

Minutes

Title of meeting:	Wales Land Management Forum (WLMF) Sub Group on Agricultural Pollution
Location:	Microsoft Teams Meeting
Date of meeting:	10 th July 2023
Members present:	Rhys A. Jones, NRW Board Member (Chair) Dennis Matheson, TFA David Ball, AHDB Ieuan S. Davies, NRW Creighton Harvey, CFF Chris R. Thomas, NRW Einir Williams, Farming Connect Gareth Parry, FUW Rachel Lewis-Davies, NFU Cymru Katy Simmons, NRW Sarah Jones, Dwr Cymru Welsh Water Shane Thomas, CFF
Additional attendees:	Aled Jones, Pruex Ltd
Apologies:	Brad Welch, NRW Kate Snow, United Utilities Fraser McAuley, CLA Matt Walters, Welsh Government Andrew Chambers, Welsh Government Sarah Hetherington, NRW
Secretariat:	Bronwen Martin, NRW

Item 1. Introductions, Apologies and Declaration of Interest

1. Professor Rhys A. Jones (NRW Board Member and WLMF Sub Group Chair) welcomed all to the Microsoft Teams meeting and noted apologies.
2. The meeting is being recorded for the purpose of capturing the minutes and the digital file will be deleted once the meeting minutes have been approved.
3. No declarations of interest were raised in respect of agenda items.
 - NB: All members of the group have completed declaration of interest forms already but should also declare if they have an interest in anything on the agenda.

Item 2. Review of Minutes and actions

4. Rhys confirmed that once the meeting minutes have been reviewed and formally agreed by the group, they will be published on the NRW website for the public to access. Therefore, it is important that the minutes are an accurate record of the meetings.
5. The group reviewed the previous meeting minutes from 15th May. Creighton Harvey, CFF had already sent some comments and suggested amendments to Bronwen prior to the meeting. Bronwen will examine the recording and amend the minutes accordingly before recirculating to the group.

AP July 01: Bronwen Martin to provide a second iteration of the May meeting minutes for the group to review.

6. No further comments or suggested amendments were received in respect of the May meeting minutes.

Item 3. Matters Arising

7. The group was encouraged to discuss any matters arising from the previous meeting minutes, relevant documents, or recent topics.
8. No matters arising were raised by the group.

Item 4. Site Visit Discussion

9. A site visit was hosted by the Beacons Water Group (BWG) and DCWW on 19th June. This was an opportunity for a follow up discussion about the observations. A brief summary note was circulated prior to the meeting to inform this conversation.
10. Rhys provided a brief overview of the site visit for those who did not attend.
11. Gareth Parry, FUW said from his perspective, it was extremely useful as new member of the group to meet people in person. Gareth said the biggest thing he took away from the visit was the importance of collaborative working. The farmers demonstrated the collaborative catchment work they have been doing such as the use of the weather stations to make informed decisions in terms of nutrient management. That initiative was also built into developing alternative measures for the Control of Agricultural Pollution Regulations, so it was really important to have Welsh Government representatives there to see it first-hand. It is really important for us to see that these things in person to understand whether this could potentially work across Wales, either on an individual farm scale or a catchment scale. Gareth reminded the group that the Regulations are on a pan-Wales basis, but hopefully these types of alternatives can help feed into the review.
12. Sarah Jones, DCWW said it was really good to instigate the site visit for the group. it was important for this group to see some of the work that DCWW are supporting. DCWW are also considering how this work can be written up as case studies, so the information reaches the right people. Sarah appreciated that not everybody could make the visit, but it was useful for the ones that could attend. A written case study could be shared wider to illustrate the benefits of working collaboratively.

13. Rhys thanked Sarah and her colleagues at DCWW for ensuring the visit ran smoothly. Rhys mentioned that there was a range of issues discussed towards the end of the visit. Key points included how can the messages be shared wider and how can this type of work be replicated in other parts of Wales. The group discussed different farming practises, the use of technology and developing trusted networks. Rhys asked the group to what extent can things be rolled out more broadly, without necessarily having to have the network of trust between the farmers. Perhaps some of the technological solutions could be rolled out more easily like weather stations and the use of hydrological mapping. Sarah said the weather stations are something that could be rolled out and John Owen, Gelli Aur has previously discussed what that process might look like. However, that would probably come at a cost to the farmer or a group of farmers.
14. Creighton said the Brecon Beacons Mega Catchment is at the top of the catchment and is a water harvesting area so you can see why DCWW are interested in that following on from the Catskills Project in New York State. Regarding the weather stations, there has always been questions around the closed period within the Regulations and the Alternative Measures Sub Group considered weather stations and included this in the report, subject to controls. Creighton suggested that there should be an element of independence in terms of setting the parameters as well. For example, if you have a 500 head dairy herd, the pressures of managing your slurry might become critical on that site due to weather conditions or perhaps due to management not being what it should be and it's important that an independent person or body is involved in setting the parameters.
15. Gareth said although Gelli Aur are the ones who have developed and trialled these weather stations on their own farm, it is an independent app. Getting the information from it once it's installed, is relatively simple. Having this initiative in different parts of Wales will be difficult at the moment because there are a number of farmers out there who know they need to invest a serious amount of money into getting their storage right. Currently, there is no incentive for farmers to look at alternatives because farmers know that to comply with the Regulations, they might need to build new slurry stores, or silage clamps. However, if there was the option of either building a new slurry store or installing a weather station for a fraction of the cost, then people might consider it. The BWG farmers were in a fortunate position that they had an arable system to offset a lot of the issues that maybe a dairy system would experience. Rhys recalled that a weather station is roughly £5000.
16. Chris Thomas said the parameters of the weather stations are set as industry standard with a scientific basis for soil temperature, soil moisture etc. Chris said he has seen a lot of new slurry stores going in and perhaps this shows that the industry has recognised the issue. Chris explained that many slurry stores which were installed in the 80s and 90s are now coming to the end of their life. Chris said it should not be a case of an either/or and farmers in those situations should install a new slurry store and when appropriate (and possible), consider a weather station too.
17. Rhys suggested the group needs to think about how we can take this forward. It is part of understanding the value of a site visit and how that can translate into us doing something, for example finding ways of communicating some of the work that's been undertaken. The different members represented here can obviously take the messages back to respective organisations. We need to ensure that messages are communicated to different people and also find ways of promoting some of these activities.

Item 5. Presentation: Pruex Ltd

18. Aled Davies, Pruex Ltd joined the meeting to provide a presentation on the research and development that his organisation is undertaking. Aled said the aim of Pruex as a company is the prudent use of antibiotics as opposed to excessive use of antibiotics. In 2014, Aled was awarded a field scholarship sponsored by the Royal Welsh Agricultural Society to look at the use of antibiotics in agriculture, aquaculture and human use.
19. Aled explained that his grandfather died in 1950 from an infected cut but penicillin would have saved his life – Aled said he is allergic to penicillin. Antibiotics were rolled out post Second World War and now we're facing a return to a pre antibiotic era where simple infections can no longer be treated.
20. Aled started Pruex as a result of what he learned on a Nuffield study in September 2016. There are Pruex depots in Llanelli, Wexford in Ireland and Durban in South Africa. They also manufacture products in Johannesburg.
21. Pruex is looking to provide animals (not just agricultural animals) and humans with clean air and water. By doing so, it reduces the risk of antimicrobial resistance (AMR) bacteria, infections and environmental pollution. The technology they use is bioremediation. Pruex replace potentially pathogenic or resistant bacteria in human and animal environments with non-infective, environmentally beneficial bacteria that build healthy soil. Aled explained a diagram demonstrating where resistant bacteria are and how they interact with humans and animals (e.g., application of infected/polluted muck or sludge to land).
22. Aled outlined some of the on-farm problems that Pruex are addressing such as bacterial protozoa, viral infections and environmental pollution. By dominating the environments where animals are kept and reducing things like nitrous oxide and ammonia, then when the muck goes to land you get better soil and less need for synthetic fertilisers. Therefore, we are keeping animals and their environments healthy and preventing environmental pollution.
23. Pruex have a strategy which is split into three strands - find, fix and tell. Pruex visit farms to take swabs of the existing water and environment which are sent to the lab. Pruex also use Long Range Wide Area Networks (LoRaWAN) gateways and sensors to measure the air quality in the buildings and the variables that can affect air quality. These sensors measure temperature and humidity, ammonia and carbon dioxide. We also measure the temperature and humidity, dew point, wind direction and various other weather parameters outside the building. Overtime we can see the effect on ammonia production. Regarding the 'fix' aspect for their work, Aled showed some videos of Pruex colleagues spraying noninfective bacteria on farm into the animal environments. This action changes the bacteria that is in the muck. It is then dominant in noninfective soil bacteria as opposed to physical contaminating potentially pathogenic bacteria. Aled showed a water trough with a biofilm. A disinfectant can't kill the bacteria on the inside of that slime, it can only kill the planktonic bacteria that are on the surfaces. Aled showed an algae bloom in another water trough where the algae are feeding off the biofilm on the side of the trough. Aled showed the difference in the water after treating it. Regarding the 'tell' part of Pruex's work, Aled got invited to present their work on biofilms to over 45 international agricultural journalists and Pruex have received several rewards for innovation. Pruex have shown that they can fix a lot of the

problems on farms which in turn reduces the farm vet bills, reduces the farm feed bills and develops better soil.

24. Aled described some of the working solutions they have applied to various agricultural enterprises and showed photos and diagrams to demonstrate.
25. Aled concluded by providing an example of some work they have been doing in Africa. Corran Farming is situated on the banks of Lake Malawi and partnered with Pruex in 2018. Crocodile farming is all about skin quality and Corran Farming uses Pruex because customers in Europe want to source skins from farmers who are serious about farming in an environmentally responsible and sustainable manner. Traditionally a crocodile farm would use a lot of heavy chemicals when cleaning the pens. Pruex reduced the use of antibiotics keeping the animals healthy with probiotics. They use natural chemicals which don't affect the crocodiles or the water supply once it's been through the system.
26. Gareth said he remembers Aled presenting to the FUW Animal Health and Welfare Committee in February 2020, and it is good to see how things have moved on since then. Gareth asked how many farmers in Wales are using this product. Aled said he did not have Wales specific figures, but in the UK we're on about 3200 farms, that's a mixture of dairy, poultry, we've lost a lot of our pig customers during the period post Covid and the effect of the war in Ukraine on feed. In Europe, around 1000 farms, and then some farms in Africa.

Gareth suggested perhaps this group should consider how, as a result of using this product, the material is considered in future because it's not necessarily a manure. Aled said it is known as a positive dominated substrate (PDS) as opposed to slurry.

27. Aled discussed ammonia and provided examples of mitigation measures using Pruex systems and technology.
28. Ieuan recalled Aled's earlier discussion about nutrient levels that were in the muck in broiler sheds and the application of the Pruex product. Ieuan suggested there could be an interaction within the digestive system of the boilers or the cattle and asked could the product interfere with the nutrient uptake potential of the animals that are coming into contact with it (e.g., potential for nutrient dense meat). Aled said it's not just spraying onto the litter; we're also using the bacteria in water to reduce the toxins from biofilm in the water and so the birds are digesting some of the bacteria as well. The technology is regulated as a bacterial detergent and the safety aspect of the products are known and regulated. Regarding the actual classification of the product, Aled explained that if they were to add two more chemicals to the product, they would have environmentally beneficial status. However, as it stands, the product is actually better than environmentally beneficial status and if they added a bit more chemistry to get to the environmentally beneficial level, it would actually be worse of a product than what it is now.

Ieuan asked if Pruex can measure the nutrient uptake of the birds in a closed environment. Using a broiler shed as an example, Aled said these birds are usually in the sheds for 36 days, but they are actually getting the birds to 2 1/2 kilogrammes in 34 days as opposed to 36, so we're seeing a feed conversion benefit straight away. We're taking soil bacteria and applying it to faecal bacteria in the shed and using the effect on quorum sensing and competitive exclusion to change the content of the muck. That means the birds are breathing less ammonia, breathing less nitrous oxide and also

drinking less toxins. We're not doing anything with their actual feed but by improving their environment and air quality, there's less toxins getting onto the feed that they are consuming. Aled said Pruex have an innovative project starting the 1st August where they will be doing further work on this, but in terms of degradation of food quality, the opposite would be true because there's less toxins being consumed.

Ieuan suggested that they may need to do more research to analyse the meat of the chickens because there are concerns in the food industry around nutrient density from various products across agriculture.

29. Creighton recalled the discussion about broilers operating in a closed system where there is much more control over the product. Creighton asked if there is a use for egg producers and if so, what would be the benefit. Aled said Pruex's business on the agricultural side is around 40% dairy and 40% poultry, and of that 40% poultry, about 80% of that is layers or broiler breeders and both are producing healthy eggs. Aled provided an example of the benefits they have seen on farms with laying birds where their product has been used including quantity of eggs produced, the quality of the shell, impact on muck and mucking out, air quality, overall health of the birds and subsequent economic benefits. Creighton asked about the situation in free range systems. Aled said they only have a few non-free-range egg systems. The majority are on climbing frame type structures and old-fashioned systems called flat deck where the birds are on slats. Aled explained the impact on animal health and welfare. Creighton mentioned that he is concerned about what leaves the animal, what gets on to the ground and what gets into the rivers. In terms of free-range systems, what benefit does your system have that would reduce the amount of nutrient loss from free range systems into the environment. Aled said they put bacteria in water which then comes through the birds into the muck. If the birds were mucking out on the range, then we've already started the process of binding the phosphorus and nitrogen into the body of the bacteria that is coming through. In order to keep the animal healthy, we've got to take the phosphorus and nitrogen into the body of the bacteria so that the nitrogen doesn't gas off as either nitrous oxide or ammonium, because that's what makes the bird sick. If there's toxic bacteria in the air, water and the feed, the one that has the biggest effect on that animal's immune system is the air that it is breathing. Talking about the animal's health and the pollutive capacity of its muck is the same thing. In order to keep the animals healthy, we've got to turn the muck that they are surrounded by into soil in the shed before it goes out to the range and subsequently before it goes to the land and to the river. Algae can use phosphorus and nitrogen in any form and a plant needs bacteria and fungus to be able to capture those nutrients. If we take slurry or poultry muck to the land, the biology in the soil can't process it quickly, so it ends up in the river. Essentially, we are doing that process in the shed before it gets to the land. Creighton asked whether there is an environmental benefit from having a Pruex system applied within a shed even though the bird is going out into the field and excreting in that field. Aled said yes, 100%.
30. Rachel recalled that Aled mentioned that bioremediation is not currently recognised by NRW as a best available technique within permitting. Rachel asked for clarification and asked what Pruex are doing in terms of building the science and the evidence base to give NRW as the regulator more confidence. Aled said Pruex have been involved in providing data to the Welsh Government, Defra, Environment Agency, SEPA and the equivalent in Northern Ireland. There is a project about to start with Aberystwyth University where they'll be taking our commercially sensitive data and working that through as evidence for Welsh Government. In other European countries, we are doing

the same thing. Aled suggested that Pruex is about five years ahead of the Universities regarding their technology. Aled said Pruex have to be careful that they do not commercially open themselves up competition. However, the data they are sharing is being scrutinised by Aberystwyth University for Welsh Government and that will allow the Welsh Government to apply the ammonia reduction figures that they are already getting to the air modelling system.

Rachel said that's really useful because the deployment of the technology is beneficial so it needs to evidence that and then it can feed into not just the ammonia inventory, but also the best available techniques in permitting. Rachel noted that it might have possible implications for the Control of Agricultural Pollution Regulations. It is important to evidence this and to be able to recognise that the deployment of those technologies has a benefit on farm. Aled said Wales has got a chance to lead internationally on this.

31. Rhys thanked Aled for joining the meeting, there are a lot of interesting developments and more work to be done to evidence this so that it is recognised as an appropriate technology for reducing some of the pollution issues on farms. Aled invited those attending the RWAS to talk to him and his colleagues about the work that have done. Aled also offered to arrange a WLMF Sub Group visit to the lab and a customer's farm.

Item 6. Agricultural Technical Group Update

32. Ieuan S. Davies, NRW provided a brief verbal update on the progress of the Special Areas of Conservation (SAC) Rivers Agricultural Technical Group (ATG).
33. The ATG was set up at the request of Zoe Henderson and the remit was to review and find agreement on the vast array of evidence around agricultural pollution from the various different sectors. The group was to look at the evidence, agree what was missing and recommend steps (and indeed take ownership of those steps) to fill the gaps in evidence.
34. The ATG was set up as a sort of Task and Finish Group and was due to produce a report by the end of June. However, that report is not yet finished but it is almost complete. The group has agreed that time needs to be spent on the report in order for it to be of a good quality to report back to Welsh Government.
35. There is an ATG meeting this week and the focus of that meeting will be editing and completing that report. The group will be looking at the recommendations and probably adding to those. There is constant innovation and things like that happening within the industry and these things need to be captured. The recommendations within the report span the whole of the industry and cover many aspects from individual farm business type interventions to the regulatory bodies and industry wide systemic changes as well.
36. Ieuan mentioned that there are ongoing discussions around the life of the group after this report has been completed. There's been a bit of an ask from Welsh Government and the new Ministerial Government structure for delivering the action plan on the housing has actually included this group within it. That sort of indicates that Welsh Government may see this group continuing but that's also a question for the group.
37. Rhys asked about the evidence gaps; how can they be filled, what are the mechanisms for filling those gaps, how might additional research be commissioned and who does that. Ieuan said there have been comments coming through along those elements and

that ownership of those recommendations. Filling the evidence gaps going forward can be really important for the future of the group, is the group to be involved in taking any of those actions on, will it come back to this WLMF Sub Group, will it be fed through to Welsh Government or be part of wider industry research (e.g. universities, farming connect, etc). That has very much been part of the discussion but there's a lot of unknowns currently. There might be crossover in discussion with this group actually to fill in some of that.

38. Rhys asked about the timeline of completing the report. Ieuan said it is a difficult time due to many people taking annual leave, but the intention is to finish it soon, although there is no hard

39. Bronwen asked whether that report will be circulated to this WLMF Sub Group or is it just solely for Welsh Government. Ieuan confirmed that the report will be circulated to this group.

Item 7. WLMF Sub Group Newsletter

40. Bronwen mentioned that she had spoken to Katy about the next edition for the WLMF Sub Group Newsletter; 'Our Land, Water and Air'. We've got some draft articles in mind which cover the recent site visit, introduction about Rhys and a few other articles. This is a plea for anybody to contact Katy or Bronwen with suggested contents or topics. Bronwen said it is intended that we get the next edition out before the RWAS, so the deadline to provide articles will be next week. An email will be circulated following the meeting.

AP July 02: Bronwen Martin, NRW to circulate information regarding the next edition of the WLMF Sub Group newsletter.

AP July 03: The group to forward articles to Katy Simmons or Bronwen Martin, NRW to be included in the next edition of the WLMF Sub Group newsletter.

41. Gareth asked who receives that newsletter and how wide does it need to go. Bronwen said those people who have subscribed to it will receive a copy. It also gets shared via NRW social media, and we ask that all of the WLMF Sub Group members share it wider within your networks (it is accessible for the public, farmers etc). Hopefully it reaches a wide audience if we all share it. Bronwen offered to send Gareth a copy of a previous edition to give him an idea of what type of information has been included in the past.

AP July 04: Bronwen Martin, NRW to send Gareth Parry, FUW a copy of a previous edition of the WLMF Sub Group Newsletter.

42. Rhys asked if there is a paper copy that goes out. Bronwen said it is digital.

Item 8. Any other business

43. Rhys confirmed that the August meeting has been postponed due to many people being away on holiday. The next meeting will be on 4th September 2023 on MS Teams.

44. There is the possibility of a site visit for the October meeting, but more details will follow. Members should send any suggested site visit locations to the WLMF Sub Group mailbox.
45. Dennis mentioned that he has finally received a copy of the Frequently Asked Questions (FAQ) for Tenanted Land. It is disappointing because it's identical to the draft document of a year ago, except the word draft has been taken out. All the problems that we brought up regarding tenants being unable to comply with the regulations because of their tenancy agreements have just not been addressed and if the advice given on the FAQ document was followed, then a tenant could well lose his tenancy, and it appears that the authors of the FAQ document have just not taken on board our concerns, and it really does want sorting out. Rhys asked if the Tenant Farmers Association are taking that forward through other channels. Dennis mentioned that there is a Tenancy Working Group which has come up with a lot of recommendations and at the moment the government could still be considering that. We have been discussing this with the Welsh Government at a higher level for five years probably, and no solutions have come up. The WLMF Sub Group has been very supportive but it's almost an unsolvable or insolvable problem, because the tenancy law and the regulations are diametrically opposed. It's a very difficult one. Rhys asked if Dennis could keep the group updated on developments and if there's anything you think that the Sub Group could do to help. Dennis said the WLMF Sub Group actually wrote a letter on behalf of the group to the Minister outlining our concerns, but he was not sure if it was answered. Rhys asked Bronwen to check up on that because at the very least we would expect an acknowledgement of that.

AP July 05: Bronwen Martin, NRW to look into whether the group received a response from the letter to the Minister regarding concerns around the Tenancy FAQ document.

46. No other business was raised.