

Present

Andrew Mackenzie	Lews Castle College
Clíodhna Ní Ghríofa	Údarás na Gaeltachta, Na Forbacha, Co. na Gaillimhe
Dr Ronan Sulpice	NUI Galway
Dr Masami Inaba	NUI Galway
Dr Agnes Mols Mortensen	TARI – Faroe seaweed
Dr Angus Murray	Lews Castle College
Dr Roy Bartle	Lews Castle College
Prof Rúnar Unnþórsson	University of Iceland
Prof Francesco Gentili	Swedish University of Agricultural Sciences
Dr Calle Niemi	Swedish University of Agricultural Sciences
Dr Alasdair Macleod	Lews Castle College, Stornoway
Jon MacLeod	An Lanntair
Prof Lisbeth Truelstrup Hansen	Arktisk Teknologi Center, Greenland

Apologies

Minute

	ITEM	Comment	Decision	Task	Who?	By date
1.	Approval of minute of 30 September 2020 – progress with Actions	The minute was approved.	No matters arising.			
	Contact with Peter Martin	e-mail sent but no reply yet				
	SLU FLC claim	Now certified.				

	ITEM	Comment	Decision	Task	Who?	By date
	An Lanntair	Jon spoke to Calum at CIB Services and discovered that An Lanntair is not on the system. Spoke to Kerry Morten and this should be sorted soon.		Certify the claim	CIB Services	Once it's on the system
	Samples for analysis	Ronan has received samples from TARI				
2.	Progress with Period 1 reports	Once all the claims have been certified by the FLC then one final document (Signature Template) has to be completed before funds can be released.		Sign the Signature Template	Sue Macfarlane	When all FLC claims have been certified.
3.	Progress with Period 2 reports	Some partners have started their reports, but Ronan has no financial claim to be made in period 2 - so he will only submit a technical report. SLU have submitted their claim.				

	Item	Information
4.	Update on progress with work packages	<p>Lews Castle College</p> <p>Andrew Mackenzie: Work package Management; Continuing to chase up FLC and finance claims – and responding to queries from Partners and the NPA. Working on reports and liaising with colleagues at Lews Castle College.</p> <p>Roy Bartle</p> <p>Work package T1.2.1 Drying systems. Submitted paper to the Journal of Applied Phycology. Been working on the drying rig in conjunction with the technicians and on some electrical aspects. One aspect that we need to discuss is of nutritional characterisation because of the moment we are dry materials that may be helpful in optimising the drying process, but if this causes a decrease in the nutritional content, then the work has no value. It is very important that we are able, in the next set of drying experiments, to also obtain their nutritional characteristics of the seaweed. SLU are working on carbohydrate analysis in conjunction with colleagues at an adjacent University, but there have been problems with <i>Palmaria</i>, but work is underway to solve this problem. In relation to fatty acids, then there should be no problems and these results should be available during the next set of drying experiments. SLU confirmed that they were happy to carry out the required nutritional assessments from Roy's samples following drying but that it might take some time to generate the results. It will be important to calibrate the results so that we are confident that the analysis is correct. One of the big problems they have had is that of cell disruption, especially in relation to <i>Palmaria palmata</i> because when you are drying it the polysaccharides become very resistant to cell breaking - but by using liquid nitrogen and heavy steel ball milling, it seems to be able to finally break them. If we want to look at drying profiles versus quality of the crop then proteins would be one way to look at that, because they do not tolerate high temperatures very well so if we could just increase it to check the quality of the proteins after drying in one specific way and then we can compare. So, if we have the same material that is harvested from the same area at the same time and we look at the protein content and the amino acid composition after drying that could be one way to proceed. Maybe for these drying experiments the best approach would be to concentrate on the amount of protein as an indicator of quality. We need to be reasonably confident that by, possibly June 2021, we have a strategy in place that will work.</p>
	Update on progress with work packages	<p>Swedish University of Agricultural Sciences</p> <p>Work package 2 (See above). Period 2 report has been submitted to the EMS and Francesco has also contacted a researcher in Gothenburg, who has started seaweed production, mainly in sugar kelp, but it would be</p>

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		<p>nice to get some Swedish algae that we could characterise and compare that could be included in a possible future publication. However, it would be possible to get other samples of seaweed from various areas because Calle has had access to algae from Ireland and TARI , but at a recent conference connections were made with Norwegian producers and it might be possible to receive samples from there for analysis. Samples from Iceland would also be useful. Calle would be happy to receive samples from any source and of any species - preferably dried. Action-provide Calle with as many samples as possible.</p>
	Update on progress with work packages	<p>An Lanntair Work Package T2.6 Characterisation Continuing with collating information, archive work relating to seaweed use and folklore and oral history in the region. T2.2 Development of Brand identity Have set up a meeting with Shona Cameron in Skye, who is working on CLIMAVORE a project that examines the environmental impact of intensive salmon aquaculture, and reacts to the changing shores of Portree, Isle of Skye. Also looking at current brands the marketplace and to see whether such things as DNA certification and low carbon etc are considered good practice and necessary as a constituent part of the brand. It will be necessary not to replicate what is already available in the marketplace.</p>
	Update on progress with work packages	<p>Arktisk Teknologi Center, Greenland Period 2 report has been submitted to the EMS. Work package T2 1.1 working in the cultivation quality improvement work package and have been analysing cultivated samples of Saccharina latissima (sugar kelp) and Alaria esculenta from local Greenland seaweed. Also done shelf life experiments both with seaweed from the Faroe Islands and from Greenland and have looked at some Danish sugar kelp to use as a benchmark to see how it compares across each region. Some chemistry is being done and relates to Roy's request for some analysis - this has been done in partnership with another lab at DTU. Planning on repeating the quality characterisation next year, hopefully with some more samples, and that means that there will be a wait until the project can be wrapped up next year. Some important results have been determined-mainly that the refrigerated shelf life is about 7 to 9 days and that will be important information for the industry because that will be the "window" producers will have for stabilising the seaweed either by freezing or drying or salting or fermentation or some other process.</p>

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		<p>Different seasons have been assessed, in Greenland, by looking at the seaweed from 2 different times and it looks like there is an optimal harvesting time in this region. Hoping to repeat this something next year.</p> <p>Regarding the piloting and evaluation work package-looking at industrial and Artisanal drying, with reference to how the inhabitants of Greenland have done it but the food regulations may act against traditional methods. It is hoped to look at ways of modifying the traditional drying methods (wind and sun) to comply with modern food safety standards, but this has not been possible because of the current travel restrictions. Instead, some preliminary experiments have been made on fermentation of seaweed using a variety of bacteria-native bacteria, starter cultures (yoghurt type bacteria). Still considerable work to be done, including sequencing of the microbiomes on the seaweed and to see whether there are significant differences in the microbiomes that are on Alaria from Greenland and the Faroe Islands versus sugar kelp from 3 different regions and different salinities etc.</p>
	Update on progress with work packages	<p>TARI</p> <p>Samples were sent to Sweden and Ireland, but these were only frozen and dried but still need to send freeze dried to Sweden and fresh live material to Ireland.</p> <p>Busy in the hatchery and working on data from the farm or from the test ropes in the fjord. The data shows a significant difference in the 2 cultivation sites on the same fjord showing that there is better growth on the more exposed site. Also, material has been sent for analysis for a range of compounds and there does not seem to be the same difference in the composition of the biomass between the 2 sites. There is potential to write a paper, but it may be that more work needs to be done next season to finalise. Also interested in doing some work on different harvesting methods, e.g. partial harvests leaving the growth zone behind so that the crop can grow again and then it will be possible to do a 2nd characterisation. Currently, it is not possible to seed until the autumn because there will be extensive fouling from other organisms that makes analysis impossible. However, it may be possible to overcome this by doing a partial harvest and look at the quality in the autumn time - may be possible next season? Possible collaboration with ARTEK.</p> <p>Also been looking at fermentation using the existing flora on the seaweed using dried product-but the results were disappointing. Other possibilities were tried but the best result was using 2 different kinds of Lactobacillus and this could be developed further. It might be possible to do a joint paper with ARTEK in the future.</p>

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		Some work has been done on the cultivation pilot that will include using “green energy” from a water turbine that will have a look of potential for sustainability. A separate discussion will take place on this later in the week.
	Update on progress with work packages	<p>Údarás na Gaeltachta Work package T4 Dissemination and engagement with stakeholders. Has been on a webinar with Norwegian contacts from another project and informed them of our SW-GROW project and this should lead to some connections with the Norwegian press. Also, had a workshop last week with 100 attendees, so it was excellent exposure for SW-GROW and engagement has been very good. Regarding the shared infrastructure project, work is still continuing with drafting a document that will be circulated shortly to all Partners. Action Reminder: Clíodhna ask will Partners to send information about any work, papers etc. for dissemination.</p>
	Update on progress with work packages	<p>NUI Galway Samples of Alaria and Palmaria have been received from Clíodhna, Agnes and from colleagues in Ireland for analysis. Some samples were not able to be analysed because they had degraded too much so Masami has proposed that she will develop a simple protocol for preparation and sending samples to ensure that, on receipt, they will be in a suitable state for DNA analysis. In general, fresh samples in seawater are preferred. The work that Masami has done means that NUI Galway has been able to produce a reference genome for Alaria and Palmaria - this will be the 1st time in the world that this has been accomplished! 2nd period report completed.</p>
	Update on progress with work packages	<p>University of Iceland Preliminary plans for the proposed drying Cabinet have been sent to Roy and Alistair at Lews Castle College and comments for improvements are invited before any construction takes place.</p>
5.	Update on questionnaire to SMEs	<p>Currently we have 37 respondents-3 of them are from the UK and the remainder are from Ireland. Action-All Partners are asked to publicise and circulate the questionnaire via the link in their own region so that we can have a widespread response.</p>
6.	Feedback Sustainable Seaweed Workshop	<p>It was interesting to hear about the various regulations in the seaweed industry but not sure if the way forward on the branding issue is any more clear. It will be important to, at the outset, determine how our brand will fit in with the plethora of existing quality standards and brands in the industry. Jon will be trying to establish what benefits developing our own brand will bring to the industry.</p>

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		We need to remember what we said we would do in our original proposal for this project - it was to develop a brand that was based on quality, environmental standards and good science (which we have around partnership). The expertise within the project will be able to leave a brand into the marketplace that we do need to spend some time on establishing what is the unique selling point for any brand that comes out of this work. Jon will be doing some more research on this in the next couple of months. Our challenge will be differentiating our brand from all the other brands that currently exist.
7.	Summary of Roy's paper to the Journal of Applied Phycology	Please see: https://www.youtube.com/watch?v=qegGO0cyyOc . The paper demonstrates that increasing the drying temperature from 40° to 70° decreases the drying time for both species by about 60% and that the seaweeds are completely dry in terms of the equilibrium moisture content so that the water activity is maintained below 0.61.
8.	Discussion of drying systems LCC and University of Iceland	Essentially, we are looking at drying in ways-Clíodhna is looking at sharing a drying facility, Lews Castle College is looking at how we can dry, using renewable energy, without affecting the quality of the seaweed and Rúnar is looking at effective drying methods. There was a suggestion that the proposal from Iceland can be made more efficient by recovering waste heat. This could be done by taking the moist air, superheating it, removing the water and using it heat the incoming air, thus reducing the load on the heater. Roy and Rúnar to discuss further.
9.	Progress with pilot projects to be delivered.	Already covered-see above.
10.	Extension to project	It was agreed that we should apply for a 2-month extension. A formal application will need to be made with rationale for such application.

Next meeting:

Skype Wednesday 25 November 2020