

**VISION**

My long-term aspiration is to change the role of wool in Welsh agriculture to promote sustainable sheep farming. The Wool Innovation Centre uses community, research and education to create a new Welsh woollen industry that aims to be economically and environmentally resilient. By having a central hub, WIC will encourage a more active exchange of knowledge between communities, farmers, and academics. Climate change, biodiversity loss and social challenges have put huge pressure on the sheep industry, including economic hardship for farmers in the industry.

The key aims are:

- To research innovative uses for wool to create a non-textile woollen industry.
- To encourage farm diversification towards wool based businesses.
- To foster knowledge transfer between stakeholder groups.
- To promote a positive perspective on wool and its role in creating a sustainable future.
- Close the trust gap between the agricultural and academic communities.

The most important aim of WIC is to create a resilient Welsh wool and sheep industry. All the other aims are ones that provide support through community engagement and/or revenue streams. In short, the Wool Innovation Centre's vision is to change the world.

Wool Innovation Centre: Vivid Vision

Figure 1: Vivid Vision (Mercer, 2024a)

## OPPORTUNITY AND VALUE PROPOSITION

The opportunity WIC seeks to address is the abundance of wool as a raw material. Wool is traditionally seen as a textile product, however, there is a growing body of research on non-textile uses for wool. By combining the wool resource with active research, WIC aims to add value to wool, increasing on-farm profits and farm diversification, making it easier for agricultural businesses to meet sustainability targets as set by the Welsh Government. WIC will have 3 main areas of focus:

**Education:** WIC will have two main educational aspects. The first is the delivery of wool based modules that will tie into degree programs currently offered by UWTSD and the degree programs being developed by Tir Glas. These modules will promote both theoretical and practical exploration of wool as a resource.

*Example: "The history of wool" will focus on understanding the evolution of sheep wool and its importance in society from pre-history to the early modern period through the lens of wool. The module will explore animal evolution, land use, textile production and gender roles, economy and trade, and colonialism. This module would be suitable for many historical degree programs currently on offer on the Lampeter campus, highlighting the importance of interdisciplinary research. There will be a 2-day wool handling and shearing practical as part of this module to encourage experimental archaeology.*

The second educational aspect will be short-courses aimed at the general public but also open to and advertised to UWTSD students. These short courses will be more practical and farm-based. They will also be a vital part of the partnership with British Wool through training days delivered by British wool instructors and facilitated by WIC. The short-courses will also aim to develop on farm innovation by running courses and open farm events focused on non-textiles for wool.

**Community:** Community will be an integral aspect of WIC. One of the key issues WK seeks to address is the information gap between academia and agri. WIC will do this by being present within the agricultural community at markets and agricultural shows and by holding on-farm events in a similar fashion to Farming Connect but purely focused on wool.

**Research & Innovation:** there is a growing body of research into non-textile uses for wool, however many of these innovations have yet to be commercialized. These innovations range from biocomposite's, insulation and compost. This gap in the market presents WIC with an opportunity to become a world leader in wool-based research and innovation. Sheep are some of the most common domesticated livestock in the world, and research and development of wool based products that are beneficial to the global environment and economy could have incredibly far-reaching consequences.

## Wool Innovation Centre Infographic

# Canolfan Arloesi Gwlân

## Wool Innovation Centre

Tir Glas is a new sustainability initiative for UWTSD in Lampeter focused on a community of thinking and experiential learning. Tir Glas currently has three main strands of education and research:

Food-Timber-Enterprise

Lampeter is based in a rural community with sheep farming being the dominant agricultural industry, there is a potential for wool to become another main strand for Tir Glas.

### Hidden in Plain Sight: The Worth of Wool

Wool is an intrinsic part of the Welsh landscape. Right now it is seen as a waste product but things are beginning to change with innovations and research opportunities.

This resource is right in front of us, in huge amounts!

Here are things that Tir Glas could achieve:

- Wool based compost as a product for Tir Glas to sell to generate funding
- Wool as a carbon sequester as a novel area of research
- Traditional and short course education as a way to empower local producers
- Resilient sheep farming methods that become part of the climate solution instead of the climate crisis!

### Replication: Educational Opportunities in an Educational Institute

Tir Glas already has plans for creating a degree scheme, however we can do so much more with the colleges under UWTSD. With working farms under Tir Glas, we can engage in theory and practice by teaching about the history of wool (and its myriad uses) as well as teaching shearing and wool handling in both higher and further education.

- Short courses on wool handling and shearing open to the public and supported by British Wool
- Integrating wool handling into college courses
- Wool and sheep based seminars in both new and existing modules at UWTSD.

### Slow Thinking: How can we use wool in non textile areas?

When most people think of wool they think of textiles like jumpers and carpets. But is that really the only use for wool? Wool has many properties that make it a sustainable material for many products that already exist. Researching unusual uses for wool will open up new research areas such as:

- Wool in hydroponics
- Wool as a carbon sequester
- Wool as a solution to water contamination

### The Fast Second: Improving what's out there.

There are already several companies with innovative wool products. Many of these products are unique, enabling Tir Glas to use the fast second to develop an improved product. By further developing products that utilise "waste" wool, Tir Glas can increase the value of wool for local producers

- Wool Biocomposites
- Wool based compost
- Lanolin based preservatives



Figure 2: Infographic (Mercer, 2024a)

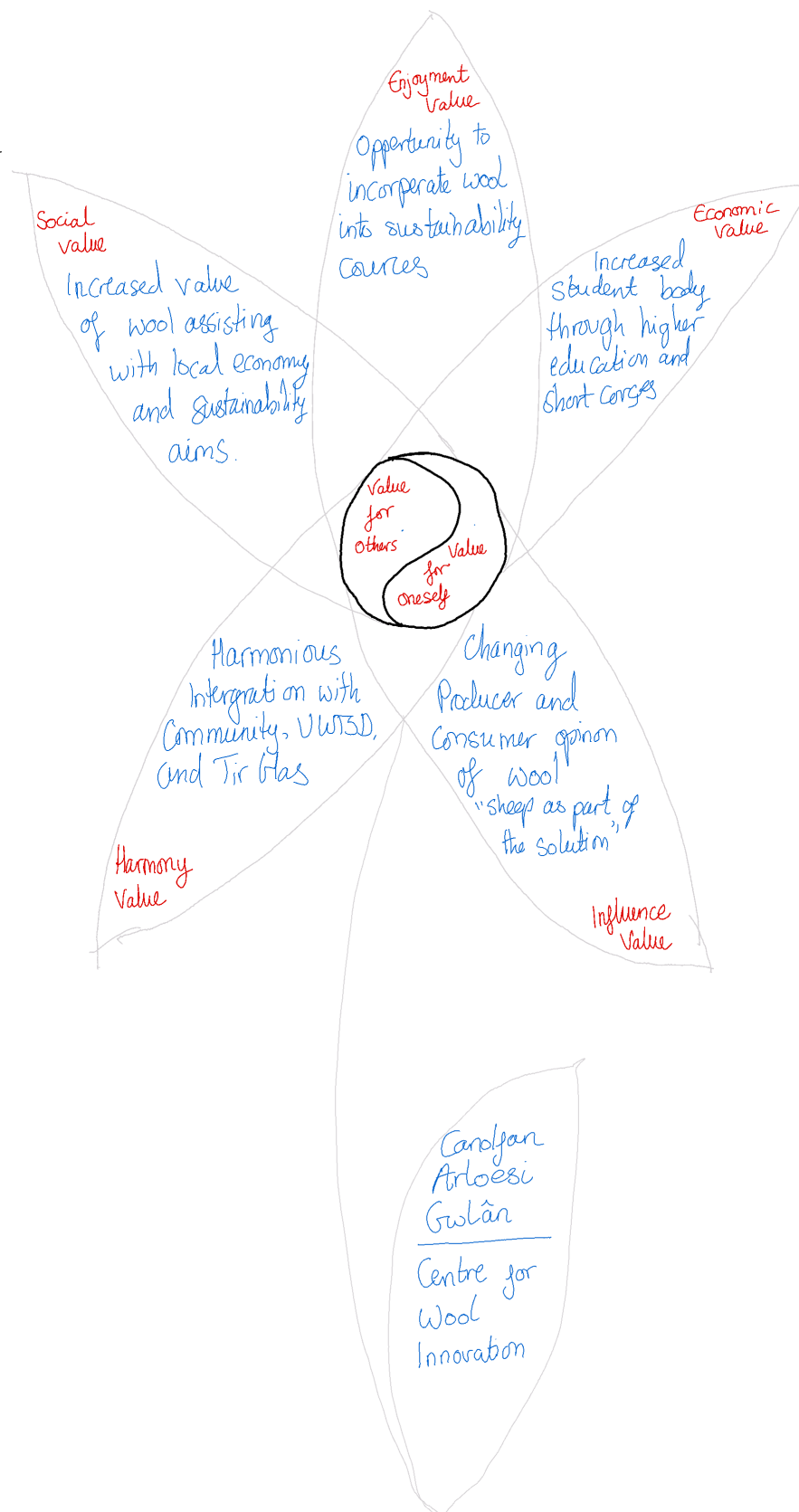
Wool Innovation Centre Value Flower

Figure 3: Figure 3: Value Flower (Mercer, 2024a)

**COMMUNICATION WITH STAKEHOLDERS**

Due to the diversity of stakeholders, there will need to be a variety of communication methods:

- To communicate with the farming community, WIC will need to have a presence at livestock markets and agricultural shows, with information accessible to the farming community.
- To communicate with academics and researchers, WIC will need to attend a diverse range of conferences and publish in a variety of journals, highlighting the interdisciplinary nature of wool-based research.

**Research & Education:** The communication for the educational aspect of WIC will be complicated as there are short course and degree students taking WIC modules as well as past and present students. Part of WIC's communication strategy will be to draw in new students to the current degree programs with the availability of unique modules thus increasing the number of students at UWTSD. The short courses would be more focused in the local community and continuing to develop new courses that would promote returning students.

**Agricultural community:** Communicating effectively with the agricultural community is going to be the most difficult, important and rewarding part of WIC's communication strategy. Studies show that farmers do not trust scientists and get most of their information from their peers. In light of this, WIC must have a presence at respected agricultural shows as well as a regular presence at sheep markets.

Building this relationship will be slow, overturning decades of mistrust and prejudice will not happen overnight.

Wool Innovation Centre Landing Page *English* (minimum viable product)

See appendix 1 for full size images

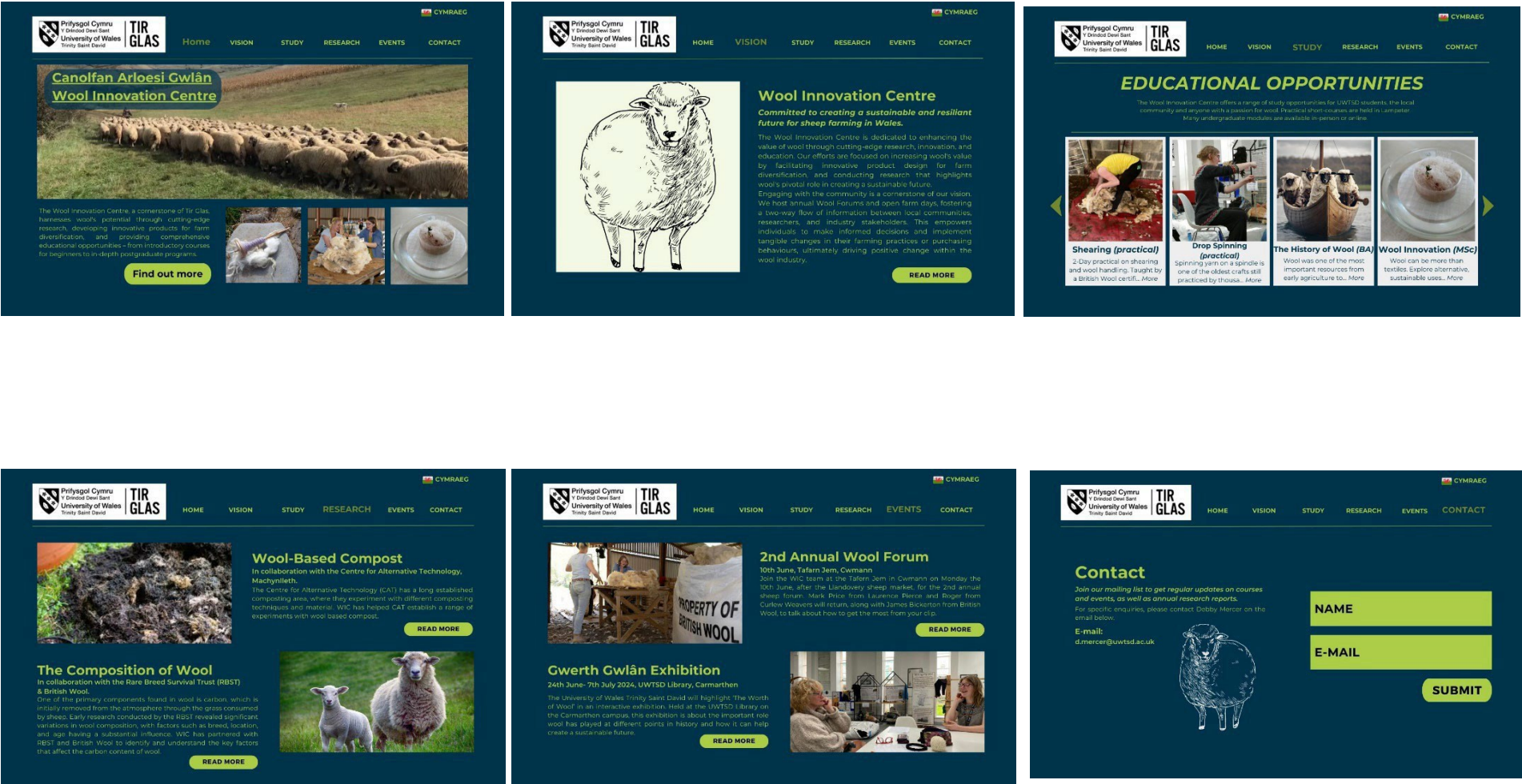


Figure 4: Wool Innovation Centre Website English (Mercer, 2024b)

Wool Innovation Centre Lading Page *Welsh* (minimum viable product)

See Appendix 2 for full size image



Figure 5: Wool Innovation Centre Website Welsh (Mercer, 2024b)

## CREATIVITY IN ADAPTATION

Wool is a known resource for textiles, however there is a robust, established wool textile industry in Australasia and the Middle East. The opportunity is the abundance of wool as a raw material, the creative adaptation is to specifically focus on non-textile uses for wool and to create an information exchange between farmers and academics. Creating a SCAMPER is a useful way of creatively exploring the ways WIC seeks to adapt the current role of wool and the wool marketing system.

**S- Substitute.** WIC will substitute general modules with ones focused on wool. That is not to say that the only thing studies will be sheep and wool, but that the module will use wool as a lenses. For example, "Households in the Ancient World" becomes "Sheep, wool and economy in the Ancient World".

**C- Combine.** WIC will combine agricultural knowledge with academic research to create a more resilient sheep industry. This is not a new aim, science and academia work towards real world solutions all the time, however, there is a persistent mistrust between these communities. WIC will aim to combine and integrate agriculture and academia in new, productive ways.

**A- Adapt.** WIC will aim to adapt the perception of wool for both producers and consumers. This will be focused on adopting producers view from "wool is waste" to "wool is voluble". For consumers it will require a behaviour adaptation from "Wool is for clothing" to "wool has many applications". WIC will also seek to adapt education around Wool, making it more prominent in compulsory, further and higher education institutes as well as in training programs such as British Wool shearing and wool handling courses.

**M-modify, Magnify, minify.** WIC aims to modify the way wool is bought and sold. British wool currently prioritises textile uses for wool, and this is reflected in their grading system. WIC will modify this system to include other parameters such as carbon content, nitrogen content and insulative qualities to ensure the wool goes to make the product it is best suited for and get the most value for the producer.

**P-Put to other Uses.** "Put to other uses" is a cornerstone of WIC. Wool can be so much more than clothing, from insulation to compost to bio composites.

**E- Eliminate.** There are many things WIC seeks to eliminate; however, it is also important to outline the things that WIC will *not* be eliminating. With WIC focusing on promoting wool based products, both textile and non-textile, it would be easy to assume that an aim of WIC is to eliminate Plastics. This is not the case. If anything, WIC seeks to eliminate the dichotomy of wool vs plastics. There is a place for synthetic fibres and oil-based Plastic products.

**R- REARRANGE & REVERSE** one of the core aims of WIC is to bridge the gap between agricultural and academic communities. This will involve rearranging perceptions on both sides and reversing the current flow of knowledge transfer from "academic down" to "agriculture up". That is not to diminish the role of academia in this relationship, however, farmers have been marginalised for decades. While huge steps have been taken in the 21st century to bridge this gap with organizations such as Farming Connect supporting farmers and promoting agricultural research, there is still a mistrust of science and scientists within the agricultural community.

**ETHICAL CONSIDERATIONS**

WIC needs to keep animal welfare high on the list of priorities and ethical considerations. There's already a considerable spotlight on the animal industry and it would be remiss to ignore the issues around shearing. Shearing is a necessary part of sheep farming, however a multitude of factors can cause a significant lapse in treatment of the sheep. Practical courses that involve handling livestock will be preceded by an introduction to animal welfare and discussion of animal ethics. Another ethical consideration is equal opportunities for both farmers and academics to gain skills and exchange knowledge and expertise. This means encouraging both parties to have an equal influence in community events working groups, the development of educational courses, and the direction of research.

Ethical considerations have played a large role in developing the idea of WIC. Wool is currently seen as a waste product despite being a natural, biodegradable resource.

Reducing waste is an important part of sustainability goals, both of UWTSD and the Welsh Government. Current Agricultural practices are increasingly being seen as unethical due to biodiversity loss and environmental contamination. However, the agricultural sector is under increasing pressure to provide food security for a growing global population. This is a global ethical dilemma that must be considered by any group or organization in the agricultural sector.

**PERSONAL MOTIVATION**

I love wool and sheep. I love the endless possibilities and variety of products that can be made, but I hate that Welsh wool has little value and shearing is seen as an expensive, but necessary, part of sheep farming. I want to change this. I want to create new opportunities for farmer, businesses, researchers, and communities. My vision for WIC is to motivate stakeholders from different areas, backgrounds and communities to create a better future.

In order to keep my motivation for WIC, I will embrace the interdisciplinary and short project nature of WIC, working on innovative projects that will engage the rapid cycling of my interests due to my ADHD. I will lean into my ADHD to keep my focus on the big project by being involved in little ones. Long-term research projects will tap into my desire to create a more resilient Welsh sheep industry and make a real-world difference, both to my local community and to the global climate and environmental crisis.

The main thing I want to do is develop resilience in the sheep industry. This aim has led to the creation of educational streams that can give knowledge to those in the agricultural community (and beyond), along with research streams to explore non-textile uses of wool that can create a new, resilient, and environmentally conscious Welsh woollen industry.

By creating an additional income from sheep, farmers will be in a better position to reduce stocking numbers and off farm inputs, making it easier to achieve the sustainability goals set by Westminster and the Senedd.

**FINANCIAL STRATEGY**

WIC will have four main income streams:

- UWTSD and Tir Glas students
- Wool based compost as a product
- Industry partnerships
- Grant/funding applications

Industry partnerships will be an integral part of the initial finances for WIC as it will bring in funding while at the same time, establishing strong relationships within the agricultural sector. The financial strategy will mainly focus on grant funding and partnerships within industry to promote collaboration and aim to give back as much as possible to the community. However, there is also the consideration of those employed by WIC. In order to attract the best in the field, WIC will need to offer competitive salaries. This would have to be balanced with the funding coming in.

This area is my weakest and where I will need to rely on support from the team around me and the resources given by UWTSD and Tir Glas. As much as I would like to be able to understand everything about WIC how it runs, the finances must be carefully managed in order ensure the success and continuation of WIC.

**RESOURCE MANAGEMENT**

The main resource required for WIC will be trust from the agricultural community. The main aim of WIC is to instill resilient practices with the sheep industry. Without trust and support from the agricultural community, there is no way WIC can achieve its key aim. Other resources will be required eventually, such as a farm to run practical courses, however these will be reliant on the trust within the community. Open farm days will not work unless people want to come and feel like they will gain something that they can apply to their own farming practices. In light of this, the people who come to work at WIC are very important. With UWTSD providing administrative services and assistance, WIC can focus on hiring a central team that will have representation from a variety of farming communities alongside interdisciplinary researchers.

Tir Glas and UWTSD will be providing vital resources for WIC in the form of physical buildings and administrative services, which is why the current iteration of WIC is dependent on being part of a larger institute. As there are 'agricultural colleges within the UWTSD partnership, there will be suitable facilities for the practical aspects of WIC without the need for additional financial outlay. Partnerships with other organizations will also give WIC access to a range of resources, from equipment to instructors.

Figure 6: Business Model Canvas (Mercer, 2024c)

Figure 6: Business Model Canvas (Mercer, 2024c)

**TEAM BUILDING**

At present, there are only a few people involved in the development of WIC as the initial stages of development focus on lean business practices. Non-textile uses for wool are still in the early stages; as such, there will need to be some proof of concept with limited resources before the enterprise will gain the attention of partner industries and investors.

Hazel Thomas (Tir Glas)-Hazel has been the Tir Glas coordinator for many years and has been incredibly supportive of my projects on Wool, including a wool forum held in 2023. Hazel has been a mentor for me as she has many connections in the local community and in UWTSD and is passionate about education and sustainability. She Dai Davies (Agri Community) -Dai has continuously supported me in my sheep farming endeavors. Not only has Dai supported me and given me opportunities, but he is also a very well-known figure in the local agricultural community. His attendance at the Wool Forum in 2023 was important in gaining the trust of other farmers and increased attendance.

**ADAPTABILITY**

WIC may outgrow the physical facilities available through UWTSD and Tir Glas. This may require the creation of a physical premises for WIC to conduct training, research and community outreach. As WIC develops new research avenues, there will be a need to develop suitable facilities for a different types of research. Laboratory equipment will become necessary for experimenting with innovative wool-based products such as biocomposite's. While there are other institutes exploring the viability of these products, such as Bangor, collaborations would only be possible to a certain point. WIC aims to create viable alternative income for sheep farmers. So, it would be necessary to have production as local as possible to ensure the highest profits possible to farmers. As WIC aims to create a new wool market, there may also be a need to develop new marketing strategies for the innovative products. This may require WIC to explore intangible research areas, such as behaviour change.

**AGILE MANAGEMENT**

The woollen industry is not consistent year-round. The weather can have a serious effect on shearing time as on, the one hand, wet sheep cannot be sheared and on the other, shearing time coincides with other important agricultural processes which take precedence, such as bailing hay. To be agile in this endeavor will require adaptation to seasonal needs. Wool is a seasonal product. WIC will have to keep this in mind when developing educational courses and community outreach. In order to build a relationship with the agricultural community, it is imperative that WIC complements the agricultural calendar

The many different aspects of WIC will require different management methods, especially the educational side as there will be a constant change in students. WIC will also need to encourage people to use more wool based products. This will require some degree of behaviour change. Customer collaboration will be very important as making the customers part of the process will enable the desired behaviour change.

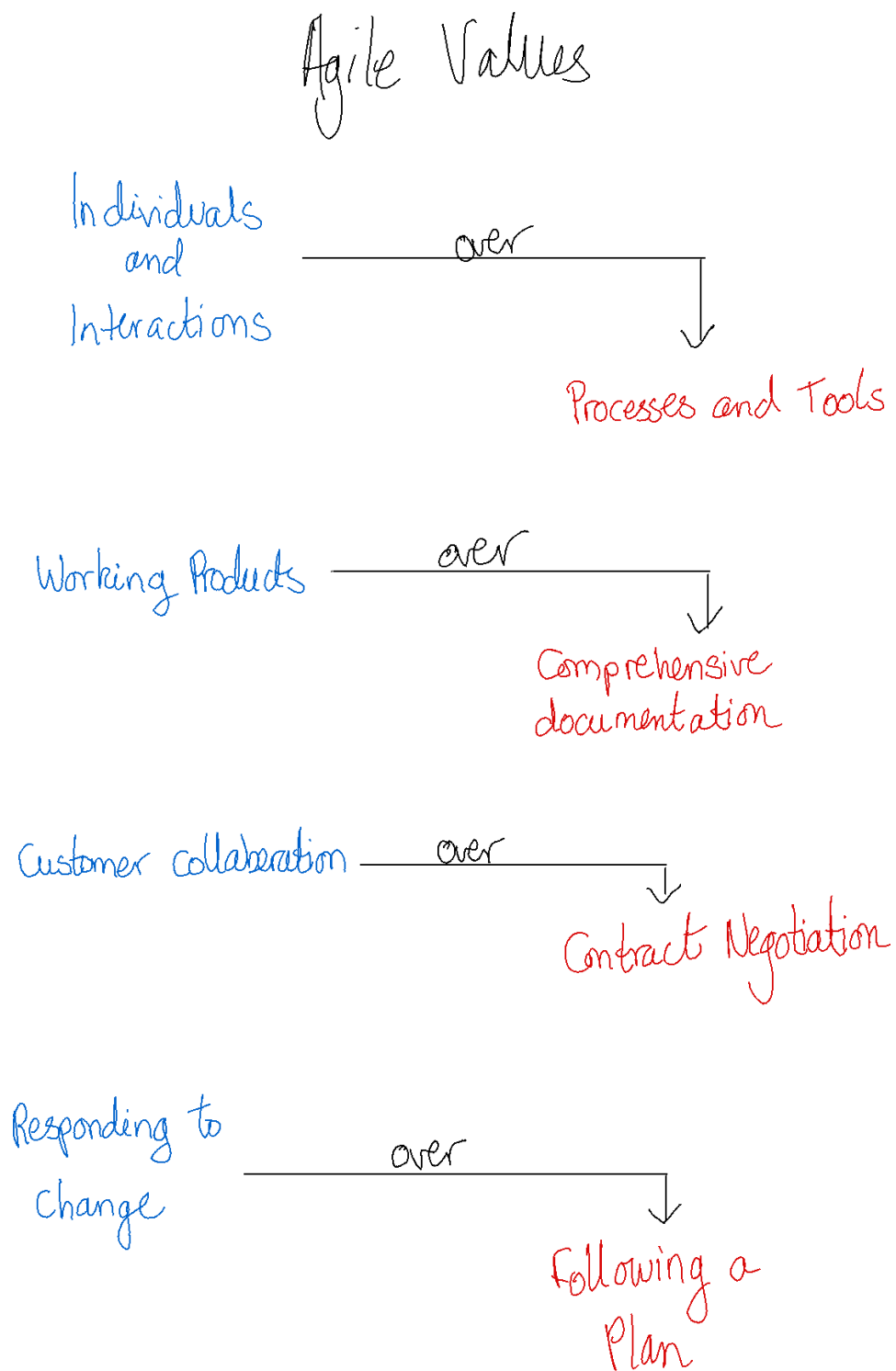
Agile Values Scamp

Figure 7: Agile Values Scamp (Mercer, 2024)

**LEADERSHIP PERSPECTIVE**

My leadership perspective has always been with the idea to lead by example and be present in all areas of the enterprise, even if it is not in active capacity. The biggest difficulty will be delegating tasks and focusing my efforts where I am *needed* rather than where I *want* to be. To this point, my ventures have been “one-man-band” where I have done everything myself, from finance and marketing to product development and delivery. With WIC, it is impossible for one person to take on all the roles, and nor do I have the required expertise in all areas. As such, delegation and trust in colleagues will be very important.

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[design.org/literature/article/wicked-problems-5-steps-to-help-you-tackle-wicked-](https://www.interaction-design.org/literature/article/wicked-problems-5-steps-to-help-you-tackle-wicked-problems-by-combining-systems-thinking-with-agile-methodology)

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## Appendices

### Appendix 1

Full Size Images of Wool Innovation Centre landing page *English* (minimum viable product) (Mercer, 2024b)





Prifysgol Cymru  
Y Drindod Dewi Sant  
University of Wales  
Trinity Saint David

TIR  
GLAS

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## Wool Innovation Centre

***Committed to creating a sustainable and resilient future for sheep farming in Wales.***

The Wool Innovation Centre is dedicated to enhancing the value of wool through cutting-edge research, innovation, and education. Our efforts are focused on increasing wool's value by facilitating innovative product design for farm diversification, and conducting research that highlights wool's pivotal role in creating a sustainable future.

Engaging with the community is a cornerstone of our vision. We host annual Wool Forums and open farm days, fostering a two-way flow of information between local communities, researchers, and industry stakeholders. This empowers individuals to make informed decisions and implement tangible changes in their farming practices or purchasing behaviours, ultimately driving positive change within the wool industry.

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## EDUCATIONAL OPPORTUNITIES

The Wool Innovation Centre offers a range of study opportunities for UWTSD students, the local community and anyone with a passion for wool. Practical short-courses are held in Lampeter. Many undergraduate modules are available in-person or online.



### Shearing (practical)

2-Day practical on shearing and wool handling. Taught by a British Wool certifi... [More](#)



### Drop Spinning (practical)

Spinning yarn on a spindle is one of the oldest crafts still practiced by thousa... [More](#)



### The History of Wool (BA)

Wool was one of the most important resources from early agriculture to... [More](#)



### Wool Innovation (MSc)

Wool can be more than textiles. Explore alternative, sustainable uses... [More](#)

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## Wool-Based Compost

**In collaboration with the Centre for Alternative Technology, Machynlleth.**

The Centre for Alternative Technology (CAT) has a long established composting area, where they experiment with different composting techniques and material. WIC has helped CAT establish a range of experiments with wool based compost.

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## The Composition of Wool

**In collaboration with the Rare Breed Survival Trust (RBST) & British Wool.**

One of the primary components found in wool is carbon, which is initially removed from the atmosphere through the grass consumed by sheep. Early research conducted by the RBST revealed significant variations in wool composition, with factors such as breed, location, and age having a substantial influence. WIC has partnered with RBST and British Wool to identify and understand the key factors that affect the carbon content of wool.

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## 2nd Annual Wool Forum

10th June, Tafarn Jem, Cwmann

Join the WIC team at the Tafarn Jem in Cwmann on Monday the 10th June, after the Llandovery sheep market, for the 2nd annual sheep forum. Mark Price from Laurence Pierce and Roger from Curlew Weavers will return, along with James Bickerton from British Wool, to talk about how to get the most from your clip.

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## Gwerth Gwlân Exhibition

24th June- 7th July 2024, UWTSD Library, Carmarthen

The University of Wales Trinity Saint David will highlight 'The Worth of Wool' in an interactive exhibition. Held at the UWTSD Library on the Carmarthen campus, this exhibition is about the important role wool has played at different points in history and how it can help create a sustainable future.

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For specific enquiries, please contact Debby Mercer on the email below.

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Appendix 2Full Size Images of Wool Innovation Centre landing page *Welsh* (Minimum Viable Product) (Mercer, 2024b)



 ENGLISH

Hafan GWELEDIGAETH ASTUDIO YMCHWIL DIGWYDDIADAU CYSWLLT

## Canolfan Arloesi Gwlân

## Wool Innovation Centre



Mae Canolfan Arloesi Gwlân, maen prawf Tir Glas, yn manteisio ar botensial gwlân trwy ymchwil arloesol, datblygu cynhyrchion arloesol ar gyfer amrywio ffermydd, a darparu cyfleoedd addysgol cynhwysfawr - o gyrsiau dechreuol i ddechreuwr i raglenni ôl-raddedig manwl.

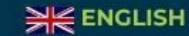
[Darganfod Mwy](#)





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ENGLISH

Hafan GWELEDIGAETH ASTUDIO YMCHWIL DIGWYDDIADAU CYSWLLT



## Canolfan Arloesi Gwlân

***Wedi ymrwymo i greu dyfodol cynaliadwy a gwydn i ffermio defaid yng Nghymru.***

Mae'r Ganolfan Arloesedd Gwlân yn ymroddedig i wella gwerth gwlân trwy ymchwil, arloesi ac addysg flaengar. Mae ein hymdrechion yn canolbwyntio ar gynyddu gwerth gwlân trwy hwyluso dylunio cynnyrch arloesol ar gyfer arallgyfeirio ar ffermydd, a chynnal ymchwil sy'n amlygu rôl ganolog gwlân wrth greu dyfodol cynaliadwy.

Mae ymgysylltu â'r gymuned yn gonglfaen i'n gweledigaeth. Rydym yn cynnal Fforymau Gwlân blynyddol a diwrnodau fferm agored, gan feithrin llif dwy ffordd o wybodaeth rhwng cymunedau lleol, ymchwilwyr, a rhanddeiliaid diwydiant. Mae hyn yn grymuso unigolion i wneud penderfyniadau gwybodus a gweithredu newidiadau diriaethol yn eu harferion ffermio neu ymddygiadau prynu, gan ysgogi newid cadarnhaol yn y diwydiant gwlân yn y pen draw.

**DARLEN RHAGOR**

## CYFLEOEDD ADDYSGOL

Mae'r Ganolfan Arloesedd Gwlân yn cynnig amrywiaeth o gyfleoedd astudio i fyfyrwyr PCYDDS, y gymuned leol ac unrhyw un sy'n frwd dros wllân. Cynhelir cyrsiau byr ymarferol yn Llanbedr Pont Steffan. Mae llawer o fodiwlau israddedig ar gael yn bersonol neu ar-lein.



### Cneifio (ymarferol)

2-ddiwrnod ymarferol ar gneifio a thrin gwlân. Addysgir gan dystysgrif Gwlân Prydain... Mwy



### Gollwng Troelli (ymarferol)

Mae nyddu edafedd ar werthdyd yn un o'r crefftau hynaf sy'n dal i gael ei harfer gan filoedd... Mwy



### Hanes Gwlân (BA)

Gwlân oedd un o'r adnoddau pwysicaf o amaethyddiaeth gynnar i... Mwy



### Arloesedd Gwlân (MSc)

Gall gwlân fod yn fwy na thecstilau. Archwilio defnyddiau amgen, cynaliadwy... Mwy



## Compost Seiliedig ar Wlân

Mewn cydweithrediad â Chanolfan y Dechnoleg Amgen, Machynlleth.

Mae gan Ganolfan y Dechnoleg Amgen (CyDA) ardal gompostio hirsefydlog, lle maent yn arbrofi gyda gwahanol dechnegau a deunyddiau compostio. Mae CAG wedi helpu CyDA i sefydlu ystod o arbrofion gyda chompost yn seiliedig ar wllân.

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## Cyfansoddiad Gwllan

Mewn cydweithrediad â'r Rare Breed Survival Trust (RBST) & British Wool.

Un o'r prif gydrannau a geir mewn gwllân yw carbon, sy'n cael ei dynnu i ddechrau o'r atmosffer trwy'r glaswellt sy'n cael ei fwyta gan ddefaid. Datgelodd ymchwil gynnar a gynhaliwyd gan yr RBST amrywiadau sylweddol yng nghyfansoddiad gwllân, gyda ffactorau megis brid, lleoliad ac oedran yn cael dylanwad sylweddol. Mae CAG wedi partneru ag RBST a British Wool i nodi a deall y ffactorau allweddol sy'n effeithio ar gynnwys carbon gwllân.

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Prifysgol Cymru  
Y Drindod Dewi Sant  
University of Wales  
Trinity Saint David

TIR  
GLAS

ENGLISH

Hafan

GWELEDIGAETH

ASTUDIO

YMCHWIL

DIGWYDDIADAU CYSWLLT

## Cyswllt

*Ymunwch â'n rhestr bostio i gael diweddariadau rheolaidd ar gyrsiau a digwyddiadau, yn ogystal ag adroddiadau ymchwil blynyddol.*

Ar gyfer ymholiadau penodol, cysylltwch â Debby Mercer ar yr e-mail isod.

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ENW

EBOST

CYFLWYNO