Hen System Review

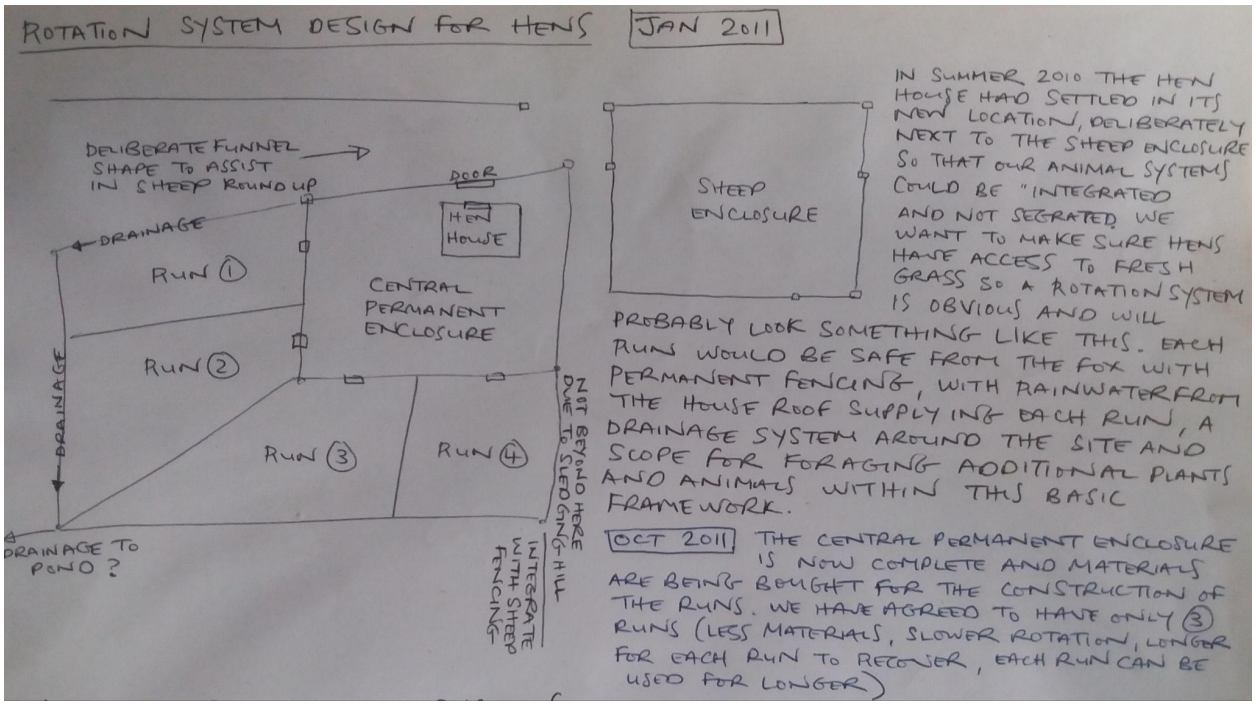
Wilf Richards, Abundant Earth

This design is a review of our established hen area, carried out in Oct and Nov 2020.

1. Introduction

The hen area at Abundant Earth has been in place for many years but it is time for a stock take and a possible redesign. I am not attached to any particular outcome. The result might be to drop the hens or expand or stay the same.

The management of our hens was originally the responsibility of Beth, who built their house with her dad back in about 2006. This original hen area was in the woodland but after a series of attacks by foxes and a switch in responsibilities the hen area was dropped. For a few years we had no hens. Then when Matt and Jo decided to build their home close to the old hen area it was agreed to move the hen house out of the way and find a new place for it. That was back in 2011. At this point I took on the responsibility of managing the hens and the hen house was moved into the main pasture. I carried out various design drawings with the intention of creating a foraging system for the hens. You can see those original drawings here.



The original rotation system design Jan 2011, implemented by early 2012

I have slowly developed the hen area since that point. It has gradually evolved into what it is today, ten years on from the original design and build.

The basis of this design is to reflect on what's going well and what's challenging, carry out some analysis of the current situation, explore options and decide a strategic direction. I will use ***CEAP*** for this process and use at least one Design Tool at each stage. CEAP stands for Collect Information, Evaluate, Apply Principles and make a Plan.

Whole Hen Area 2016 includes main house, smaller houses, willow and fruit trees

2. Collect Information

At this stage I am going to use ***PASTE*** and ***Input / Output Analysis*** as the Design Tools.

2.1. PASTE

PASTE stands for Plants, Animals, Structures, Tools and Events. It simply involves making lists relevant to each title as a way of gathering and organising survey information.

2.1.1. Plants

- There are many fruit trees and bushes that I have planted in the runs providing shelter and snacks. These include apples, mulberries, walnut, hawthorns, blackthorns, blueberries, blackcurrants, comfrey, willow, elder and elecampane. There is room for more plants including rowan and mint which I have on a list.
- The willow is coppiced or pollarded every winter to provide kindling for our stoves the following winter.
- There are many wild plants in the runs which are grazed differently as compared to their neighbouring plants in the surrounding sheep pasture. I keep a monthly log of wild plants as they flower. This includes knapweed, self heal and lady's mantle.

- Nettles are in abundance. They are an indicator of high nitrogen and acidic soil. I harvest them and make nettle liquid feed for the garden. Many are left as habitat for caterpillars and butterflies in the summer. Their long stems provide shelter in the autumn.

Caterpillars feeding on nettle leaves, the hens won't eat these

2.1.2. Animals

- On average we have 37 laying hens but this can range from 20 to 50. This average is known from long term data collected.
- We normally have two cockerels, to ensure all eggs are fertilised.
- We typically have 10-20 chicks every year with a high mortality rate. About 5-10 make it to adult life, the other half dying due to aspergillosis or predators. Half of the adults are typically male which are culled for the dinner table before 9 months of age.
- Rats can be present in winter months. I will block their holes and lay traps if necessary.
- Red mites are dominant in summer and autumn months, and can weaken the birds.
- Foxes can be a problem but mainly only if the birds are out late at night or very early in the morning.
- Sheep surround the runs as the hen area sits in the middle of the pasture.
- Lice can be present on the birds weakening them

- Weasels and Stoats are rare but there have been attacks where they kill chicks in the house and just leave the bones.
- Rabbits are now common in the pasture and get into the hen area.
- Crows and Rooks are often present especially when there has been a death as they will clean up carcasses.
- Song birds of various types are regular visitors, taking scraps of hen feed

2.1.3. Structures

- The hen area is in the middle of the pasture, consisting of a large hen house suitable for 45-50 birds.
- The main house is shed like and was built by Beth and her dad. It is sturdy, lined on the inside with hardboard and with an insulated roof. Although the hardboard provides additional warmth to the structure, it also, as discovered recently, hides red mites in their thousands.
- They have four runs, one in constant use and three in rotation with regular access to the whole pasture beyond the runs.
- The runs contain additional small houses of various sizes for isolation or chick rearing.
- The runs are made of posts and 6ft high chicken wire.
- The base of the chicken wire that is buried is now ten years old and needs replacing. There are many gaps which allow hens out, rabbits in and sometimes foxes in.

2.1.4. Tools

- I keep detailed accounts showing eggs laid each week, feed bought in, average cost to produce a box of eggs and various other notes.
- Various tools are stored at the hen house including shovel, hoe, fork, brushes and spray bottles.
- I use an app called Trello to keep relevant lists and notes on the hen area

Just about every year we would welcome a few chicks

2.1.5. Events

- We produce 10-20 chicks every year typically from April to August.
- Rats are more common from October to March.
- Moulting is most likely in October. This weakens the birds as they grow new feathers and egg count will fall.
- Red Mites are most common from April to October.
- Testing for laying abilities happens primarily from Feb to May to see which ones might not be laying.
- Culling happens from September to April.
- Ideally every month the hen house is cleaned out, bedding is taken from the house up to the compost system in the veg garden, and fresh bedding is added from the wood processing areas.

2.2. Input-Output Analysis

Input-Output Analysis will gather further information about the current system and start to consider my analysis of the situation. It has three key parts: the intrinsic characteristics, the inputs and the outputs

2.2.1. Intrinsic Characteristics

Landform: the site is in the centre of the pasture, south facing, lowland, boulder clay. The soil type can't be changed but the location of the hen area could be.
Breeds: mainly hybrids, some rescue birds, some leghorns, some bred on site. They are quite a mix.

2.2.2. Inputs

Feed: their primary food is organic layers pellets that I buy wholesale from the manufacturer via a local agricultural merchant. I also sell some of the feed to other hen keepers that keep a few birds.
Kitchen scraps: they will receive the odd bit of cooked food waste, primarily bread, pasta, rice, off milk and veg.
Wild food: they clearly love grass and worms. I have also seen them devouring blackcurrants, comfrey leaves, spiders, mulberries, rotten apples and willow leaves.
Water: rainwater harvesting from the roof is collected in an IBC. I have had plans to add a second IBC for the last year ever since we ran out of water for the first time in 2019.
Wood shavings: waste material from our planing machine is perfect bedding for the hens. They sometimes get sawdust from our sawmill.
Time: they need feed, water, doors opening, cleaning out, health checks and more, taking up about an hour a day on average. Fortunately I have help and would love more help when required.
Medicines: they need a variety of medications including garlic and anti mite spray or powder (usually diatomaceous earth)

Dust Bath: primarily wood ash but also diatomaceous earth. ***I need a better supply of diatomaceous earth.***

Eggs hiding in the undergrowth

2.2.3. Outputs

Eggs: I have kept a series of accounting information about the hens. Egg production is very seasonal with a peak in April and the lowest in November. Eggs laid per week per hen range from 1 to 5 through the seasons.
Muck: when the houses are cleaned out then the muck is taken up to the veg garden and added into the compost system.
Meat: culling is part of the process as the birds grow older and less productive or we have too many cockerels.
Sales: most of the eggs are sold through the veg box scheme. The accounts are complicated as many key things need to be recorded including feed bought in, feed sold, eggs produced, eggs bought in and eggs sold. Some of these numbers are hard to extract for example eggs bought in are part of a larger wholesale order of organic veg, and customers buy a veg bag with eggs and that is paid as a whole so the egg income needs to be extracted. The hens have a turnover of approximately £4000 a year and an average profit of £800. This is not enough to cover the wages required to manage them. I see the role as voluntary as there are many other benefits.
Nettles: this is made in the hen area in the form of liquid feed and taken up to the garden.
Kindling: this is from the trees in the hen area, especially willow which is coppiced and harvested every winter
Fruit: not just for the hens but us as well. This includes mulberry, blackcurrants and blueberries

3. Evaluate

Here I will use a PMI to evaluate the existing system.

3.1. Plus

- Eggs are produced
- Wild flowers
- Nettle liquid feed production
- Muck for the garden
- The fruit grown for the hens and us
- The forest garden style in their runs
- The skills to cull and meat consumed
- The planting of willow for drainage, shelter and kindling
- The hen area makes a profit, even if small

3.2. Minus

- The distance to shift the muck and it being uphill. It is quite a distance to the veg garden
- The mud in wet months can drive me mad
- The high mortality of chicks especially to aspergillosis
- Diseases and pests in particular red mite

3.3. Interesting

- The variety of breeds, ages, colours
- Their behaviour, which can be very entertaining

The mud can be immense, planting more willow to counteract 2018

4. Apply Principles and Ethics

There are many principles and ethics applied already which I will include here. If the principle or ethic can be expanded with additional action then that addition will be in ***bold and italics***.

4.1. Each Element provides many Functions

The hens being the key element here do indeed provide many functions including egg production, meat providers, grazing, muck producers and waste food consumers. The hen area provides many functions too including protection against sheep grazing, hen protection, wild flowers and fruit production for hens and us.

4.2. Every Important Function is supported by many Elements

The key function of the hens are to provide eggs to the veg box scheme but we are not entirely dependent on them as we also buy in extra eggs from the organic wholesaler. Also as a food source they are obviously not our only supply of food. Water supply to the hens is also key and they primarily use the rainwater harvested from the hen house roof. ***An extra IBC for storage would be great to increase the resilience of that aspect of the system.*** The supply of their feed through an agricultural merchant is but just one possible avenue to source wholesale organic layers pellets.

4.3. Obtain a Yield

There are plenty of yields including eggs, meat, compost materials, learning, sales and chicks. ***This could be increased by running courses in hen related subjects.***

4.4. Use and Value Renewable Resources

Hens are renewable and are a great resource. They have a distinctive role in our landscape as they are also gardening the land.

4.5. Everything Gardens

Hens will scratch up thickets of grass, spread molehills, eat a massive variety of bugs, increase the fertility of the land. They will also impact the soil, denude it of grass and increase the muddy state. ***I could do with reducing their impact. This could be through utilising wood chips in the muddy areas and giving them more than one pophole door to the pasture.***

The hen house and IBC water harvesting system 2016

4.6. Earth Care Ethic

Hens do have an impact on the earth: they compact the ground, overeat the grass from their immediate habitat, turning the same area into mud. I too have that same impact as I visit them twice a day. I use reclaimed paving slabs where the impact is highest. Some hen keepers have a rotation system around big fields to minimise this problem. That requires having a low fox population and a tractor to move the houses or multiple houses but only some of them occupied at any one time. I also use plants, especially willow to create deep roots that open up the soil, draw up moisture and increase drainage. Those same plants have other yields too such as protection, kindling and food. ***The use of wood chips in some areas would be great to cover bare soil conditions. We do not have a supply on site but we do generate a lot of wood shavings which are ideal for bedding and a lot of sawdust ideal for the toilet. I wonder if the sawdust would help in some areas especially where nettles grow in abundance but no humans are going.***

The other main earth impact the hens have is through their feed. They thrive best on layers pellets which involve large scale agriculture, industrial processing and transport. I use a UK and organic processor but I can't be certain of the source of raw materials used which may have had an impact in transportation. I am aware that some hen keepers will buy in bulk raw ingredients and then make their own mash, a sort of porridge. That has always seemed like one job too many. The other great option I have seen is linking hens to the compost system. There are some large scale municipal compost companies that use hens to free roam and scratch the compost extracting out food waste, bugs, seeds and mycelium. We have tried having the hens in our garden area but they have a massive negative impact on the raised beds and of course eat the same food crops that we love.

4.7. People Care

Hens are a people. I seem to learn a big thing each year about caring for them, such as protection from foxes, dealing with rats, dealing with red mites, storing feed correctly, providing a dust bath, providing herbs and identifying the best bedding material. I am sure I have more to learn though. I feel very aware that they are not wild and are a highly bred and domesticated animal. As such humans have created the hens that we know as can be summarised in this TED animation https://youtu.be/KsuesiVJgtI

I realise that I have never attended a thorough hen course myself. I have only read books, watched YouTube videos, and chatted with fellow hen keepers. I would be particularly interested in learning from larger scale hen keepers. How does someone keep hundreds or even thousands of hens? The demand for our eggs in the veg box scheme has doubled from 20 boxes a week a few years ago to over 40 boxes a week now. Our hens rarely produce this many a week. There is learning to be done on scaling up if we want to be the main supplier to our own business. This would also require a review of the accounts procedure.

4.8. Fair Shares

The main basis of fair shares is limits to consumption in recognition that we only live on one planet and sharing our surplus. Our surplus is indeed shared as sales through the veg box but over the last few years our egg sales have increased dramatically from less than 20 boxes a week to over 40 a week. This is whilst the number of veg bags has stayed the same. It looks like consumption of eggs has increased dramatically. This trend is normal across the country as shown by the UK Egg Industry
https://www.egginfo.co.uk/egg-facts-and-figures/industry-information/data

I have assumed that the recent rise in veganism and climate change awareness is lowering people's meat consumption and they are sourcing their protein from other foods such as eggs. I have never asked our customers this question though. I have another set of questions to ask our customers about veg bag price changes so I can add egg consumption changes into that survey.

Eggs for sale in our veg box scheme

Each type of livestock has a different impact in terms of climate change. By far the highest is cattle in meat and dairy production. There has been a growing trend to reduce beef consumption and replace it with eggs, chicken and plants.

I am certainly aware of the impact of the hens in terms of importing feed to our land. This aspect does not sit well with me. I regard eggs as a luxury item and an incredible ingredient in many food recipes. I would regard eggs as one of the items that we should consume less of when we

consider climate change but the opposite is happening globally. ***Maybe as the wider trend is to lower beef and dairy and replace it with eggs and plants then we should consider increasing our egg production. For the first time ever this year the number of boxes of eggs we sell each week has started to exceed the number of veg boxes.***

At the moment with an average of 37 laying hens we generate about 950 boxes of eggs a year. We currently sell over 2000 boxes of eggs a year though by buying in the additional boxes that we require from organic wholesalers. So to be able to provide our own customers entirely with our own eggs then we would have to more than double our number of hens.

5. Plans

At the start of this design I said that I was not attached to any particular outcome, that the result might be to drop the hens or expand or stay the same. Well I can now say for certainty that none of those options are going to happen. I am not going to drop the hens or expand them or stay the same but instead like with any good evaluation of an existing system, I am going to tweak it. Here are my planned tweaks:

5.1. Remove all internal hardboard

Remove all of the internal hardboard in the main house to rid the red mite of their hiding spaces. This will lower the warmth of the house and produce considerable waste but the red mites are out of control and are weakening the birds, making them dull, less likely to explore, lowering egg production, even killing them in some cases (four this year). I consulted Beth in the matter as she built the house and she said yes. I asked Matt if we can burn it for this year's bonfire, he said yes as well. ***DONE Nov 3rd, all in time for bonfire night, what a blaze!***

5.2. Add Various Tasks to my Trello board

-more pop holes for access to pasture
-additional IBC for rainwater storage
-more paving slabs for pathways
-fix perimeter fencing
-survey customers on why they eat eggs, changes in egg consumption
DONE, all of the above added to Trello, and started adding more paving slabs Nov 21st

5.3. Start a Hen Club

A monthly volunteer day to get extra time input: This will involve local people in helping to maintain the hen area who want to learn about keeping hens. There are many hands-on long term maintenance tasks identified in this design as listed above that are now on my Trello Board. They could also highlight to me what I have to share which could help with designing a hen course, and no doubt I could learn from them too. ***DONE Nov 4th,*** sent first email out to our 600+ mailing list followed by email in mid Nov to local permaculture network of 750+ members and ran first session on Nov 21st

The hen area with wood chips added 2020

5.4. Find a supplier of wood chips

To help counteract the mud: I have been thinking about tree surgeons but I asked Matt and he said he has lots of big chips from bowl making, too many and would love to get rid of them. ***DONE***, Matt will supply wood chips from his bowl production area. Job added to my Trello board

5.5. Experiment with sawdust

We have a large supply on site from Matt's sawmill work. To begin with we have used that for our compost toilet but he is clearly producing way more than our toilet needs. I think the high carbon levels could balance the high nitrogen levels of the hen poo. When I have used it before as bedding it tends to get wet and cover the eggs and clags to the hens feet. Wood shavings from our planning machine are better bedding. Sawdust left outdoors soaks up moisture and can under high impact turn to mud. So I will experiment with the sawdust in areas that have low impact, hen areas only, in high nitrogen areas such as nettle dominant areas at the edges where I don't go. This needs adding as a task to my Trello board. ***DONE, Nov 19th and added first sack of sawdust onto nettle patch Nov 20th***

5.6. Stop chick production

They take up time and feed, mortality is very high (50%) and half that survive are male. I may gain three adult hens each year and three cockerels for chicken dinners. Considering the work that they take and the heartbreak of multiple dead chicks then I have to admit that I do not have an ethical or efficient chick production system. I had a design for natural chick production but it has not been as productive as I wished for. I was trying to avoid incubators, which use lots of electricity (which we don't have, as we only have a solar system on site). I have had to buy in hens every year as the chick system has not been successful enough year after year.

The freeing up of the small hen houses will allow them to have other uses such as introduction of new birds or isolation for sick birds. My decision is to stop chick production for at least one year, see how that is and consider coming back to it in the future, maybe when we have more electricity so that an incubator can be used instead.

This might mean culling our remaining adult cockerel and all male pullets. I will next announce this decision to the team and see what reactions I receive. Jo was sad about this as she has a couple of hens and they have sat on some of the fertilised eggs successfully. She could always buy fertilised eggs if she wanted to do this again or we could keep one cockerel.

DONE. Spoke to the team Nov 11th. Agreed to stop chick production at the main hen area for at least a year. Jo would like the option to rear chicks in her little hen area next year. Agreed to cull the remaining adult cockerel now and consider keeping one of the pullet cockerels for next season. The cockerel was culled on Nov 21st.

Cockerels fighting 2018

5.7. Find a better supplier of hens

As I am not going to give lots of time to chicks, I can now concentrate more on the hens themselves. If we buy hens then they can be point of lay or older. I will avoid buying chicks. There are a few options for suppliers of hens including:

Asking our local networks for their unwanted hens. I emailed the local permaculture network in mid Nov re volunteering and also mentioned this request

Fresh Start for Hens: Retired hens from big farms that have multiple drop off points including one just down the road. They are cheap, about £2.50 each and very convenient but the hens are already 72 weeks old. I have used them once before.
https://freshstartforhens.co.uk/

Durham Hens: They are expensive at £15 to £20 each. https://www.durhamhens.co.uk/

Pets4Homes: Usually have some available. Would need to pick them up. Can be cheap
https://www.pets4homes.co.uk/sale/poultry/chickens/durham/

Poultry Breeders directory
https://www.chickens.allotment-garden.org/poultry-suppliers/pol-hens-for-sale-Durham.php

I would really like a steady supplier of point of lay hens.

5.8. Find a better supply of Diatomaceous Earth

A quick look on ebay and some price comparisons. ***DONE Nov 15th.*** Now buying it at £2.50 a kilo in bulk as compared to previous supply at over £10 a kilo for small quantities. I think I will also sell it in small quantities alongside the feed that I sell.

5.9. Review the Accounting Procedure

I have a pretty good spreadsheet that is frequently tweaked as I add more information into it. That can be seen here Hen Accounts

I currently have a business student on work placement and I will ask him to research accounts for egg production to see if we can find a better way of doing the accounts. The accounts currently tell me most things that I need to know. I would also like to know how much feed is being consumed on average by each bird each day. I don't record the day that feed is put into the feed bins or the day it is empty. That potentially would give me a daily cost of the feed versus the number of eggs produced. ***DONE, Nov 29th, added an additional sheet to the accounts and started the process of recording the day feed is brought down to the hens.***

Feed started on	No. of bags	Total feed	Value of feed	Days lasted for	No. of birds	Feed per bird	Cost of feed
Averages						**101**	**6.3**
Nov 30th	1	20000	£12.35	4	49	102.04	6.3
Fri Dec 4th	2	40000	£24.70	8	49	102.04	6.3
Sat Dec 12th	2	40000	£24.70	8	48	104.17	6.4
Sun Dec 20th	2	40000	£24.70	6.5	51	120.66	7.5
Sun Dec 27th pm	2	40000	£24.70	8	49	102.04	6.3
Mon Jan 4th '21 pm	4	80000	£49.40	17	49	96.04	5.9
Thurs Jan 21st pm	2	40000	£24.70	9.5	46	91.53	5.7
Sun Jan 31st	2	40000	£24.70	8	46	108.70	6.7
Mon Feb 8th	2	40000	£24.70	9	46	96.62	6.0
Wed Feb 17th	2	40000	£24.70	9	46	96.62	6.0
Fri Feb 26th	2	40000	£24.70	9	46	96.62	6.0
Sun March 7th	2	40000	£24.70	8	44	113.64	7.0
Mon March 15th	2	40000	£24.70	9	43	103.36	6.4
Wed March 24th	2	40000	£24.70	9	43	103.36	6.4
Fri April 2nd	2	40000	£24.70	9	42	105.82	6.5

Addition of new page to hen accounts to calculate cost per bird per day

5.10. Run a Hen Keeping Course

I have already started a design on potential permaculture courses for 2021. Running one on hens and permaculture would be great. The course content could include:
-Walk through of our system, Share design of our system, Ethics and principles applied, Evaluation of our system, Practical activity
The details of the course plan would need to be created and I will do that as a separate design.

5.11. Learn More about Hens

There are dozens of courses out there online but ideally I would just simply visit a nearby organic farm with approximately 200 hens. There aren't many that fit that description. Here are some possibilities:
Piercebridge Farm http://piercebridgeorganics.co.uk/harrys-eggs/
The Paddock https://www.thepaddock.org.uk/meet-laura-s-layers/
Broom House Farm https://www.broomhousedurham.co.uk/farm-shop/
There are also dozens of useful websites and youtube videos out there.

5.12. Consider increasing the number of hens

This would require a discussion with the team and if agreed then a separate design and plan. I know that it costs us on average £1.40 to produce a box of eggs and £1.65 to buy a wholesale box in. I have at times managed to lower our production cost to £1.20. It is thus in theory more profitable for us to produce eggs for our veg box scheme. It will though have a bigger impact on the land and cost us more time and risk. There is some motivation there to explore this further. One key thing is that we have a small static system whereas most larger systems are mobile.

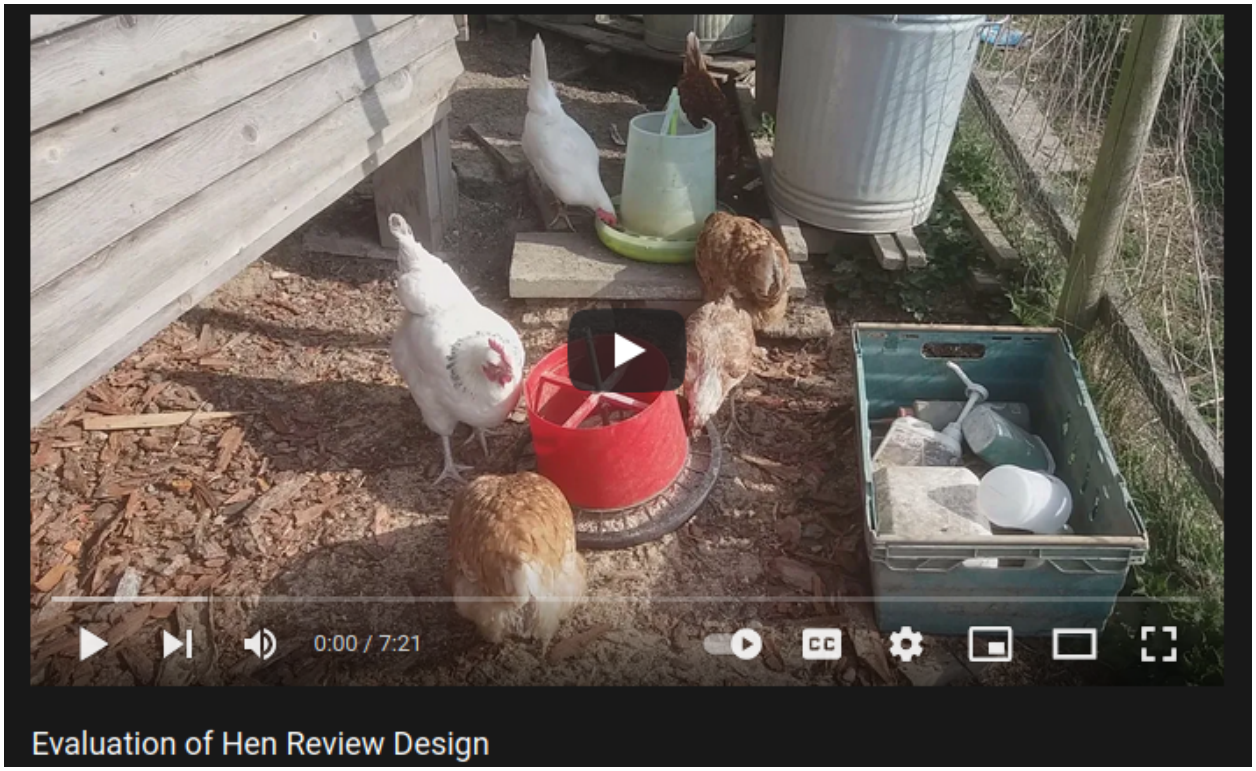
5.13. Be more aware of organic standards

We fulfil some but not all. The best details of organic standards are on the Soil Association website here. https://www.soilassociation.org/organic-living/what-is-organic/organic-eggs/

6. Evaluation Nov 2020

6.1. What's gone well?

I feel quite different about the hens having completed this design, a lot clearer about the direction for the next year 2021, relieved about not managing chicks and more supported with the hen club. There have been many tasks completed already with a few longer term tasks set in motion already. I have already given a presentation of the design to a diploma event which got some good feedback including suggestions on dealing with red mites (thyme, chilli and ladybirds). It also gave me the idea that I could include a video as part of the evaluation which is exactly what I did and that can be seen here https://youtu.be/blqM5voGlic



6.2. What's been challenging?

I haven't found anything to be particularly challenging with this design. I have set some goals and tasks that might become challenging and certainly some that are more long term.

7. Reflection Nov 2020

This was a short focused design. I noticed that I made more progress on this design when I focused on it for a few days in a row. I usually have several designs on the go at any one time and it is easy to jump from one design to the next to keep them all progressing. For this design I had several days in a row where I would focus on it. That kept momentum and it was easier to pick it up and run with it.

I realised after the plan was well formed that I could have used another tool at that point, namely Now, Soon and Later. That would have given me an order to the tasks. Looking at that now then it could have looked as follows:

Now
5.1. Remove all internal hardboard
5.2. Add various tasks to my Trello Board
5.3. Start a Hen Club
5.4. Find a supplier of wood chips
5.5. Experiment with sawdust
5.8. Find a better supply of Diatomaceous Earth

Soon
5.6. Stop chick production
5.7. Find a better supply of hens

Later
5.9. Review the Accounting Procedure
5.10. Run a Hen Keeping Course
5.11. Learn More about hens
5.12. Consider increasing the number of hens
5.13. Be more aware of organic standards

The use of the ethics really brought quite a few things to the surface. The exploration of both earth care and fair shares in particular really reminded me of how edgy it is to keep hens as they have quite an impact on the soil, the environment and the larger climate.