

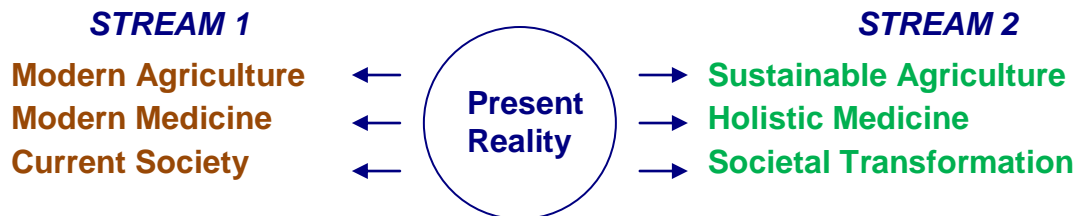
Scientific Advances in Agriculture, Medicine and Societal Change

By Nicanor G. Perlas

Department of Agronomy, UPLB on September 10, 2004. Some concepts have been elaborated from various sources to help the reader. Documentation by Pam Fernandez with Lea Bawagan.

I. Seminar

1. There are two streams or directions that spring from our present reality in the areas of agriculture, health and society. Each of the areas have intended and unintended impacts.



2. The impact of modern agriculture is well known and acknowledged. While yields may have increased briefly with the Green Revolution, the lingering effects are still being felt. Resistance to multiple pesticides has been observed in more than 500 insect species. Resistance to antibiotics has also become a grave problem through the introduction of modern medicines.
3. The mainstream solution to the problems generated by modern approaches is through a more modern and more reductionist strategy. Nowadays, focus in agriculture shifted from the Green Revolution to biotechnology or genetic engineering. In health, it is still a pathology-focused medicine; particular attention is given to the organ to where the disease occurs and not on the well being of the person. The same concept applies in agriculture. The modern medical methodology yields many side effects attributed to the drug being used and to the focus on pathology and not on health. Short-term effects of this method may be realized but in the end, the disease may still recur.
4. In the realm of society, we have unconsciously or consciously been doing many things to downgrade Philippine society. The Wallace paper (in the Economist, dealing with Philippine realities) details the Philippines' problems particularly in the economy and the political system, as well as the difficulty of Filipinos in alleviating this problem. In the 1970s, the Philippines was ahead by 30 years of Thailand, but now we are 30 years behind. Our society, in terms of corruption, stands 4th in Asia and 11th in the world. Our present structure of society cannot cope with the competition (from globalization) due to the overwhelming corruption, as also manifested by our fiscal corruption.
5. State-centered development approach presupposes that once people are put in office (e.g., through election) everything will be ok. This old concept of democracy has never worked in improving our nation.
6. Consider that we have a severe fiscal crisis. Our officials put out huge investments during the elections (e.g., P200M by a congressman) which is hoped to be readily regained when they assume office in less than 1 year. It is a fact that half (50%) of

our national budget goes to corruption. In order to change our society, we must look at our current framework (models of change).

7. The overall framework, be it agriculture, medicine or society, is “materialism”; a product of *Neo-Darwinian Theory of Evolution* (this theory is applied on ecological systems). In chemical agriculture, the Neo-Darwinian Theory of Evolution proposes “survival of the fittest”. Modern agriculture creates a structure suited for the TNCs thus creating domination in society.
8. According to Darwin, the natural law has no spirit and that all organisms on earth today descended from inanimate matter. Darwinian theory has no concept of human “loob” (inner self). Instead, the human being is perceived as a biochemical machine with spare parts, thus embracing the concept of organ replacement through nanotechnology (which is in the realm of 1 billionth of a meter). The essence of being human has been changed; diseased organs are replaced with machines. Human cyborgs are now being developed to glorify man’s immortality.

According to the Darwinian Theory, “the formation of inanimate matter is unknown. The sources of inanimate matter have been a random, spontaneous, heritable changes in genomes and other heritable materials. Man was created accidentally from inanimate matter.”

9. In the University of Chicago (1969), top philosophers and scientists around the world have joined hands and declared that materialist science is dead and had been overtaken by the development of quantum mechanics. **However, since society is still into high materialism, this version of quantum mechanics is still geared towards technological materialism. Materialism theories are still applied towards the ultimate control of society.**
10. In genetics, we talk about good and bad genes. However, who really selects these genes? This is where cultural assumptions come in. The selection process of farmers is different from those of scientists. The culture that holds more power naturally dominates (cultural power) in the current society.
11. The old materialist genetics had now been superseded, especially with the emergence of epigenetics and fluid genetics.

Epigenetics is the study of heritable changes in gene function that occur without a change in the DNA sequence.

Fluid genetics is the influence of the environment on the genes and the DNA sequence, thus defying genetic determinism (which is one-gene, one-protein, one-trait theory, or “only genes determine traits of organisms”).

12. **If we want sustainable agriculture and empowerment (human development), power should be discussed.** We should remember that cultural power is more powerful than state power.
13. **The academe should reframe its reality and approach in solving its problems otherwise it will be swallowed by ignorance and will lose its perspective and ability to effect change through education.**

14. Some individuals, and even TNCs themselves, think they are genuinely helping in improving agricultural productivity, the farmers' welfare and the country's development.
15. During the 1950's, a Yale student was sent on a mission to the Hanunuo Mangyans in Oriental Mindoro to check out the so called "destructive" practices of the Kaingin system or slash-and-burn farming (which is considered unsustainable by modern science). His conclusion was that we could actually learn more from them and that they have the most sophisticated farming practices in the world. He wondered where that knowledge came from.
16. Indigenous Knowledge System (IKS) is very deep, enough to merit a field of study in anthropology. There is even a field called "**ethnomathematics**" which examines how mathematics arises therein. It is used in various cultures and learned, not through equations, but for example, through dance.

Ethnomathematics makes an abstract connection of a "number" between a pile of pebbles and the members of flock of sheep, an idea called one to one correspondence. Other human activities which require some form of mathematics are: architecture, weaving, sewing, agriculture, kinship relation or lamentation and spiritual and religious practices.

17. It is to be stressed that man has access to other forms of knowledge. **But is UPLB willing to look at this in greater detail and develop this indigenous knowledge?**
18. A French anthropologist studied (for his PhD thesis) the worldview of the Tagbanuas (in Palawan) for 20 years. His conclusion was that their system is as sophisticated as that of the Egyptian star science (where modern science began). We were brought up to look only at one category of science – a science that is being taught by the university.
19. Sustainable agriculture, which is rooted in indigenous knowledge systems, is now being practiced in over 10M ha all over the world.
20. **Comparing the different time-tested approaches, biodynamic agriculture is considered deeper than organic agriculture.** Biodynamic farming and holistic medicine are both being taught in western universities. Note that **about 3,600 families are already practicing biodynamic farming in Mindanao.**
21. In worldwide movements, about 50 to 90% of those who are doing alternatives and are involved in mass movements are young people. This has been proven true globally.
22. There are 50,000 medical doctors of holistic medicine. About 85% of US citizens have one way or another approached holistic medical practitioners. This indicates that conventional medical system has been collapsing due to recurrence of illnesses. What we want to see/discover is the new science that fits into the sustainable agriculture paradigm, one that would strengthen holistic medicine and would change our 19th century medical view.

23. We are now in the 21st century and are living in the age of profound change. We have gained so much knowledge in the last five years. As population grows exponentially, we are now reaching the inflection point (or at the juncture in a curvature from a flat to a very steep upward line). In 20 years time, the gain would be equivalent to 100,000 years of evolution.

24. Half-life of the following disciplines can be very short. Note the following half-life in the following fields of science:

molecular biology	-	6 months
neoparticle physics	-	1 year
medicine	-	2 years
agriculture	-	7 years

This means that if you have finished your PhD in molecular biology, half of what you've learned will no longer be relevant after 6 months.

This rationalizes why medical doctors in the US undergo written examinations in their respective fields every two years. Knowledge in science indeed changes. But scientists are human beings and are by nature emotional. They particularly get emotional when the technologies they have invented become outmoded by other inventions and hence resist change and fiercely defend what they know. (There is even a joke as to what BS, MS and PhD mean). *Going up the ladder of success means getting more and more of less and less.* Such imbalance or deficiency in education curricula is being recognized globally, manifested by many CEOs in the US and Europe now taking courses in the Humanities. **CEOs with philosophy background tend to be favored as they show better ability to cope with rapid change.**

25. Science is undermined by materialism, which proposes that all realities can be reduced to a molecule and that the bottom line of reality is the atom. This framework collapsed in the 1920's.

26. Quantum mechanics emerged and professes **non-locality**. Note that Newtonian physics is a subset of the physics of Einstein (the theory of cause and effect). Quantum mechanics can subset all of the above.

27. Non-locality contends that we have a twin entity in the cosmos several million light years away. It cancels the concept of space and time. Non-locality means the cause and the effect on a particular situation or idea can be one and the same, occurring simultaneously despite distance and time.

28. The "**kutob**" (**heart-sense**) of IPs (indigenous peoples) is very accurate because they can sense what will happen even in far places. This is their basis of action and in developing appropriate strategies and tools for survival and life enhancement.

29. Quantum optics, especially dealing with laser quantum optics, also deals with non-locality. This can be seen in science fiction movies/stories such as "The Matrix" which tackle quantum physics. You need only to imagine the cellphone that is based on quantum mechanics.

30. There are eight mathematical explanations for quantum phenomena. I'll discuss just a few.
31. For example, new findings in genetics, physical and molecular biology suggest that genes have a **"microworm-hole"**. A worm-hole is the entrance point of our universe to another universe, like a parallel universe.
32. There are many controversies surrounding these topics. A case in point: Scientists have been currently arguing about the theory of the universe. But they all agree that our current practice cannot lead us to the understanding of present reality. **It is indeed here in the alternative concepts that we'll understand some findings on sustainable agriculture and alternative medicine.**
33. One project at Princeton University, called the global consciousness project, tries to find the link between human consciousness and matter (on the possible impact of our minds on matter). It puts Newtonian Theory in question. The materialism framework contends that there is no link between mind and matter, and that what we think is brought about by the biochemical changes or by the secretions in the brain.

A global network called the *random generator counterflow* has been set-up in order to prove the link between human consciousness and matter. Unconscious events are being read by a machine that registers random quantum phenomenon. The "9/11" event (World Trade Center bombing) registered non-random counting by some 50 of these counters (which count stresses). This project proved that some form of consciousness of a certain event is also realized/perceived even by those who did not have any knowledge about the element or to those who lived in remote areas. This illustrates that there is a connection between human consciousness and matter.

34. **"Field theory"** is a new science dealing with matter, living systems and the "tao". It contends that entities or objects have fields (akin to magnetic fields). Hence, it matters how and what we think of ourselves, because this affects other people's behavior.
35. At Yale University, Professor Harold Saxton-Burr says that if the life energy level of a plant is low, it will get sick. Thus, sickness or disease may be predicted using life energy.

Saxton-Burr discovered that all living creatures have a measurable electromagnetic field surrounding them. These field changes when there are physical or even emotional changes in the body. Thousands of painstaking experiments over several decades proved that the field (life energy level) is primary and the physical body is secondary - that is, the field is controlling nature. It proposes that changes in the field are later followed by changes in the physical cells of the body.

36. **Psychoneuroimmunology (PNI)** is a new field emerging in medicine which has the potential to integrate the systems of the body into a unified view of how the body works and interacts with itself and its environment. It is also a study of how all these mechanisms and bodily functions interact to produce states of health and disease. It teaches that with what you think there is a great tendency that *it will likely happen*. This is the basis of "active visualization". What's happening to the Philippines may

be also explained this way. **The country is caught in a self-fulfilling prophecy because it is pervaded with bad/pessimistic news (need only to check the newspaper) with our minds focusing only on bad news.**

37. **Appreciative Inquiry** (AI) is a technique to counter negativity. It seeks to review what happened in one's life that has positive impact. This is now getting popular as an approach in problem solving, management and HRD (Human Resource Development).

AI aims to see what others may not see and heighten one's awareness of the value, strength and potential of others and ourselves, which makes us overcome the limits that we impose, often unconsciously, on our own capacities.

38. There are also findings by Russian scientists that **the mind can restructure the genetic system**. This is a contradiction to conventional biology. What you think can affect the DNA. **If we will not be critical about the way our culture has been progressing, chances are our self-fulfilling prophecies are likely to occur.**

HEART INTELLIGENCE

39. There is such a thing as **"heart intelligence"**. For further information, visit www.heartmath.org that contains 30 years of research which the US has also been using. It is equivalent to EQ at the social level and can teach students to manage the heart. If the heart is managed well, there is less pressure, less anxiety and a better learning process.

40. The difference between a nerd and a geek (both have the same high IQ) is that the latter has higher heart intelligence (can distinguish false from objective truth). The bad news for geniuses is that at 28 years of age, having low EQ could lead to a much lower IQ. That is why many geniuses become simply ordinary and are even failures in later life. **Sad to say, our schools and universities put high premium only on brain intelligence.**

41. One finding stipulates that there is a hidden brain structure in the human heart and that the heart has a brain structure that governs the brain itself. Unfortunately, conventional education produces children that are heart-damaged because it does not train our emotional intelligence. To develop the emotional intelligence later on in life, one has to go through a lot of pain and suffering to transform and awaken the heart intelligence.

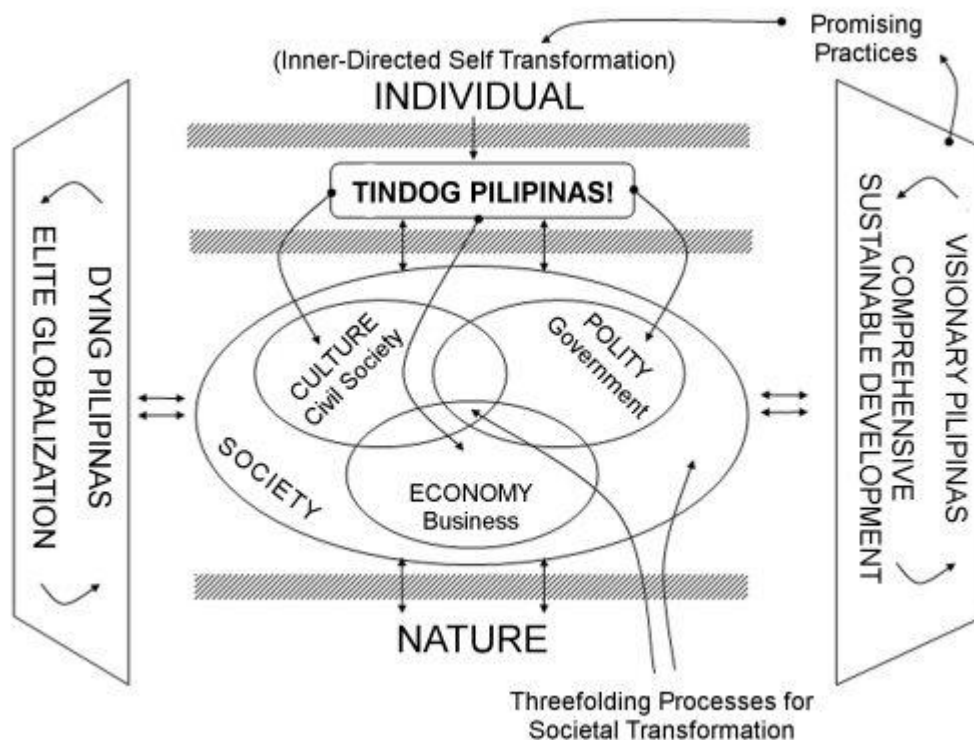
42. The heart is a big muscle and has interesting properties. This is seen in the realm of Kinesiology (scientific study of movement), which looks at response of the muscle to external stimuli; it also seeks to understand the psychological effects of physical activity on human behavior. Furthermore, the heart can objectively distinguish between what is true and what is false.

43. Filipinos have higher innate heart intelligence as compared to Western culture but our one-sided education destroyed this. Now we have a tendency to hold power with no 'heart'.

44. **Heart intelligence has access to the field of ecological processes that is why it is not surprising that IPs have a highly evolved ecological approaches in their farming system.**
45. IRRI spent millions of dollars just to learn that five (5) crop species may be intercropped together and yet they did not even fully succeed with such combination. Contrast to this are the Hanunuo Mangyans of Oriental Mindoro who combine more than 200 species of plants in their farm. One can calculate the amazing number of combinations of species that can be intercropped (i.e., through the factorial approach).
46. A Yale University study done by some PhD students in the 1980s discovered that more than 100 tons per hectare of edible yield could be obtained in a rainfed setting using IKS (a previous study was also conducted during the 1950s). This proves their worth and the need to understand and respect their indigenous knowledge and correlate it, where possible, with the corresponding scientific basis.
47. **“Presencing”** is a technique for societal change. It is the capacity for super creative people to attune/predict what will happen in the world, to sense the future before it emerges. It requires heart intelligence and development in multi-intelligence. In an interview done by social scientists from the Michigan Institute of Technology (MIT) on 150 super creative people around the world (they are big time awardees), it was discovered that these people have an innate capacity to attune to the “field”, to sense the future before it emerges. Their work or discovery actually already happened in their early 20’s, many years before the award had been given.
48. **Materialist science can’t sense the future because it is a product of, or based on the past.** The future may not be a product of the past. There’s no new freedom if we are always ruled by the past. In the Philippines, economists use 10,000 variable models for the super computer models of the economy. Incidentally, all of those who used such models were part of the 1997 financial crisis in Asia. They are now resorting to presencing and other these technologies because they had difficulty in devising plans to improve the Philippines.
49. The number one requirement for presencing is the **transformation of the self by allowing one to enter the “field” through the heart.** The mind’s role is only to verify. Nobel prize awardees first discovered their inventions through their intuition, by first entering in a “field”. One radical example is in the realm of mathematics, which has been used to predict something that is yet to exist. Mathematics is an unreasonable science but it predicted the atomic bomb. A scientist described the shape of the galaxy through heart intelligence (sideways, the galaxy is like a disc with a mound in the middle, very much like the side view of the flying saucer) by means of an equation that he has yet to prove. **In farming, a good farmer with heart intelligence can easily sense what is happening in his farm and can intuitively know what to do with it.**
50. **We are now in the 21st century and the university should have all the radicals in the world. However, what it has right now are conservatives. This is unfortunate because the university is in the best position to initiate and effect change, and become innovators of integrative science.** We wish that technologies currently being developed are “Angkop-Pinoy” (pro-Filipino). However, the dominant worldview is more convergent to natural science which is a product of

restored materialism, being pushed by colonialism and imperialism. With the addition of US imperialism, US Empire and our educational system, materialism has drastically changed our mindset and way of thinking. It is hoped that universities become a part of the vision and science to new findings that has scientific impacts 150 to 400 years from now.

51. The Presencing method is now being used extensively in many institutions worldwide.
52. In order to drive the future, one must be able to see the new science of synergy (which still includes the old science), such as the relationship between Newton's Law of Gravity, Einstein's Theory of Relativity and Quantum Phenomenon. It is important to know their uses and limitations, and to be able to translate them into **the new science synergy** especially in the fields of agriculture, medicine and societal transformation. Because only in this way can we create a New Philippines (*Panibagong Pilipinas*).
53. The "Tindog Pilipinas" movement speaks about how new science can achieve our struggle for a new Philippines. All of us want a new Philippines but the old framework is the one embodied in our minds. There is a need for a new country, new consciousness, new science, new agriculture, new medicine and new structure to be able for the Philippines to truly progress.
54. Question: *What do the 'powers' do in order to contradict the change that we want to achieve towards a new paradigm, the new science that is spirit-filled?*
- (1) There are three types of power: economic, political and cultural, representing our three realms of society (business or market, state or governance, and civil society)



Economic power is sometimes called 'sticky power' (as referred to by Foreign Affairs) because it is not very definite or is double-edged. The other is *political power*, also called 'military or hired power'; *cultural power* is called 'soft power'. Political power has been the most apparent among the three because of the monarchy system that was turned over by the press revolution.

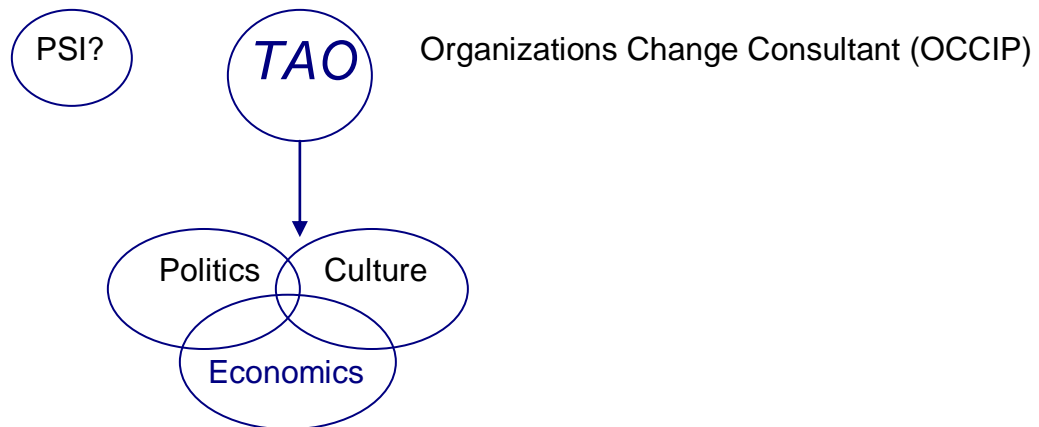
Among the three, **cultural or soft power is most powerful because it controls the bad news, our worldview and our identity.** Once identity is formed, true freedom and truth are sought out, because it is hard to find them in a suppressed state, dominated by economic forces. Globalization suppresses democracy, individual initiative and magnifies the power of everyone.

- (2) **Transnational Corporations/Companies (TNCs) are into branding. They spend billions of dollars just so to stamp a brand into our consciousness.** A brand is simply shown to consumers and consumers buy the product just like that. Branding is in the realm of culture and gives us a surrogate identity. People are vulnerable to branding because they do not know what they want in life. The TNCs create a specific identity in our brains, and it's a pity that they have created a macho culture for farmers as manifested by pesticide branding such as 'machete', 'karate'. This can be a challenge to the PABINHI movement (Pambansang Inisyatibo sa Binhi at Likas Kayang Pagsasaka sa Pilipinas (PABINHI-Pilipinas or the National Initiative on Seed and Sustainable Agriculture in the Philippines- http://www.ebookscenter.co.uk/download/THE-PHILIPPINE-SUSTAINABLE-SEED-AND-AGRICULTURE-DEVELOPMENT-PROJECT_aHR0cDovL3d3dy5yZWFWLWNhbmFkYS5jb20vb25saW5lX2xpYnJhcnkvSW50RGV2L2lkX3BoaWxpcHBpbmVzL1BoaWxpcHBpbmVzJTlwLSUyMFBU0EIMjBFbmQtb2YtUHJvamVjdCUyMFJlcG9yZCUyMCGyMDA2KS5wZGY=). There is a need to expose the assumptions behind advertising, and aim for the downfall of the advertised pesticides and the pesticide campaign.
- (3) Branding power is manifested in cigarettes. We know that 60% of the more than 100 chemicals in tobacco are cancer causing yet people buy it as if it is a basic commodity. Branding is also being used in advertisements and the media campaign. ABS-CBN has branding approach into its star making process. Check out the "No-logo" book.
- (4) To fight the cultural war, a battle between one form of consciousness into the other, visit www.truthforce.info.com.
- (5) Cultural power is the weakness of TNCs. People naturally expect that governments are trustworthy and have legitimacy. Thus, policies in the business realm could be bad for TNCs; some of these policies are now being attacked by the TNCs themselves.

54. Our local cultural movement is through TINDOG Pilipinas (refer to leaflet).

Tindog means to "stand up" physically and also for one's principles. It means to be inwardly upright as a basis for standing up against abuses in society and a moral foundation for a better Philippines. Tindog Pilipinas! is the name of this

national movement which seeks to transform Philippine society. The word "Tindog" is used widely in the Visayas, Mindanao, and parts of Luzon.



“The heart of the revolution is the revolution of the heart”. This is the popular way of saying that if we don’t change our mind, thoughts, and feelings we will continue to operate within the same consciousness that has created the problem in the first place. To overcome this, we also have to overcome materialism, the sense of power inside us. From the past four administrations (Aquino, Ramos, Estrada and Arroyo), it was observed that 95% of cabinet members become corrupt; only a few survived. The weak ones don’t have their integrity intact. If one lacks heart intelligence, he can be easily changed by the system.

The core mode of cultural revolution or revolution of the heart is network science. This is a very sophisticated, mathematical social science that has emerged in the last two years; it reveals the network processes and structures of world matters, world of social system and the university factor, and is in itself part of a larger network. **Top-down approach cannot push network science. Network properties rely on diversity and flexibility.**

According to the University of British Columbia, network science also has implications for biology and medicine. Since it governs the principle that network structures govern transmission, population spread and ecological success, it is common concept for many infectious diseases because many biological and epidemiological processes can be represented by network. It is possible to apply the principles of network science to infectious diseases biology by bringing together international experts from the fields of network science, epidemiology, etc.

55. “Karangalan” is a big event, whose design is based on Appreciate Inquiry. It gathers various cultural initiatives on January 21-23, 2005. There will be exhibits, talks, and workshops that include presencing (i.e., to enter into fields, improve heart intelligence, etc.). http://www.cadi.ph/Features/Feature_19_Karangalan.htm; <http://96.0.107.6/?q=node/view/1534>; <http://96.0.107.6/?q=node/view/1408>; <http://www.philstar.com/Article.aspx?articleId=316533>
56. In order for man and nature to be in harmony, the **Babaylans** in the old days can enter into the “diwa” (essence) of plants. It is a form of presencing. It goes through an inner transformation process where actual communication occurs with the plant’s consciousness. If we want to address the IPs, we need to organize and base our worldview according to theirs.

57. The placebo effect can be related to the realm of psychoimmunology. A substance may have some properties that is neither perceived nor discerned by conventional standards. Note an experiment in Japan that showed the impact of consciousness on the structure of water. If one is in contact with water during those times of stress or bad feelings, these bad feelings will have an unharmonious effect on the water. This implies that what we think will manifest in our body and soul realms. Watch the short video: <http://www.youtube.com/watch?v=yfJxx0BNyFM&feature=related> or visit the site http://www.masaru-emoto.net/english/e_ome_home.html .
58. Astrophysics is within the anthroposophic principle. It presents the structure of the universe the same way anthroposophy does. The universe has many improbabilities that indicate the existence of a divine intelligence that guided the creation of the universe billions of years ago.
59. Both the concept of a human being and a national framework have now expanded to include a larger divine framework. It is good to understand Christianity, Buddhism, Hinduism, etc. One of the purposes of Eastern culture is to train on and pursue the combination of matter and integrative holistic science. **Eastern culture is guided by human consciousness while Western culture is guided by matter and the materialist principle.**

Part II. Smaller group sharing ... also attended by Pabinhi farmers.

1. Biodynamic (BD) is not in the level of substance or matter but on life force.
2. Homeopathy, a branch of anthroposophy, operates beyond Avogadro's number (10^{23}).
3. To conventional pathology an organism is only opportunistic. There is deeper meaning to disease and pests.
4. The second scientific revolution transcends materialism. It is spirit revolution. In biodynamics... It is explained by the Biodynamic Gardening and Farming Association of the USA as follows: *we cultivate the spiritual dimension of agricultural renewal*. Put differently: we awaken people to the reality of spirit in nature and give them tools *to make sacred their relationship with the earth... we place spirit at the center...* the essence of our work is *to fan the flames of a spiritual awakening to the dignity of the earth and to provide the tools necessary to act on that awakening!*
5. Many doctors are now into alternative medicine. Dr. Jaime Tan (the brother of Jake Tan who is a homeopathist) is also into alternative medicine. He says that 80-90% of diseases in rural areas is preventable.
6. The Secretary of Department of Education (DepEd), Mr. Butch Abad, recognizes that the high school education system in rural areas may be better than in urban areas as evidenced by the good academic performance of graduates from the former despite having limited resources (such as tables, chairs, blackboards, chalks, etc.). By seeking excellence through synergy, these local schools' success may be attributed to the following initiatives such as:

- a) Community responsibility
 - b) Local involvement
 - c) Synergy and convergence (community synergy)
 - d) Result-oriented performance contracts and basis of evaluation of performance
 - e) Leadership
7. Life Bank, where Nicky is the Strategic Director, is an example of an initiative dealing with alternative economics (through microfinance).
8. We are now aiming to have a program on Waldorf for the poor. Teachers who will be trained will come from the barangays.
9. Dr. Pinky Baclic convinced her father, who is a researcher of Del Monte, on the effectiveness of BD.
10. The challenge now is how to translate Biodynamics into the PABINHI program. Possibilities are:
- (a) *incorporate IKS and BD in own training.*
 - (b) *do research on BD*
 - (c) *engage farmers and other practitioners and enthusiasts to do BD (through ecoseminar, BD modeling*
 - (d) *do transformation of the self first*
 - (e) *do alternative marketing. The Don Bosco example has inspired PABINHI; however, materials/plants are needed to start with. Horsetail and female carabao horn posed as our initial challenge.*
11. A way to enhance germplasm (breeding?) is by shocking the seed. This not only leads to genetic enhancement but also to variation. *The new science in Biology can explain the genetic modification that is heritable when a seed is exposed to extreme temperature or heat-cold shock. And this genetic change due to environment is heritable (epigenetics). Example of scientific articles for further investigation:*
<http://www.faculty.ucr.edu/~jkzhu/articles/2009/COPB%20in%20press.pdf>
<http://www.plantcell.org/content/22/9/3118.full>
<http://www.nrcresearchpress.com/doi/full/10.1139/B09-030>
<http://jxb.oxfordjournals.org/content/61/7/1959.full>
12. There is so much creativity in BD breeding relative to other BD disciplines (shared by Renee Vellve, author of Saving the Seed).
13. "Swarming" is more important than a top-down approach in alleviating organizational burn out. Horizontal network is very powerful. The CIA has a hard time stopping/instigating the Al Queda due to their unique organizational structure. Evidently, there is a need for "autonomy" on each local group member for the organization (PABINHI) to survive.
14. Here is an aspect of BD that is quite interesting, esp related to the BD preparations: BD 500 is for vegetative development. On the other hand, BD 501 is used for reproductive development, enhancing (*nagpapatindi*) the archetype (e.g., aromaticity, flavor). It is also used for seed maintenance especially in aromatic rice. It is recommended to start BD on a small-scale farm for 1-3 years.

15. Nicky's questions: **What is the role of Pabinhi with respect to other change processes?** *PABINHI believes in the "expose-propose" scheme. Rather than mobilizing groups in the streets, members' time is spent in formulating ground level solutions for key issues and concerns.*
16. In Egypt, large-scale BD is being practiced (<http://www.sekem.com/> ; <http://www.threefolding.com/socialthreefolding/threefeb2003.asp>). Anthroposophy and BD enhances spirituality. Take note that the Muslims refer a lot to "ether". The Bible is based on spiritual science. In India BD is prevalent among the Hindus. These can't be easily understood if one's perspective is materialist.
17. The book "Pasyon of the Revolution" says that origin of the Philippine revolution is the *pasyon*/passion of Christ. "Pasyon and Revolution" by Reynaldo Ileto talks about the spiritual origins of the Philippine revolution in 1896. It is one of the books that Perlas reads and which resonate his ideologies of change.
18. Tindog has nodes, e.g. functional node and geographic node.
19. **What is the identity and the core belief (paniniwala) of an initiative or organization such as PABINHI?** It is very important to know who you really are. It is thus important to have training on the framework and on enhancing the creativity of farmers. **Creativity is now being added as one of UNDP indicators of sustainability/development.**
20. The BD perspective regarding the development of the seed or "binhi": during fertilization, there is a process of chaos. Then cosmic process descends and a new form with a new "field" follows. F₁ hybrids have no connection with the cosmos because they did not undergo chaos. **Chaos is a Greek word that means creative beginning.**
21. It is important to recognize chaos in a positive light. Note that the Chinese character for crisis has similarity to that of opportunity.



We should recognize this duality. *"Hindi pwedeng mabuhay ang hindi mamamatay"* (something that doesn't die doesn't live).

22. With chaos is a creative void. The pupa for example first dissolves itself to become a butterfly. This also applies in composting, as well as in food digestion. After chaos, the new form, the humus, emerges from a compost.
23. KKK is for *Kinaiyahang Kinahiladman Katilingban* (Visayan translation for Native/Indigenous Knowledge Society).
24. There are earth acupuncturists, those that identify earth spots and do healing of the planet.

Part III. Group Discussion with PABINHI members who had just their BD training at Don Bosco Foundation for Sustainable Development in Makilala, North Cotabato one month ago (August 2004):

1. Through the BD training, the scientific basis of IKS was found.
2. Current science (materialist science) is very limited because some IK practices being employed are labeled unfounded.
3. One basic principle learned is that “The farmer belongs to the farm and not the farm belongs to me, the farmer”.
4. Our spiritual aspect has been deepened during the training.
5. Transformation of self is needed to be able to apply BD principles. One must start with himself so as to effectively effect change.
6. The importance of “giving offerings” as an agricultural practice has been given scientific basis.
7. Gained a more holistic view of religion, spirituality, creation, role of transformation of individual; these were connected to agriculture, economics and environment.
8. BD practices are now being encouraged, pursued in a seemingly “dying”, “lowbatt” organization.
9. The learnings from the BD training were re-echoed to the on-site management teams (OMTs) of the different PABINHI areas. These gave them hope, light, etc.
10. The Philippines is seen high in religiosity but low in spirituality, as manifested by the behavior of many church leaders.
11. **BD principles are seen as very different from the teachings in the university. Hence, a lot of unlearning and detoxification is needed to embrace BD in the academe.**
12. Scientists have difficult time to change/accept BD teachings, as well as accept the fact that IKS is deeper than modern agriculture.
13. People with bad conscience have no transformation of the heart.

14. One of the fruits of the BD training is the focus on the NOOSPHERE; also on values formation. *noosphere- the sphere of human thought; the sphere of human consciousness and mental activity especially in regard to its influence on the biosphere and in relation to evolution.* An account of the BD initiative: <http://www.cebusemile.com/2008/10/01/soil-to-soul/>
15. Farmers are convinced that SA could also work even in large farms.
16. Particular emphasis was given on agriculture as a CULTURE (as opposed to agriculture as a BUSINESS). Technology should consider farmers' culture.
17. Farmers had been part of the success of Don Bosco in BD.
18. Through BD, the spiritual and science aspects had been linked/interconnected.
19. We have expanded PABINHI programs to alternative education and health.
20. We aim to localize BD principles at the household level.