Are wicking beds getting off track?

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Why wicking beds

People use wicking beds for a number of reasons – they just like to see plants grow – it is convenient to have food readily available (I have a couple of wicking baskets growing lettuce and spinach right outside my backdoor for when I forget to buy or collect vegetables) but surely the main reason must be healthy food.

We need food – and for two reasons. We need energy to power our body to provide the fuel so we can be active, power the brain and our sexual activities both major users of energy. But we also need food to replace our body parts. We may think we are the same person from day to day, and our personality may remain pretty much the same but the molecules in our body are continuously being replaced.

Food for energy

Let's look at energy first. Energy for our bodies is supplied by glucose in our blood stream. Glucose is a pretty simple molecule and our bodies have remarkable capacity to produce glucose from virtually any food, meats, fish, fowl, fats, protein, sugars, plants – basically anything we can eat and digest.

There is no shortage of energy food in the world. I may be critical of our food system – which economists like to classify as a cooperative oligopoly but basically it is a handful of major international companies which are working from the same rule book – but they have been wonderfully effective at producing vast quantities of cheap high energy food. There is enough food to feed the entire world population and more. Of course there are some people who simply do not have enough food but that is not because of lack of food – it is the result of economic or political failure.

We have an excess of energy food. There has been an enormous amount of research into the energy needs of our bodies but basically we consume far more energy than we expend – our bodies simply extract the energy that it needs and excretes the rest.

Food to replace our body parts

But now look at the food we need to replace our body parts. We may look and feel pretty much the same as we did months or years ago but we are really made up of different material. This is obvious with hair, nails and skin which may look the same as they always did to but are made up from totally different molecules. This is happening throughout our bodies and is the magic of DNA.

To reproduce our body parts we need a steady supply of nutrients particularly the trace minerals and phytonutrients. The failure in our food system is not the capacity to produce enough food but to supply the critical minerals, vitamins and phytonutrient to rebuild our bodies.

The world's greatest health problem

This imbalance is causing what is the world's worst health crisis - often referred to as the metabolic syndrome the accumulation of fats around the vital organs which lead to diabetes, heart attacks, strokes and cancer. These are now the most serious health burden both medically and financially. Diabetes is the single largest cause of blindness and amputation. The number of sufferers worldwide is estimated at 1.4 billion, equal to the entire population of China.

A message for our politicians; - stop trying to chisel away at our health services, help people have a better diet and you will save far more money and make the population healthier.

Prevention is better than cure.

How did food end up such a mess

There are three main reasons why we ended up in such a mess.

Whether we like it or not, that the food industry is dominated by a handful of multinational companies whose primary interest is profit rather than our health. It is just a reality of life.

The carefully formulated bends of sugar, fats and salt is addictive – it is not as immoral as the tactics used by the tobacco industry – but it not that much better.

Secondly is a monumental blunder made by the food science industry. For years it was assumed that our bodies were some dumb machine which could be analysed as an 'energy in' 'energy out' balance. We now know that our bodies work on a highly intelligent system with hormones being sent to the brain via the blood stream and our brains then directing messages back to control our digestive system, the release and storage of fats and energy in our various organs and muscles.

Thirdly it is relatively easy to conduct research into the energy needs of the body, by contrast the mechanics of how our body parts are continuously replacing themselves is incredibly complex and we are still trying to work out how it really works. We know that the right minerals, vitamins and phytonutrients must be available to provide the raw materials.

For a long time it was assumed that this process of reproduction was simply controlled by our DNA but now we are just learning that our DNA can be turned on and off by various switches or triggers. This is discussed in Eat, Fate and Disease by Peter Gluckman and Mark Hanson.

Commonly these triggers are age related controlling the body from birth, through puberty to old age. However external factors such as diet have a role in switching our DNA on or off.

How we learn about how our bodies work?

How do we learn about diet and health?

Scientists conduct three basic types of research. There are the mass surveys like the China and Framington nurses project which involve thousands of people monitored over long period of time. The data is examined statistically looking for correlations between diet and health.

Correlations may indicate connections but they do not reveal causes.

The range of experiments we can do on living humans is limited so science reverts to experiments on animals, often rats, giving them different diets and monitoring their reactions – how long they live, how fat they get, how active they are etc.

Scientists also conduct research on specific issues to develop an understanding of basic mechanics of a particular organ. This is vital research but may not give an understanding of how the body works as a whole.

The major error of confusing correlation with causation

And what have we found out? Well there have been some pretty horrific errors made primarily because of failure to differentiate between correlation and causation.

For years we were told that people got fat (with all its implications for chronic health) simply because they ate too much.

There was a time when being overweight was thought of as a personal problem because people simply overate. We now know this is simply not true. Modern research has shown that our appetite is controlled by a complex system of hormones or neurotransmitters. Insulin is probably the most dominant but there are many more hormones which control our bodies.

Our modern diet high in energy - particularly sugars and carbohydrates - but low in nutrients activates these hormones to send signals for our bodies to store the energy as fat. Storing fat makes us feel hungry so we eat more. It is exactly the opposite of what was previously thought.

We do not get fat because we eat too much; rather we eat too much because we are getting fat (see Why We Get Fat by Gary Traubes or the Big Fat Surprise by Nina Teicholz).

Much of what we learn about diet comes from correlation studies on large numbers of people, but just because there is a correlation does not prove a cause, we need to understand the mechanism to know what is the cause and what is the effect.

We have learned that certain foods like the sugars and carbohydrates activates the hormones to make us store fat so we overeat (they increase our appetite so we eat more to replace the fat which is being stored – net result we get fat). Other foods particular vegetables with a high fibre content suppress the hormones telling us to store fat so we actually feel full and don't want to eat as much (they supress our appetite so we get slimmer).

We know that reversing our diet so it has a high nutrient level has dramatic effects on our health.

If this does not stop and make you think I don't know what will.

There are many populations which are very long lived and these have been extensively studied showing a correlation between the fertility of the local soil and life span. One region in particular is the foot hills of the Himalayan Mountains in Western China which I visited to see for myself.

The results are far more dramatic then the reports on simple life span indicate. True the raw numbers show that many people live well into their nineties but what is more dramatic is the

obvious health of the people. People well into their nineties are fit and active; it is a common sight to see seriously old people working in the fields in the day time then out dancing in the streets at night.

Of course life spans in developed countries are also increasing but our elderly people have nowhere near the level of health and activity of these populations with a food based on high nutrient soils.

Common sense and science

From a strict scientific viewpoint this actually proves nothing. A pedantic myopic statistician could argue that this is purely a correlation - it could be either that people are healthy because they are eating food from nutritious soil or alternatively it could be that old ladies dancing in the street is causing the entire Himalayan Mountains to be rich in nutrients.

Fortunately science is not that myopic and has provided us with a cause or mechanism. In particular trace elements such as selenium are needed for our DNA to accurately reproduce. It would appear that eating a diet rich in critical micronutrients may lead to a more accurate reproduction of our cells so we maintain our youth for longer while a lack of these critical micronutrients leads to errors in the reproduction of our cells so we age faster.

At this moment this is still an area where the science has not been resolved but common sense would say it would be pretty stupid not to include these critical micronutrients in our diets.

So what does all this tell us;- we should experiment to find a diet that makes us feel satisfied so we don't want to eat continuously. This does appear to vary between individuals but having a diet of nutrient rich vegetables seems a good starting point for self-experimentation.

Note I should just mention that some of these long lived communities do not eat vegetables because they life in high mountains where it is simply too cold to grow vegetables. However they eat animals which freely graze on native vegetation which grows in the volcanic soil which is rich in nutrients. This is very different to eating animals which are raised in feedlots and fed corn.

The basic law of conservation of mass holds. If the nutrients are not in the soil then they can never be in the plants or animals we eat. Conversely if the nutrients are in the soil (or in the sea for fish eaters) then they will end up in our bodies.

Rebuilding our bodies

I have made the point that we need food for energy and food to rebuild our bodies (so we can live a long and healthy life).

Energy food is no problem – it is a relatively simple process which we are already doing on a massive scale with highly automated agriculture, the use of synthetic fertilisers and an integrated distribution system. We are producing energy food in excess. No doubt factory farming produces abundant cheap energy food.

But there are inherent difficulties in producing food to rebuild our bodies – nutritional food.

The process starts in the root zone – the zone that scientist call the rhizosphere where roots and soil biology interact. If you just want to produce energy food the rhizosphere is not important – just feed the plant soluble fertiliser. But if you want to produce nutrient rich food to rebuild our bodies the rhizosphere is critical.

Plants exude sugars and nutrients from their roots to feed and encourage soil biology which provide the plant with the mineral in solution for the plant to convert into the complex chemicals which we need.

Science is really just beginning to get to grips with the rhizosphere. There are so many different species that probably we have only identified a small proportion of them. Elaine Ingham has written extensively on soil biology from her primer The Soil Food Web to scientific papers and You Tube. Other readable books are Teaming with Microbes by Jeff Lowenfels and Wayne Lewis and Roots Demystified by Robert Kourik.

What is abundantly clear is that the rhizosphere is a battle ground with beneficial creatures which are providing the plants with nutrients while other creatures from fungi, viruses and nematodes can be highly destructive. It is no wonder that many commercial farmers who rank production higher than nutrition intentionally or unknowingly wipe out much of the soil biology.

Some plants themselves have developed chemical protection against this harmful biology. In a natural environment it is rare to have a monoculture primarily in extreme climates, dry or cold. Plants can communicate through chemical signals transmitted from plant to plant by Mycorrhizal fungi. This enables plants to defend themselves against the malevolent biology.

Science by its very nature tends to be highly specialist and the three key technology of soil biology; botany and diet tend to be researched separately rather than as an integrated system.

Traditional farmers on the other hand are more concerned with ‘does it work’ rather than theory. It is interesting to read old books on early farming, even in the 1800’s farmers adopted very practical solutions. For example when planting clover seeds it was common to mix the seeds with soil taken from virgin land, sunflowers were often grown because they improved production in the following crops. Now of course we understand how these work by fostering specific soil biology like Mycorrhizal fungi.

We know that the production of nutritious food means managing the system as an integrated whole. It is not necessary to understand every single speciality. How many people are perfectly competent drivers but have no idea of how a complex fuel injection system works.

No one individual can possibly be expert in all aspects but can still produce highly nutritious food by recognising the need to manage an integrated ecosystem system and sharing information using the principles of Collective Commons which I will discuss later.

Solutions

Wicking beds can be part of the solution as they can provide nutrient dense vegetables. But this is not automatic; you have to work at getting the nutrients into the bed and just as important making the nutrients available to the plant which means fostering the soil biology.

Wicking beds are now hugely popular and are being adopted right around the world but from what I see the majority of users are missing the key point about wicking beds.

It is absolutely true that wicking beds save a significant amount of water and make life a lot easier by avoiding the drudgery of frequent watering. But that is only a small part of the story. Water is a scare but renewable resource. Some nutrients are available in large quantities but others like phosphorous and many of the trace minerals are on the critical list. Agricultural specialist are already debating peak phosphorous. With conventional growing these nutrients are prone to being washed away on heavy rain, many critical nutrients are non-renewable.

In a properly managed wicking bed the nutrients can be trapped in the lower levels. Their importance lies in providing the minerals, vitamins and phytonutrients essential for health.

Thinking about wicking beds purely as a water saving system is like saying a luxury car has high performance tyres so fitting high performance tyres will convert an old bomb into a luxury car.

The overriding benefit of wicking beds is this ability to provide us with these nutrients and balance our current excess of energy and lack of nutrients. They can do this partly because the nutrients in the soil tend to stay there rather than being washed away (at least in a well manage wicking beds with well-designed drainage) but more importantly because the moist conditions favour the growth of soil biology which is essential to release these trace minerals and make them available to the plants.

Alternative food distribution system

Nutritious vegetables grown in wicking bed could provide a technical solution but not everyone is willing or able to grow their own food in a wicking bed.

If nutritious vegetables are going to have a serious impact on global health they need to be part of a total strategy to create what is in affect an alternative food distribution system.

It is great that many people are growing their own food in wicking beds but we need to be looking at this on a larger scale so everyone has access to nutritious food.

How are we going?

Wicking beds have achieved such a state of popularity worldwide in a relatively short time. Unfortunately the current promotion of wicking beds has water saving as the priority rather than the nutrients - which have been a continuous theme in my web sites.

It worth studying how this happened and what can be done to correct this imbalance. Let's have a look at the history to see what we can learn.

When Bill Mollison first publicized his permaculture system way back in the mid-seventies I became an enthusiastic convert and got seriously stuck into permaculture. I came to the conclusion that permaculture as was then being promoted was really only viable for dedicated enthusiast and would only be adopted by a minority of growers.

However the philosophy behind Bill's thinking of looking at agriculture as part of a totally integrated ecosystem is totally profound for food production. It has had a major impact on the way progressive farmers think and act around the world. It is a little sad that Bill has not

received the full credit he deserves for changing the agricultural system. Many farmers are basing their practices on Bills thinking without even realising his contribution.

But it certainly had a major impact on my life and I need to recognise him for that.

Sometime (1983 to be precise) after being introduce to Bill's ecological philosophy Melbourne suffered horrific dust storms. This was another dramatic event in my life because I realised that the world was simply running out of soil. At that time my software company had become profitable and the largest exporter of technical software in Australia. I had a research and development budget of $5 million per year (now worth about $10million) and I was heavily into speculative research, the sort of high risk project that Governments and big business shy away from funding so I started a major research program on soil regeneration.

I am not sure I believe in miracles but if I did the conversion of clay - like concrete when dry and a sticky glue when wet - into a light friable and fertile soil would be top of my list of miracles. The essential ingredients for this near miraculous conversion are water, plants, soil biology and some minerals particularly calcium.

The start of wicking beds

My fascinations with water lead me to wicking beds which now for better or worse dominate my life. I don't think many people know the story so let's have a look at history.

It is now over forty years ago (1971 to be precise) that I used to take trips out to the Australian desert in my beat up old series 1 Land Rover. At isolated spots in the dry sand deserts I noticed little patches of verdant green vegetation which appears to be surviving against all odds in the midst of an expanse of dry sand.

I worked out that what was happening was that a clay pan would silt up with sand so an underground water reservoir could form when it rained.

Seeds would germinate and plants would put down roots but most of the plants would die. The dead roots would form a pipe channelling any rain that happened to form into the water reservoir below. Dead vegetation would gradually build up on the surface to form a nutrient rich soil giving the key ingredient of a modern wicking bed, a waterproof layer, a subsurface water reservoir, a rich upper soil and a pipe to the subsurface reservoir.

It would not be accurate to say that I invented wicking beds because they have existed in nature for millions of years. But I can reasonably claim to have observed them in nature and worked out the underling science of how they actually work.

This was well before the internet but I did write several articles and published a book (Water, Wit and Wisdom) explaining the potential of wicking beds – unfortunately this had virtually zero impact.

However when at the end of last century when the internet arrived and was readily available I set up a web site and started to write about ways of making more effective use of water which included articles on wicking beds. Again I can reasonably claim to be the first to start promoting wicking beds on a global scale.

Now at that time I had absolutely no idea that wicking beds were going to take off and took very little effort to protect what we would now call my intellectual property.

Going feral

At that time I don't think the words 'going feral' had entered the English language in the form that we now understand it. But that is precisely what happened in a totally uncontrolled way.

People saw my web site, maybe did their own experimentation with wicking beds and maybe developed their own particular version then set up their own web site to show people what they had done.

Then other people would see this second generation web site and repeat this duplication by making their own third generation web site. Now there are many sites all over the world talking about their own particular version of wicking beds – sometime they would recognise the original source e.g. my web site and sometimes not.

This could of course be regarded as plagiarism but this is not as bad as it sounds, in that era the rules of the internet were not well developed and the simple fact is that wicking beds would never have achieved their wide spread adoption had it not been for these copycat web sites.

I also have to admit that some of these sites were much slicker than mine, which tends to be a bit dull and boring with a lot of technical stuff (my strengths are in technology - I am not a salesman).

Let's get personal here.

I have spent a great deal of time (and money) researching how wicking beds work and the effect of diet on health. This is not altruistic, I have needed heart surgery while my wife Xiulan has drifted into being a diabetic and came very close to having her leg amputated. My interest in diet, health wicking beds is primarily driven by selfishness. I don't have any great desire to live to some great age if that means dribbling away in a wheel chair and wetting my pants but while I am alive I want to be fit and healthy so I can enjoy life.

I am also greatly concerned about a society in which a handful of food companies dominate the market using the market power to persuade people to eat a diet which is intrinsically unhealthy. To my mind this is just plain wrong.

If the technologies I have been developing can help other people lead a healthy life that is great regardless of any rewards I may or may not receive.

However there is no point in my spending the time and effort in promoting these technologies if there is little or no results, I want to create a significant achievement.

My plan is simple – I have no idea whether it will work but I can only try.

Aims and aspirations

While I am more than happy to see the widespread adaptation of wicking bed some changes are needed.

Nutrients

The emphasis should be on the nutrient content, water saving is fine by our health is more important than saving water. As a start this means incorporating minerals and micro nutrients into the soil to create the needed physical and chemical structure specifically void space and surface chemistry. This required nurturing the soil biology. This is a lot more than just adding a bit of trace elements and worm juice. Plants and soil biology form a complex synergistic relationship which needs to be managed.

Soil biology

When growers first began to realise the importance of soil biology a common approach was to first sterilise the soil, sometimes by using toxic chemicals like methyl bromide, then introducing what they thought were the beneficial organisms. Sorry - we have as yet only identified a small proportion of what constitutes beneficial soil biology - you don't buy biology out of a bottle. We have to recognise the limits to our knowledge and learn how nature does it so we can provide the conditions where the beneficial biology can control the harmful.

Flood and drain

The flood and drain cycle is the natural cycle which enable the soil to breath giving oxygen to the plant roots. This is rarely mentioned in second tier wicking bed sites but is an important part of creating a healthy soil.

Open wicking beds

Open wicking beds have been grossly neglected. They are however by far the cheapest way of creating wicking beds for large scale production. I see these as almost essential to meet my hopes for an alternative food distribution system.

Alternative food distribution

Everyone should have the right to nutritious food – it should be part of the human rights charter. However the majority of people are simply not able to grow their own food and have to rely on suppliers. The current commercial system is geared to profit and I am suspicious that this will ever be achieved within a traditional food distribution system.

I would like to see a system where people can buy on a commercial basis, food which has been grown by either private individual or commercial operations with the emphasis on the nutritional value of the produce and where consumers and growers get to know each other and have direct contact so the consumers have the confidence that the food they buy really does have the nutritious levels they want.

All good stuff but how?

You may say all great aspiration but how can this be bought about?

Well may be not so easy, I cannot do it, neither I think, anyone individual can bring this about by themselves. It requires some form of organisation. But certainly the last thing I (and I think most people) want to see is the any large commercial organisation having control over our food distribution system particularly if the technology is protected by patents and intellectual property law.

My experiences with intellectual property law have not been particularly satisfactory. I did in fact take out patents on certain aspects of wicking bed technology but the reality is that they would be impossible to enforce with a multitude of small growers – even if I wanted to which I don't.

After a while I did start the process of registering the name 'wicking bed'. I was told that this was not possible as the name was now in common usage and you cannot register a name which is widely used. Ironically the case they quoted (and law is all about previous cases) was the name permaculture which apparently Bill had tried to register but was not backed on the basis of common usage. At least I am in good company with Bill Mollison, Hoover, Bic and many more.

Bill at least has the advantage that permaculture is intimately associated with his name. People blandly use the term wicking bed with no idea that it originated from me. I feel pretty sure that if I had not started to promote wicking beds that someone else would have promoted a similar system – the concept is so intrinsically simple. However they would have used their own name rather than 'wicking beds'.

It is clear to me that the conventional intellectual property law, which was designed to give monopoly power to an individual or company, is just not appropriate for what is essentially a community operation in which everyone should be allowed to participate.

Fortunately an alternative legal structure has developed from the software industry where a lot of software is written by individual or groups on a cooperative basis. This is the system of Creative Commons which I have now adopted.

Creative commons

There has been some major changes in social attitudes since the introduction of the internet and the spread of globalisation. There has been a major backlash against large multinational organisation which try and dominate the market often by the excessive use of patents (or more often the threat of high cost patent action). Many people in the software business actually wanted to cooperate with others in writing major pieces of code by sharing resources and expertise. However they wanted some recognition for their work and if their work generated any revenue they wanted to participate in the rewards.

This has led to the concepts of creative commons which are a major advance in legal mechanisms for the internet.

The underlying principles are very simple. There are some variations but the most common, and the method I have now adopted is that technology developers can publish their work under the creative commons principle. This is in the public domain and anyone can access and study the information. They can use it for their own private use and they can copy and reproduce but they must recognise the original source (typically by referring to the web site).

However the commercial use of the technology requires a formal license with a royalty agreement.

Banging home the point

I just want to make this point clear. Anyone can copy, reproduce or use for private (e.g. non-commercial use) any of my publications from the web sites without fees (or even without permission but a note saying they are using my material is always polite).

They cannot however claim that any of their publication is original (that would be plagiarism) and they must make a reference back to the original site. This is important because it is not just fair but it means that everyone has access to the original information. The will then have ready access to information, for example my work on soil biology which the owner of the new web site may not wish to incorporate into that site.

Creative Commons enable large groups of people to readily share each other information.

Upgrading waterright

I want to upgrade by current web site www.waterright.com.au into a major technical resource for people who want to really learn wicking bed technology and the effect of diet and health.

I first started running waterright almost twenty years ago and it seems a bit like the traditional Australian farm house in which every generation tacks on a new lean to.

There is a lot of information already on this site but often hidden away so people cannot readily find it. I would like to see this as a reference or library on wicking beds so I need to get busy on the navigation.

I am not that not that bothered about people who in the past may have plagiarised my work– they have done a great job in promoting wicking beds – far better than I could have done so keep on spreading the work but please link back to my www.waterright.com.au site so people have access to the core technology.

Technology is never the preserve of any one person – improvements come from many people participating in developing a technology – so keep up the good work and promote your ideas, hopefully under the creative commons banner.

Kick-starting Alternative food distribution

I recognise that there are many people who don't want to or simply cannot for reasons of time, space or expertise grow their own food. Also the fact remains that is almost impossible for one grower to have a steady stream of produce – life is either feast or famine.

I would very much like to see an alternative food distribution system created around the technologies for producing nutrient rich food. But I am not going to get into the food distribution business. But maybe I can kick start this nutritious food distribution system by setting up a free web site which will basically be a notice board.

So I am setting up my website www.healthyfoodassociation.com as essentially a trading post for private or commercial growers to advertise their produce so customers can choose which produce they want to buy and who they buy it from.

I have decided that this it is best to make this a free site so anyone can advertise their produce. What growers put on this web site is largely up to them however I hope growers to indicate how they grow their produce to generate consumer confidence.

The overriding reason I want to make this a free site is to that customers and growers can get to know each other and communicate directly without having to pass money through some third party.

Wickingbed101

I will keep also need to update my web site www.wickingbed.com as a primer on wicking beds for those who don't want to get too deeply involved in the technologies.

Comments on this post are most welcome.

Colin