

Holistic Science

Scientific progress takes place not within paradigms but between them.

D. Seamon, 1998



Section 1

These are the first set of notes for the Holistic Science module.

Why a course on **Researching Holistic Approaches to Agroecology?**

It is interesting, as an initial response to this question, to take a look at a very small selection of some of the current issues in the realm of agriculture and ecology as reported in various news outlets.

- ***The Guardian view on GM cotton: handle with care -***
<https://www.theguardian.com/commentisfree/2016/sep/04/the-guardian-view-on-gm-cotton-handle-with-care>
- ***High pesticide levels on oilseed rape crops harm wild bees, scientists prove -***
<https://www.theguardian.com/environment/2016/aug/16/high-pesticide-levels-on-oilseed-crops-harm-wild-bees-scientists-prove>
- ***Bayer offers \$65bn to win control of Monsanto -***
http://www.bbc.co.uk/news/business-37281453?intlink_from_url=http://www.bbc.co.uk/news/topics/b6313976-a311-480f-a813-08caddad7a2f/agriculture&link_location=live-reporting-story
- ***Brexit: Farmers who backed Leave now regret vote over subsidy fears -***
<http://www.independent.co.uk/news/uk/farmers-brexit-regret-bregret-funding-common-agricultural-policy-a7163996.html>

We could look at almost any number of issues arising from these realms to find examples of why all is not well with how food is currently studied, understood, produced, grown, distributed, priced etc. and the social, economic and environmental factors which arise from current food production practices. In fact in the [Agriculture Course](#), a series of lectures which provides the basis for what is now known as *biodynamics*, the statement is made that “*the interests of agriculture are bound up with the broadest spheres of human life...there is practically no field of human endeavour that does not relate to agriculture in some way. Seen from whatever perspective you choose, agriculture touches on every single aspect of human life*”¹

Whatever our background or orientation in approaching this subject, I think that we can agree that when it comes to issues such as those illustrated in the headlines above, we are in a complex realm which demands that we look at a number of subjects and their cross-over whenever we seek to understand how even one relatively discrete food item finds its way onto our tables.

First Steps...

Let’s look once more at the aims of this course in *Researching Holistic Approaches to Agroecology*. The course is strongly oriented toward *research*. This is to say that rather than focussing on teaching or learning specific techniques or approaches to land stewardship *per se*, this course aims to support you in developing and deepening the tools for undertaking a research project of your choosing. We won’t be placing a great deal of focus on engaging in detail with specific techniques to do with an organic, biodynamic (or other approach) to food production, land stewardship or agriculturally related activity – these you are likely to be either bringing with you or developing alongside this course of study.

Whether you are interested in deepening knowledge and practice in practical aspects of food production, investigating social dimensions of agriculture, delving into questions of policy or economics, or some other subject that is touched upon within this realm of food production and land stewardship, you will share in common with your colleagues an emphasis on undertaking *research*.

In order to pursue this aim of undertaking *situated research* there are some essential foundations to establish. That is what the first three modules of this course set out to do.

- The **Holistic Science** module is the first module you will take on the Researching Holistic Approaches to Agroecology course. It begins with an enquiry into ‘holism’ – what do we mean by holism? What are some examples of holistic approaches? The module unfolds with an enquiry into developments in both science and agriculture over time and looks at current developments in holistic approaches to agroecology today.
- The second module you will take is the **Research Methods** module. Alternative approaches to science and agriculture ask for appropriate research methods and

¹ Steiner, R. and Gardner, M. (1993). *Agriculture course*. Pennsylvania: Bio-dynamic Farming and Gardening Association; p14.

approaches – approaches that will likely include quantitative, analytical methods but that also avail themselves of qualitative research methods. This module introduces you to different research methods and asks you to engage in a consideration of the strengths and weaknesses of different methods in different contexts.

- The **Sustainable Practice** module provides a basis for an investigation into the broader ‘field’ of agroecology and sustainability wherein you will, in time, come to contextualise your own specific contribution to this ‘field’. This module invites you to become familiar with approaches to agroecology that you may not be familiar with, or that may challenge aspects of your current affiliations with particular methods and theoretical perspectives.

Masters Level Study

The approach we will take in our study of Holistic Science will be to have one eye on the theme of *science* and one eye on *agriculture*. The decision to design the module in this way arises from the proposal that “science and agriculture are not a-historical but are expressions of their time and the modes of seeing/cognizing prevalent at any given point in time. We therefore undertake a study of the history of science from ancient times to current practices alongside a study of the history of the development of agriculture from nomadism to genetic modification.”

The term ‘proposal’ is used above quite consciously. You may or may not agree with that proposal and the whole aim of study and engagement at a postgraduate level is to begin to develop a stance of ‘critical enquiry’ in relation to perspectives presented by peers, faculty, colleagues, scholars, the press, etc.

We could think of ‘critical’ in terms of ‘considered’, ‘informed’ or as ‘arising out of reflective appraisal’ - the important stance being one that engages a range of perspectives and/or practices in the academic sense of ‘critical’ - asking further questions rather than accepting everything at face value.

Please take a look once again at the Handbook and specifically at the section (titled ‘Studying At Postgraduate Level’) that describes general indications on what it means to undertake studies at a postgraduate level (as articulated by the Quality Assurance Agency of the UK). As it is written there, “compared to undergraduate education, there is a greater emphasis on enquiring critically into your subject area and dealing with the latest current information as well as an expectation that you will be able to work independently and problem solve in a creative way. **All of this is good because these are the really interesting things to be doing!**”

Looking back to the articles provided at the beginning of this section of notes, you can see that articles are chosen to represent a variety of perspectives, some that present contrasting perspectives or challenging assumptions that other articles don’t.

And So....

Researching Holistic Approaches to Agroecology

Our starting point will be to consider the concept 'holistic' that frames and contextualizes this study as a whole.

You will be doing a similar process of enquiry with the term 'research' (in the **Research Methods** module) and will start to dig a bit into what might be meant by this term. This is a deceptively 'self-evident' term, we suggest, and we will definitely find that in a course such as this - which is predicated on approaches that do not fit neatly into established approaches to research, science and agriculture - that this thing called 'research' will be in itself a central aspect of our enquiry throughout the whole three years.

The same might well be said of the term 'holistic'.

What do we mean by 'holistic'? What kind of approaches does this include? Exclude? Does it exclude 'conventional' approaches to research and science? The short answer to this question is 'no'... or 'not necessarily' or...

This concept 'holistic' needs some study and consideration.



Think

Begin by taking some time for yourself to consider the concept 'holism'. How would you define it? What does it encompass? What does it exclude?

Write a paragraph about what holism means to you, and for now, do so without reference to literature or other sources which you may have to hand. This is a reflective exercise on what the concept 'holism' means *to you*. Give yourself the freedom to write without a lot of preparation, pre-thought or critical 'editing' as you go. This is – at this point – purely an exercise to engage you in reflecting on themes as they arise.

Holism Considered

We are going to start this module by looking at three different contexts where the idea of 'holism' or 'wholes' are considered. These examples come from quite different sources, and this is also an aspect of the kind of an approach that you will take in a study at postgraduate level. Through an engagement with different sources on any given theme or subject area we begin to engage with different perspectives, voices, and interpretations of a given subject. We also start to investigate the underlying aspects of these perspectives – often not explicit or acknowledged. Let's look at some examples of where we might find the term 'holism' being used.

The first example we would like you to consider is one that I came across while undertaking a bit of research myself on the term 'holistic science'. I came across an intriguing article which reported on a study undertaken by a University of Virginia doctoral candidate named Thomas Talhelm. The first report of Talhelm's research that I came across was this one in Scientific American online: ***Rice Farming Linked to Holistic Thinking: Historical agriculture practices predict modern mentalities***. You can find this article here:

<http://www.scientificamerican.com/article/rice-farming-linked-to-holistic-thinking/>

Another article that reports on this study can be found in National Geographic, titled ***What You Farm Affects Your Thinking, Study Says***. This article can be found here:

<http://news.nationalgeographic.com/news/2014/05/140508-rice-wheat-psychology-china-food-thinking-world/>

The articles mentioned above are compiled in a document in the *module literature* folder (for registered students who have access to the VLE, go to the holistic science portal and look for the folder in the list of resources there). The document is titled *Rice Farming Linked to Holistic Thinking*.

I have also placed Talhelm's article, published in *Science*, in the module literature folder for those who want to read the original article that is being referred to in the synopses by National Geographic and Scientific American. This article is called *Large-Scale Psychological Differences Within China Explained by Rice Versus Wheat Agriculture*.

Please read these articles (either the short articles and/or the full article by Talhelm and co.) and then...

Consider

How does this instance of the use and context for the term 'holism' relate to your own thoughts about this concept?



How is holism being defined in this article? How is it being assessed? Does this make sense to you?

What do you think the strong points of this research are? What aspects raise questions or concerns regarding the content, the approach, the conclusions?

Write down a few of these questions or concerns that the article has raised for you, as well as aspects which might be congruent with your own thinking.

Here is an example of a response from historian Rachel Laudan. It is one example of a critical response and consideration of a piece of research.

<http://www.rachellaudan.com/2014/05/do-those-who-cultivate-rice-paddies-think-holistically-and-lag-industrially.html>

Holistic vs Reductionistic

The second example we will look at in our search to make sense of the term 'holistic' comes out of a quite different context. This article is also one of my 'findings' which I came across while doing some literature searches.

The article is available online from this link:

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3067528/>

It is available in the Module Literature folder with the title *Reductionistic and Holistic Science*.

If biology or molecular biology is not your strong point, don't worry - we are going to engage with this article for the example it provides for a *compare and contrast* format in seeking to understand different approaches to science. There are, in fact, several reasons for studying an article such as this. The main reason is to see if we can deepen our sense for the term 'holistic' through the approach taken by the authors. The article also provides a good example for the way arguments or perspectives are presented in a scientific journal. This article is furthermore an example of what may emerge as we set out on a path of enquiry because we will find another term enter the stage through this article – 'systems biology' and the idea of 'systemic' thinking. More questions arise – is 'systemic' the same as 'holistic'? How are they the same, similar or different?

Consider

Having read the article on '*Reductionistic and Holistic Science*'



How does this instance of the use and context for the term 'holism' relate to your own thoughts about this concept?

How is holism being defined in this article?

How is it being assessed?

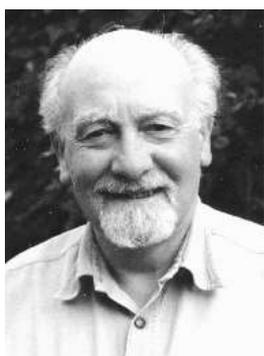
Does this make sense to you?

Authentic and Counterfeit Wholes

When we begin to contemplate concepts such as ‘holistic’ or ‘holism’ we clearly step into a rich and very interesting realm of considerations, one that has occupied a wide range of thinkers and invited a diversity of perspectives.

The last example that we will study in this enquiry into what constitutes ‘holism’ is one that arises from the work of an individual whose life was steeped in science and the philosophy of science. A brief introduction to this individual is in order. One of the approaches we are keen to explore throughout the course is that knowledge is not purely ‘a-historical’ nor is it ‘impersonal’, but that it arises from the perspectives of individuals (or groups of people) who may or may not be conscious of them. Perhaps this is a step toward a science of ‘holism’, where the scientist (the ‘who’) is once again considered integral to making sense of the science (the ‘what’)? We will return to this question in due course.

We are going to read and critically reflect upon an article called ‘Authentic and Counterfeit Wholes’ by Henri Bortoft. The article appears in Bortoft’s book *The Wholeness of Nature: Goethe’s Way toward a Science of Conscious Participation in Nature*. (Lindisfarne Press, 1996).



Henri Bortoft (1938 – 2012) studied physics and became interested in the problem of wholeness in quantum theory, having been introduced to this theme by David Bohm. Bortoft subsequently worked with the scientist and mathematician J.G. Bennett on the topic of *the perception of wholeness*. Bortoft became interested in the scientific work of J. W. Goethe and his book *The Wholeness of Nature* is an exemplary study and articulation of philosophical considerations regarding Goethe’s scientific method and thought. Bortoft’s work is, in fact, thoroughly recommended for considering the ‘how’ of science in many aspects.

His work weaves topics such as the philosophy of science, consciousness studies, studies in perception and the history of science into a rich tapestry that contributes greatly to considerations of the practice of science as well as to the life of consciousness in more general terms.

Exercise

Read Bortoft’s article *Authentic and Counterfeit Wholes* up to the heading Goethe’s Way of Science on page 8 of the pdf. This article is on the website on the page title ‘The Course’ under the ‘Sample Content’ tab. (You can also find this article in the folder called ‘Module Literature’ in the Holistic Science section of the VLE).

When reading literature as part of this course of study there are a number of different ‘lenses’ do consider.

The most obvious is likely that of the 'content'. Read in such a way that you are getting a sense that you understand the content that is being presented. With some material this may take several times reading through the material, and maybe it is helpful to read it at different times. Sometimes reading material that is not new to us presents us with a different task of relating to the content, we may feel that we 'know this already'. However, here too it is important to read with attention and concentration as we are now going to work with the material in a new context.

Once you have read the article through ask yourself the following questions:

How has reading Bortoft changed your thinking about 'holism'? Has it?

What does this article offer to an enquiry into the concept 'holism' that the other articles don't?

The final consideration that we would like you to undertake in this first section of the module is to think about what authors, articles or perspectives have contributed to **your own** enquiry into the concept 'holism'. Post these, as well as any comments you would like to make on the theme of 'holism' to the Holistic Science Forum (found at the bottom of the list of resources in the Holistic Science portal). You can also comment on other posts by other colleagues.

This brings us to the end of the preliminary set of notes for Holistic Science.

If you have worked with these notes already (as they are available from the website) please make sure you have followed the notes in detail.

The next set of notes is available on the VLE, in the Holistic Science portal.

If you want to undertake FURTHER READING on this theme please make sure you have had a look at the material in the RESOURCES tab of the VLE and the reading material in the PRELIMINARY READING Folder there.

If you want suggestions for material above and beyond what is mentioned above please contact the module leader – Jonathan Code for recommendations.