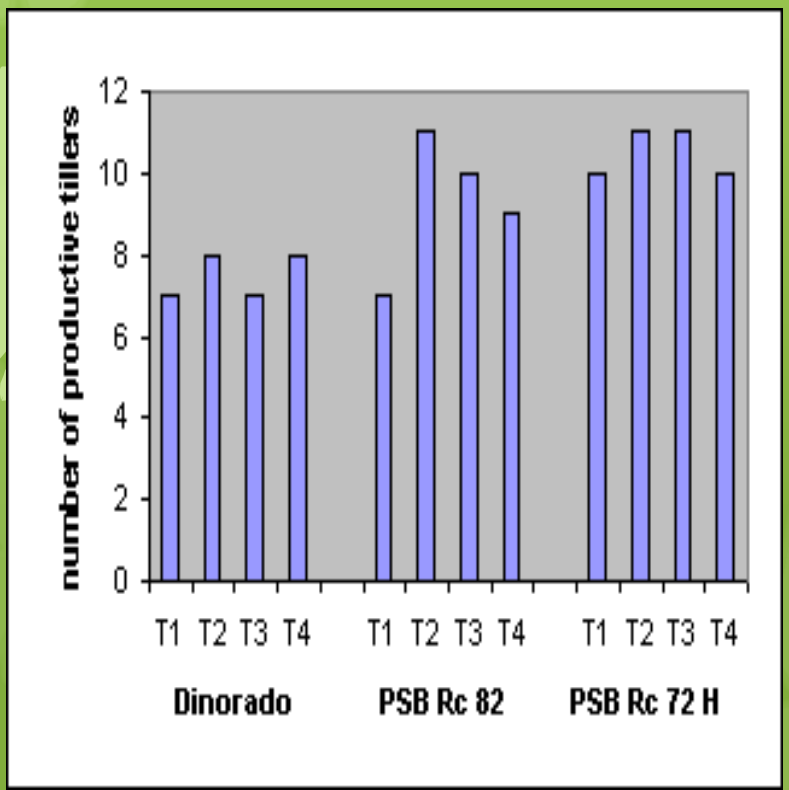
T1 = control T2 = synthetic T3 = organic T4 = biodynamic



Grain yield

T vs V : Pr > F = 0.0001
V : Pr > F = 0.0001
T vs V : Pr > F = 0.38
Ctrl vs Others: Pr > F = 0.0001
Bio & Org vs Syn: Pr > F = 0.0001 Bio vs Org: Pr > F = 0.0001

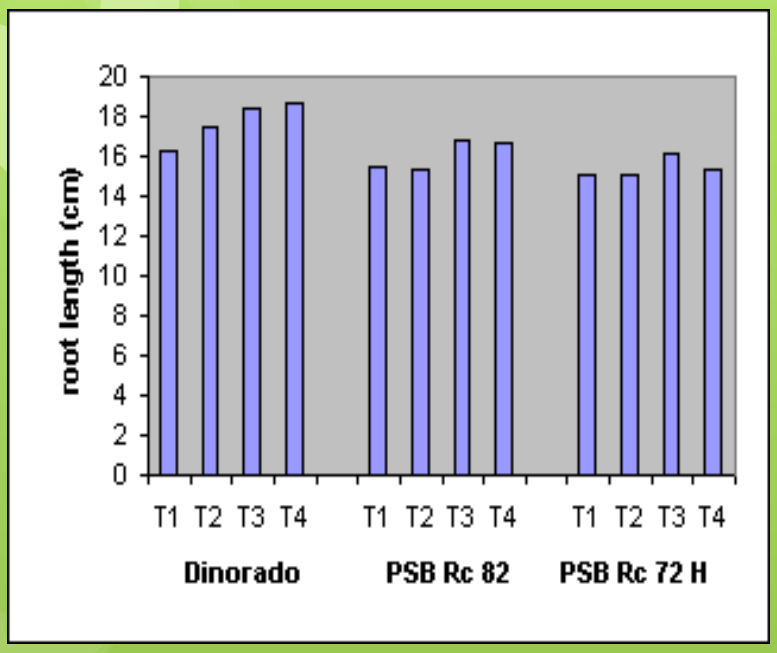
Note: No yield taken from Dinorado



Productive tillers

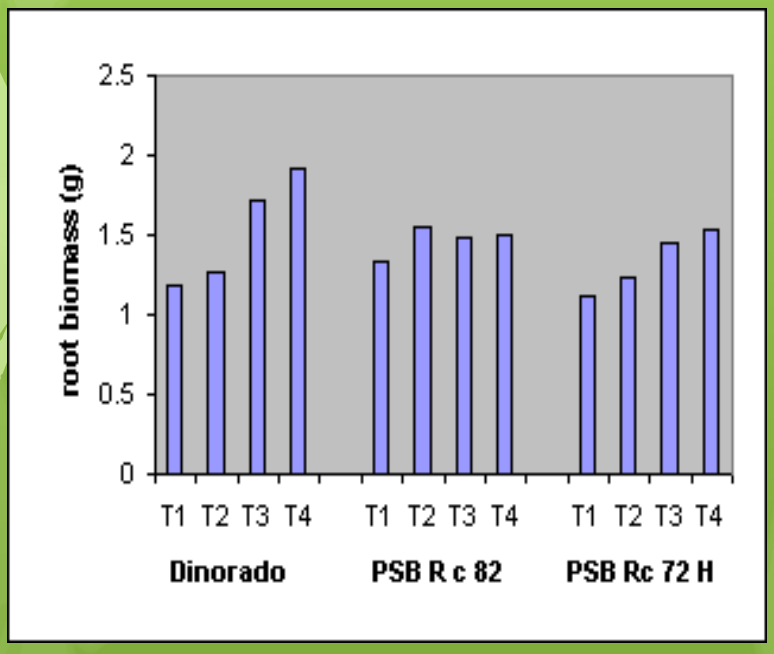
T: Pr > F = 0.018
V : Pr > F = 0.0001
V x T : Pr > F = 0.28
Ctrl vs Others: Pr > F = 0.02
Bio and Org vs Syn: Pr> F =0.017

T1 = control T2 = synthetic T3 = organic T4 = biodynamic



Root length

T: Pr > F = 0.003
V : Pr > F = 0.0001
V x T : Pr > F = 0.47
Ctrl vs Others:Pr > F = 0.004
Bio and Org vs Syn: Pr > F =0.006
Org vs Bio: Pr > F = 0.67



Root biomass

T: Pr > F = 0.0001
V : Pr > F = 0.02
V x T : Pr > F = 0.023
Ctrl vs Others:Pr > F = 0.0001
Bio and Org vs Syn: Pr > F =0.001
Org vs Bio: Pr > F = 0.20

Soil properties of the experimental area, taken before and after the conduct of the experiment.

VARIETY	SOIL ANALYSIS (before planting)	SOIL ANALYSIS (after planting, average over variety)			
		Control	Synthetic	Organic	Biodynamic
pH	5.53	5.32 a	5.43 a	5.44 a	5.54 a
Total nitrogen (%)	0.18	0.15 a	0.15 a	0.13 b	0.13 b
Available phosphorus (ppm)	41.57	39.85 b	40.76 b	49.01 a	49.90 a
Total potassium (meq/100)	23.62	18.36 a	18.28 a	15.87 b	16.32 ab
Organic matter (%)	2.97	2.63 ab	2.76 a	2.50 b	2.75 a
Cation exchange capacity (meq/100)	35.55	35.80 a	35.20 ab	35.53 a	34.61 b

Means followed by the same letter within the row are not significantly different from each other using LSD at 5 % level of significance.

Net Profit

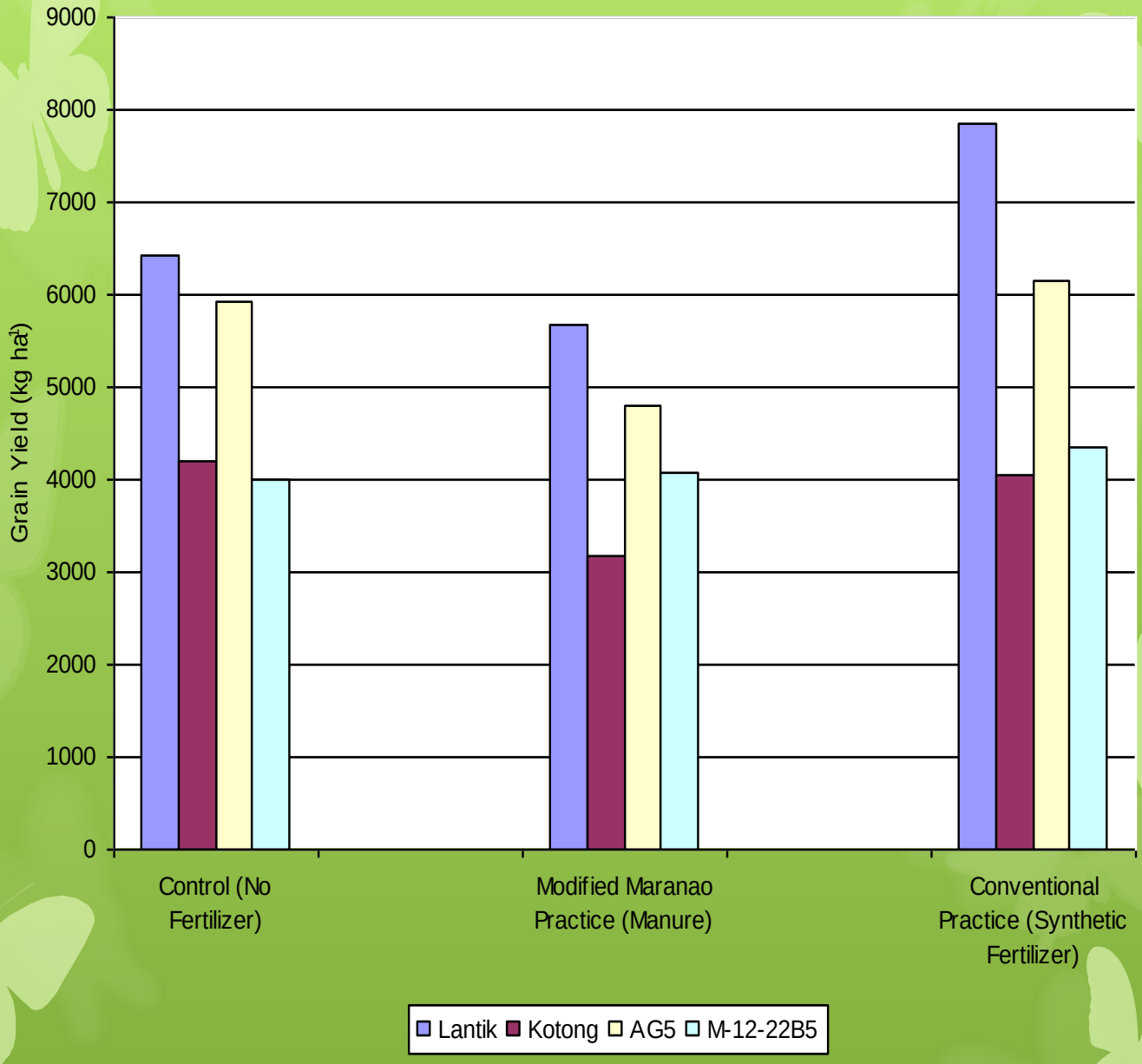
	Control	Synthetic	Organic	Biodynamic	Average
PSB Rc82	7,000	11,345	13,974	9,848	10,542
PSB Rc72 H	10,589	14,966	16,765	13,072	13,848
Average	8,795	13,156	15,370	11,460	

Return of Investment

PSB Rc82	41.35	42.85	74.23	55.95	53.56
PSB Rc72 H	60.59	56.52	86.75	72.02	68.97
Average	50.97	49.69	80.49	63.99	

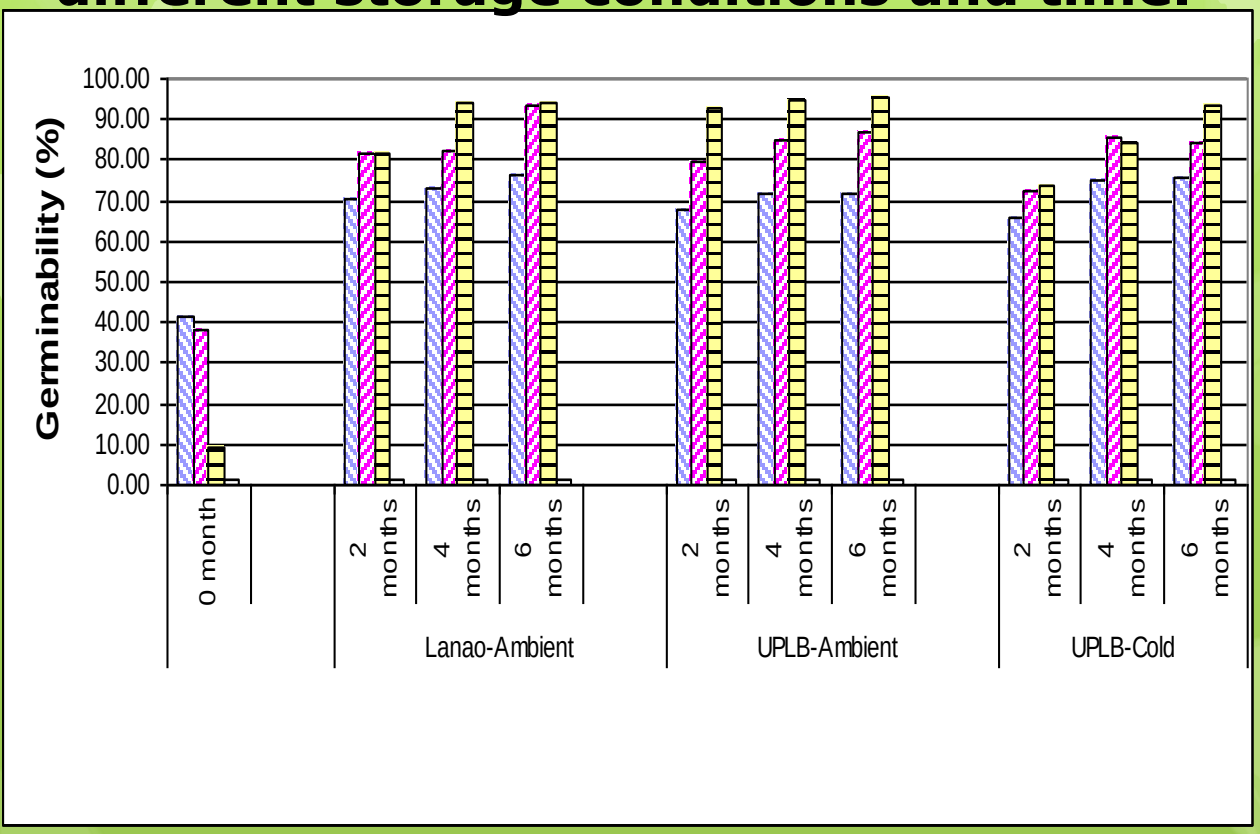
Thesis

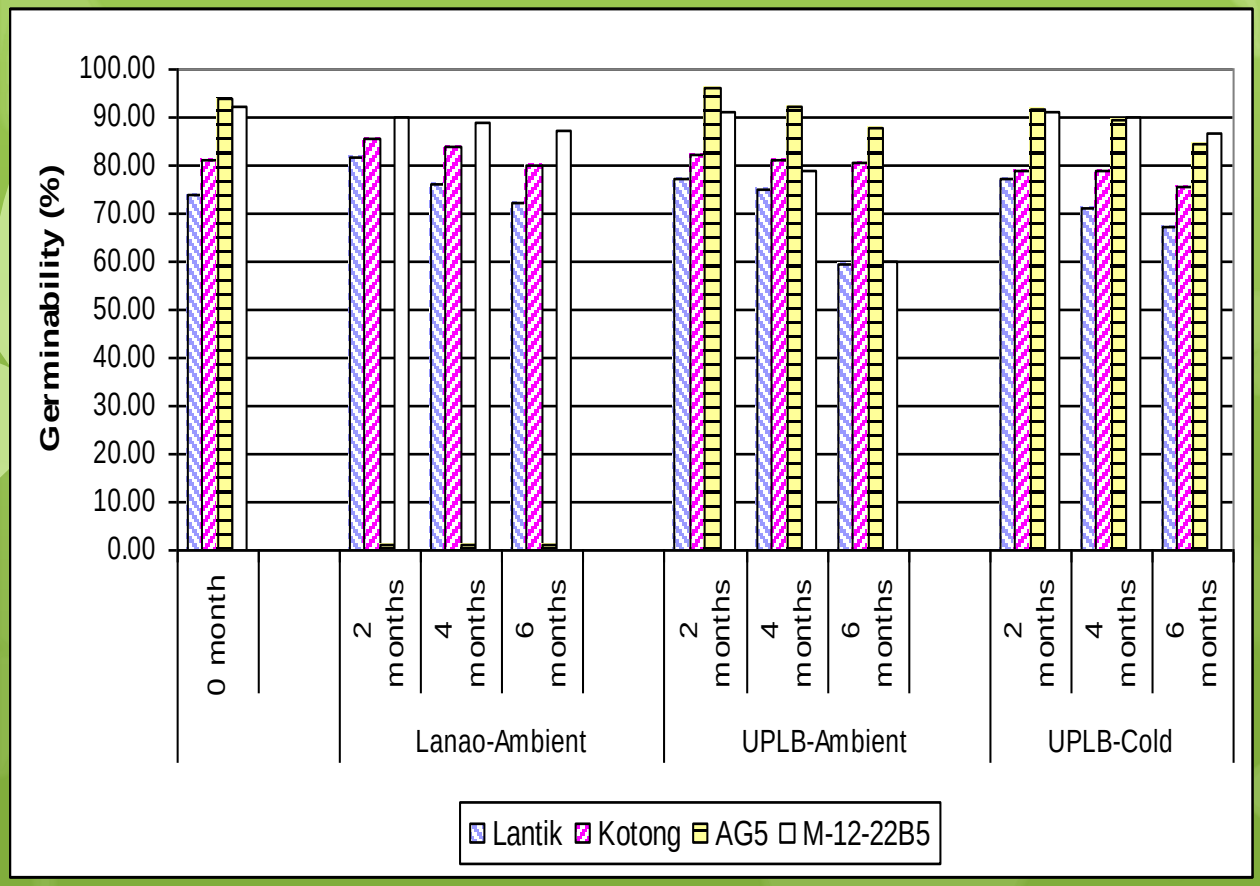
Grain yield of different varieties grown under different rice production practices in Mapantao, Lumba Bayabao, Lanao del Sur.



Indihra Dimaporo

Germinability of dormant and non-dormant rice seeds stored under different storage conditions and time.





*Variety M-12-22B5 is non-dormant thus not available for dormant-seed storage set-up.
*Variety AG5 was excluded for Lanao-ambient non dormant seed treatment due to insufficient seed sample

ECONOMICS OF RICE PRODUCTION…ORGANIC VS CHEMICAL

COMMODITY YIELD – rice grain harvest is the only benefit derived

SYSTEMS YIELD – harvests more than just the commodity: rice hull, rice straw, edible frog, fish, enriched soil, clean water, clean air, biodiversity, natural pest control, psychic and spiritual income for organic and sustainable agriculture, etc

EXTERNALITIES – costs associated with chemical-based farming … health bills (medical fees, medicines), soil acidity, loss of diversity, air and water quality, animals, seeds, intuitive ability, culture and associated farming practices , land → DISEMPOWERMENT

Cost and Return in Rice Production

Batan, Aklan

Production Cost	Conventional Farming	Organic Systems of Rice Intensification
Land preparation	1,200	1,200
Seeds		120
Transplanted	600	-
Direct -seeded	-	-
Insecticide	1,000	-
Herbicide	700	-
Hand tractor	1,200	1,200
Tanum		800
Labor	300	-
Fertilizer	3,000	-
Pagtatabas	300	300
Pag-aayos ng dike	700	-
Sprayer	700	-
Harvest	18,000	18,000
Less Production Cost	12,050	4,220
Net Income	P 5,950	P 13,780
Return on Investment (ROI)	**0.49**	**3.26**

Talon Motoderazo Multi Purpose Cooperative Talon, Victoria, Mindoro Oriental

Production Cost	Chemical Farming	Organic SRI
Irrigation	6,600	3,300
Plowing	1,500	1,500
Hand tractor	1,200	1,200
Harrowing	1,200	1,200
Leveling	400	400
Seeds (100 kgs at P12)	1,200	96
Transplanting	2,400	2,400
Weeding	600	-
Broadcasting	180	-
Fertilizers (8 sacks @ P500/sack)	4,000	-
Herbicide	1,270	-
Insecticide	750	-
Fungicide	400	-
Molluscide	1,000	-
Sprayer	180	-
TOTAL	**22,8800**	**10,096**
Harvest (P 65 @ 57 kg)	3,705	
(P 8 @ 1 kg)	29,640	29,640
Less Production Cost	22,880	10,096
Net Income	P 6,760	P 19,544
Return on Investment (ROI)	**0.30**	**1.94**

Yield and Financial Indicators for Three Farms (Conventional, LEISA, Organic) in Tudturan, Infanta, Quezon, 1998-2000) (Mendoza, et al. 2001)

Particulars	Conventional			LEISA			ORGANIC		
	WS	DS	Ave.[1]	WS	DS	Ave.[1]	WS	DS	Ave.[1]
Gross Production (kg)	17,874.69	25,755.97	21,815.33	28,859.34	32,032.15	30,445.75	31,344.00	38,576.00	34,960.00
Yield, kg/ha@P8/kg	2,445.34	3,507.29	2,976.32	3,748.77	4,024.14	3,886.46	3,918.00	4,822.00	4,370.00
Total Cost	7,832.24	9,419.20	8,625.72	11,879.33	10,792.45	11,335.89	13,073.36	13,005.44	13,039.40
									***10,027.65**
Non-Cash	5,192.81	6,513.93	5,853.37	8,681.65	7,057.10	7,869.38	6,197.36	5,437.44	5,817.40
Cash Cost	2,639.43	2,905.27	2,772.35	3,197.68	3,735.35	3,466.51	6,876.00	7,568.00	7,222.00
Net Profit	10,042.45	16,336.77	13,189.61	16,980.01	21,239.71	19,109.86	18,270.64	25,370.56	21,820.60
Break-even (kg/ha)	1,044.30	1,255.89	1,150.10	1,534.00	1,357.40	1,445.70	1,634.00	1,650.68	1,642.43
									***1,253.46**
Cost to produce 1 kg-palay	3.20	2.69	2.90	3.17	2.68	2.92	3.34	2.74	3.01
									***2.26**
Return on Investment	22.28	2.73	2.53	2.43	2.97	2.69	2.40	2.92	2.66
									***3.48**

[1] Average of 2 seasons only (WS = Wet Season, DS = Dry Season) [2] Average of 4 cropping seasons [*] adjusted financial indicator after deducting P3,011.75 from the total costs. The amount is for land preparation and weeding costs which are added cost in organic farm but not in LEISA and conventional farm.

COMPARATIVE CHART BETWEEN GRAIN YIELD AND SYSTEMS YIELD

Name	NELSON PEREZ	WILLY NGAMOY
Address	Buayan, Mlang, Cotabato	Jose Rizal, Makilala, Cotabato
Farm Area	8,500 m^2 with 7,000 m^2 rice	1 ha
Treatment	Biodynamics	Chemical Fertilizer and Pesticides
Approach	Systems Yield	Grain Yield
Cropping Period	April-September 1999	April-September 1999
Production System	Rice-based diversified with freshwater tilapia culture (rice-fish integration)	Rice-based diversified with full chemical treatment

PRODUCTION COSTS	NELSON PEREZ'S FARM	WILLY NGAMOY'S FARM
Seeds	(30 kg @ P8.50/kg) P255.00	(110 kg @ P7.20/kg) 792.00
Land Preparation	800.00	2,960.00
Pulling of seeds	450.00	1,200.00
Transplanting	850.00	
Fertilizer (P380.00/bag)		(8 bags) @ 3,040.00
BD 500, Manure		
Rice Straw (labor)	160.00	
Mare de Cacao		
Pesticides		3 quarts Hostathion 1,000.00
		2 quarts Magnum 900.00
Weeding		750.00
Water (Irrigation rentals)	200.00	200.00
Harvest:		
Threshers' share	2,128.83	2,736.00
Harvesters' share	2,128.83	2,736.00
TOTAL	**P 6,972.66**	**P 16,314.00**

PRODUCTION	NELSON PEREZ'S FARM	WILLY NGAMOY'S FARM
Gross Yield	62 bags @ 58 kg	95 bags @ 60 kg
Yield/ha	5,137 tons/ha	5.7 tons/ha
CASH VALUE	Fresh @ P7.40/kg **31,302.00**	Fresh @ P7.20/kg **41,040.00**
LESS PRODN. COST	**P 6,672.66**	**P 16,314.00**
NET INCOME (RICE)	**P 24,630.00**	**P 24,726.00**

OTHER FARM ACTIVITIES	NELSON PEREZ'S FARM	WILLY NGAMOY'S FARM
ADD OTHER INCOME	From 1,500 m^2	None
Tilapia/fish harvest	P4,250.00	
Vegetables	8,400.00	
Kalubay/gourd, Beans, Eggplant, Okra, Onion, Ampalaya (bitter gourd), Alugbati (Malavar spinach), Leafy veg.		
Fruits (calamansi and guapple)	9,600.00	
Rootcrops/Aquatic gabi	1,800.00	
TOTAL NET INCOME	**P 48,680.00**	**P 24,726.00**
Over 6 months	8,063.22/month	4,121.00/month

ANALYSIS	NELSON PEREZ'S FARM	WILLY NGAMOY'S FARM
Landuse Efficiency Ratio for the TOTAL Prod'n	55,32.00/0.85 ha or 6.51/m^2	41,040.00/ha or 4.10/m^2
Return on Investment	729.54% or P7.29/P invested	151.56% or 1.51/P invested
For rice production		
Production	62 bags	95 bags
Cash value	31,302.00	41,040.00
Production Cost	6,972.66	16,314.00
Net Income	24,630.00	24,726.00
Monthly Equivalent (6 mo incl fallow period)	4,105.00 (for 0.7 ha)	4,121.00 (for 1 ha)
Systems Costs:	**None**	**Yes**
Systems Yield:	**Yes**	**None**

NELSON PEREZ'S FARM		WILLY NGAMOY'S FARM	
LONG-TERM ACCUMULATED BENEFITS		LONG-TERM HIDDEN COSTS	
Population build-up of		Population elimination of	
• Wild fish	• Rice/fish	• Wild fish	• Natural enemies/predators
• Edible frogs	• Azolla	• Edible frogs	• Azolla
Rice-fish integration			
• Natural predators		• Pest resistance	• Pest outbreak
• Natural pest control		• Pest resurgence	
Soil build-up		Soil breakdown/degradation	
• Rice straw	• Soil micronutrients	• Burnt rice straw	• Macro/micronutrient loss
• Microbial population	• Organic Matter	• Increased soil pH	• Loss of organic matter
• Soil macronutrients	• Physical/chemical/ biological properties	• Decreased microorganisms	
• Natural hormones, antibiotics, healthy plants		• Decreased production	
Toxins (Zero)		Toxins/Health Hazards	
• Dermal	• Water	• Dermal	• Pesticide residue in food
• Air	• Safe food	• Inhalation	• Death to animals
		• Ingestion	• Toxins in water
• Healthy people		• Health hazard	• Decreased productivity
		• Medical cost	