ewmpas
Start Something Good

FRESH IDEAS FOR SOCIAL CHANGE

Natural Resources Wales 28-29.02.2024

The Hackathon Challenge

"How might we better collaborate to improve water quality in the Teifi, whilst encouraging climate resilience and enhanced biodiversity?"

Summary of responses from working groups at the Hackathon

1. **Farmer Led Projects – A farmer led participatory budgeting model, engaging local communities.**

The proposed projects would need to be built on trust and clear principles for working, co-designing, and co-producing each project in line with the needs, resources, and aspirations of each community.

2. **Data Integration – A data "Netflix".**

A single trusted organisation holding all the data for all stakeholders that are currently collecting data. This data will then be available to the eco-system through different "channels" according to the needs of stakeholders.

3. **Water Quality Awareness – A campaign and Theory of Change.**

Fostering individual awareness in the catchment through to crucial groups like the Teifi Partnership. The goal is to build a shared understanding of the state of the river and to precipitate a range of actions through all the different actors involved.

4. **Long-Term Funding – A "ground up" funding stream.**

The creation of a grassroots body to collate and quantify the different mitigation options within the catchment, understanding all finance options, and prioritising actions in the catchment to deliver outcomes.

This would assist in identifying funding gaps, cost-effective methods, and provide a basis for pitches for large and small-scale investment.

5. **Rainfall Management – An educational approach, leading to behaviour change.**

A rainwater management education approach would alleviate responsibility on one group, community, or sector. This approach would invest in educating different sectors and communities, and link educational institutions with farmers to learn about rainfall management practices.

6. **Behavioural Change – A case study on land managers.**

The development of a case study of land managers to provide a baseline of knowledge and benchmarking, helping farmers to prioritise their journeys and better communicate what they are doing. This behaviour change approach would need to deliver multiple public goods, with livestock management and carbon capture working hand in hand.

The Hackathon Challenge

Cwmpas was commissioned to deliver a hackathon event that would bring together multiple stakeholders from the Teifi Catchment to address the following problem:

"How might we better collaborate to improve water quality in the Teifi, whilst encouraging climate resilience and enhanced biodiversity?"

Specifically exploring solutions that:

- **Adopt innovative and agile approaches**
- **Improve evidence communication**
- **Support a range of remedial interventions**
- **Capture learning and manage it so it can be scaled up to bring multiple benefits to other catchments**

The Process

The two-day event was held on 28-29th February, in Aberystwyth. Forty attendees comprising of academics, regulators, farmers, public bodies, and scientists, embarked on two days of intense and progressive workshops that aimed to share perspectives, create new connections, learn new methodologies, arrive at innovative ideas, and be encouraged to work in co-operation. Creating multiple diverse groups is key to the process. Participants were split into six teams, each comprising of 6-8 members from a range of diverse backgrounds and perspectives.

Workshops

As well as hearing expert sessions on catchment data, and comparable and relevant UK wide projects, the six teams were taken through seven different workshops throughout the event. These included:

Asset Mapping
Problem Convergence
Idea Convergence
Pitching
Problem Divergence
Idea Divergence
Prototyping

Asset Mapping

The Start Something Good® approach is to begin from a position of strength by identifying what resources are available to solve the challenge at hand. To find a solution we need a wealth of 'tools' at our disposal. Each of the groups produced an asset map that aimed to identify areas of current activity and strength, areas for development, and the orientation of existing assets.

	Who	What	When	Where	Why	How
Improving water quality in the Teifi						
Adopting innovative and agile approaches						
Improving evidence communication						
Supporting a range of remedial interventions						
Capturing and sharing learning						

Table 1

	Who	What	When	Where	Why	How
Improving water quality in the Teifi.	DWCC FARMERS NRW LAs WG Landowners Householders Forestry Managers River Trust	Treating / upgrading works & New permits and PRZ4 for funding. NVZ legislation, Agri enviro schemes. SMS Weather Apps. Monitoring. Incidents. Permit Compliance. Projects e.g. fencing. NMB, Planning, Consultation. Driving NMB	LL+L by 2025 Permits starting now +12m Target 24/7 Current.	Llanybyd & Llanbed.P.S Twenty-eight permits PRZ4 sites Ceredigion Across Wales Teifi catchment WW Counties	Regulations &. Targets Advisory Improve Efficiency & BioD	Funding** Management Practice Monitoring Projects & Day Job
Adopting innovative and agile approaches	DWCC LA's NRW Farms Teifi demo pro	Nature based solutions. Bio solids. Teifi life project/ fencing. Sampling tech/mine projects. Precision technology Slurry separator	Improve productivity	Across locations in Wales	Improve-Productivity*	Improve accuracy of slurry & Fert Application & cover crops & Buffer strips.
Improving evidence communication	NMB OS map NRW Monitoring Data DCWW Storm overflow map River trusts Tywi Weather app	Evidence Reports	Evidence for monitoring & benchmarking**		Evidence for Monitoring & Benchmarking**	Apps Portals
Supporting a range of remedial interventions	Teifi life project NRW DCWW CCC Agriculture LA	Life Project permits PRAM. Disposal of Sheep dip	To prevent pollution of water sources		Prevent pollution of water sources	
Capturing and sharing learning	Farming SMA Bro Caran LA	& Pesticides SUDS	Gov funded Improve biodiversity, water quality & productivity.	Wales wide, Ceredigion, (8 farms)	Gov funded Improve BioD Water quality & Productivity.	CPD events Newsletters Demo farms Presentations PRAM

Table 2

	Who	What	When	Where	Why	How
Improving water quality in the Teifi.	DCWW / NRW / LA Landowners / septic tank owners Canoe clubs / supermarkets/ National Parks/Citizens	Land use management- ADAS Directory Industrial pollution- abattoirs, pharmaceuticals, factories, shipping, fisheries.	Spatialised – Need spatial mapping.		Statutory requirements Water companies – benefit via abstractions. Customer drinking water benefit. Intrinsic value Mental Health Allow sustainable development.	Financial support. Enforcement * NMB'S.
Adopting innovative and agile approaches	NRW/WG Collab groups e.g. Farmers/SFS Demonstrator Farms/Ceredigion council/farming connect (future) Project slurry.	Nutrient trading Marginal abatement cost curve/choosing what to deliver. Catchment permitting WWT Innovation	WQWE NVR (NNR?) Farms in catchment.	Can NT be used to drive improvement ? Or implemented after improvements achieved.		
Improving evidence communication	NMB'S data platform. One place for evidence from stakeholders, including public. NRW, WW, Citizens	Data visualisation to encourage- public invest- create action. Analysis & data interpretation Data visibility.	Fill the gaps in the data	Needs long term maintenance.	Improve access to info. Create meaningful improvements in the right places. No waste money.	Make data relatable! River to tap More monitoring Analysed differently. Make data work harder.
Supporting a range of remedial interventions	NRW change wetland policy – include other land users for wetland applications. NRW/WWRT	Expand mitigation menu. Habitat mapping- river boundary.	River Boundary	Recent	Not enough options.	Riparian corridor.
Capturing and sharing learning	All stakeholders implementing WQ improvements.		Share as widely as possible.		Correct capturing for better learning.	

Table 3

	Who	What	When	Where	Why	How
Improving water quality in the Teifi.	Dwr Cymru NRW / PRAM WWRT / ENGOS	Investment Monitoring permitting	Ongoing imminent	Point sources WTW metal mines Land management	Legalisation Community Nature Climate emergency	Enforcement regulation
Adopting innovative and agile approaches	DCWW/NRW Local Auth Gelli Aur Universities NMBS	Treatment tech – Nature based solutions Reducing inputs	Project end ongoing	Point sources Land intervention	Compliance planning Public pressure	Projects / Trials
Improving evidence communication	Farming connect universities /KE ENGOS, DCWW	Workshops Public engagement / media	intermittent	On farms, in communities Scientific public briefing	Public pressure	Through stakeholders networks
Supporting a range of remedial interventions	Farming connect universities /KE ENGOS, DCWW, Farmers	Slurry management Tree planting P removal	Ongoing imminent	Point sources Individual farms	Compliance Environmental consciousness	Permits
Capturing and sharing learning	Universities WG /NRW DCWW	Limited snapshots Project specific	intermittent	Social media conference On site newsletters	Highlighting change	

Table 4

	Who	What	When	Where	Why	How
Improving water quality in the Teifi.	Welsh water NRW River trust Councils Welsh gov Community groups NMB'S Farmers / landowners NGO's	Monitoring / data survey Drinking H2O safety plans, safeguarded zone? Website / GIS Tools. Observation Phosphate summits. Forums NMLF Salmon and sea plant action plans	Have been doing, will be. AMP, 5-year planning cycle WFB planning cycle Compliance deadlines Monitoring projects. Together action.	Catchment target areas. Old mine works. In the moving water. Specific placed based Community groups.	Climactic changes Eco-resilience Improving biodiversity Unlocking housing Recreational use. Drinking water quality.	Funding. Awareness rising. AI Analysis. Guidelines Targets. Monitoring. Research. Water treatment & waste treatment.
Adopting innovative and agile approaches	NRW Land managers Welsh water Council Welsh gov / task force for Welsh data Leadership managers/ board officer	Empower those on the ground "Machine learning of big data" regulation. Shared Prosperity fund to put things together. Collaborative approach like an orchestra. ART!	Priority areas.	Connect the people on the ground. Reduce the gap between the people and the ground	Do important stuff with the data analysis results Upscale solutions we know works rather than do more pilots Farming connect peer to peer.	Citizen science. Developing high date. Empower those on the ground. Enforcement & Regulation.
Improving evidence communication	All of above! Raise awareness Best messenger for the story ENGOs, technical specialist, Peevs YFC / ICCF	Supply chain. Contain water + recycle. Accept there is a problem and reduce focus on Perfect. Trial approved Answer very specific place-based questions Understanding scale up		Identify support for farmers rather than enforcement framing Message though examples that people see themselves W/IN	Shift risk tolerance for those on the ground. Need to understand data analysis tolls are just a tool. How do you what/ if the data analysis is unlocking. Simplify regulations	Peer to peer buy in. Layered communication Targeted communication. Targeted media.
Supporting a range of remedial interventions	Welsh water NRW Welsh water	Historic Sceptic tanks PFA'S /AD EDNA Forever chemicals circular economy Supply chain		Package wastewater treatment. Recycling. Areas outside water work.	Can collect data on what is going wrong. But also what is going well.	Reduce reuse Recycle Band at source Just do it! Scale up
Capturing and sharing learning	Everyone working on it	Interpretation of data		Cat SKILLS Australia?	Identify metrics of	Unified framework.

	but can be siloed rather than working thru others. International learning.	Addressing bias Impact of mapping & lessons learned on outcomes. Cascade project. Beacon water group.		Emerging risk work in the USA Examples exist. Supporting farmers.	success. Can It happen now? Does it make a change? Community buy in, change behaviour	Tailoring messages to audience.

Table 5

	Who	What	When	Where	Why	How
Improving water quality in the Teifi.	Nutrient management boards DCWW Farming connect WWRT/NRW Local Auth	Action plan to reduce nutrients. Scoping of nutrient inputs (point source & diffuse) Phosphorus removal programme Farm advisory visits NFM/SUDS PRAM Metal mine, Agri advice & Regulation. Managing development.	Report by April (draft). Throughout the Teifi 2032. Ongoing.	Regional while Teifi	Heightened p levels. Regulator responsibility* high proportion Benefit of NGOs delivery All pollution and habitat reasons & recreational changes.	TBC P REMOVAL**
Adopting innovative and agile approaches	Gelli aur – project slurry * weather solutions DCWW waste WWRT & Save me Teifi & DCWW	Nature based solutions screening. Live monitoring project nutrients & Physiochemical Visual citizen science trial.	AMP 8	4 SAC rivers		
Improving evidence communication	WWRT DCWW NMBS PRAM	Fishery habitat restoration surveys. Sediment pathways. Farm infrastructure report. Citizen science. SAGIS reports/modelling scenarios. Storm overflow investigations. sharing Biosolids spreading with NMBs data bases of issues visualisation and actions. Display boards.		All SAC rivers	Sharing project decisions etc with the community.	
Supporting a range of remedial interventions	4 rivers for life DCWW wetland investigation Farm advisory visits Riparian fencing NRW,WWRT Farming connect?	Fencing river restoration NRW WWRT Control of invasives Natural flood management River restoration Soil management	Until 2027 Variable subject to funding.	All SAC & W. Wales rivers		
Capturing and sharing learning	Joint (rolling chair)	Teifi working group				

	Nutrient management board. Farming connect WWRT, save me Teifi. Wales land management forum local fisheries group.	Llais yr afon project				

Table 6

	Who	What	When	Where	Why	How
Improving water quality in the Teifi.	Water companies Public Businesses** & tourism Gov policy	High resolution monitoring. Mitigation / enhancement	Sufficient to be sure	Catchment wide pathway	Legislation Moral right thing To improve biodiversity	Circular* sustainable* farming 15 min Chem sondes Alternative?
Adopting innovative and agile approaches		Q controlled empirical mon. Independent** Transparent.	Other participant re-assured protected.	Different scales	GHG's Down Carbon balance Refined practice Economic advantage	High-res tech M2 Land use Sagis retainment* With integrity Visual accessible*
Improving evidence communication		Visual easily accessible maps.			Monitor for behavioural change not compliance* built trust	Single trusted data Multi-layer to interest data comms Start from scratch
Supporting a range of remedial interventions		Land management options River restoration Tourism / business Eco-tourism				Legume based farming
Capturing and sharing learning		Bio-diversity evidence. Economic evidence				Ownership meaning support.

Collective Sense Making Tool

The purpose of this exercise is to investigate and analyse what is in existence now and what has gone before: What do we need to end or reduce? What do we need to amplify or increase? What do we need to Start? What do we need to Restart?

Table 1

End/Reduce	Amplify/Increase
Duplication of effort between organisations. Silo working / Taking shared responsibility, end blames culture.	Farm led approach (Tech & Land management practices) with advisory board support. Data driven decision. / Knowledge exchange (FC) Orgs working to strengths. /Communication & Understanding between NRW & Farmers. Nature Based solutions / Understanding remit & Objectives of different orgs /people. Tackling storm overflows.
Start	**Restart**
Common objective for WQ on Teifi eco production.(more quality data) Experimental approach to sanctions / enforcement. Rewards for agricultural management to improve WQ-SFS Citizen science with Collab Nature based solutions Nutrient trading? Reg & Monitoring septic tanks / education.	Sampling / monitoring / analysis of rivers to measure change.

Table 2

End/Reduce	Amplify/Increase
Reduce storm overflows operations. Phosphorus levels Mines pollution Industrial pollution Reduce barriers to regulation to trail experiment – increase innovation high impact high effort.	Increase capacity of slurry storage on farm – with a requirement of increase funding support. Use this project to amplify work already done on Teifi. Ensure collaborative work, increase co-ordination. Need more monitoring and targeted data capture. Increase number of salmon Enforcement and inspection of small farms too. Start with advice / Education. Expand mitigation menu. Increase trust and collective endeavour across stakeholders involved. Give NMB Ability to action.
Start	**Restart**
Mass improvement of Riparian buffer zone. Citizen science policy to be developed. Mapping gaps in Data, sharing habitat mapping river boundary. (WWRT) Share data in understandable form for public – public investors. Look to tightening permits – septic tanks and WTW over 20m? Nutrient trading / catchment permitting. NRW to sign 'common ground' statement for river water quality across WW. More robust data and collection for landowners / farmers in the water body a robust way of contacting these. Demonstrator farms. Marginal abetment cost curves.	NRW to change wetland policy to include other land uses for wetland application. Restart work previously delivered on farm through projects such as BRICS / 4Riveres on small capital, works to assist farmers in lowering water intake to slurry storage.

Table 3

End/Reduce	Amplify/Increase
Hard engineering grey solution Silos Nutrient loading, surface water into sewer systems/rivers. Number of groups.	Acknowledgement of problem Understanding Integrating / holistic approaches Communication and dialogue – land users Cymraeg YFC? BEHAVIOUR CHANGE Multi benefit solutions (e.g. natural flood management)
Start	**Restart**
Integrating evidence gathering & recording Supporting citizen science Testing schemes / interventions Collaborative scenario planning River champions.	Catchment management plans.

Table 4

End/Reduce	Amplify/Increase
Silo working Ban at source Prioritization on brand new pilots Post grant evaluations have a positive spin to protect next opportunity for funding. Reduce direct ROI focus, holistic evaluation. Evidence output Ridiculously short timelines and funding cycles.	Monitoring Targeted data analysis / interpretation / evaluation Share exemplar / champion case studies / relatable people Working through trusted local champions Teifi exemplar community – building by understanding Circular economy Learning from to others (good & bad) Innovation acceptance of risk (innovation messaging / not just technology) Funding beyond Pilot Education to reduce e misinformation.
Start	**Restart**
Sharing relationships Sharing data / integration of data Sharing recourses (people / time / work) Understand behaviour science (Water champion / good behaviour) Sponsor scout badges)Urdd Welsh / English) Collaborative landscape project funding Impact mapping on outcomes Systems thinking unintended consequences localised adaptations Appropriate levels of governance Reduce precautionary principle Challenging outcome medics – delivery restricted because of having to prove (measured output / qualitative not quantitively) Collaborating with school on Cynefin	Engagement of youth representation Reconnecting people with their rivers

Table 5

End/Reduce	Amplify/Increase
Storm overflows Misconnections INNS Self-regulation Short term projects Finger pointing all responsible Phosphorus form treatment works.	Amplify current understanding of nutrient loads including satellite spreading Land legacy (phosphorus) soil testing Farm advice and regulation Stop the block and similar campaigns Surfaced water removal Matching nutrient requirements with crop requirements Sustainable urban drainage schemes Riparian buffer strips & tree planting Tree planting (right tree right place) Understanding soil loss

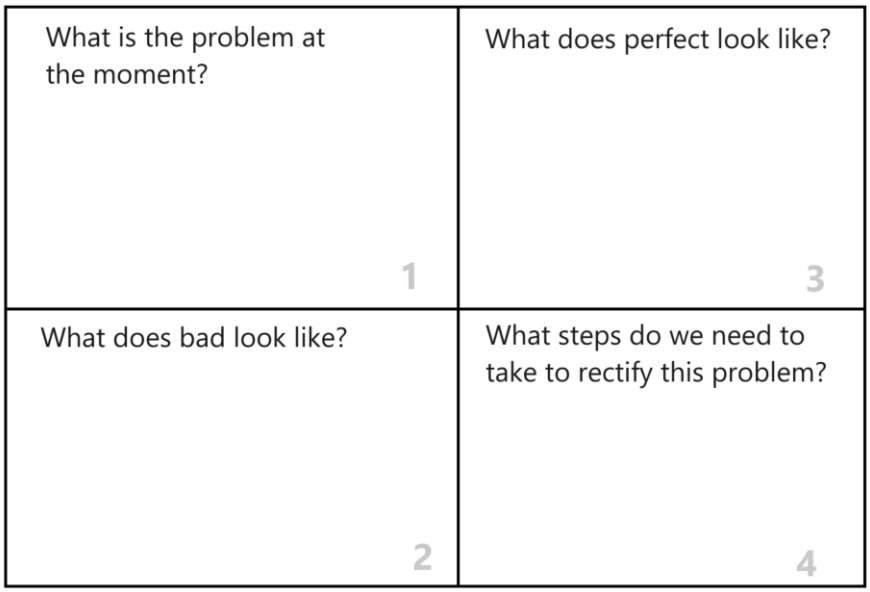
	SUDS in new developments.
Start	Restart
Supply chain review and investment Continuous monitoring Delivery of NBS & regulation of payment for ecosystem services Nutrient reduction / movement licenses Engagement with agricultural contractors manure Forestry sector engagement with issues /solutions Catchment cover/crop/no till machinery hubs Catchment wide natural flood management Experimental regulation for trials.	Revisit septic tank registration scheme (non-voluntary in Teifi trail?) Guidance & Regulation Public campaign for phosphorus free products Monitoring of non DCWW sewage treatment works

Table 6

End/Reduce	Amplify/Increase
Permitted discharges Reduce acidic soils Import of P into catchment Viewing strategies as single issue (maize) Over winter fallowing.	NRW Funds E/A building reg standards Carbon in Soils Citizen science – parameters for collecting / guidance. Species based solutions Inc.PH 6 (6.5-7) Application of lime Urban rainwater harvesting Soil education Intercropping with Maize Urban rainwater harvesting?
Start	Restart
Behavioural change pilots Waste water blockages BACI for innovative nature based /Land practice. Real Time monitoring for additional WQ Section 82 innovation opportunities Innovative CIF- SCI Business involved in solutions.	Subsidised liming Subsidised benefits Willow planting Circular feed of willow leaves Coppice every three years

Challenge Mapping

We asked each team to complete a challenge map to 1) Identify the problems at hand, 2) What does bad look like, 3) What does perfect look like, and 4) What would be the next steps to rectify the problems?



The value of this section in the process is the clear identification of the problem(s), the contrast between two states (bad/perfect) and the actions that need to be taken to move forward. The responses were as follows:

Table 1

Problems	Awesome
Farm led approach – Wrong organisation running it. No incentive Funding Engagement with wider community. Monitoring /Data driven – Duplication Lack of evidence Lack of transparency Availability Funding Lack of resources Collaboration	Farm Led – Teifi meeting water quality targets Improving food production (Not compromised) Adapting to climate change Replication to other catchments Involving communities. Monitoring / Data Open portal for data (one place) Evidence based intervention Replication to other catchments Involving communities / citizen science.
Bad	**Next Steps**
Farm led – investing in things that are not a problem. Disengaging farmers from the process. Monitoring/Data – Efforts & Money spent where not needed. Money waster on intervention NOT required. No monitoring No faith in data No analysis of data.	Farm led – Provide Funding (Infrastructure improvements, weather stations/tech) Remove fear of failure Nutrient trading? – DCWW & Farmers Monitoring / Data – Provide funding Gathering evidence for informed decisions Establish framework Remove fear of failure

Table 2

Problems	Awesome
Existing data sets are with different orgs – no overview of data, unaware of gaps/duplication. Complexity of current data – lack of decision tools, accessibility of current data. State of publishes data, citizen science currently undervalued. Don't know what we don't know.	One universal single source of truth- data in one place. Different front ends depending on audience but same data. Being able to fill data gaps in a meaningful way. Something that adaptable which provide decision support tool. Continuously maintained and updated platform – LIVE? Evidence based cost-based analysis. Special understanding of where the opportunities are in the catchment what their costs are and what outcomes / impacts are.
Bad	**Next Steps**
Every stakeholder justifying different actions based on different interpretation & varying data = Plus using their own data platform (disconnected). Duplication of effort (waste of money & recourse) Misdirected outputs and solution of current data. Focus on published data, not looking wider. Over publication of data to public (mixed messaging) Poor data. (& poor data interpretation (Funding constraints / stakeholders unwilling to work together.	Need to find trusted body to hold the data and run the platform. Ensuring stakeholders hand over data correctly and actively. Need regulatory or mandated of timescale for delivery.

Table 3

Problems	Awesome
Water quality improvements have stalled, continues to impact people and ecosystems.	Mixed environmentally & economically sustainable land use (SDG'S) More `OTTERS, SALMON diverse habitats effective / efficient legal framework and support to achieve compliance. delivering international obligations (cop 15) Exemplar of wellbeing & Environment goal in action.
Bad	**Next Steps**
Further deterioration, compounded by climate change: Biodiversity, habitat, soil health Treatment costs risk to public health Flood risks, drought, instability. Farming productivity disease	Advice & guidance (Consistent integrated clear) Investment (Public & explore private options) Innovation Regulation -review Voluntary actions (Incentives) Community participation Collaboration & Partnership education.

Table 4

Table 4 decided to investigate two different challenges simultaneously.

a) Short term funding

Problems	Awesome
Short term, does not cover cycle Perpetual loss of resources / knowledge / relationship Momentum lost Loss of trust Engagement fatigue	Long term Centralisation of funding Less constraints Simpler application process Trusted partnership 'Bank of Dave' Ecologically & climate change resilient FGE Supported Community ownership Favourable conditions Good WQ
Bad	**Next Steps**
Energy focus in wrong area Lack of continuity Duplication Effort of application focus	Long term financial instrument Valuation of environment (People & Nature) Green financing Endowment (Canada example) Common shared outcomes

b) Behavioural change

Problems	Awesome
Denial Misunderstanding Dis interests Fair share Disconnect between behaviour & impact Lots of assumptions Lack of ownership of problem	Positive social media Engaged communities at rivers Zero complaints Zero pollution incidents Farmers & regulators drinking in the pub Scaled up delivery Functioning circular economy, less waste, efficient use of recourses, new metrics Community friendly reporting
Bad	**Next Steps**
People throw things Disconnected Pollution increase No improvement Conspiracy theory Minimal players to improve environment Higher bills (Council tax / water bills) No Ecological and CC resilience Loss of designation species Biodiversity loss Inflective policy & intervention.	Participating budgeting / citizen assembly / mini public (look at Scotland). Co-create narrative Public participation at every stage Behaviour change study Share resources & previous studies Place based (Tailored messaging) Community interviews Test interventions Wated funding spent in wrong places Duplication of effort

Table 5

Problems	Awesome
High rainfall, going the wrong places, because: non permeable surfaces (concrete, loss of green spaces) Poor land management Climate change Combined sewers Tree/habitat las Previous development / housing adding to network.	Replaced system for separate sewers Good soil management Permeable ground surface Higher yielding corps as a result of water management Customers on water butts reduced after usage Rainwater flushing toilets via storage tanks Reduced flooding SUD'S NBS for slowing flow but additional benefits Everyone on board = ONE GOAL, OWENSRSHIP Treatment works treating less dilute influence Partial treatment for highways run off.
Bad	**Next Steps**
Flooding – sewer river coastal So activity Land run off, sediment highways, pesticides, Slurry volume Human animal health risk increase Increased pollution. Increase in peak flows ,bank erosion, gravel loss, habitat degradation Raw water quality decrease.	Quantifying volumes Combine data on catchment risks Community engagement for merging own water Review payment for existing service Service funding for maintenances of interventions Retro fit SUDS? Implement NBS wetland system for run off in high-risk areas DCWW Review surface water re-bate payment. Ban artificial grass and limit concrete / tarmac Education campaigns – how we all influence the river Re-meander river and streams Farm visits advice & Changes, guttering, slurry tanks, yard.

Table 6

Problems	Awesome
Current behaviour & Culture contribute to degraded eco-system Resilient to expected changes.	Historically minded behaviours & culture, having nature and resilience at the core of decision making Shaked by early education and connected engagement System - wary of future risks Multiple benefits Prioritising the WIN WIN WIN opinion , synergistic. School & University.
Bad	**Next Steps**
Continued environmental degradation. Loss of salmon & otters, runaway pollution Shifting baselines – ecological amnesia Reduced resilience to future climate shifts. Socio-economic collapse – public perception Damage to culture /heritage.	Trial and prove pilot studies Across scale peer to peer Education & engagement to change culture & behaviours Secure funding.

Following multiple workshops that highlighted different elements of the challenge on day one, six themes were identified and formed the basis of further exploration for solutions on day two. On day two, the participants formed new groups around the six themes:

1. **Farmer Led Projects**
2. **Data Integration**
3. **Water Quality Awareness**
4. **Long-Term Funding**
5. **Rainfall Management**
6. **Behavioural Change**

Ideation

Now that the participants had framed their question, they were taken through an introductory session on ideation methods and an accompanying task.
The participants were introduced to the "Innovation Engine" and the three core methods of ideation: Recombinant, Incremental, and Exaptive.

The Innovation Engine by Tina Seelig

The groups were asked to participate in an exercise called "Crazy 8s" where each participant uses their "How might we?" statement to produce at least eight different ideas within eight minutes.

They were then invited to extend their ideation process via the "Clever Trevor" technique by looking at the problem from the perspective of a non-related company or organisation (e.g. Ikea, Netflix, NASA), and adding those ideas to the suggestions.

The purpose of asking individuals and groups to consider multiple ideas encourages new and fresh ways of thinking. Instead of starting with only one idea in mind, the groups have multiple options to choose from and to combine. The value of thinking and working in this way is that options are opened up instead of restricted, and good ideas can be sourced across the group instead of coming from one dominant individual. This ideation method broadens the number of people involved in producing ideas and fosters a democratic and open approach

The full list of ideas generated per group were as follows:

Ideas Generated

(in no particular order)

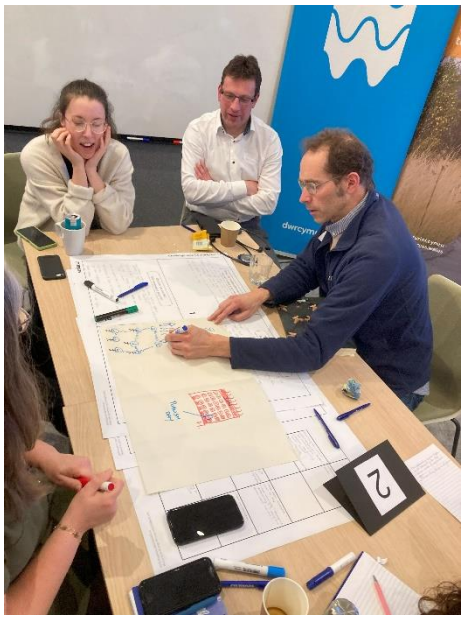
Group 1. Farmer Led Projects

Recording of Observed Changes.	Chefs Invent market of new crops.	Education on what to do when Teach new practices.	Teach everyone the same thing -share the same info.
Individual advice and support.	Monitor baseline BioD	Mapping land use.	Scenario planning- imagining the future farm.
Accessible, transparent best practice online for encyclopaedia for Win-Win options for farmers trial.	Raise Food prices.	Pledge that data collected will not be used for compliance.	Create algorithms that bring relevant info to the farmer.
More freedom.	Weather station.	Principle based guidance.	Interactive farm modelling, (mapping, nutrient, management)
Ensuring data cannot be used to hurt farmers.	Scale up what is already working.	Micro community grants, low barrier and self-directed.	De-centralize and give opportunity to profit off their idea (but really you will buy it cheap)
Be real about funding options	Options and funding to monitor success & economic value of trials.	One database for capturing projects / learnings.	Participatory budgeting, commit funding & Trust the group to direct it.
Grants for herbal lay pasture.	Weather and soil information data collection app, with the ability to do a farmers NVZ (?) calculation.	Farm scale airborne catchment.	Paid for all aspect of trial.
Workshops on farms.	Data gathering to be done all in one place.	Listening series?	Software development to record and farm change
Make finding data easy.	Shared risk and reward)	Less red tape.	Automated maintain & data.
Use the same monitoring sections through the whole catchment. Same data capture. same land management.	Investment from other stakeholders for a shared goal.	Have fun stimulating activities.	Portal for idea generation from farmers
Quick win response.	Retired farmers in government.	Assign ££££	Portal for farmers to show off.
Farmers choose who holds the data & agreement.	Reduce inputs and maintain productivity.	Think of framers as the commodity “seal their data”	Agree independent trusted group to keep data and help with monitoring.

Greenpeace hearts & minds campaign.	Ikea – step by step 'how to build a farm led project"	Siarad a rhannu	Emphasise focus on demonstrating economic value of trails for farmers to enable farmer-led projects.
Willow coppice/funding programme?	Soil sampling and interpretation (Uni-collab?)	More small-scale farms instead of mass scale.	Community awareness projects, run by farmers to give better insight about what they do.
Taking cows in and out of barns for milking / sleeping to reduce slurry amount.	Ikea -free meatballs as an incentive	Create a community of practice outside of regulatory oversight.	Real time monitoring soil/water/air.
Developed network of farmers with appetite.	McDonalds: Drive schemes with incentives for farmers with awareness for customers.	Soil monitoring / sensor kit.	

Group 2. Data Integration

Apply to collect data	Ensuring data governance of all those that enter data to a platform	Develop a common data policy (who/what/how?)	Agree a data framework. Around shared common objective.
Understand response.	Data Facebook?	Single platform Quality assurance	Incorporate data, forecasting, modelled data to form predictive insight
A new organisation that holds all the info, no open data.	Easy to use tool - that brings everyone together.	Social media platform that allows users to interact with data	Apple? An app that has the information – offers solutions?
Greenpeace? Would establish a common ground & look at how the solution can drive social value.	Training on data interpretation	Nominate data liaison officer!	Mobile upload – real time?
Usable map tool to view all data. App? Map based?	Whole catchment not just river.	Data Subscription service? (Each organisation is responsible for upkeep of their 'series') New project=NEW SERIES	Co-Design platform
Cross organisations	Establish AI task force, how to incorporate AI techniques to support insight development.	Monthly data conference	



Group 3. Water Quality Awareness

Reform governance	Water bill discounts for good practice	Identify possible solutions Encourage you to choose other solutions (based on solutions history)	Bring water quality to life
“Toilet to tap”	“Farm for the Future”	Make solutions more popular depending on their use and make those solutions available	Support citizen science.
Develop a reward approach for positive action	Engage land managers into providing multiple edition services	Campaigns / Public interventions	Campaign on connecting individual actions to WQ issues
Encourage interest & Awareness amongst kids	Allow feedback and views to get buy in.	GREENPEACE Out future is the future of water	Water quality status needs to be disseminated more widely to the public
Focus on end users not policy makers	Contextualise the impacts	We all live in the river	Problem solving education
Netflix series “water of life”	Use social media (Audience tells the story)	Think like a fish	‘Summer / water camps”?
Education at grass roots level	Apple The water app “Your river is what you make it|	Google river Google scholar	Real time water quality monitoring
Real time river quality forecast	Real time river quality forecast	WQ Analysis Kit delivered to your door.	Public water quality statistics, AT areas of recreational use.

Group 4. Long-Term Funding

Google: look for investible options / invest in creative labs / make a plan to sell new tool internationally/focus on novel funding sources.	Water companies pay a levee for innovation/ make the process quick/roll over funding year to year. Allow modification to ensure agility.	A water researcher network for collaboration; what can we learn from elsewhere.	Legislation to ensure project undertaken	Establish IT collaborative NBS Wales Mitigation knowledge & Funding hub.
Joined regulatory needs & agreed outcomes.	Do a NAT cap assessment of catchment	To identify value of all service.	Licence to operate / linked to need to collaborate	Outcomes based funding.
Create a team & trusted ethos clear court for communication	Long term roadmap co-designed with many partners	MAP Projects - are we prioritising?	Institutions to have long term plans to resolve the issues with timescales and review points.	Celebrity endorsement
Get billionaires interested in charitable funding pot.	Create a 'pitch' business case for long term investment.	Define end goal.	Supply chain investment consumer to producer.	Marketplace joint risk.
Identity every partner input on Teifi	Share recourse Teifi team.	Recourse sharing. Person retained in a business for technical skills.	Multiple objectives, marginal abetment.	Root cause analysis.
A clear tax linked to environmental improvement	Create an investment vehicle for the catchment.	Nutrient? Teifi £ consortium & all players deps sectors, central reserve.	Create a community or org to share investment in long term hub.	Pool funding into a catchment Teifi pot.
Establish centre of excellence and innovation.	Central pot that everyone pays into and draws from.	Pool data and develop products.		

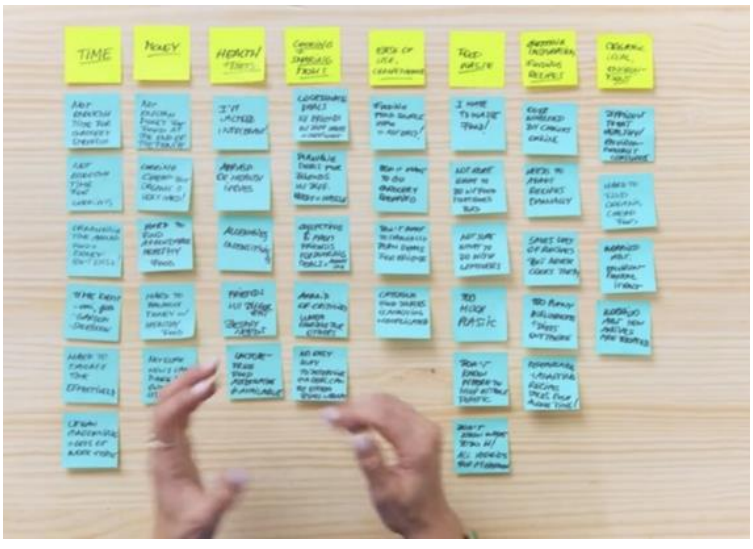
Group 5. Rainfall Management

Clear projects	Long term funding / supply chain investment. Deviation form LA	Modelling of cost saving to LA / WG	Charge customers for services and increase prices every March.	Volunteers for projects / education for the people / Landscape managers on board.
Train people for projects	Behaviour change farm level evidence & quantifiable changes.	Farmers supported	Farm level info Long term funding models.	Apple would re-imaging the sewer system and treatment processers.
Land managed better / or land use /crop change.	Education driving educational change.	SUDS off the shelf (easy to install one size fits all) High effort low impact for the Teifi	Air B&B would create a certificate for sustainable homes, & point for water butts	Smart water BA1 roll out to specific location susceptible to rush off, flooding and overflows.
Every household to have water butts – school yards	Urban rainwater gardens – incorporate into other works e.g. traffic management.	Remove highways form sewers and replace with SUDs ponds wetlands before water body drainage.	Water retention planters in urban areas and public buildings.	Retro suds on all public buildings.
Slow the flow and popular food business venues (e.g. pizza tipi)	Engage people to target blockage.	Wetland introduction	Improve sewer system	Increased reservoir
BEAVERS!	Removal of hard surface and replace with free partial draining	Re-wilding of upper catchment.	Collaborative tier of support for rainwater harvesting investors for cluster of farms.	Money incentives
Minimum grass coverage on owned land	Offsetting developments or existing increased run off.	Water neutrality.		

Group 6. Behavioural Change

Through inspiration	Buying and engaging locally allowing engagement with local industry	Ikea – simple actions each individual can make to improve conditions	Tool kit in schools; Farmers provided with tool kit catalogue with options of things they can deliver	Peer to peer learning.
Financial incentives	Allow people to choose sustainable options.	Compare current performance with alike county or catchments.	Trusted partners, engaged in developing behaviour change camping's.	Mentoring of behaviour change interventions.
Nature champions.	Education and awareness landowners and users.	More data health measured on farm pre & post.	Influencers.	Developing artistic representation of different kinds
Using peer pressure.	Pester power!	Working through local newspapers.	Feat on the ground community walks.	Looking at river / litter picking.
Information boards by river access points.	Sponsorship of river monitoring	Suing regulation and enforcement.	Using knowledge and empowerment.	Focused citizen science project.
Local youth groups / cross community mixing.	Research into nutrition.	Scenario modelling and associate mapping to show what the Teifi could look in 25 years' time good & bad	Hard data and evidence.	Encouraging buying of local produce.
Provide educational material	Free ways to do more.	Art and creativity-based events.	Showing cause and effect	The cost money that is currently being invested.
Upstream engagement, tree per person?				

The groups then categorised, analysed, and merged the different ideas to decide on one solution based upon minimal effort versus maximum impact.



Ideas Generated

Below are the six ideas generated from the two-day hackathon and responses from the wider stakeholders to each pitch.

Group 1
Challenge: Farmer Led Projects
Idea: "Farmer Led Participatory Budgeting Model"

The key to this idea is to give some level of trust to local communities to decide how they want to spend their money. A percentage of the overall budget would be assigned to farmer led projects, identifying, and mapping suitable areas that have similar monitoring metrics.

This would also need to consider social capital and local co-operation built on mutual trust. Following this, localised planning would need to happen in each one of these areas, bringing together these place-based networks alongside wider stakeholders including Dwr Cymru and NRW. Essential to this working relationship would be transparency, trust, mutual sharing of knowledge and data, and a collective approach to problem solving.

The proposed projects would need to be built on these clear principles for working, co-designing, and co-producing each project in line with the needs, resources, and aspirations of each community. This will help to ensure that the voices in each community are heard and that there is agreement around plans and local solutions.

Support required

This idea would require adequate funding, legislation, and the involvement of farmers.

Engagement and trust are critical; farmers know their own farms and know where the problems are.

Feedback, questions and/or comments from the floor

How do you decide what stakeholders are involved in the participatory budget?
Farmers may be wary of nutrient trading. Is this similar to carbon trading?

Group 2
Challenge: Data Integration
Idea: "Data Netflix"

The idea is that a single organisation will hold all the data for all stakeholders that are currently collecting data. This will allow all stakeholders to data share, with one agreed trusted body assimilating and organising all the data.

This body will put the insights together, analyse it, and then invest in new monitoring and new models. This will help the eco-system to get more insights from all the data that currently exists.

The next step is a data platform which everybody can access, but one that can be looked at through "different channels" (e.g. a "Discovery Channel," on a personal channel basis, for example a "water catchment area"). The platform would be a data "Netflix." From inception this needs to be an integrated process, with an evolving and growing platform. This is a long-term solution.

<u>Support required</u>
The recognition of the importance of the first few steps.

Finding a common approach and an agreement between the stakeholders. Encouraging all stakeholders to come together and discuss what they are all willing to share and enter onto the platform.

Behaviour change. Recognition that the stakeholders are trying to find reasons to do something progressive, rather than do nothing at all.

Funding. Exploration as to how resources are pooled and where that money gets spent, distributed correctly, and aligned with our goals.

Feedback, questions and/or comments from the floor

There is a barrier in the willingness to share raw data. A potential solution, and one that has been used in Northern Ireland is the creation of a firewall, or an ethical wall, establishing a "halfway house"; enough information is provided to help regulators conduct data capture while sufficient privacy measures are implemented to ensure that farmers are not prosecuted, for example, because they may have a field that was very high in phosphate.

Establishing what this "one trusted body" is going to be is a significant challenge. A concern was raised that it may prove onerous for farmers to input a lot of different information, but there are examples of where information about livestock movements and nutrients can be pre-populated.

The insights needed might be varied. Generating additional applications will be necessary overtime and can be built upon in a staged approach.

It was noted that Welsh Government has a "data gateway project" underway to pull data from multiple platforms into a single place for analysis at a catchment level.

Group 3
Challenge: Water Quality Awareness
Idea: "Water Quality Awareness Campaign and Theory Of Change"

This proposal acknowledges that the information about the state of the catchment is multi-faceted; some data is uncertain, some of it is information around things like plastics and fish, which is also contested. The overarching goal is to foster individual awareness in the catchment of the Teifi, right the way through to groups like the Teifi Partnership.

The Partnership is critical because it builds a shared understanding of the state of the river in a way that is shared and not contested. As a consequence of that, one can precipitate a range of actions through all the different actors involved, from individuals, farmers, water companies, and regulators etc., to change the nature and the state of the river in a positive direction. This would develop a citizen science approach, pulling all this together and trying to influence through these means.

<u>Support required</u>
There was recognition that there are lots of issues with the granularity behind this and therefore the process requires staged implementation. Such granular steps may

include a media campaign, social media use, social media influencers, a data portal etc.

A lack of trust was also identified as a barrier, between the public and perhaps the regulator, or the water company, or the farming unions. A lack of trust certainly exists at the moment.

We need to harness the power of partnership and collaboration. We need to use this partnership to deliver a single message to engage the wider network. Therefore, an additional barrier/question is "How do we get to that joint messaging and how do we agree those approaches?"

A third barrier/question is "How to make such a very complex issue simple to understand?"

Feedback, questions and/or comments from the floor
How do we build trust?

Presenting the information honestly, with transparency, is fundamental to citizen science and that is not currently encouraged. If we can tell the 'story' backed up by data, then that is a powerful message.

Because the data is often contested, the fact that a partnership involves bringing people together who do have different views is a way of coming to a common understood position. Talking to your adversaries helps you to see other perspectives and positions.

What a lot of people are looking for is that something is being done rather than something is being constantly talked about. Actions speak louder than words.
We need to raise awareness about what we are doing about the water quality, and what individuals can do themselves.

Group 4
Challenge: Collaborative Long-Term Funding
Idea: "Create a 'ground up' funding stream for the catchment"

The creation of a grassroots body to essentially "do the math" for the catchment. This would involve collating and quantifying all the different mitigation options within the catchment, understanding what finance *is* attached, what finance *could* be attached, and using that to compile a prioritised list of actions in the catchment to deliver the outcome.

This would assist in identifying funding gaps, and the most cost-effective method, and could then be used as the basis for pitches to large and small-scale investment. There is also the potential for reallocation of funding within catchments in an innovative manner e.g. through mechanisms that may look like nutrient trading, but just to emphasise, this is "grassroots up." What is on the table comes from an understanding of what can be delivered within the catchment. Through this mechanism we could obtain greater clarity on what is doable, and at what budget, in a manner that is deliverable by stakeholders.

Support required

Data and evidence. We need to engage with our land managers to support on the evidence (this could be a collaborative approach with Group1).

The current funding is sat in multiple pots (possibly up to sixteen different Welsh Government funding schemes). Furthermore, they are at Wales level that results in a huge amount of time loss, resources, and the time required to complete multiple funding applications. To overcome this we require a single pot of funding for the Teifi exemplar; an area-based pot that requires all stakeholders and interrogation of the existing funding structure.

We need to engage further support and conduct risk assessments on existing funding models while exploring new.

Stakeholder fatigue. Seed funding is required to assemble a dedicated stakeholder team so we can get further analysis.

Feedback, questions and/or comments from the floor

The biggest problem is the time that is invested in going through processes and boundaries. If you put the money in a pot to specifically invest in this work, you overcome all the "jumping hoops," which as we know, delays the delivery of action. There is a need for a trusted body to take this forward. We possibly do not have the right structure in place right now. It would be highly innovative to do that.

A similar idea to this came up recently. Some innovative working groups at the United States around this principle of "Warm Water," where the water provider, the supplier, the wastewater treatment works providers, and the catchment authority came together to do something similar. It is not an NGO, but it is an organisation with a common goal. It is believed that they have had some big successes in the way that they have separated out their investments.

A cascade project. It is important to have a system-based solution. It needs to be sophisticated; it is not just about water, it is also carbon, air quality, and efficiency of nutrients.

We need to move away from tailoring our project to a particular funding source and instead turn this on its head, identify the project and *then* source the funding to support it.

Group 5
Challenge: Rainfall Management
Idea: "A Rainwater Management Education Approach that Leads to Behavioural Change"

A rainwater management education approach would alleviate responsibility on one sector, one community, or one group. We need to widen the engagement beyond farmers, householders, and the Local Authority.

We need to invest in educating different sectors and communities to ensure that they understand, for example, "slow to flow." As a further example, school children could visit farms to understand water management methods and apply them within a school setting in order that they too can aim to manage rainwater.

We are also aiming to create a network in this community of credibility while evidencing that the small things that individuals can do make a difference, thus encouraging them to continue. We can then spread the message, not just as a farmer, not just as a school child, but as a future leader.

We have the power that to take the learning and all the evidence into actions outside our day-to-day life. We need to demonstrate how the things we do at home together contribute to a much larger solution. We think that would be a very powerful way of changing behaviours permanently.

Support required

We have some gaps in understanding that we need to identify and ascertain where they will have the most value. We have farm level information, but this needs to be matched from an urban perspective as well; we need to do more to understand the surface water volumes that are contributing.

We require long term funding models. We need to look at opportunities such as supply chain funding, payment frequency, system services, and public goods. We need to explore the possibility of diverting Welsh Government flood risk funds into these and having that long term vision to enable behaviour change.

We need to be able to prove the benefits of the idea, provide proof of concept, and the cost savings that can be applied to Local Authorities and Government.
We need to conduct more engagement in urban settings while also promoting the financial benefits that come from soil water retention or farms, better soil structure, better crop management etc.

Trust and integrity are also barriers. To achieve this we require long term funding. We need to avoid "funding fatigue" via multiple short-term projects. One cannot manage a farm going forward and make changes based on one-year funding programmes. We need to prove that something is going to work.

Feedback, questions and/or comments from the floor

There is a wealth of other linkages from this activity that have the potential to create further engagement and awareness such as the misinformation and misunderstanding around sewer overflows, and how they operate.

This is a very simple solution of making the different things we do very visible to everyone who can do their bit. Sometimes we tend to think we need a profound massive change. Sometimes there is space for a legislative intervention, but sometimes, the most important thing is to keep doing the things that we are doing; being motivated and/or motivating each other to continue because something is working.

Highways drainage is also very important. Future leaders and future voters as well.

Group 6
Challenge: Behavioural Change
Idea: "Case Study - Land Managers (Knowledge, People, and Money)"

The development of a case study of land managers as one group of key stakeholders for the project. This case study will provide a baseline of knowledge and benchmarking. We propose following a typical farmer's journey and how a better knowledge base can work with the aspirations of farmers in their communities for healthy lives and businesses. This will help farmers to prioritise their journeys and better communicate what they are doing.

This behaviour change approach would need to deliver multiple public goods, with livestock management and carbon capture working hand in hand, looking at approaches developed in Northern Ireland around planting chicory for grazing. Dialogue would need to be started around scarcity of funding and maximising what can be done and what cannot be done.

<u>Support required</u>
Acquiring resources to conduct the initial baseline.

Long-term and repeated engagement.

How to demonstrate success when we know that these processes take a long time.
The availability of policymakers and other influential stakeholders - will they be able to visit frequently enough to experience the change?

We require multiple examples to identify what 'good' looks like.

Feedback, questions and/or comments from the floor
In terms of behavioural change, there has been a theme around articulation of benefits, and who we engage with that information.

It can become confusing when trying to measure everything (getting caught into discussions of stacking benefits, carbon sequestration, biodiversity enhancement etc).
How do we engage with stakeholders to highlight the positive stories?
Stories need to tell the human and anecdotal journey, aligned with the data journey.
We have quite big glaring gaps in our knowledge. We monitor to deliver regulation, but we do not monitor to deliver behavioural change.

The level of monitoring needed to deliver behavioural change is a quantum greater than is needed for regulation.

If we are serious about this catchment and many other catchments across Wales, we need to 'dive deeper' into the behaviour change and see what the nuances are in each of those catchments while maintaining the importance of evidence, the role of academia, and science.

"A good idea is a clever solution to a problem, one that I have never seen before. But if an idea is not taken up and used as a solution to a problem it has no value. It becomes a non-idea. Lying in a drawer it is useless. Worse than useless, it's a complete waste of space. Ideas have to be applied before they are recognized as good ideas. "
Paul Arden

“When people feel like they belong, they are able to be their best and do their best”

Susie Wise, d:school