



NATIONAL SEAWEED FORUM REPORT
TUARASCÁIL AN FHÓRAIM NÁISIÚNTA FEAMAINNE



Alaria esculenta

Atlantic Wakame, Tangle, Dabbertlocks, Wing kelp, Honeyware, Murlins
Láir, Láracha



Laminaria hyperborea

Forest kelp, Cuvie, May-weed (detached blades) Sea rods (stipes)

Ceanna Slat, Múrach Bhealtaine, Múrach Fómhair, Stumpa, Leathach dearg, Feamnach bhuí, Barraí raice, Sraith bhuí



Laminaria digitata

Oarweed, Tangleweed, Sea Girdle, Kombu

Feamnach dhubh, Leathrach



Laminaria saccharina

Sugar kelp, Sugar wrack, Sea belt, Sea tangle, Oarweed, Poor man's Weatherglass, Sweet Kombu, Kombu Royale

Cupóg na gCloch, Lásaí, Fruill, Réabán, Madraí, Madraí rua



Himanthalia elongata

Thongweed, Buttonweed, Sea Haricots, Sea spaghetti, Spaghetti de mer

Ruálach, Ruánach, Riseach, Imleacán cloch, Raif



Fucus serratus

Serrated wrack, Saw wrack, Toothed wrack

Míoránach, Dúlámán, Múrach dhubh



Ascophyllum nodosum

Asco, Knotted wrack, Sea whistle, Yellow Tang, Rockweed

Feamainn bhuí, Feamainn bhuí bhoilgineach



Pelvetia canaliculata

Channelled wrack, Cow tang

Dúlámán



Palmaria palmata

Dillisk, Dulse, Sheldulse, Sea-grass

Duilleasc, Creathnach



Chondrus crispus

Carrageen Moss, Carrageen, Carragheen, Irish Moss, Mousse d'Irlande, Jelly Moss

Cosáinín Carraige, Carraigín



Porphyra spp.

Nori, Laver, Purple laver, Sloke, Black butter

Sleabhacán, Sladaí, Sleabhac



Asparagopsis armata

Harpoon weed

Feamainn mhuirgha



Phymatolithon calcareum / Lithothamnion corallioides

Maërl
Griúán



Ulva rigida

Sea lettuce

Glasán



Enteromorpha spp.

Sea Grass

Glasán, Lineáil ghorm



Codium fragile

Fleece, Sponge seaweed, Sponge-weed, Green sea-velvet

Spúinse

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From left: Dr Henry Lyons (*Chairman*), Minister Frank Fahey, T.D., Dr. Angela Savage, Ms Lorna Kelly, Mr Séamus McGarvey, Mr Val Clarke, Mr Frank Melvin, Mr Declan O' Rourke, Mr Declan Clarke, Mr Micheál Ó Corrduibh, Dr Pádraig Whelan, Ms Kaye Mulrooney, Dr. John Joyce, Ms Eilís Nic Dhonncha, Mr Jim Morrissey.

Ón clé: Dr. Anraoi Ó Liatháin (*Cathaoirleach*), An tAire Frank Fahey, T.D., Dr. Aingeal Ní Shamhaois, Lorna Ní Cheallaigh, Séamus Mac Gairbhith, Val Ó Cléirigh, Proinsias Melvin, Deaglán Ó Ruairc, Deaglán Ó Cléirigh, Micheál Ó Corrduibh, Dr. Pádraig Ó Faoiláin, Kaye Mulrooney, Dr. Seán Seoighe, Eilís Nic Dhonncha, Séamus Ó Muiríosa.

Executive Summary

The National Seaweed Forum was established by the Minister for the Marine and Natural Resources and commenced its work in October 1999.

The overall remit of the Forum was to:

- Evaluate the current state of knowledge of the seaweed resource and its economic contribution
- Consult widely with the relevant participants and industry players
- Investigate the potential uses of seaweed, taking into account future research needs and global market opportunities
- Examine any barriers to realising the sector's potential and make recommendations to overcome these



Members of the Forum:
Declan Clarke, Micheál Ó Corraduibh, Dr Pádraig Whelan

The current economic contribution of the Irish seaweed industry has been estimated to be IR£6.9 million p.a. (€8.8 million). The industry currently employs nearly 700 people on either a full-time, part-time or seasonal basis in remote rural areas of the west coast primarily within the Gaeltacht. The socio-economic contribution of the seaweed industry is considerable and it would be difficult to replace given the remoteness, high levels of deprivation, and population decline of the areas in which it operates.

The seaweed industry in Ireland can be divided into six main areas at present: biopolymers, agriculture/horticulture, maërl, sea-vegetables, cosmetics and thalassotherapy and biochemistry/biomedicine. At present, these sectors have various factors working in their favour but also have barriers to their overall development. Value-added areas identified in this report can be explored in the future and developed to a market scale.

It is estimated that if there is significant investment (financial and personnel) in the areas outlined and if other issues raised in the recommendations are addressed adequately that within ten years the Irish seaweed industry will be worth approximately IR£50 million per annum. It is also estimated that there will be an increase in the number and value of the jobs in the seaweed sector due to the development of a natural resource based high-tech industry. The industry and related research facilities will continue to be focussed on the west coast and so it is expected that the socio-economic importance of the industry will increase accordingly.

The principal recommendations of this report is that the State, in partnership with public and private enterprise, should actively support the development of a greatly expanded but sustainable Irish seaweed industry. This will be achieved by the establishment of seaweed development centres in Bord Iascaigh Mhara and the Marine Institute to collaborate with the industry's representative body, the Irish Seaweed Industry Organisation. The establishment of a Seaweed Research Institute is also recommended to foster the development of key commercial ideas for aquaculture, mechanical harvesting, biotechnology, biomedicine, nutraceuticals, and biopolymers. Commercially exploitable species will be mapped and quantified by the Institute. Key concepts for research by the Institute will be industry support, sustainable development, added value, competitive development and public/private partnership.



Declan O'Rourke and Tony Fitzpatrick

Achoimre Feidhmiúcháin

Bhunaigh an tAire Mara agus Acmhainní Náúrtha an Fóram Náisiúnta Feamainne sa bhliain 1999 agus chuaigh sé i mbun oibre an bhliain chéanna. Ba iad téarmaí tagartha an Fhórait:

- An t-eolas atá ar fáil maidir le hacmhainní feamainne agus a dtábhacht eacnamúil a mheas
- Dul i gcomhairle leo sin atá bainteach leis, lucht tionsclaíochta san áireamh
- Fiosrú a dhéanamh ar úsáid feamainne, an riachtanas atá le taighde sa todhchaí agus féidearthachtaí margaíochta domhanda curtha san áireamh
- Cúinsí a d'fhéadfadh bac a chur ar an tionscal a mheas agus moltaí a dhéanamh lena sárú

Meastar gur fiú £6.9 milliún (€8.8 milliún) tionscal na feamainne d'Éirinn gach bliain. Tá beagnach 700 duine ag obair ar bhonn lánaimseartha nó ar bhonn páirtaimseartha nó ar bhonn séasúrach sa tionscal i gceantair iargúlta tuaithe an chósta thiar, sa Ghaeltacht ach go háirithe. Is mór is fiú an tionscal feamainne ó thaobh na socheacnamaíochta de agus ba dheacair tada a chur ina áit nuair a chuirtear san áireamh iargúlacht, easnamh agus laghdú daonra na gceantar ina bhfuil sé.

Tá sé roinn i dtionscal na feamainne faoi láthair: bithpholaiméirí, talmhaíocht/garraíodóireacht, griuán, glasraí mara, cosmaid agus teiripe mara agus bithcheimic/bithleigheas. Faoi láthair tá cúinsí éagsúla ag tacú leis na ranna seo ach tá cúinsí eile a chuireann bac ar a bhforbairt. D'fhéadfaí na réimsí breisluacha a thagann chun solais sa tuarascáil seo a scrúdú agus iad a fhorbairt don mhargadh.

Meastar anois, má dhéantar infheistiú fiúntach (airgid agus daoine) sna ranna a luaitear agus má thugtar aird mar is gá ar na ceisteanna eile a luaitear sna moltaí, gur fiú tuairim is £50 milliún punt sa bhliain tionscal na feamainne in Éirinn laistigh de dheich mbliana. Meastar freisin go dtiocfaidh méadú ar an bhfostaíocht, ó thaobh uimhreacha agus luacha, i dtionscal na feamainne de bharr forbartha i dtionscal ardeicneolaíoch atá bunaithe ar acmhainn nádúrtha. Beidh an tionscal agus an taighde a théann leis dírithe ar an gcósta thiar agus méadóidh ar thábhacht socheacnamaíoch an tionscail dá réir.

Is iad príomh-mholtaí na tuarascála seo go dtabharfaidh an Stát tacaíocht ghníomhach, i gcomhar le fiontar príobháideach agus poiblí, d'fhorbairt shuntasach ach sodhéanta i dtionscal feamainne na hÉireann. Cuirfear é seo i gcrích trí lárionaid forbartha feamainne a bhunú i mBord Iascaigh Mhara agus san Institiúid Mara a chomhoibriú le heagraíocht ionadaíoch an tionscail, Eagraíocht Thionscal Feamainne na hÉireann. Moltar freisin go mbunófaí Institiúid Taighde Feamainne le forbairt a dhéanamh ar fheirmeoireacht mara, baint mheicniúil, biteicneolaíocht, bithleigheas, nítrasúiteicéin agus bithpholaiméirí. Déanfaidh an Institiúid léarscáilíú agus cáinníochtú ar chineálacha insaothraithe speiceas. Déanfaidh an Institiúid taighde faoi leith ar thacaíocht tionscail, forbairt indéanta, breisluach, forbairt iomaíoch agus páirtíocht phoiblí/príobháideach.



An Dr. Anraoi Ó Liatháin leis An tAire Stát
Éamon Ó Cuív agus an Dr. Aingel Ní Shamhaíos

1 : Background



Seaweed is a sustainable natural resource with industrial potential that is not being fully realised at present. This industry is currently contributing to the maintenance of coastal communities by providing much-needed employment and has the potential to augment this with the creation of skilled jobs in an expanding, indigenous, high-tech industry.

The National Seaweed Forum was established by the Minister for the Marine and Natural Resources and commenced its work in October 1999. The overall remit of the Forum was to:

- Evaluate the current state of knowledge of the seaweed resource and its economic contribution;
- Consult widely with the relevant participants and industry players;
- Investigate the potential uses of seaweed, taking into account future research needs and global market opportunities;
- Examine any barriers to realising the sector's potential and make recommendations to overcome these.

In an effort to ensure that all relevant parties and opinions were represented, the Forum sought written submissions from members of the public, relevant groups or organisations through newspapers (national, local and sectoral) and on radio.

In addition, specific development organisations and groups and the member companies of the Irish Seaweed Industry Organisation (ISIO) were contacted directly in an effort to consult as widely as possible with the relevant participants and industry players.

This document reports the findings and recommendations of the Forum. Initially, the current state of knowledge of the resource and its economic contribution are evaluated. A case study of the largest seaweed company in Ireland, Arramara Teoranta, is included to show the importance of the economic contribution to rural coastal economies. Following this the report details the current state of the seaweed resource and the barriers that are considered to hinder it reaching its full potential and recommends actions to help overcome these. The potential uses of seaweeds and the research needs involved therein are also examined.

The Forum has also drawn on the experience of other countries, notably France, Scotland, Norway, Iceland and the Maritime Provinces in Canada. A short comparison of the seaweed industry in Ireland to that in these countries is included as Appendix VII.

For the purposes of this report 'seaweed' refers to marine macroalgae belonging to the Phyla Chlorophycota, Phaeophycota and Rhodophycota. Also, for the purposes of this report the Irish Seaweed Industry will be broadly divided into six categories (Figure 1).

Figure 1
Division of the Irish Seaweed Industry into market sectors

Ireland's Seaweed Resource : 501 species : 16 utilised commercially : 18 companies

Sea-Vegetables	Glasraí mara	Maérl	Griúán	Biotechnology	Biteicneolaíocht	Biopolymers	Bithpholaimeirí	Cosmetics & Thalassotherapy	Cosmaid agus Teiripe mara	Agriculture & Horticulture	Talmhaíocht agus Garraíodóireacht
<ul style="list-style-type: none"> • 5 companies • 11 species • Under-supplied market 	<ul style="list-style-type: none"> • 5 comhlacht • 11 speiceas • Soláthar gan don mhargadh 	<ul style="list-style-type: none"> • 1 company • Mainly 2 species • Application in many areas 	<ul style="list-style-type: none"> • 1 comhlacht • 2 speiceas go príomha • Feidhmeanna iomadla i mórchuid réimsí 	<ul style="list-style-type: none"> • 1 company • 1 species for niche market • 100% export 	<ul style="list-style-type: none"> • 1 comhlacht • 1 speiceas do mhargadh faoi leith • 100% easportáil 	<ul style="list-style-type: none"> • 1 company • Currently 1 species • Currently 100% export 	<ul style="list-style-type: none"> • 1 comhlacht • 1 speiceas faoi láthair • 100% easportáil faoi láthair 	<ul style="list-style-type: none"> • 7 companies • 8 species • Expanding customer base 	<ul style="list-style-type: none"> • 7 comhlacht • 8 speiceas • Bonn custaiméara ag leathnú 	<ul style="list-style-type: none"> • 4 companies • Mainly 1 species • Fertiliser and feed applications 	<ul style="list-style-type: none"> • 4 comhlacht • 1 speiceas go príomha • Úsáid mar leasú agus bia

1 : Cúlra

Is acmhainn nádúrtha inbhuanaithe í an fheamainn a bhfuil féidearthachtaí tionscail aici agus nach bhfuil úsáid iomlán á baint aisti faoi láthair. Tá an tionscal seo ag cuidiú le pobail cois farraige faoi láthair trí fhostaíocht a chur ar fáil agus d'fhéadfaí cur leis seo trí phoist oile a chur ar fáil i dtionscal áitiúil ardeicniúil atá ag fás.

Bhunaigh an tAire Mara agus Acmhainní Nádúrtha an Fóram Náisiúnta Feamainne agus chuaigh sé i mbun oibre i mí Dheireadh Fómhair 1999. Is iad téarmaí tagartha an Fhórait:

- An t-eolas atá ar fáil maidir le hacmhainní feamainne agus a dtábhacht a mheas;
- Dul i gcomhairle leo sin atá bainteach leis, lucht tionsclaíochta san áireamh;
- Fiosrú a dhéanamh ar úsáid feamainne, an riachtanas atá le taighde sa todhchaí agus féidearthachtaí margaíochta domhanda curtha san áireamh;
- Cúinsí a d'fhéadfadh bac a chur ar an tionscal a mheas agus moltaí a dhéanamh lena sárú.

Ionas go mbeadh éisteacht le fáil ag gach aicme agus tuairim a bhí bainteach leis an ábhar, d'iarr an Fóram a guí tuairimí scríofa ar an bpobal agus ar ghrúpaí agus ar eagraíochtaí éagsúla trí na nuachtáin (náisiúnta, áitiúil agus eamálach) agus ar raidió.

Ina theannta sin, rinneadh teagmháil dhíreach le heagraíochtaí agus grúpaí forbartha agus le baillochhlachtaí d'Eagraíocht Thionscal Feamainne na hÉireann (ISIO) le dul i gcomhairle chomh maith agus ab fhéidir, leo sin a raibh baint acu leis an ábhar, lucht tionsclaíochta san áireamh.

Cuireann an cháipéis seo cinneadh agus moltaí an Fhórait ar fáil. I dtosach déantar an t-eolas atá ar fáil faoin acmhainn agus an leas eacnamúil a eascrann as, a mheas. Déantar cás-staidéar ar an gcomhlacht feamainne is mó in Éirinn, Arramara Teoranta, le tábhacht na feamainne do phobail tuaithe cois farraige a léiriú. Ansin déanann an tuarascáil cur síos ar na hacmhainní feamainne mar atá siad faoi láthair agus ar na baic a cheaptar a bheith ar fhás eacnamúil na n-acmhainní sin agus molann sí bealaí leis na baic sin a shárú. Déantar scrúdú freisin ar an úsáid a d'fhéadfaí a bhaint as feamainn agus ar na riachtanais taighde a bheadh i gceist.

Baineann an Fóram úsáid as an eolas atá bailithe ag tíortha eile freisin, go háirithe An Fhrainc, Albain, An Ioruaidh, An Íoslainn agus Cúigí Mara Cheanada. Déantar comparáid ghairid idir tionscal na feamainne in Éirinn agus tionscal na dtíortha sin in Aguisín VII.

Sa tuarascáil seo ciallaíonn 'feamainn' macra-algaí mara a bhaineann le Phyla Chlorophycota, Phaeophycota agus Rhodophycota. Ina theannta sin, sa tuarascáil seo déanfar Tionscal Feamainne na hÉireann a roinnt i sé roinn (Figióir 1).



Phytomatalithon calcareum

Figióir 1
Ranna margaidh Thionscal Feamainne na hÉireann

2 : Current Knowledge of the Resource

2.1. General

2.1.1. At present, the knowledge of the seaweed resource in Ireland is considerable but incomplete. Extensive work has been carried out to date, mainly in the areas of biodiversity (Table 1), ecophysiology and life-history studies.

Ireland has 501 species of seaweed (Table 1). Considering the relative size of the island this is a remarkably high proportion of the marine algae of the whole of the North Atlantic basin. Many of these algae are relatively obscure species, known only to a handful of experts even on a world-wide basis.

Table 1. Numbers of seaweed species (red, brown and green) occurring in selected areas and in the whole of the North Atlantic.

	Rhodophycota (Red)	Phaeophycota (Brown)	Chlorophycota (Green)	Total Seaweeds
Ireland	274	147	80	501
Scotland	208	137	70	415
England & Wales	311	181	85	577
France	368	193	128	689
North Atlantic	620	329	256	1205

DATA FROM GUIRY, 2000, UNPUBLISHED DATABASE; <http://www.seaweed.ie/>

Among these 500 or so species are 19 that are currently commercially important on a world-wide scale. Of these, 16 are currently being exploited in Ireland to a greater or lesser extent in a selection of market applications. Although there is much cross-over between these markets they can be broadly divided into six categories (Figure 1). While 16 species are exploited at present in Ireland there has been little or no research to determine the potential high-value applications of most Irish seaweeds.

Economic Contribution Case Study - Arramara Teoranta

While the annual turnover of the seaweed industry in Ireland may seem small when compared to other maritime industries, the significant socio-economic contribution of the industry must also be taken into account. Seaweed employment is concentrated in rural areas along the western seaboard, in coastal and often

Gaeltacht, communities. These are areas characterised by relatively high levels of deprivation and population decline. Employment opportunities are limited and work is seasonal and unsecured. Spreading the benefits of economic growth to such areas is one of the cornerstones of Irish and European economic policy. To illustrate the impact of the seaweed industry on local communities a case study of Ireland's largest seaweed processing company, Arramara Teoranta, was prepared.



Bales of dried seaweed at Arramara Teo.

2 : Eolas faoin Acmhainn

2.1. Ginearálta

2.1.1. Faoi láthair tá eolas leathan, ach neamhiomlán, ar acmhainn feamainne na hÉireann. Tá obair mhór déanta go dtí seo, go príomha maidir le bitheagsúlacht (Tábla 1), éicifiseolaíocht agus staidéar ar stair bheatha.

Tá 501 speiceas feamainne in Éirinn (Tábla 1). Is céadchodán an-ard é seo d'algáí farraige an Atlantaigh Thuaidh, i bhfianaise mhéid an oileáin. Níl eolas ar go leor de na halgaí seo ach ag beagán saineolaithe ar domhan.

Tábla 1. An líon speiceas feamainne (dearg, donn agus glas) atá le fáil i réigiúin faoi leith agus san Atlantach Thuaidh go hiomlán.

	Rhodophycota (dearg)	Phaeophycota (donn)	Chlorophycota (glas)	Líon Feamainne
Éire	274	147	80	501
Albain	208	137	70	415
Sasana agus an Bhreatain Bheag	311	181	85	577
An Fhrainc	368	193	128	689
Atlantach Thuaidh	620	329	256	1205

EOLAS Ó GUIRY, 2000, BONNEOLAS NEAMHFOILSITHE; <http://www.seaweed.ie/>

I measc na 501 speiceas seo tá 19 a bhfuil tábhacht tráchtála ar bhonn domhanda ag baint leo. Diobh seo, tá 16 acu á saothrú in Éirinn, a bheag nó a mhór, i rannóga éagsúla tráchtála. Cé go bhfuil cuid de na rannóga seo ag teacht trasna ar a chéile, is féidir iad a roinnt go ginearálta i na sé roinn (Figiúr 1). Cé go ndéantar 16 speiceas a shaothrú in Éirinn faoi láthair, is beag taighde atá déanta d'fhonn úsáid arluacha fhorhmór feamainn na hÉireann a aimsiú.



Feamainn bhui á bhaint

Cás-staidéar ar an gCion Tairbhe Eacnamaíoch - Arramara Teoranta

Cé gur beag é láimhdeachas bliantúil thionscal na feamainne in Éirinn i gcomparáid le tionscail mhara eile, caithear an tionchar tábhachtach socheacnamaíoch atá aige a chur san áireamh. Tá formhór na fostaíochta i dtionscal na feamainne le fáil i gceantair tuaithe ar chósta an iarthair, i bpobail cois farraige, agus Gaeltachta go minic. Is ceantair iad seo a bhfuil leibhéal ard easnaimh agus laghdú daonra iontu. Tá deiseanna fostaíochta teoranta agus bíonn an obair séasúrach agus neamhchinnte. Is cuid bhunúsach de pholasáí eacnamaíochta na hÉireann agus na hEorpa é na buntáistí a bhaineann le fás eacnamaíochta a scaipeadh ar cheantair mar seo. Rinneadh cás-staidéar ar an gcomhlacht próiseála feamainne is mó in Éirinn, Arramara Teoranta, le tionchar thionscal na feamainne ar phobail áitiúla a léiriú.

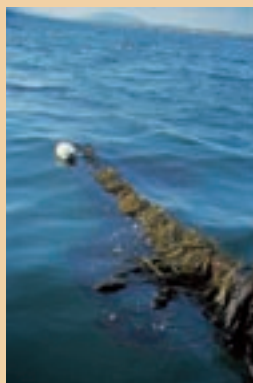
2 : Current Knowledge of the Resource

Arramara has factories based in Dungloe, Co. Donegal and Cill Chiaráin, Co. Galway. The company employs a total of 32 people full time in their factories and offices. Seaweed is bought from 267 harvesters based mainly in counties Galway, Mayo, Sligo and Donegal. Using the figure of 3.21 as number of dependants per harvester (a BIM study (1999b) was based in the same areas and, in many cases, probably on the same people) the total number of people that benefit directly from the money paid to the harvesters is approximately 1124. These harvesters all have other sources of income in addition to harvesting. The other sources quoted include fishing, farming, social welfare and self-employed.

The amount of money generated by Arramara that remains in the local area includes not only salaries to its own staff and payments to harvesters but also the expenditure on goods and services in these areas. These figures can be broken down as follows:

Arramara Teoranta Outlay in Coastal Areas

Wages and expenses to Staff	£510,000
Payments to harvesters	£413,459
Haulage	£201,485
Repairs and Maintenance	£77,300
Office Supplies	£12,542
Fuel	£20,435
Packaging	£7,000
Carriage	£9,500
Power	£70,000
Rates	£61,200
Total	£1,382,921



Seaweed long-line in Connemara

From these figures the socio-economic contribution of this seaweed company is visible. Any decline in the scale of Arramara Teoranta's operation would have a significant impact on the local communities which rely heavily on this indigenous industry. Investment in the seaweed sector will help to boost the contribution and create sustainable economic growth thereby leading to population stability.

2.1.2. The current economic contribution of the Irish seaweed industry has been estimated to be IR£7 million p.a. (€8.8 million). At the launch of the Forum the Minister for State for Arts, Culture, the Gaeltacht and the Islands pointed out that at present the seaweed industry in Ireland employs nearly 700 people on either a full-time, part-time or seasonal basis in remote rural areas of the west coast, many of which are Gaeltacht areas. This compares favourably with some of the largest factories currently in operation in Ireland and would support a community of 2,800 persons (family of 4 x 700). If such a factory were to open it would be eligible for many grants and subsidies not to mention national press and public goodwill. Perhaps viewing the seaweed industry in this way might help to bring home its importance to the national economy.

2 : Eolas faoin Acmhainn

Tá monarchana ag Arramara sa Chlochán Liath i gCo. Dhún na nGall agus i gCill Chiaráin i gCo. na Gaillimhe. Tá fostaíocht lánaimseartha ag 32 duine ina gcuid monarchan agus oifigí. Ceannaítear feamainn ó 267 bainteoir, as contaetha na Gaillimhe, Mhaigh Eo, Shligigh agus Dhún na nGall den chuid is mó. Má ghlactar leis go bhfuil 3.21 cleithiúnach in aghaidh gach bainteora (bhí staidéar BIM (1999b) bunaithe sna ceantair chéanna agus go minic, is dócha, ar na daoine céanna), is é líon na ndaoine a bhaineann sochar as an airgead a íoctar leis na bainteoirí, 1124. Tá foinsí ioncaim eile ag na bainteoirí seo i dteannta le bheith ag baint feamainne. Is iad na foinsí eile a ainmníodh iascaireacht, feirmeoireacht, leas sóisialta agus féinfhostaíocht.



Tine á lasadh i Arramara Teo.

Ar an airgead a chuireann Arramara ar fáil agus a fhanann sa cheantar tá pá na n-oibríthe agus íocaíocht na mbainteoirí chomh maith le caiteachas ar earraí agus seirbhísí sa cheantar. Is féidir miondealú a dhéanamh ar na figiúirí seo:

Caiteachas Arramara Teoranta i gCeantair Chósta

Pá agus Costais don Fhoireann Oibre	£510,000
Pá do Bhainteoirí Feamainne	£413,459
Tarlú	£201,485
Deisiúcháin agus Cothabháil	£77,300
Soláthairtí Oifige	£12,542
Breosla	£20,435
Pacáistíú	£7,000
Iompar	£9,500
Cumhacht	£70,000
Rátaí	£61,200
Iomlán	£1,382,921

Ó na figiúirí seo, is léir an buntáiste socheacnamaíoch atá ag baint leis an gcomhlacht feamainne seo. Chuirfeadh laghdú in oibriú Arramara Teoranta isteach go mór ar na pobail atá ag brath ar an tionscal dúchasach seo. Má dhéantar infheistíocht i dtionscal na feamainne, méadóidh leas an chomhlachta don phobal agus méadóidh an fhorbairt eacnamaíochta, rud a chuideoidh le cobhsaíocht daonra.

2.1.2. Meastar gur fiú £7 milliún punt sa bhliain tionscal feamainne na hÉireann (€8.8 milliún). Nuair a bunaíodh an Fóram, luaigh an tAire Stáit sa Roinn Ealaíon, Cultúir, Gaeltachta agus Oileán go bhfuil beagnach 700 duine fostaíthe ar bhonn lánaimseartha, páirtaimseartha nó séasúrach i gceantair iargúlta tuaithe ar an gcósta thiar, go leor díobh sa Ghaeltacht. Tá sé seo inchurtha le ceann de na monarchana is mó in Éirinn faoi láthair agus chothódh sé 2,800 duine (líon tí 4 x 700). Dá gcuirfí monarcha mar seo ar bun bheadh sé i dteideal go leor deontas agus fóirdheontas, gan trácht ar airid na meán náisiúnta agus dea-mhéin an phobail. Dá bhféachfaí ar thionscal na feamainne mar seo, b'fhéidir go dtuigfí a thábhacht d'eacnamaíocht na tíre.

2 : Current Knowledge of the Resource

2.2. Biopolymers

Alginates are polysaccharides that are extracted from brown algae. They are of commercial importance because they have very good gelling properties and also biological properties such as being natural, biocompatible, biodegradable, bioadhesive and non-immunogenic. They are used in the food industry as thickening and gelling agents in, for example, ice-creams and desserts. They are also commonly used in the pharmaceutical industry in gastric alkalis, binding agents for tablets, wound dressings and dental impressions. They also have industrial applications in the production of textiles, electrodes and in water processing as well as many other applications. The world wide market is estimated to be 25,000 tonnes. Of this approximately 23% is used in sauces and dressings, 17% in dairy applications, 15% in pet food leaving the other 45.6% which is used in other food, pharmaceutical and industrial applications. The largest centre for alginate use is the USA (44%) followed by the UK (23%) with the remainder being used by countries such as Germany, Italy, France and others.

In general the Biopolymers sector makes use of the large bulk seaweed species. As these species have been very financially important to Ireland over the last 50 years, a considerable amount of time and money has been expended researching their habitats, etc. A major mapping project undertaken in Ireland over the last few years was carried out on some of these bulk species - *Ascophyllum nodosum* and *Laminaria* spp. (Hession *et al.*, 1998). This work was a large undertaking and has generated interest among the general public on the west coast and has also elucidated certain facts; at present only half of the available *Ascophyllum nodosum* is being harvested and there is a substantial *Laminaria* (kelp) resource that is not being used at all. However, this study is also a 'point-in-time' study. Continual monitoring of populations would be an efficient method of observing and controlling environmental impact of harvesting. More detailed work on the exact distribution of certain kelps is also needed. Development of efficient kelp-harvesting techniques is required as is further work on the impacts of harvesting on all species.

Research requirements on applications and production of biopolymers are dealt with in section 4.4.

2.3. Agriculture/Horticulture

Since the same bulk species are used for the production of biopolymers as are used in the agriculture/horticulture sector, similar research is needed to complement the knowledge that already exists on these species.

The production of liquid seaweed extracts requires extraction techniques and these techniques are constantly being refined in an effort to give companies an edge in an extremely competitive market. Further scientific work on extraction procedures and processing techniques in this country could make Ireland the world leader in the agriculture/horticulture sector.



Laminaria hyperborea

2 : Eolas faoin Acmhainn

2.2. Bithpholaiméirí

Is polaisiúicrídí iad ailgionáití a dhéantar a eastóscadh as alga donn. Tá tábhacht tráchtála leo mar go bhfuil cáilíochtaí maithe glóthaí acu agus cáilíochtaí bitheolaíochta ar nós a bheith nádúrtha, bithchomhoiriúnach, bithdhíghrádach, bithghreamaitheach, agus neamhimdhíonach. Baintear úsáid astu i dtionscal an bhia mar shampla, le huachtar reoite agus milseoga a ramhrú agus a ghlóthú. Úsáidtear freisin iad i dtionscal na poitigéireachta in alcailí gastracha, le táibléid a dhlúthú le chéile, cóiríú cneá agus múnlaí déadacha. Tá feidhmeanna tionsclaíochta acu freisin i dtáirgeadh teicstílí, leictreoidí agus próiseáil uisce, chomh maith le mórán feidhmeanna eile. Meastar gurb é 25,000 tonna an margadh domhanda. De seo úsáidtear 23% in anlann agus cóiríú, 17% i ndéiríocht, 15% i mbia peataí, rud a fhágann an 45.6% eile i gcineálacha eile bia, cógseolaíochta agus tionsclaíochta. Is iad Stáit Aontaithe Mheiriceá is mó a úsáideann ailgionáití (44%), ansin an Ríocht Aontaithe (23%) agus an chuid eile a úsáid ag tíortha eile ar nós na Gearmáine, na Fraince, na hIodáil agus eile.



Laminaria saccharina

Go ginearálta is í earnáil na mBithpholaiméirí is mó a bhaineann úsáid as cineálacha mórthoirteacha feamainne. De bharr thábhacht airgid na speiceas seo don tír, le 50 bliain anuas, tá caiteachas mór airgid agus ama déanta maidir le taighde ar a ngnáthóga agus eile. Rinneadh léarscáilíú forleathan ar chuid de na speicis mhórthoirteacha seo in Éirinn le blianta beaga anuas - *Ascophyllum nodosum* agus *Laminaria* spp. (Hession *et al.*, 1998). Ba thionscnamh mór é seo agus chothaigh sé spéis i measc an phobail ar an gcósta thiar; shoiléirigh sé roinnt pointí eolais freisin: faoi láthair ní bhaintear ach leath den *Ascophyllum nodosum* atá ann agus tá acmhainn mhór *Laminaria* (ceilp) ann nach bhfuil á húsáid ar chor ar bith. Ach is staidéar ag pointe ama áirithe an staidéar seo. Slí éifeachtach a bheadh ann monatóireacht leanúnach a dhéanamh ar dhaoine chun breithniú agus stiúradh a dhéanamh ar an tionchar atá ag baint na feamainne ar an timpeallacht. Ní mór tuilleadh oibre a dhéanamh freisin maidir le dáileadh cruinn cineálacha áirithe ceilpe. Ní mór forbairt a dhéanamh ar mhodhanna éifeachtacha bainte ceilpe chomh maith le breis oibre ar an tionchar a bhíonn ag an mbaint ar gach cineál speiceas.

Pléitear riachtanais taighde maidir le húsáid agus táirgeadh bithpholaiméirí i roinn 4.4.

2.3. Talmhaíocht/Garraíodóireacht

Ó tharla gurb iad na cineálacha céanna speiceas mórthoirteach a bhíonn in úsáid le bithpholaiméirí a tháirgeadh agus san earnáil talmhaíochta/garraíodóireachta, ní mór taighde den chineál céanna a dhéanamh a chuirfeadh leis an eolas atá ar fáil cheana faoi na speicis seo.

Tá gá le teicnící eastósctha chun eastósca leachtacha feamainne a chur ar fáil agus tá na teicnící seo á bhforbairt de shíor le buntáiste a thabhairt do chomhlachtaí sa mhargadh fíor-íomáioch seo. Chuirfeadh tuilleadh taighde ar bhealaí eastósctha agus ar theicnící próiseála sa tír seo ar chumas na hÉireann a bheith ina ceannródaí i gcúrsaí talmhaíochta/garraíodóireachta.

2 : Current Knowledge of the Resource

2.4. Maërl

Maërl is made up several species of calcareous red algae, mostly *Lithothamnion corallioides* and *Phymatolithon calcareum*. In several places, notably in Co. Galway at Trá an Dóilín, near An Cheathrú Rua, and at Ballyconneely, Co. Galway, dead maërl is cast up and a beach is formed of the broken fragments. Such 'coral strands' are important tourist attractions and any maërl harvesting in future must take into account environmental effects, including the potential denudation of such beaches.

Extensive subtidal beds are found all along the west coast of Ireland, particularly in the larger bays. The greatest concentration - about 8 million wet tonnes - is found in the inner and outer reaches of Galway Bay with one bed alone having a conservative estimate of 2 million tonnes. In some instances, these deposits (and the beaches) are being replenished from living beds, but in others they appear to be remnants that are not being renewed.

Over 500,000 tonnes (worth €61 million) of this material is collected in Brittany every year, dried, ground and sold as a top dressing for soils. An estimated 200,000 wet tonnes per annum, worth £10 million stg. (€13 million), is also harvested at Falmouth in Cornwall. In Ireland, one company is harvesting maërl. They are based in county Cork and harvest about 10,000 tonnes per year. It is clear, then, that in Ireland maërl is not only a valuable resource but also an under-utilised one.

Preliminary studies of the distribution and composition of maërl beds and their associated biodiversity have been carried out. While this work has been very useful, much information is still required as it appears that there are many unique species found on maërl and they may be spawning grounds for fish and shellfish. More detailed work is required to quantify the beds that have been identified, ascertain whether the matter within them is growing *in situ* or being washed in from somewhere else, identify whether the beds are made up of living or dead matter and study the environmental impacts of harvesting maërl. All these areas require immediate attention to determine market potential.

2.5. Sea-Vegetables

At the moment the main species that are utilised in the sea-vegetable sector are:

Scientific name	Market name in Ireland
<i>Chondrus crispus</i> & <i>Mastocarpus stellatus</i>	Carrageen, Carrageen Moss
<i>Palmaria palmata</i>	Dulse, Dillisk
<i>Porphyra</i> spp.	Nori
<i>Laminaria</i> spp.	Kombu
<i>Laminaria saccharina</i>	Sweet Kombu, Kombu Royale
<i>Himantalia elongata</i>	Sea Spaghetti, Spaghetti de mer
<i>Alaria esculenta</i>	Atlantic Wakame
<i>Ulva lactuca</i> & <i>Enteromorpha</i> spp.	Green Sea Veg Mix

Knowledge of the life histories and habitat preferences of these species is sufficient for the amount of usage at the present time. However, several of the markets, in particular the dulse market, is currently supply-limited. Aquaculture development for this species and others is a priority to satisfy the market potential that currently exists and to enable further expansion of the market.



Threading *Palmaria* into ropes

2 : Eolas faoin Acmhainn

2.4. Griuán



An griuán ag fás faoi thonn

Tá griuán déanta as roinnt speiceas alga dearg cailceach, *Lithothamnion corallioides* agus *Phymatolithon calcareum* den chuid is mó. In áiteanna éagsúla, go háirithe i gCo. na Gaillimhe ag Trá an Dóilín gar don Cheathrú Rua agus ag Baile Conaola, caitear griuán marbh i dtír agus déantar trá den smionagar briste. Tá tábhacht ag baint leis na trána seo ó thaobh na turasóireachta de, agus ní mór an tionchar ar an timpeallacht a chur san áireamh nuair a bhailítear griuán sa todhchá, lomairt na dtránna seo san áireamh.

Tá leapacha fairsinge le fáil faoin taobh ar fud chósta thiar na hÉireann, go háirithe sna cuanta móra. Tá an méid is mó - tuairim agus 8 milliún tonna fluich - le fáil i gCuan na Gaillimhe agus suas le 2 milliún tonna i leaba amháin díobh. I gcásanna áirithe, tá na sil-leaganacha seo (agus na trána) á n-athlónadh as leapacha beo, ach i gcásanna eile ní léir go bhfuil sé seo ag tarlú.

Bailítear os cionn 500,000 tonna (luach €61 milliún) den ábhar seo sa Bhriotáin gach bliain agus triomaítear é, meiltar é agus díoltar é mar bharrleasú talún. Bailítear 200,000 tonna fluich sa bhliain, luach £10 milliún sterling (€13 milliún) in Falmouth in Cornwall. In Éirinn comhlacht amháin atá ag bailiú griuáin. Tá an comhlacht seo lonnaithe i gCo. Chorcaí agus bailiún sé tuairim agus 10 dtonna sa bhliain. Tá sé soiléir mar sin, ní hamháin gur acmhainn luachmhar in Éirinn é an griuán ach acmhainn tearcúsáidte.

Tá bunstaidéir déanta ar dháileadh agus ar chomhshuíomh na leapacha seo agus ar na bithéagsúlachtaí a bhaineann leo. Cé go bhfuil an obair seo fóinteach, tá gá le mórán eolais fós mar gur cosúil gurb iomaí speiceas sainiúil a bhíonn ar an ngruán agus go mb'fhéidir gur leapacha síolraithe é d'iasc agus sliogiasc. Ní mór tuilleadh oibre a dhéanamh, ar leibhéal mion, le líon na leapacha atá aimsithe a chainníochtú, le fáil amach an bhfuil an t-ábhar atá ann ag fás *in situ* nó an é gur caitheadh isteach as áit éigin eile é, lena chinntiú an ábhar marbh nó beo atá sna leapacha agus chun staidéar a dhéanamh ar an tionchar a bheadh ag tionscal bailithe griuáin ar an timpeallacht. Ní mór breathnú ar na pointí seo ar fad go práinneach chun féidearthachtaí an mhargaidh a chinntiú.

2.5. Glasraí mara

Faoi láthair is iad na speicis is mó a úsáidtear in earnáil na nglasraí mara:

Ainm eolaíochta	Ainm margaidh in Éirinn
<i>Chondrus crispus</i> & <i>Mastocarpus stellatus</i>	Carraigín, Carrageen (moss)
<i>Palmaria palmata</i>	Duilleasc, Dulse, Dillisk
<i>Porphyra</i> spp.	Nori
<i>Laminaria</i> spp.	Kombu
<i>Laminaria saccharina</i>	Sweet Kombu, Kombu Royale
<i>Himantalia elongata</i>	Sea spaghetti, Spaghetti de mer
<i>Alaria esculenta</i>	Atlantic Wakame
<i>Ulva lactuca</i> & <i>Enteromorpha</i> spp.	Green Sea Veg Mix



Palmaria palmata

Is leor an t-eolas ar stair bheatha agus rogha gnáthóg do na speicis seo don mhéid úsáide atá ann faoi láthair. Ach tá cuid de na margá, go háirithe margadh an duilisc, soláthar-teoranta faoi láthair. Ba cheart tosaíocht a thabhairt d'fhorbairt na feirmeoireachta mara don speiceas seo agus cinn eile nach é, mar fhreagra ar na féidearthachtaí margaidh atá ann agus ionas go méadófar an margadh sa todhchá.

2 : Current Knowledge of the Resource

While it is expected that, with current demand, farmed seaweed would quickly dominate the market, some connoisseurs will still prefer to use wild sea-vegetables. It is likely therefore that traditional harvesting will still be carried out and that indeed there may be market growth in this area. Mapping of the species concerned on the Irish coast will prove very helpful to companies hoping to increase their harvesting potential and consequently the number of harvesters that they employ.

The lack of knowledge of the constituents of the sea-vegetables themselves is a weakness of this sector. Today's consumer is very concerned with the nutritional content of food. At present, providing accurate information on the content of sea-vegetables is difficult as the content varies not only from season to season but also from one area to the next. Preliminary work is underway with three processing companies to try to ascertain the exact vitamin and mineral content of their products but this can only be a 'point in time' study. Long-term monitoring needs to be considered to ensure that accurate and up-to-date information is available for health and environment conscious consumers.

2.6. Cosmetics and Thalassotherapy

Thalasso is the Greek word for sea; thalassotherapy, which is treatment with seawater or seaweed, has been used in Europe for many years. There is a historical precedent for thalassotherapy that dates back at least 2500 years. The observed affects of seaweed baths include stress relief and ease of pain in joints and back. They were, and indeed still are, recommended for sufferers of arthritis, rheumatism and other ailments of the joints, athletes and anyone else whose daily life takes a hard physical toll on their body or mind.

The main species used in the cosmetics and thalassotherapy sector in Ireland are *Chondrus crispus*, *Mastocarpus stellatus*, *Fucus* spp., *Laminaria* spp. and *Ascophyllum nodosum*. The quantities of seaweed used in this sector are small (currently less than 200 wet tonnes per annum) and so for the most part aquaculture would be unnecessary.

A hindrance in this sector is the lack of published scientific data to corroborate seemingly well-known claims for such effects as stress relief. Research into this area would prove particularly useful for the thalassotherapy sector.

2.7. Biochemistry/Biomedicine

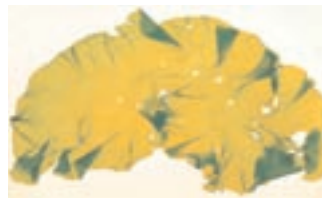
As will be discussed later in this report, the development of this sector is a priority for the Irish seaweed industry. Many of the potential areas for this development involve the use of kelps. As has been mentioned earlier in the Biopolymers section (2.2), mapping and quantification of the kelp beds around the coast, research into harvesting methods and environmental impacts are also important if the potential of this sector is to be fully realised.

There are also potentially many more species growing in Irish waters that have as yet undiscovered applications in the biochemistry/biomedicine sector. While at present it is impossible to predict which species will become important, a long-term future plan should include the facility to investigate fully such opportunities as they arise. Investigation of habitat preferences and life cycle, research into harvesting techniques (including sustainability and environmental impact) and mapping of the resource will all need to be completed in as short a time as possible to give Ireland an advantage in this highly competitive world market. Long-term programmes for monitoring the resource and the impacts that the industry is having on it should also be implemented.

2 : Eolas faoin Acmhainn

Cé go meastar, ón éileamh atá ann faoi láthair, go mbeadh an chuid is mó den mhargadh ag feamainn feirme, mar sin féin go mbeadh daoine ann arbh fhearr leo glasraí mara fáina. Is dócha, mar sin, go leanfar le baint feamainne go traidisiúnta, agus fiú amháin go méadófar ar an margadh san earnáil seo. Bheadh sé ina chabhair mhór léarscáiliú a dhéanamh ar na speicis atá i gceist ar chósta na hÉireann do chomhlachtaí ar mian leo níos mó feamainne a bhaint agus mar thoradh air sin níos mó bainteoirí a fhosú.

Is laige san earnáil seo é an easpa eolais atá ann ar chomhábhair na nglasraí mara. Tugann tomhaltóir an lae inniu aird mhór ar thuilleadh cothaíoch an bhia a itheann sé. Faoi láthair tá sé deacair eolas cruinn a chur ar fáil maidir le toilleadh cothaíoch glasraí mara mar go mbíonn éagsúlacht sa chomhábhar a bhraitheann ar an séasúr agus ar an áit a bhfásann sé. Tá réamhobair ar siúl le trí chomhlacht próiseála le fáil amach go cruinn céard é toilleadh vitimíní agus mianraí na dtáirgí atá acu ach ní bheidh sa staidéar seo ach staidéar ag pointe amháin ama. Is ceart smaoinemh ar mhonatóireacht fhadtéarmach lena chinntiú go mbíonn eolas cruinn agus nua-aimseartha ar fáil do thomhaltóirí ar cás leo cúrsaí sláinte agus timpeallachta.



Ulva rigida

2.6. Cosmaid agus Teiripe mara

Is é thalasso an focal Gréigise ar an bhfarrage; tá teiripe mara, sin cóiriú le sáile nó le feamainn, á chleachtadh san Eoraip le blianta fada. Is féidir teiripe mara a leanacht siar ar a laghad 2500 bliain. Is léir go gcuireann folcadh feamainne laghdú struis agus maolú ar phian ailt agus droma ar fáil do dhaoine. Moladh, agus go deimhin moltar fós, é do dhaoine a bhfuil airtríteas, scoilteacha agus tinnis eile sna hailt ag dul dóibh, agus do lúthchleasaithe agus éinne eile a gcuireann a saol laethúil strus mór ar a gcolainn nó ar a n-intinn.

Is iad na príomhspeicis a mbaintear úsáid astu le haghaidh cosmaidí agus teiripe mara in Éirinn *Chondrus crispus*, *Mastocarpus stellatus*, *Fucus* spp., *Laminaria* spp. agus *Ascophyllum nodosum*. Is beag feamainn a úsáidtear faoi láthair san earnáil seo (níos lú ná 200 tonna fluich sa bhliain) agus mar sin is beag gá a bheadh le feirmeoireacht mara.

Is bac san earnáil seo é go bhfuil easpa sonraí eolaíochta foilsithe ann a thacódh leis an tuairim go laghdáinn sé strus mar shampla. Ba mhór an leas a dhéanfadh taighde ina leith seo don earnáil teiripe mara.

2.7. Bithcheimic/Bithleigheas

Mar a phléifear níos faide anonn sa tuarascáil seo, tá tosaíocht i dtionscal feamainne na hÉireann á tabhairt d'fhorbairt na hearnála seo. Bheadh ceilp in úsáid i gcuid mhaith den fhorbairt phoitéinsíúil seo. Mar a luadh cheana san earnáil Bhithpholaiméirí (2.2) tá tábhacht ag baint le léarscáiliú agus cinntiú líon na leapacha ceilpe ar fud an chósta, le taighde ar mhodhanna bainte agus ar thionchar timpeallachta, má tá leas iomlán le baint as an earnáil seo.

D'fhéadfadh sé gurb iomaí speiceas atá ag fás in uiscí na hÉireann nach fios fós a bhfóinteacht san earnáil bhithcheimice/bhithleigheas. Cé nach féidir a rá fós cé na speicis a mbeidh tábhacht ag baint leo, ba cheart go mbeadh sé i gceist in aon phlean fadtéarmach féidearthachtaí mar seo a fhiosrú de réir mar a thagann siad chun cinn. Ní mór d'Éirinn fiosrú a dhéanamh ar rogha gnáthóg agus saolré na feamainne seo chomh luath agus is féidir mar aon le taighde a dhéanamh ar mhodhanna bainte (inbhuanaitheacht agus a dtionchar ar an timpeallacht san áireamh), má tá sí le bhuntáiste a bhaint as an margadh iomaíoch domhanda seo. Ba cheart clár fhadtéarmacha a chur in bhfeidhm freisin a dhéanfadh monatóireacht ar an acmhainn agus ar an tionchar atá ag an tionscal uirthi.

3 : Irish Seaweed Industry - Current Status

<p>Ireland Today</p> <p>Turnover IRE 7 million approx. (€8.9 million)</p> <p>Employment ~700 (full-time, part-time and seasonal). Based mostly in rural locations concentrated in the BMW region.</p> <ul style="list-style-type: none"> • Large focus on raw material processing • SMEs in six processing area (sea-vegetables, cosmetics and thalassotherapy, biotechnology, biopolymers, maerl, agriculture and horticulture) • Too small to compete efficiently on a world market • Development of value-added sector required 	<p>France Today</p> <p>Turnover 1000 million Francs* (€152.5 million)</p> <p>Employment ~2000*</p> <ul style="list-style-type: none"> • Indigenous processing • Concentration on high value - low volume markets • Mechanical harvesting • Aquaculture development for high value species <p>* French figures do not include maerl industry which is not considered a seaweed by the French Government. Turnover of the maerl industry is estimated at 4000 million francs (€61 million) and employs approximately 3700 people</p>	<p>Norway Today</p> <p>Turnover 530 million Kroner (approx. €65 million)</p> <p>Employment ~300*</p> <ul style="list-style-type: none"> • highly developed mechanised harvesting • Alginate processing within the country • World leader in alginate production 	<p>Maritime Provinces Today</p> <p>Landed Value** CAN\$2.7 million (€1.9 million)</p> <p>Employment ~990*</p> <ul style="list-style-type: none"> • <i>Ascophyllum</i> harvesting highly restricted by recent regulations • Resource damaged by overharvesting in the past • Reversion to hand harvesting • Carrageen industry shifting focus to low volume - high value end of the market <p>** Canadian figures show landing value only - turnover not available.</p>
<p>Ireland in 5 years</p> <p>Turnover IRE 20 million approx. (€25.4 million)</p> <p>Employment Maintenance of current levels of employment but with a change of focus towards higher skilled jobs and corresponding increased income.</p> <ul style="list-style-type: none"> • Irish seaweed companies competitive in European market • Research Initiative operational with strong links between third level institutions, industry and development agencies. • Small number of key ideas in the biotechnological area undergoing market trials • General public aware of benefits of seaweed usage 	<p>Ireland in 10 years</p> <p>Turnover IRE 50 million approx. (€63.5 million)</p> <p>Employment Increase in numbers and value due to the development of a natural resource based on high-tech industry.</p> <ul style="list-style-type: none"> • Low volume - high value sector highly developed • Irish seaweed companies competing in European and international markets. • World leader in product development for niche markets • Highly developed aquaculture programmes supplying food and cosmetics sectors 		

3.1 General

3.1.1. The Irish seaweed industry is a very diverse one. It could be said that it is in fact made up of elements of several different industries (food, cosmetics, agriculture, etc.) and that all that they have in common is the seaweed itself. Underpinning the current position of these industries is a common and simple factor - seaweed works. This is the fundamental principle behind the marketing in all sectors. Certainly, as has been stated earlier, there is considerable scope for more research in some areas, but in many cases the traditional use of seaweed as well as the natural aspect of the products can be enough to convince many people.

3 : Tionscal Feamainne na hÉireann - A Stádas faoi láthair

<p>Éire Innui</p> <p>Láimhdeachas tuairim is £7 milliún (€8.9 mill)</p> <p>Fostaíocht ~700 (lán/páirtaimseartha agus séasúrach. Lonnaithe i gceantair tuaithe i réigiún BMW)</p> <ul style="list-style-type: none"> • Béim mhór ar phróiseáil amhábhair • SME i sé eamail próiseála (glasraí mara, cosmaid agus teiripe mara, biteicneolaíocht, bithpholaiméir, griúán, talmhaíocht agus garraíodóireacht) • Róbheag le dul in iomaíocht ar bhonn éifeachtach ar an margadh domhanda. • Gá eamail bhreisluacha a fhorbairt 	<p>An Fhrainc</p> <p>Láimhdeachas 1000 milliún Franc* (€152.5 milliún)</p> <p>Fostaíocht ~2000*</p> <ul style="list-style-type: none"> * Próiseáil dhúchasach • Dírithe ar mhargáí ardluacha agus beagán toirte • Baint mheicniúil • Forbairt feirmeoireachta mara do speicis ardluacha <p>* Ní áirítear an tionscal griúáin i bhfigiúirí na Fraince mar nach nglacann Rialtas na Fraince leis gur feamainn é griúán. Meastar láimhdeachas thionscal an griúáin a bheith tuairim is 4000 milliún Franc (€61 milliún) agus tugann sé fostaíocht do thuairim is 3700 duine.</p>	<p>An Ioruaidh</p> <p>Láimhdeachas 530 milliún Kroner (tuairim agus (€65 milliún))</p> <p>Fostaíocht ~300</p> <ul style="list-style-type: none"> • Modhanna bainte an-fhorbartha • Próiseáil ailgionáite sa tír • Ceannródaí domhanda i bpróiseáil ailgionáite 	<p>Cúigí Mara Cheanada</p> <p>Luach i dtír** CAN \$2.7 milliún (€1.9 milliún)</p> <p>Fostaíocht ~ 990</p> <ul style="list-style-type: none"> • Teorannú géar déanta ar bhaint <i>Ascophyllum</i> toisc rialacha nua • Damáiste déanta d'acmhainní trí róbhaint san am a d'imigh • Filleadh ar bhaint láimhe • Tionscal an charraigín ag athrú béime ar an gcuid sin den mhargadh le toirt íseal ach luach ard <p>** Ní thaispeánann figiúirí Cheanada ach an luach tugtha i dtír - níl láimhdeachas ar fáil.</p>
<p>Éire faoi cheann 5 bliana</p> <p>Láimhdeachas £20 milliún (€25.4 milliún)</p> <p>Fostaíocht An leibhéal céanna fostaíochta ach béim ar phoist oílte agus ioncam níos airde dá réir.</p> <ul style="list-style-type: none"> • Comhlachtaí feamainne na hÉireann iomaíoch ar mhargadh na hEorpa • Tionscnamh Taighde gníomhach le naisc láidre idir institiúidí tríú leibhéal tionsclaíochta agus áisneachtaí forbartha • Roinnt eochairsmaointe i réimse na Biteicneolaíocht ag dul faoi thrialacha margaidh • Eolas ginearálta ag an bpobal ar bhuntáistí na feamainne 	<p>Éire faoi cheann 10 mbliana</p> <p>Láimhdeachas £50 milliún (€63.5 milliún)</p> <p>Fostaíocht Méadú ar uimhreacha agus luach de bharr forbartha ar thionscail ardeicneolaíoch bunaithe ar acmhainní nádúrtha.</p> <ul style="list-style-type: none"> • Toirt íseal - eamail ardluacha forbartha • Comhlachtaí feamainne Éireannacha san iomaíocht ar mhargáí Eorpacha agus idirnáisiúnta • Ceannródaí domhanda i bhforbairt táirgí do mhargáí faoi leith • Tionscal forbartha feirmeoireachta mara ag soláthar don eamail chosmaide agus bia 		

3.1 Ginearálta

3.1.1. Is tionscal an-ighnéitheach é tionscal feamainne na hÉireann. D'fhéadfaí a rá go bhfuil cúpla tionscal ann (bia, cosmaid, talmhaíocht agus eile) agus nach bhfuil de chosúlacht eatarthu ach an fheamainn. Ach tá aon chosúlacht amháin eatarthu agus sin é gur féidir gnó a dhéanamh le feamainn. Seo é is bunchloch don mhargáíocht ar fad. Cinnte tá gá le tuilleadh taighde ach, do chuid mhaith daoine, is leor an úsáid a baineadh i gcónaí an bhfeamainn chomh maith le gné nádúrtha na dtáirgí.

3 : Irish Seaweed Industry - Current Status



Dr Henry Lyons with the Minister for the Marine and Natural Resources, Frank Fahey TD.

3.1.2. Natural, Traditional, Clean & Green

This current swing in public attitude towards natural products has been a big boost for the Irish Seaweed Industry. This swing can be seen at all levels and in all sectors and the seaweed industry is already benefiting greatly from an upsurge in public goodwill which is very evident on the ground. The presence of a seaweed industry in Ireland since at least the 18th Century is a major factor in the goodwill that exists towards it today. Many Irish people are aware of traditional uses of seaweed. This knowledge is resurfacing as people search for more traditional (and so natural) ways of living.

In the area of foodstuffs, large numbers of consumers are becoming more aware of their diets and eating more healthy, 'alternative', food. This is making them more open to traditional foods. It could almost be described as a reversion from modern food and cooking to more traditional sources of nutrition. Scientific research has been at the heart of this proving that 'granny knows best' usually has a sound basis. There has also been significant growth in the convenience food sector and a development of products that incorporate both of these areas would be of great benefit.

But it is not just food that is involved in this revolution. People are looking for more natural cosmetics, beauty treatments,

fertilisers, animal feeds - basically any product that can be produced in a more natural way from natural raw materials. This movement, at its most developed level, is manifested by the organic movement. In Ireland at the current time, there is no recognised set of guidelines for certifying the production of seaweed products as organic. This situation is as frustrating for many organic farmers as it is for the seaweed fertiliser and fodder producers. It is important to stress that this situation does not exist because the products are not produced organically; indeed the converse is probably true; but the seaweed producers are unable to **prove** that their product is certifiably organic. It is of course possible to use the word 'organic' on any product, so qualifying for a recognised standard would be preferable for most companies.

Procedural matters aside, the swing towards cleaner, greener living that is taking place is contributing to the growth of the Irish seaweed industry.

3.1.3. Resource

The coast of Ireland has a myriad of different algal species. This forms a potentially very valuable resource. Tapping into this resource is completely sustainable due to a combination of the renewable resource and the good husbandry practices that are employed in its harvesting. The main seaweed crop used in Ireland today (*Ascophyllum nodosum*) requires a recovery time of only 3-4 years and so the fallow period of 4-5 years employed in Ireland is quite sufficient for sustainability. The fact that the cutters used by the largest company in Ireland (Arramara Teoranta) have been cutting seaweed in the same areas over and over again for more than fifty years provides the practical evidence to support this.

3 : Tionscal Feamainne na hÉireann - A Stádas faoi láthair

3.1.2. Nádúrtha, Traidisiúnta, Glan & Glas

Is mór an cúnaimh do thionscal feamainne na hÉireann an aghaidh athraithe atá ag an bpobal ar tháirgí nádúrtha. Tá an t-athrú seo le feiceáil ar an uile leibhéal agus earnáil agus tá sochar á bhaint cheana féin ag tionscal na feamainne as an bhfás seo i ndea-thoil an phobail atá le feiceáil go soiléir mórthimpeall. Cuid den dea-thoil seo atá ag daoine i leith na feamainne inniu go bhfuil tionscal feamainne in Éirinn ón 18ú hAois ar a laghad. Tá eolas ag go leor de mhuintir na hÉireann ar an úsáid a bhaintí as feamainn. Tá an t-eolas seo ag teacht chun cinn arís de réir mar a lorgaíonn daoine modh maireachtála atá níos traidisiúnta agus, dá bhrí, níos nádúrtha.

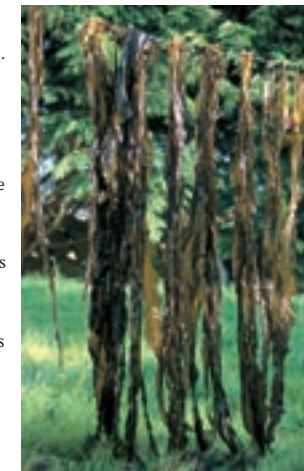
I gcúrsaí bia, tá aird níos mó ag tomhaltóirí ar a bhfuil á ithe acu agus ar bhia folláin 'malartach'. Fágann sin go bhfuil glacadh níos mó acu le bia traidisiúnta. Is beag nach bhféadfaí a rá gur droim láimhe atá á thabhairt do bhia agus bealaí cócaireachta an lae inniu agus go bhfuil daoine ag iompú i dtreo an bhia thraidisiúnta. Tá sé seo ar fad bunaithe ar thaighde eolaíoch agus taispeánann sé go raibh fáth maith leis na seantraidisiúin. Tá fás mór tagtha freisin ar earnáil an 'bhia thapa' agus ba mhór ab fhiú é dá bhféadfaí bia a tháirgeadh a bheadh folláin, traidisiúnta agus tapa.

Ach tá an réabhlóid seo ag tarlú i rudaí eile seachas bia. Tá daoine ag lorg tuilleadh cosmaidí, cóiríú áilleachta, leasú talún, bia ainmhithe atá níos nádúrtha; go bunúsach tá siad ag lorg táirgí ar féidir iad a chur ar fáil ar bhealach níos nádúrtha ó amháibhair nádúrtha. Is í an chuid is forbartha den ghluaiseacht seo an ghluaiseacht orgánach. In Éirinn faoi láthair níl aon treoilínte aitheanta leagtha síos lena chinntiú go bhfuil táirgí feamainne orgánach. Tá sé seo míshásúil d'fheirmeoirí orgánacha chomh maith leo siúd a tháirgíonn leasuithe agus bia ainmhithe ón bhfeamainn. Ní mór a rá nach bhfuil an scéal amhlaidh mar nach bhfuil na táirgí orgánach; go deimhin is é a mhalaírt atá fíor; ach níl na táirgeoirí feamainne in ann a **chruthú** go bhfuil a gcuid táirgí orgánach. Cinnte, is féidir an focal 'orgánach' a chur ar tháirge ar bith, ach bheadh sé níos sásúla do chomhlacht ar bith a bheith in ann cáiliú de réir caihdeáin aitheanta.

Gan bacadh leis an nós imeachta ar chor ar bith, tá an claonadh i dtreo modh maireachtála níos glaine agus níos glaise ag cabhrú go mór le fás agus forbairt thionscal na feamainne in Éirinn.

3.1.3. Acmhainn

Tá iliomad cineál feamainne ag fás ar chóstaí na hÉireann. D'fhéadfadh sé seo a bheith ina acmhainn shárluachmhar agus d'fhéadfaí leanacht le saothrú na hacmhainne seo mar gur acmhainn í a dhéanann athfhás agus trí mhodhanna ciallmhara saothraithe. Ní theastaíonn ach tréimhse athfháis 3-4 bliana ón bpríomhchineál feamainne (*Ascophyllum nodosum*) atá in úsáid in Éirinn faoi láthair agus is leor an tréimhse bhán 4-5 bliana atá á húsáid faoi láthair chun athnuachan a dhéanamh uirthi. Tá cruthúnas air seo le fáil sa mhéid go bhfuil na bainteoír atá ag an gcomhlacht is mó in Éirinn (Arramara Teoranta) ag baint feamainne sna háiteanna céanna arís agus arís eile le breis agus leathchéad bliain.



Ag triomú feamainne

3 : Irish Seaweed Industry - Current Status

There is also evidence that the potential harvest far exceeds the actual harvest even in this species which is exploited on a large scale. This is borne out by a 1998 report (Hession *et al.*, 1998) found that the potential sustainable harvest of *Ascophyllum nodosum* was 74,845 wet tonnes. The amount currently harvested is of the order of 30,000 tonnes. This has been the experience of harvesters of many different species e.g. *Palmaria palmata*, *Chondrus crispus*, *Laminaria* spp. and *Himanthalia elongata*. Indeed, there does not seem to be any species in Ireland currently being commercially utilised to its full potential. The rich biodiversity also leaves open a strong possibility that there are many species that could be harvested commercially that are currently not being harvested at all. Increased knowledge in the specialised areas of cosmetics and biochemical/biomedical applications could lead to a more diverse range of species being utilised.



Ascophyllum nodosum

3.1.4. Irish Seaweed Industry Organisation (ISIO)

At present, strong lines of communication exist between individual companies and also between those companies and certain research centres. The founding of the ISIO as the representative body of the seaweed producers and harvesters in Ireland in 1994 helped to cement those relationships and since its initiation the industry has increased both in its size and strength. Like most small and medium-sized enterprises (SMEs) the ISIO companies cannot afford to carry out scientific research on any appreciable scale. Having access to the research personnel and facilities at NUI, Galway has thus proved very useful. The links and general cohesion generated has also resulted in many mutually beneficial partnerships. Trade among companies has increased, as has overall seaweed marketing and joint marketing initiatives in the sector. The existence of a central office has meant a more efficient method of handling public enquiries, media coverage, desk research and representation at a national and international level. Apart from the time this saves individual companies, the more efficient handling of queries gives a more impressive first view of the seaweed industry in general to potential customers, media and public alike.

3.1.5. Quality Control Standards

Lack of quality standards within the industry is a negative factor that has been noted on several occasions. In some sectors, particularly the sea-vegetable sector, the presence of competitors trading on the black economy causes a serious threat to the reputation of the legitimate producers as well as their markets. This situation that must be dealt with if markets are to be developed effectively. A recognisable 'Quality Irish Seaweed' mark would make a very effective method of collective marketing of legitimate seaweed companies operating under an agreed code of standards.

3.1.6. Knowledge

Considerable scientific expertise already exists in Ireland in areas such as seaweed biology, biochemistry, chemistry and molecular biology that are critical to the future development of the Irish seaweed industry. To date, however, this indigenous expertise has not been co-ordinated or focused on the seaweed industry as such. For this resource to be employed to its full potential, links and networks within and between third-level institutions as well as between these institutions, research organisations, development agencies and industry are necessary. A Seaweed Research Institute, similar to those established with great success in France, Norway and other countries, to link these groups in a planned and coherent way, should be established within the next two years to develop a number of key commercial ideas in areas such as aquaculture, harvesting, biotechnology, biomedicine, nutraceuticals and biopolymers.

3 : Tionscal Feamainne na hÉireann - A Stádas faoi láthair

Tá cruthú freisin ann go bhfuil i bhfad níos mó feamainne ann ná mar atá á baint, fiú den chineál atá á baint go forleathan le fada. Tá sé seo deimhnithe ag tuarascáil den bhliain 1998 (Hession *et al.*, 1998) a deir go bhféadfaí leanacht ar aghaidh ag baint 74,845 tonna fluich de *Ascophyllum nodosum*. Ní bhaintear faoi láthair ach 30,000 tonna. Tá an rud céanna faighte amach ag bainteoirí de chineálacha eile speiceas e.g. *Palmaria palmata*, *Chondrus crispus*, *Laminaria* spp. agus *Himanthalia elongata*. Go deimhin is cosúil nach bhfuil aon speiceas in Éirinn atá á bhaint an oiread agus a d'fhéadfaí. D'fhéadfadh sé freisin, mar gheall ar an mbithéagsúlacht mhór atá ann, go bhfuil go leor speiceas ann a d'fhéadfaí a bhaint ar bhonn tráchtála, nach bhfuil á mbaint ar chor ar bith fós. D'fhéadfaí réimse speiceas níos leithne a bheith in úsáid trí thuilleadh eolais a chur ar ábhair speisialta ar nós cosmaidí agus bithcheimic/bithleigheas.

3.1.4. Cumann Thionscal Feamainne na hÉireann (ISIO)

Faoi láthair tá cumarsáid láidir idir comhlachtaí éagsúla agus freisin idir na comhlachtaí sin agus láithreacha taighde. Bunaíodh an ISIO i 1994 mar eagraíocht do na táirgeoirí agus na bainteoirí feamainne agus chabhraigh sé leis an gceangal idir na codanna éagsúla den tionscal a neartú agus ó bunaíodh é tá an tionscal dultha i méid agus i neart. Mar aon le go leor gnónna beaga agus meánmhéide eile 'SMEs', níl comhlachtaí ISIO in ann taighde eolaíoch a dhéanamh ar scála gur fiú trácht air. Mar sin tá sé fíor áisiúil go bhfuil fáil acu ar an bhfoireann agus ar na háiseanna taighde in Ollscoil na hÉireann, Gaillimh agus tá leas bainte ag an dá thaobh as an gceangal seo chomh maith le go leor comhpháirtíochtaí tairbheacha tagtha as. Tá meádu tagtha ar thrádáil idir comhlachtaí agus ar mhargaíocht iomlán feamainne agus ar chomhthionscnaimh mhargaíochta san earnáil seo. Déantar freastal níos fearr ar cheisteanna an phobail, ar na meáin chumarsáide, taighde dheisce agus ionadaíocht ar an leibhéal náisiúnta agus idirnáisiúnta, trí oifig lárnach a bheith ann. Gan trácht ar an am a shábháilann sé seo do na comhlachtaí éagsúla, tugann an freastal éifeachtach seo ar cheisteanna léargas níos fabhraí ar an tionscal feamainne do chustaiméirí, do na meáin agus don phobal.

3.1.5. Caighdeán Rialaithe Cáilíochta

Tá easpa caighdeán cáilíochta sa tionscal agus agus tá sé seo tugtha faoi deara níos mó ná uair amháin. I gcuid de na hearnálacha, go háirithe earnáil na nglasraí mara, cuireann iomaitheoirí a bhíonn ag trádáil sa gheilleagar dubh isteach go mór ar dhea-cháil na dtáirgeoirí dlísteanaigh agus ar a gcuid margáí. Ní mór déileáil leis seo má táthar le margáí a fhorbairt go héifeachtach. Chuirfeadh lipéad inaitheanta 'Sárfeamainne na hÉireann' ar chumas comhlachtaí dlísteanaigh, a oibríonn faoi chomhchaighdeán, margáíocht a dhéanamh go héifeachtach.

3.1.6. Eolas

Tá roinnt mhaith eolais cheana féin in Éirinn faoi bhitheolaíocht feamainne, bithcheimic, ceimic agus bitheolaíocht mhóilíneach agus tá siad seo thar a bheith tábhachtach d'fhorbairt thionscal feamainne na hÉireann. Ach go dtí seo, níl an saineolas dúchasach seo comhordaithe ná dírithe ar thionscal na feamainne. D'fhonn an leas is fearr a bhaint as an acmhainn seo tá gá le ceangal agus naisc a bheith laistigh de agus idir institiúidí tríú leibhéal agus idir na hinstiúidí seo, eagraíochtaí taighde, áisíneachtaí forbartha agus tionscail. Ba cheart Institiúid Taighde Feamainne, mar atá bunaithe sa Fhrainc, san Ioruaidh agus i dtíortha eile, a bhunú laistigh de dhá bhliain, leis na grúpaí seo a cheangal ar bhealach pleanáilte agus leanúnach, le bunraith dhainic trádála a fhorbairt i réimsí ar nós: feirmeoireacht mara, baint feamainne, biteicneolaíocht, bithleigheas, nūtrasúiticeáin agus bithpholaiméirí.



Climiní: Droichead Leitir Mór

3 : Irish Seaweed Industry - Current Status

3.1.7. Workforce

The seaweed cutters of Ireland are a highly skilled group that have been in the business for many years. However, seaweed cutting is hard, physically strenuous work that is also seasonal and weather-dependent. The age profile of the current harvesters is high and in the current thriving economy seaweed harvesting is being viewed as less and less attractive work and recruitment is non-existent. There are several ways in which these problems can be addressed. The first and most obvious way is to increase the seaweed harvester's income. This may be done by means of Social Welfare measures, EU subsidies, or foreshore subsidies. In the longer term, higher-value markets for the cut seaweed must be found.

Another proposition is to make harvesting easier by means of mechanical harvesters. This would reduce the time involved and increase the quantity of seaweed being harvested but would reduce the number of jobs. Environmental factors would also have to be considered.

A third proposition is the introduction of aquaculture which would cut down on harvesting and, as has been found in the fish sector, this would prove a more attractive job for highly-educated job seekers in the geographical areas in question. Aquaculture is discussed further in section 4.3.

3.1.8. Location

The location of the companies adjacent to large areas of raw material can be considered a positive aspect for many reasons. Haulage of seaweed can be time-consuming and costly. The proximity of the factories to the resource cuts down on these costs. However, in general, it means that the factories are located away from the markets. This problem is compounded as the companies become larger and their export markets increase in size. Capital grants to allow the companies to purchase newer, more efficient vehicles and improved infrastructure in the affected areas are possible solutions to this problem.

The introduction of e-commerce would also cut down dramatically on the logistical difficulties of being located in peripheral areas, making it easier for the companies to communicate with their markets around Ireland and abroad. Significant financial investment would be required to allow the companies to purchase the equipment necessary to participate effectively.

3.1.9. Product Research & Development

A serious weakness in the Irish seaweed industry cited by many people within the industry is in the area of product research and development. Despite the development of new products by some companies, there has been a certain stagnancy in the industry for a number of years. By their nature the SMEs that make up most of the sector have trouble funding the development of new products. The ability to anticipate market trends and to have mechanisms in place to develop new products to market standard rapidly is crucial for the establishment of the Irish seaweed industry in a changing and competitive world market.



Harvesting farmed seaweed in Ard Bay, Connemara

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3.1.7. Lucht oibre

Dream sáraithe iad bainteoirí feamainne na hÉireann agus taithí na mblianta acu ar an obair. Ach is obair chrua í baint na feamainne, atá séasúrach agus ag brath ar an aimsir. Tá próifil aoise na mbainteoirí ard agus in eacnamaíocht láidir an lae inniu níl mórán tóra ar an obair seo agus níl aon earcaíocht ar siúl ar chor ar bith. Tá roinnt bealaí gur féidir aghaidh a thabhairt ar na fadhbanna seo. Is é an chéad bhealach íocaíocht na mbainteoirí a mhéadú. Is féidir é seo a dhéanamh tríd an gcóras Leasa Shóisialaigh, fóirdheontais AE, nó fóirdheontais urthrú. Go fadtéarmach, caithfear margaí ardluacha a aimsiú don fheamainn bhainte.

Bealach eile is ea baint na feamainne a dhéanamh níos éasca le bainteoirí meicniúla. Laghdóidh sé seo an t-am a bheadh i gceist agus mhéadóidh sé an méid feamainne a chuirfí ar fáil ach laghdóidh sé an líon a bheadh fostaithe. Bheadh gá freisin cúinsí timpeallachta a chur san áireamh.

Is é an tríú bealach feirmeoireacht mhara a chur ar bun a laghdóidh an bhaint, agus mar a fuarthas amach in eamail an éisc, bheadh níos mó tóra ar an bpost seo ag aos óg na gceantar i gceist, a bhfuil ardoideachas orthu. Pléitear feirmeoireacht mhara arís i roinn 4.3.

3.1.8. Suíomh

Is gné dhearfach é go bhfuil na comhlachtaí feamainne lonnaithe i ngar do réimsí móra amhábhair ar go leor cúiseanna. Bíonn iompar feamainne costasach ó thaobh airgid agus ama de. Laghdaítear ar na costais seo nuair a bhíonn an mhonarcha i ngar don amhábhair. Ach go minic ciallaíonn sé seo go mbíonn na monarchana lonnaithe i bhfad ó na margaí. Méadaítear ar an bhfadhb de réir mar a théann na comhlachtaí agus a gcuid margaí easportála i méid. B'fhéidir go bhfuil réiteach na faidhbe le fáil i ndeontais chaipitil a chuirfeadh ar chumas na gcomhlachtaí feithiclí níos nua agus níos éifeachtaí a cheannach agus feabhas a chur ar an infastruchtúr sna ceantair i gceist.

Laghódh r-thráchtáil go mór ar na deacrachtaí lóistíochta a ghabhann le bheith lonnaithe i gceantair imeallacha, agus bheadh sé níos éasca do na comhlachtaí dul i dteagmháil lena gcuid margaí in Éirinn agus thar lear. Theastóidh infheistíocht shuntasach a chuirfeadh ar chumas na gcomhlachtaí an trealamh is gá a cheannach le páirt éifeachtach a ghlacadh.

3.1.9. Taighde agus Forbairt Táirgí

Deir go leor i dtionscal feamainne na hÉireann go bhfuil laige mhór ann maidir le taighde agus forbairt táirgí. Cé go bhfuil táirgí nua curtha ar fáil ag comhlachtaí éagsúla, tá marbhántacht éigin sa tionscal le roinnt blianta. Óna nádúr tá deacracht ag go leor de na SMEs, an dream is mó a dhéanann suas an eamail, táirgí nua a chistiú. Tá sé rí thábhachtach, do thionscal feamainne na hÉireann i margadh domhanda iomaíoch atá ag athrú go tréan, go bhféadfaí treochtaí an mhargaidh a thuar agus bealaí a aimsiú le táirgí nua a fhorbairt go caihdeán an mhargaidh go tapa.



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3.1.10. Outside Dependence

In the past the reliance of the seaweed industry on outside factors has been a weakness. This problem is demonstrated in Arramara Teoranta where for years the company was completely dependent on a company in Scotland that bought all of their raw material. When that company decided to source its raw material elsewhere, the Irish industry could have been in considerable difficulty if other outlets had not been found in time. The establishment of processing in Ireland will not only reduce foreign dependence but will increase dramatically the overall contribution of the industry to GNP by capitalising on the value-added end of the market. It has been estimated that there is enough biomass in Ireland to support one large alginate-producing plant and this proposal is considered in section 4.4.

3.1.11. Pollution - Real or Apparent

The most serious threat to the Irish seaweed industry is large and difficult to predict or control. Pollution of the resource by oil spill, chemical waste or any other method would devastate the industry in the affected areas.

A secondary factor relating to this is the public perception of pollution which can be just as damaging as actual pollution. Regular monitoring of water quality and how that relates to the content of the local seaweed and publication of the results may be necessary to help to maintain public confidence. The 'clean and green' image of Ireland at home and abroad is one of our best assets and should be preserved and promoted using all possible methods. The continued presence of the nuclear reprocessing facility at Sellafield is a severe threat to the viability of the seaweed industry.

3.1.12. Legal Status of Harvesting

For a long time it has been considered that the legal status of harvesting and seaweed rights was a serious problem for the development of the industry. Through consultation with the Office of the Attorney General it has been found that legislation regarding this issue is much clearer than was previously perceived and is no longer thought to be a serious barrier to development. A summary of the preliminary findings of the Office of the Attorney General is contained in Appendix IV.

3.1.13 Licensing Issues

The current lack of resources within the Department of the Marine and Natural Resources, Dúchas and other State Organisations means that the consultation process for licence applications can be quite time-consuming and thereby causes delays. Speeding up this process would allow commercial enterprises to plan more effectively. Increased transparency in regard to licensing is also particularly desirable.



Asparagopsis armata being grown on long-lines, Co. Galway

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Pictiúr ó chomórta Arramara Teo, 'Ag Baint na Climini'

3.1.10 Spleáchas ar an Taobh Amuigh

San am atá caite ba laige é go raibh tionscal na feamainne ag brath ar chúinsí taobh amuigh den tír. Léirítear é seo i gcás Arramara Teoranta, a bhí ag brath go hiomlán ar chomhlacht in Albain a cheannaigh a gcuid amhábhair go léir. Nuair a shocraigh an comhlacht sin a gcuid amhábhair a fháil as foinshe eile, d'fhéadfadh an tionscal Éireannach a bheith i dtrioblóid mhór murach gur aimsigh siad asraonta eile in am. Má bhunaítear próiseáil in Éirinn, laghdóidh sé an spleáchas ar chomhlachtaí thar lear agus méadóidh sé go mór sciar an tionscail don Olltáirgeacht

Náisiúnta (OTN) trí bhéim a chur ar eamáil bhreisluacha an mhargaidh. Meastar go bhfuil dóthain bithmhaise in Éirinn le monarcha mhór amháin ailgionáite a choinneáil ag imeacht agus pléitear an moladh seo i roinn 4.4.

3.1.11. Truailliú - Fíor nó Bréagach

Tá an baol is dainséaraí do thionscal feamainne na hÉireann mór agus beagnach dothuarta agus dosmachta. Scríosfadh truailliú na hacmhainne trí dhoirteadh ola, nó dramhaíl cheimiceach nó tada eile mar é, an tionscal go hiomlán sna ceantair i gceist.

Gné eile gaolmhar leis seo is ea aireachtáil an phobail go bhfuil truailliú ann agus tá sé seo in ann an oireadh damáiste a dhéanamh le truailliú ceart. B'fhéidir gur gá monatóireacht rialta a dhéanamh ar an uisce agus an bhaint atá aige sin le toilleadh na feamainne san áit agus an toradh a fhoilsíú, le muinín an phobail a chothú. Tá an íomhá 'glan agus glas' d'Éirinn thar a bheith tábhachtach agus ba cheart í a chosaint agus a chur chun cinn ar gach bealach. Is contúirt mhór do thionscal na feamainne monarcha núicléach athphróiseála Sellafield.

3.1.12. Stádas Dlíthiúil Bhaint na Feamainne

Meastar le fada gur fadhb mhór d'fhorbairt an tionscail é stádas dlíthiúil bhaint na feamainne agus cearta feamainne. Trí dhul i gcomhairle le Oifig an Ard-Aighne fuarthas amach go bhfuil an reachtaíocht maidir leis an gceist seo i bhfad níos soiléire ná mar a ceapadh roimhe seo agus nach gceaptar anois gur bac rómhór é d'fhorbairt an tionscail. Tá achoimre den eolas ó Oifig an Ard-Aighne le fáil in Aghuisín IV.

3.1.13 Ceist Ceadúnais

De bharr ganntain acmhainní i Roinn na Mara agus Acmhainní Nádúrtha, i nDúchas agus Eagraíochtaí Stáit eile, bíonn moill ar iarratais ar cheadúnais. Dá bhféadfaí é seo a dheifriú, chuirfeadh sé ar chumas lucht gnó pleanáil níos éifeachtaí a dhéanamh. Bheadh tuilleadh soiléireachta maidir le ceadúnais inmholta freisin.

3 : Irish Seaweed Industry - Current Status

3.2. Agriculture/Horticulture

The agriculture and horticulture sector has been developed in the last number of years. Seaweed for plant growth stimulants and animal fodder is gaining support from farmers, particular organic farmers. As in other sectors the visible benefits experienced by many people have led to invaluable word-of-mouth promotion. This promotion is required as even the largest companies operate on extremely limited marketing budgets.

At present the agriculture and horticulture products produced from seaweed are, of necessity, quite expensive compared to other fertilisers, animal feeds, etc. A combination of lower production costs and research and development of new products and applications is needed to ensure that this weakness is remedied as far as possible.

Lack of awareness of the benefits of seaweed is a problem for companies in this and other sectors. The introduction of an awareness campaign among the general public, farmers in particular, would have a dramatic impact on the market profile of these companies.

A significant investment into research and development of new equipment would also be of huge benefit to this sector. Changes in processes and methods that have taken place over the last few years have meant that much of the machinery and equipment currently in use is outdated and in need of being upgraded or replaced.

3.3. Maërl



Maërl as fertiliser - An Cheathrú Rua

In Ireland maërl extraction is carried out in Bantry Bay. The maërl bed there is essentially a deposit, being composed of dead fragments and is covered by a thin layer of mud. The material is dredged, dried and ground for a variety of uses mostly in the food ingredients, healthcare and agriculture sectors. As has been mentioned earlier, there is a requirement for more research in this sector (Section 2.6).

Difficulties exist regarding the exact classification of the harvested maërl. It has variously been described as a seaweed and (because it is entirely dead) as an aggregate. This ambiguity leads to confusion regarding which set of guidelines should be adopted for its dredging. These difficulties are part of the reason that there has only ever been an exploratory licence issued, a situation which limits the company's ability to expand.

A targeted public awareness campaign is vital for the maërl industry. Little history of usage of this resource in this country has led to a lack of market awareness of calcified seaweed in general. Possible new areas and methods for the utilisation of calcified seaweed continue to be found, particularly in the areas of biotechnology and pharmaceutical applications. Product development in these areas will help the industry to go from strength to strength in the world-wide market.

3 : Tionscal Feamainne na hÉireann - A Stádas faoi láthair

3.2. Talmhaíocht/Garraíodóireacht

Tá forbairt tagtha ar eamáil na talmhaíochta agus na garraíodóireachta le blianta beaga anuas. Tá feirmeoirí, go háirithe feirmeoirí orgánacha, ag glacadh le feamainn mar leasú agus mar bheathú ainmhithe. Mar aon le hearnálacha eile, nuair a chonacthas buntáistí á bhfáil ag daoine, tháinig ardmholadh dá mbarr. Tá gá leis an moladh seo mar, fiú na comhlachtaí is mó, oibríonn siad ar bhuiséid an-teoranta margáíochta.

Faoi láthair, tá na táirgí talmhaíochta agus garraíodóireachta a tháirgtear as feamainn daor go leor le hais leasuithe, beathú ainmhithe eile agus eile. Tá gá le costais táirgthe níos ísle i dteannta le taighde agus forbairt táirgí agus feidhmiú lena chinntiú go gcuirfear an laige seo ina ceart.

Is fadhb do chomhlachtaí san eamáil seo agus in eamálacha eile easpa eolais ar na buntáistí a bhaineann le feamainn. Bheadh tionchar mór ag feachtas eolais i measc an phobail, agus i measc feirmeoirí go háirithe, ar phróifíl mhargáíochta na gcomhlachtaí seo.

Ba mhór an buntáiste don eamáil seo freisin dá ndéanfaí infheistíocht shuntasach i dtaighde agus i bhforbairt trealaimh nua. De bharr na n-athruithe atá tar éis tarlú le cúpla bliain ó thaobh próiseála agus modhanna de, tá go leor den trealamh atá in úsáid faoi láthair as dáta agus tá gá lena fheabhsú nó trealamh nua a cheannach.



Carraigín ag triomú i gCo. an Chláir

3.3 Griuán

In Éirinn bailítear griuán i mBá Bheanntraí. Go bunúsach is sil-leagan an leaba griuáin sin. Smionagar marbh atá ann agus é clúdaithe le brat tanaí lathaí. Déantar an t-ábhar a dhreideáil, a thriomú agus a mheilt le húsáid san eamáil comhábhar bia, cúraim sláinte agus talmhaíochta. Mar a dúradh cheana, tá gá le tuilleadh taighde san eamáil seo (Roinn 2.6).

Tá fadhanna ag baint leis an ngriuán a bhailítear a rangú go barainneach. Tugtar feamainn air agus (mar go bhfuil sé marbh ar fad) tugtar comhiomlán air. De bharr na héiginnteachta seo ní bhítear cinnte cé na treoracha is ceart a úsáid maidir lena dhreideáil. Sin cuid den chúis nár eisíodh riamh ach ceadúnas trialach, rud a chuireann bac ar forbairt an chomhlachta dul i méid.

Tá géarghá le feachtas eolais don phobal ar mhaithe le tionscal an ghriuáin. Toisc nár baineadh mórán úsáide as an acmhainn seo in Éirinn is beag eolas atá ag daoine ar fheamainn chailcithe. Tá úsáidí nua á bhfáil d'fheamainn chailcithe, go háirithe sa bhiteicneolaíocht agus sa chógaseolaíocht. Cabhróidh forbairt an táirge seo an tionscal a neartú go mór ar an margadh domhanda.

3 : Irish Seaweed Industry - Current Status

3.4. Sea-Vegetables

The sea-vegetable industry in Ireland has several characteristics that make it unique among the sectors. Firstly, the sector has experienced considerable growth in recent years. More and more people are eating sea-vegetables and the market continues to grow both at home and abroad. The growing sophistication of the Irish palate along with the increasing demand for healthy and natural foods have helped greatly in increasing the sales of the traditional species and also the development of markets for varieties that are not as well known in Ireland, such as kombu, sea spaghetti, wakame etc., but certainly there is still significant room for expansion.

One of the most basic and yet most serious hindrances in this sector is the name - most people don't like the idea of eating 'seaweed'. The term 'sea-vegetables' is slowly but surely gaining ground and impressive gains have resulted from just this small change, demonstrating both the power and effectiveness of simple marketing. Unfortunately for today's sea-vegetable producers, dulce, carrageen moss and other species were widely eaten during the Famine in Ireland and seemingly retain their image as 'famine food' very strongly. While the nutritional benefit of sea-vegetables is not generally disputed, shrewd marketing is needed to dispel this common notion.

There is evidence to suggest that there is a willingness among many chefs to use sea-vegetable recipes on their menus (as displayed by the BIM 2000 seafood calendar) but for a perceived lack of regular supply. Their fears are not altogether unfounded and this irregularity of supply is one of the chief problems that will need to be addressed before the Irish sea-vegetable industry can reach its full potential.

In several markets, most notably the market for dulce, demand has far outstripped supply for several years. Again it is important to stress that this lack of supply is in no way reflective of a lack of seaweed on the shore; on the contrary there is plenty. However, there is a shortage of people to harvest it. Skilled personnel willing to collect on a regular basis are becoming more scarce. Many potential harvesters have erroneous ideas about the amount of work that is involved in collecting sea-vegetables for a company, many think that they will need to dry it themselves and are put off by the idea of this extra, weather-dependent work. An educational programme for potential harvesters would help to alleviate these misconceptions.

In the sea-vegetable sector in particular it is felt that the development of aquaculture would be a more viable option than trying to entice people into a job that is season, tide and weather dependent and that may not be as financially lucrative as other available careers. Aquaculture will contribute to a larger and more regular and predictable supply. However, the growth of seaweed aquaculture in this country will have to be accelerated for it to meet the expected growth in demand that will be brought on by a marketing push. The developing market for different species and the growing popularity of Irish sea-vegetables as a delicacy in Japan and other Asian countries could lead to even more exports to these countries. The ISIO, BIM and Údarás na Gaeltachta are making progress in this regard but more capital funding in this and other areas would put the sea-vegetable industry on a much stronger footing than at present.

In conclusion, it is clear that while the sea-vegetable companies operating in the country at the moment are quite successful, this is in spite of several factors. The resolution of these factors coupled with the current climate and the potential export markets mean that the Irish sea-vegetable industry has the potential to expand far beyond its current boundaries.

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3.4. Glasraí Mara

Tá tionscal na nglasraí mara in Éirinn uathúil ar roinnt cuntar. Ar an gcéad dul síos, tá fás mór tagtha ar an earnáil le gairid. Tá níos mó daoine ag ithe glasraí mara agus tá an margadh ag fás in Éirinn agus thar lear. De bharr na héagsúlachta i gcúrsaí bia in Éirinn anois agus an t-éileamh atá ar bhia folláin agus nádúrtha, tá méadú mór tagtha ar dhíolachán na gcineálacha traidisiúnta. Chomh maith leis sin, tá forbairt tagtha ar mhargaí do chineálacha nach bhfuil mórán eolais orthu in Éirinn, ar nós kombu, spaghetti mara, wakame agus eile. ach tá neart deiseanna ann leathnú amach.

Ceann de na baic is bunusaí ach fós is measa san earnáil seo is ea an t-ainm - ní maith le go leor daoine go mbeidís ag ithe 'feamainne'. Tá an t-ainm 'glasraí mara' ag teacht chun cinn go mall agus tá dul chun cinn suntasach tagtha as an athrú beag seo, rud a chruthaíonn an neart agus éifeacht atá ag baint le margáíocht shimplí. Tá sé de mhí-ádh ar tháirgeoirí ghlásraí mara an lae inniu go bhfuil duileasc agus carraigín agus speicis eile ceangailte leis an nGorta Mór fós mar gur itheadh iad ag an am sin. Níl amhras ar éinne faoi fholláine na nglasraí mara, ach teastaíonn margáíocht chliste leis an íomhá seo a scrios.

Is iomaí cócaire a bheadh sásta glasraí mara a úsáid ina gcuid oibre (mar atá le feiceáil i bhféilire BIM) ach go bhfeictear dóibh go bhfuil soláthar rialta easnamach. Tá cuid den fhírinne acu agus caithfear an neamhríaltacht seo maidir le soláthar a cheartú sula n-éiríonn le tionscal glasraí mara na hÉireann a cheart a bhaint amach.

I roinnt margaí, go háirithe duileasc, tá an t-éileamh i bhfad níos mó ná an soláthar le roinnt blianta. Arís ní mór a chur in iúl nach léiríonn an easpa soláthair seo aon ghanntan feamainne ag an gcladach; go deimhin tá neart di ann. Ach tá ganntan daoine ann lena baint. Tá na daoine oille atá sásta dul ag baint go rialta ag éirí gann. Tá go leor bainteoirí a bhfuil dul amú orthu mar gheall ar an obair atá ag baint le glasraí mara a chur ar fáil do chomhlacht. Ceapann go leor acu go mbeidh orthu i a thriomú agus is leasc leo an obair bhreise atá ag brath chomh mór ar an aimsir. D'fhéadfadh clár oideachais do bhainteoirí an mhíthuiscint seo a cheartú.



Palmaria palmata, Duileasc

In earnáil na nglasraí mara go háirithe, meastar gur rogha níos fearr é forbairt na feirmeoireachta mara ná a bheith ag iarraidh daoine a mhealladh isteach in obair atá ag brath ar shéasúr, ar thaoidé agus ar aimsir, agus nach n-íocfadh chomh maith le fostaíocht eile. Chuirfeadh feirmeoireacht mhara soláthar níos mó, níos rialta agus níos cinnte ar fáil. Ach caithfear dlús a chur le forbairt na feirmeoireachta feamainne sa tír seo le go mbeidh sé in ann freagairt don éileamh a bheidh air de bharr dlús a chur le margáíocht. Tá an margadh ag fás do speicis éagsúla agus d'fhéadfadh an tóir atá ag an tSeapáin agus tíortha eile san Áis ar ghlásraí mara na hÉireann cur le heasportáil chuig na tíortha sin. Tá dul chun cinn á dhéanamh ag ISIO, ag BIM agus ag Údarás na Gaeltachta maidir leis seo ach chuirfeadh méadú ar chistiú san earnáil seo an tionscal glasraí mara ar bhonn níos láidre ná mar atá faoi láthair.

Faoi dheireadh, tá sé soiléir go bhfuil ag éirí go maith leis na comhlachtaí glasraí mara atá sa tír faoi láthair, ach is in ainneoin roinnt cúinsí é. Dá réiteofaí iad seo, i dteannta leis an dea-thoil atá ann agus na margaí easportála a d'fhéadfaí a fhorbairt, bheadh fás as cuimse i ndán do thionscal ghlásraí mara na hÉireann.

3 : Irish Seaweed Industry - Current Status

3.5. Cosmetics and Thalassotherapy

The existence of a history of seaweed-bath usage in Ireland is a huge asset to the thalassotherapy and cosmetics industries. Over the last few years several SMEs have been set up in the thalassotherapy sector and two full residential facilities based in hotels have recently opened showing the increased awareness of this ancient practice.

Cosmetics companies in Ireland benefit from having access to modern processing technologies within the country. Thalassotherapy companies, on the other hand, have to produce their products themselves or import them (mostly from France). A new firm producing cosmetic ingredients in Kerry may help cut down on this expenditure and keep more of the money locally but at present it is only catering for a small portion of the market. It is felt that a significant investment made in R&D in this area could help grow to an industry capable of competing on the world stage.

At present, while one Irish seaweed cosmetics company has achieved strong brand recognition and customer loyalty in this country, the cosmetics sector of the market is dominated by large multinationals that benefit greatly from economies of scale. Faced with highly financed marketing, packaging and promotional campaigns it is hard for much smaller, locally based SMEs to compete. There is also a threat posed by the response of these competitors to success on the part of the SMEs, undercutting on price, ensuring lack of access to the best distribution channels, etc. Nowadays, the promotion of products on the world market is most cost-effective by means of the Internet and for SMEs attempting to compete with these larger companies it may be the only way to achieve market penetration. As has been mentioned earlier, significant capital funding and training of personnel would be required to initiate effective e-commerce.



Codium fragile

Currently under the public health system in Holland and France patients can use thalassotherapy centres as preventative medicine. A stay at a residential thalassotherapy centre may also be prescribed around the time of a major operation; the patient attends the centre for approximately one week before the surgery to detoxify the body and boost the immune system. After the operation the patient returns to the centre to aid recovery. If a similar policy were adopted in Ireland this would provide a huge boost to the Irish thalassotherapy industry.

The ideal elements of thalassotherapy are as follows: rural environment, peace and quiet, sea air, exercise, treatments and baths, diet and relaxation. These elements make the thalassotherapy industry perfectly suited to provide the source of a sustainable indigenous industry located in rural coastal locations. The sea-based lifestyle that is on offer in these areas is very attractive to many people. The role that could be played in this sort of 'holistic tourism' by e-commerce is also quite significant. Many people who use treatments like this are prepared to travel and pay considerable sums of money, and source them by means of the Internet. Again, significant funding and training would be required to set up e-commerce efficiently.

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3.5. Cosmaid agus Teiripe Mara

Is mór an chabhair do thionscal na teiripe mara agus don tionscal cosmaide go bhfuil traidisiún folcadh feamainne in Éirinn. Le blianta beaga anuas bunaíodh roinnt gnóilachtaí in earnáil na teiripe mara agus osclaíodh dhá áis chónaitheach in óstáin, rud a léiríonn an méadú suime atá sa ghnás ársa seo.

Tá sé de bhuntáiste ag comhlachtaí cosmaidí in Éirinn go bhfuil fáil acu ar theicneolaíocht próiseála nua-aimseartha laistigh den tír. Ar an lámh eile de, tá ar chomhlachtaí teiripe mara a gcuid táirgí a chur ar fáil iad féin nó iad a iompórtáil (ón bhFrainc den chuid is mó). Tá comhlacht nua i gCiarraí ag táirgeadh comhábhair cosmaidí agus d'fhéadfadh sé seo laghdú ar an gcaiteachas agus cuid den airgead a choinneáil san áit, ach níl sé ag freastal ach ar chuid bheag den mhargadh faoi láthair. Meastar dá ndéanfaí infheistíocht shuntasach i dtaighde agus forbairt san earnáil seo, go bhféadfaí tionscal a dhéanamh de a bheadh in ann dul san iomaíocht go domhanda.

Faoi láthair, cé go bhfuil comhlacht amháin cosmaidí feamainne in Éirinn a bhfuil eolas maith ar a chuid táirgí agus dílseacht dá réir dóibh sa tír, tá margadh na gcosmaidí faoi cheannas comhlachtaí móra idirnáisiúnta atá in ann leas a bhaint as barainneacht scála eachtrach. Tá sé an-deacair ag comhlachtaí beaga áitiúla dul san iomaíocht le comhlachtaí a bhfuil neart airgid acu le haghaidh margaíochta, pacáistithe agus fógraíochta. Nuair a fheiceann na comhlachtaí móra aon chomhlacht eile ag dul chun cinn tá siad in ann praghas a laghdú, rud a chinntíonn nach mbeidh fáil ar na bealaí dáilte is fearr. Faoi láthair, tá éifeachtúlacht chostais ag baint le tionscnamh táirgí ar an margadh domhanda tríd an Idirlíon agus b'fhéidir gurb é an t-aon bhealach é do chomhlachtaí beaga dul in iomaíocht le comhlachtaí móra. Mar a luadh cheana, bheadh gá le caiteachas suntasach ar chistiú caipitil agus ar thraenáil pearsanra le r-thráchtáil a chur ar bun.



Fucus serratus

Faoi láthair san Ollainn agus sa Fhrainc is féidir le hothair dul i muinín teiripe mara mar leigheas coisctheach. D'fhéadfaí freisin go n-ordófaí tamall a chaitheamh in ionad teiripe mara ag an am a gcuirtear móbroáid ar dhuine; déanann othar freastal ar an ionad ar feadh seachtaine roimh an obráid leis an gcolainn a dhíthocsainiú agus an córas imdhíonachta a neartú. Tar éis na hobráide filleann an t-othar ar an ionad le teacht chuige féin. Dá nglacfaí leis an bpolasáí seo in Éirinn b'iontach an chabhair é do thionscal teiripe mara na tíre.

Is iad na gnéithe is mó a theastóid maidir le teiripe mara: timpeallacht tuaithe, ciúnas, aer na farraige, aclaíocht, cóireáil agus folcadh, aiste bia agus scíth. Leis na gnéithe seo bheadh an tionscal teiripe mara an-oiriúnach le tionscal dúchasach inbhuanaithe a bhunú i gceantair tuaithe cois farraige. Tá an modh maireachtála seo, bunaithe ar an bhfarraige, an-tarraingteach do go leor daoine. D'fhéadfadh ról an-mhór freisin a bheith ag r-thráchtáil sa 'turasóireacht uilíoch' seo. Tá go leor daoine, ar mian leo cóireáil den chineál seo, sásta taisteal agus suimeanna móra airgid a chaitheamh agus teacht air tríd an Idirlíon. Arís bheadh gá le cistiú chun traenáil a chur ar fáil le r-thráchtáil éifeachtach a chur ar bun.

4 : Potential Uses

4.1. Biochemistry and Biomedicine

4.1.1. General

For several years now the idea of setting up seaweed based biochemistry or biomedical industries in Ireland has been gaining credence. There are many and varied proven applications of seaweed in this area.

A preliminary list of the biotechnological/biomedical applications of **laminarans** (extracts from kelp) includes:

- Stimulation of the immune system
- Inhibition of tumour growth/reduction in tumour size
- Wound healing
- Reduction of serum cholesterol levels
- Anti-inflammatory activity
- Transplantation immunology
- Therapeutic and prophylactic effects
- Increases resistance to bacterial, viral and parasitic infections (prevent infection after surgery)
- Prevention of opportunistic infections in immunocompromised individuals (HIV sufferers, geriatric patients etc.)
- Development of immunisation strategies
- Chelation therapy to remove heavy metals
- Nutraceutical properties (see 4.1.2)
- Anti-oxidant properties

In addition to laminarans, several other polysaccharides found in different seaweeds could be utilised in the future. It is easy to see from this list that seaweed based compounds are highly likely to play a major role in the biochemistry of the future and that a country with established industry and innovation in this area will be well placed to take advantage of this.

Among the many factors currently in place in Ireland that make this an opportune time to initiate such a venture is the presence of a wealth of expertise in this area that is being underused. Young researchers involved in this area in Ireland should be given opportunities to stay in Ireland and to continue work in this field rather than going abroad and/or changing their speciality.

Faced with the array of possibilities, it is strongly advised that one or two applications are chosen upon which to concentrate. Intensive R&D will be required to bring these products to marketable standard as quality standards are understandably high with regards to these products. Care must be taken in choosing which products on which to focus, taking into account similar products that are being developed overseas. It should be noted that this market is dominated by large multinationals with large budgets that have the potential to develop similar products and/or suppress existing ones.

A lack of public knowledge of seaweed applications in this area has led to a lack of entrepreneurs interested in developing marketable products in this sector. A technology transfer initiative would be desirable to bridge this gap between theory and practice. Current initiatives such as the TTI programme being run by the Atlantic University Alliance (NUI, Galway, NUI, Cork and UL), should be expanded and adequately funded to facilitate maximum possible market penetration in the shortest possible amount of time.

4 : Úsáidí Poitéinsiúla

4.1. Bithcheimic agus Bithleigheas

4.1.1. Ginearálta

Le beagán blianta tá daoine ag smaoineamh ar thionscail bhithcheimice agus bhithleigheis bunaithe ar an bhfeamainn, a bhunú anseo. Is iomaí úsáid ilghnéitheach is féidir a bhaint as feamainn san earnáil seo.

Ar liosta d'úsáidí biteicniúla/bithleigheis de **laminarain** (eastósc ó cheilp) tá:

- Spreagadh an chórais imdhíonachta
- Moilliú ar fhás siadaí/laghú i méid siadaí
- Leigheas créachtaí
- Laghdú ar leibhéil cholaistéaról séirim
- Gníomhú frith athlastach
- Imdhíonacht athphlandála
- Éifeacht theiripeach agus phróifíolacsach
- Méadaíonn ar an bhfríotaíocht d'ionfhabhtú baictéarach, víreasach agus seadánach (coisceann ionfhabhtú tar éis obráide)
- Cosc ar infhabhtú faille i ndaoine a mbeadh a gcóras imdhíonachta lag daoine le VEID, seandaoine agus eile
- Straitéisí imdhíonachta a fhorbairt
- Teiripe crágach le miotail thromha a thógáil as an gcolainn
- Cáilíochtaí nūtrasúiteacha
- Cáilíochtaí frithocsaídeoir

I dteannta laminaran, d'fhéadfaí roinnt eile polaisiúicraídí a bhíonn le fáil i gcineálacha éagsúla feamainne a úsáid amach anseo. Is furasta a fheiceáil ón liosta seo go mbeidh tábhacht mhór le cumaisc a thagann as feamainn le bithcheimic sa todhchaí, agus go mbeidh tír a bhfuil an tionscal seo bunaithe ann in ann leas a bhaint as.

In Éirinn faoi láthair tá cúinsí éagsúla a fhágann gur am feiliúnach é seo le fiontar den chineál seo a bhunú agus orthu seo tá an méid mór saineolais nach bhfuil á úsáid faoi láthair. Ba cheart go mbeadh ar chumas taighdeoirí óga atá ag plé leis an ábhar seo in Éirinn fanacht in Éirinn agus leanacht ar aghaidh ag obair leis an ábhar seo in áit dul thar lear nó/agus a n-ábhar taighde a athrú.



Feamainn ag fás sa tsaotharlann

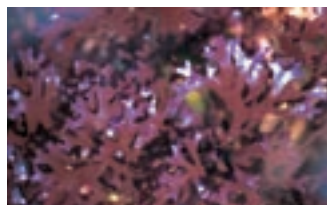
Leis an méid rogha atá ann, moltar go láidir go roghnófar feidhmiú amháin nó dhó ar a ndíreofar. Beidh gá le go leor taighde agus forbartha leis na táirgí seo a chur i gcruth margaidh, mar go bhfuil an caighdeán don mhargadh an-ard. Ní mór a bheith cúramach ag roghnú na dtáirgí a ndíreofar orthu, táirgí mar iad atá á bhforbairt thar lear a chur san áireamh. Is ceart a mheabhú go bhfuil an margadh seo faoi cheannas na gcomhlachtaí móra idirnáisiúnta a bhfuil neart airgid acu agus atá in ann a macasamhail de tháirgí a fhorbairt nó/agus táirgí atá ann a chur faoi chois.

Tá ganntan fiontraíthe ann a mbeadh spéis acu táirgí feamainne a fhorbairt don mhargadh sa réimse seo mar go bhfuil easpa eolais ar an bpobal maidir leis an rud is féidir a dhéanamh le feamainn san earnáil seo. B'innmholta an rud é scéim bhábhtála theicneolaíochta a bheith ann leis an mbearna seo idir teoiric agus cleachtas a líonadh. Ba cheart cláir ar nós an chláir TTI atá ar siúl ag Comhaontas na nOllscoileanna Atlantacha (Ollscoil na hÉireann, Gaillimh, Ollscoil na hÉireann, Corcaigh agus Ollscoil Luimnigh) a leathnú amach agus a chistiú, le cur ar a gcumas an sciar is fearr den mhargadh a bhaint amach chomh luath agus is féidir.

4 : Potential Uses

4.1.2. Nutraceuticals

Nutraceuticals or 'functional foods' are commercially available products containing active ingredients derived from natural sources that are claimed to have medicinal qualities. These may be marketed as dietary supplements to be taken separately or as added ingredients to food products. Polysaccharides, such as alginates and carrageenans, which are found in seaweeds, are currently used in many foods, often for their 'non-fat' properties, in addition to reported immunostimulatory properties. Carotenoids, found in all algae, are used as natural food colours and confer added benefits of having anti-oxidant properties and being a source of vitamin A. Other areas of great interest include oligosaccharides (short chains of sugars); these may be obtained from polysaccharides, such as those found in seaweeds, using enzymatic techniques. Different seaweeds would produce different sets of oligosaccharides, which display different bio-activities. Since considerable expertise in many of these areas already exists in Ireland, further research and development should be directed at this increasingly lucrative international market.



Chondrus crispus

4.2. Aquaculture

Several of the sectors, notably the sea-vegetable sector, currently suffer as a result of an under-supplied market. One of the methods of alleviating this problem is to cultivate the necessary seaweed. Ireland already has one fully operational seaweed farm that has been developed with the help of the ISIO and Údarás na Gaeltachta. This farm grows a seaweed to niche markets overseas in the pharmaceutical industry. Licences have been issued for two additional farms to be established in 2000.

Trials have shown the suitability of other species (mainly *Alaria esculenta* and *Palmaria palmata*) for growth under artificial conditions. As has been stated earlier, it is felt that the creation of jobs in the aquaculture sector would be more viable than trying to entice people into a job that is season, tide and weather dependent and that may not be as financially lucrative as other available careers. The development of seaweed aquaculture is currently being promoted by Bord Iascaigh Mhara and with its help there will be at least two commercial seaweed farms up and running by mid 2001. There will also be a commercial hatchery in operation within the same timeframe. This should contribute to a larger, more regular and predictable supply.

However, the growth of seaweed aquaculture in this country will have to be accelerated for it to meet the expected growth in demand that will be brought on by a marketing campaign. At present, while there is considerable interest in the possibilities presented by seaweed aquaculture among fishermen wishing to diversify, the current lack of cohesion in this new area, together with the considerable initial investment required, are proving stumbling blocks for many people. The support of BIM, Údarás na Gaeltachta and the ISIO is a great help in this regard but more capital funding would put the seaweed aquaculture industry on a much stronger footing than at present.

4.3. Biopolymers

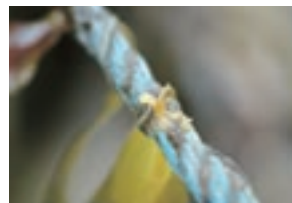
A serious weakness that has existed in the past has been the reliance of the Irish seaweed industry on processors outside the State. This has been very evident in the *Ascophyllum* industry where for years the entire Irish industry was completely dependent on one company in Scotland that bought all of their raw material. Exports of *Ascophyllum* from Ireland for alginate production has fallen off dramatically in the last few years. The main reason for this is competitive problems in the alginate industry world-wide.

4 : Úsáidí Poitéinsiúla

4.1.2. Nútrasúiteceáin

Ciallaíonn nútrasúiteceáin nó 'feidhmbhia' táirgí atá ar an margadh, ina bhfuil comhábhair a thagann as foinsí nádúrtha agus a ndeirtear fúthu go bhfuil cáilíochtaí leighis acu. D'fhéadfaí iad seo a chur ar an margadh mar bhreiseáin chothaithe a bheadh le caitheamh astu féin nó mar chomhábhair a chuirfí le bia. Baintear úsáid as polaisiúicrídí, ar nós ailgionáití agus carraigín, a fhaightear i bhfeamainn, in go leor cineálacha bia faoi láthair, mar gheall ar a gcáilíochtaí 'neamhshailleach' agus mar gheall ar cháilíochtaí spreagtha don chóras imdhionachta. Baintear úsáid as caraitéanóid, a bhíonn le fáil i ngach alga, mar dhath nádúrtha bia; tá de bhuntáiste aige freisin gur frithocsáideoir é agus go soláthraíonn sé vitimín A. Réimsí eile inspéise is ea olagaisiúicrídí (slabhraí gearra siúcra); is féidir iad seo a fháil as polaisiúicrídí, ar nós na gceann a bhíonn le fáil san fheamainn, ag úsáid teicnící einsimeacha. Bheadh olagaisiúicrídí difriúla le fáil ó chineálacha difriúla feamainne, a léiríonn bithghníomhaíocht dhifriúil. Ó tharla go bhfuil cuimse eolais maidir leis na hábhair seo ar fáil in Éirinn cheana féin, ba cheart taighde agus forbairt a dhírú ar an mír luachmhar seo den mhargadh domhanda.

4.2. Feirmeoireacht Mhara



Feamainn óg ag fás ar rópa

Tá roinnt earnálacha, go háirithe glasraí mara, faoi mhíbhuntáiste de bharr ganntain soláthair don mhargadh. Bealach amháin chun é seo a chur ina cheart is ea an fheamainn chuí a shaothrú. Tá feirm feamainne amháin in Éirinn cheana féin, a rinneadh a fhorbairt trí chabhair ón ISIO agus Údarás na Gaeltachta. Saothraíonn an fheirm seo feamainn do mhíreanna faoi leith den mhargadh thar lear i dtionscal na cógaseolaíochta. Tá ceadúnais tugtha don dhá fheirm eile atá le bunú sa bhliain 2000.

Léiríonn tástálacha chomh feiliúnach atá speicis eile (go háirithe *Alaria esculenta* agus *Palmaria palmata*) le fás go saorga. Mar a dúradh cheana, meastar go mbeadh sé níos indéanta fostaíocht a chur ar fáil san earnáil feirmeoireachta mara ná a bheith ag iarraidh daoine a mhealladh isteach i bhfostaíocht atá ag brath ar an séasúr, ar an taoide agus ar an aimsir agus nach mbeadh an teacht isteach céanna as agus a bheadh as fostaíocht eile atá le fáil. Tá feirmeoireacht mhara á cur chun cinn ag Bord Iascaigh Mhara agus lena chabhair beidh dhá fheirm feamainne bunaithe faoi lár 2001. Beidh gortlann tráchtála ag obair freisin le linn an ama cheánna. Ba cheart go gcabhródh sé seo le soláthar níos mó, níos rialta agus níos cinnte a chur ar fáil.

Ach ní mór luas a chur faoin bhfeirmeoireacht feamainne sa tír seo le go mbeadh sé in ann freagairt don éileamh a mheastar a thiocthaí as feachtas margaióchta. Faoi láthair tá spéis á cur san fheirmeoireacht feamainne ag iascaí ar mian leo éagsúlú, ach cuireann an easpa aontachta san earnáil seo agus an infheistíocht is gá a dhéanamh ó thús, laghmhisneach ar go leor. Is cabhair mhór an tacaíocht atá á tabhairt ag BIM, Údarás na Gaeltachta, agus ISIO ach chuirfeadh tuilleadh cistithe chaipitil tionscal na feirmeoireachta feamainne mara ar bhonn níos láidre ná mar atá sé faoi láthair.

4.3 Bithpholaiméirí

Laige mhór a bhí ann go dtí seo go raibh tionscal feamainne na hÉireann ag brath ar phróiseálaithe taobh amuigh den Stát. Tá sé seo an-soiléir i dtionscal an *Ascophyllum* ina raibh an tionscal iomlán ag brath ar chomhlacht amháin in Albain a cheannaigh an t-amhábhar ar fad. Tá laghdú mór tagtha ar easportáil *Ascophyllum* as Éirinn le haghaidh táirgeadh ailgionáite le blianta beaga anuas. Is í an phríomhchúis leis seo fadhbanna iomaíochta sa tionscal ailgionáite domhanda.

4 : Potential Uses

The establishment of processing in Ireland would not only reduce foreign dependence but will increase dramatically the overall contribution of the industry to GNP by taking advantage of the value-added end of the market. Apart from the basic income from the sale of the alginate, extra employment and secondary industries would also be generated. Ireland has enough biomass to support a large alginate plant and when some imported seaweed is added to this to produce a variety of alginate types, the total value of the alginate produced would be of considerable value to the Irish economy. This process would require large volumes of brown seaweed, mostly *Ascophyllum nodosum* and kelps, which are available in sufficient harvestable quantities in Ireland. An increase in the amount of seaweed being harvested would be required.

One way that this could be achieved would be with the introduction of mechanical harvesting. There is some uncertainty as to whether this option would be financially viable in Ireland. Certainly it seems that the machine currently used in Norway for the harvesting of *Ascophyllum* has serious questions over its efficiency in Irish waters due to the differences in the coastline (fjords vs. rocky outcrops). Research and development of new machinery to harvest both *Ascophyllum* and kelps should be undertaken leading to efficient harvesting technology that would be appropriate to Irish waters. The long-term environmental effects of mechanical harvesting should also be monitored. The other major factor that would be required to begin processing of alginates in this country would be significant private investment. Not only could such a plant produce marine hydrocolloids but also several other commercially important natural products.



Ascophyllum nodosum

The establishment of a Seaweed Research Institute and the funding of biopolymer research in Galway and Cork, would assist in the development of value-added products and new applications of these products in this area also. This Institute could operate in a way similar to that of CEVA (Centre d'Etudes et de Valorisation des Algues) in France or the Biopolymer Research Unit in Norway. The development of this Institute and the establishment of a hydrocolloid processing plant within Ireland could contribute extensively towards the development of the Irish Seaweed Industry with a particular focus on value-added products.

Norway was well prepared for this change in the market as it had, by means of investment in research, managed to monopolise the higher end of the market. This was largely achieved by the University of Trondheim's Biopolymer Research Unit. At present, Ireland uses at least 500 tonnes of imported alginates in the food industry (Hession & Guiry, unpublished report). Biotechnological applications of alginates require much higher-grade, tailored alginates that might be developed using gene technologies. Such alginates would have a competitive advantage and would command considerably higher prices on the world markets. Alginates are eminently biodegradable and demonstrably 'natural' and could be used to replace a whole range of materials that are currently difficult to recycle.

Carrageenan and Agar are the other two most important marine hydrocolloids. Although there is insufficient raw material to support even a small processing plant for either product, the possibility of adapting a modern alginate plant using the latest technologies to manufacture carrageenan and agar from imported material may be worth exploring.

4 : Úsáidí Poitéinsiúla

Dá ndéanfaí an phróiseáil in Éirinn, laghdódh sé an spleáchas ar thíortha eile agus mhéadódh sé go mór sciar an tionscail don OTN trí bhuntáiste a bhaint an mír bhreisluaicha an mhargaidh. Gan bacadh leis an ioncam ó dhíol na hailgionáite, ghinfí fostaíocht bhreise agus tionscail thánaisteacha dá bharr freisin. Tá dóthain bithmhaise in Éirinn le monarcha mhór algionáite a chothú agus nuair a chuirfí roinnt feamainne iomportáilte leis seo le héagsúlacht ailgionáite a chur ar fáil, ba mhór ab fhiú luach na hailgionáite sin d'eacnamaíocht na hÉireann. Theastódh toirt mhór den fheamainn dhonn, *Ascophyllum nodosum* agus ceilp, den chuid is mó, atá le fáil go fairsing in Éirinn. Bheadh gá leis an méid feamainne a bhaintear a mhéadú.

Bealach amháin chun é seo a dhéanamh is ea an fheamainn a bhaint go meicniúil. Tá éiginnteacht áirithe ann an mbeadh sé seo indéanta in Éirinn ó thaobh airgid de. Cinnte is cosúil go mbeadh deacrachtaí móra, maidir le héifeachtúlacht in uisce na hÉireann, ag baint leis an meaisín a mbaintear úsáid as san Ioruaidh le *hAscophyllum* a bhaint, mar gheall ar na difríochtaí idir an dá chineál cósta (fiordanna vs. lomáin charraige). Ní foláir taighde agus forbairt a dhéanamh ar mheaisín nua a bhainfeadh *Ascophyllum* agus ceilp go héifeachtach ar chóstaí na hÉireann. Ba cheart súil a choinneáil freisin ar an tionchar fadtéarmach a bheadh ag baint mheicniúil ar an timpeallacht. Is é an mórchúine eile a mbeadh gá leis le hailgionáit a tháirgeadh sa tír seo infheistíocht phríobháideach. Ní hamháin go mbeadh ar chumas na monarchan sin hidreacollóidigh mhara a tháirgeadh, ach táirgí nádúrtha eile a mbeadh tábhacht tráchtála leo.

Le bunú Institiúide Taighde Feamainne agus cistiú taighde bithpholaiméirí i nGaillimh agus i gCorcaigh, chabhródh sé táirgí breisluaicha agus úsáidí nua as na táirgí seo a fhorbairt. D'fhéadfadh an Institiúid seo feidhmiú cosúil le CEVA (Centre d'Etudes et de Valorisation des Algues) sa Fhrainc nó an tAonad Taighde Bithpholaiméirí san Ioruaidh. Chuirfeadh forbairt na hInstitiúide seo agus bunú monarchan próiseála hidreacollóidigh go mór le forbairt Thionscail Feamainne na hÉireann agus é dírithe ar tháirgí breisluaicha.

Bhí an Ioruaidh réidh don athrú seo sa mhargadh, mar go raibh an chuid uachtarach den mhargadh cúnneáilte aici, trí infheistíocht i dtaighde. Rannóg Taighde Bithpholaiméirí Ollscoil Trondheim ba chúis leis seo. Faoi láthair úsáideann Éire ar a laghad 500 tonna ailgionáite a iomportáiltear i dtionscail an bhia (Hession & Guiry, tuarascáil neamhfhoilsithe). Teastaíonn ailgionáit de chaihdeán níos airde, a d'fhéadfaí a fhorbairt trí theicneolaíocht géine, le hailgionáit a úsáid go biteicneolaíoch. Bheadh buntáiste ag ailgionáit den chineál seo ar an margadh agus d'éileodh sé praghas níos airde ar an margadh domhanda. Tá ailgionáit in-bhithdhíghrádaithe agus tá sé inchruithaithe go bhfuil sé 'nádúrtha' agus d'fhéadfaí é a úsáid in áit go leor ábhar atá deacair a athchúrsáil faoi láthair.



Mastocarpus stellatus - Carraigín

Is iad Carraigínín agus Agar an dá hidreacollóidigh mara eile is tábhachtaí. Cé nach bhfuil dóthain amhábhair ar fáil le fiú amháin monarcha bheag a chothú i gceachtar táirge acu, is fiú a scrúdú an féidir carraigínín agus agar a tháirgeadh ag úsáid ábhair iomportáilte, trí mhonarcha nua-aoiseach ailgionáite a chur in oiriúint le teicneolaíocht nua-aoiseach.

5 : Recommendations

The National Seaweed Forum recommends that:

1. A Seaweed Research Institute should be established as a regionally based centre of excellence with links to research centres, industry and development agencies. Its main objective will be to select a number of key commercial ideas for development in areas such as aquaculture, harvesting, biotechnology, biomedicine, nutraceuticals and biopolymers. Commercially exploitable species should be identified, quantified and mapped by the Institute.
2. BIM should establish a Seaweed Development Section, also to be regionally based, to promote sustainable harvesting and cultivation of seaweed, to assist with direct marketing initiatives and to co-ordinate investment from State, EU and private sectors. This section will work in conjunction with other relevant State agencies and the industry's representative body, the ISIO.
3. The Marine Institute should appoint dedicated seaweed personnel to promote research, development, technology and innovation in the seaweed sector.
4. Arramara Teo, given its unique strategic position in seaweed processing, should be assisted and its role expanded, to develop and diversify into new, related, commercially sustainable undertakings. In this regard, the company should be appropriately supported to reconcile the objectives of its shareholders with its proposed development role.
5. Ways of increasing the income of the harvesters should be investigated to ensure long-term continuity of supply of raw material (Social Welfare measures / EU subsidies / foreshore subsidy etc.) and that entrepreneurs are facilitated by the greater efficiency and transparency in licensing procedures. Adequate funding should be provided to the relevant departments to facilitate this.
6. Technology transfer opportunities should be identified and current initiatives should be expanded and adequately funded.
7. Pilot aquaculture projects should be assisted by relevant State Agencies and regulatory bodies in order to examine the technical and economic feasibility of culture of selected species under Irish conditions.
8. Accessible education programmes for harvesters and potential harvesters should be undertaken to cover the areas of sustainable harvesting and drying methods, legalities of harvesting and aquaculture methods and practicalities.
9. Quality Standards and Organic Processing Standards for seaweed should be designed and subject to independent audit. The existence of these standards should be promoted as part of the public awareness campaign (see recommendation 10).
10. A public awareness campaign should be carried out to highlight the value of seaweeds in nutrition, health, lifestyle, horticulture, agriculture, biochemistry, biomedical and industrial settings. Care should also be taken to stress the sustainability and environmental friendliness of the harvesting and culture methods used.
11. The main infrastructural requirements of the sector (e.g., roads and piers) should be assessed and improved with cost provisions provided where appropriate.
12. The seaweed industry representative body (currently the Irish Seaweed Industry Organisation) should continue to be recognised as representative of the seaweed sector and consulted accordingly at a national level.



Ralfsia verrucosa

5 : Moltaí

Molann an Fóram Náisiúnta Feamainne:

1. Go mbunófaí Institiúid Taighde Feamainne mar ionad réigiúnach feabhais agus é nasccha le hionaid taighde, tionsclaíocht agus áisíneachtaí forbartha. Is é is príomhaidhm dó roinnt tionscnamh tráchtála a roghnú in earnálacha ar nós: feirmeoireacht mhara, baint, biteicneolaíocht, bithleigheas, núsárúiteáin agus bithpholaiméirí. Ba cheart don Institiúid speicis thráchtála insaothraithe a aithint, a chainníochtú agus a léirscailliú.
2. Gur chóir do BIM Rannóg Forbartha Feamainne a bhunú, bunaithe go réigiúnda freisin, le baint agus saothrú na feamainne ar bhonn inbhuanaithe, a chur chun cinn, d'fhonn cabhrú le tionscnaimh dhíreacha mhargaíochta agus le comhordú a dhéanamh ar infheistíocht ón Stát, ón AE agus ón earnáil phríobháideach. Oibreoidh an rannóg seo i gcomhar le háisíneachtaí eile Stáit agus le heagraíocht ionadaíoch an tionscail, ISIO.
3. Gur chóir don Institiúid Mara daoine atá dáiríre faoi fheamainn a cheapadh le taighde, forbairt, teicneolaíocht agus nuáil a chur chun cinn san earnáil feamainne.
4. Gur chóir cabhrú le Arramara Teo, toisc an áit faoi leith atá aige i dtionscal na feamainne, agus méadú a dhéanamh ar an gcineál oibre a dhéanann sé, le cur ar a chumas forbairt agus éagsúlú maidir le tionscnaimh nua ghaolmhara agus inbhuanaithe. Ina theannta seo, ba cheart tacú leis an gcomhlacht ionas nach mbeadh aidhmeanna a scarshealbhóirí ag teacht salach ar an ról nua forbartha a bheadh aige.
5. Gur chóir fiosrú a dhéanamh ar bhealaí le hioncam na mbainteoírí a mhéadú, ionas go gcinnteofaí soláthairtí fadtéarma den amháibhar (seifteanna Leasa Shóisialaigh, fóirdheontais AE, fóirdheontais thrúthra agus eile) agus go ndéanfaí éascaíocht d'fhiontraíthe trí éifeachtacht agus soiléireacht an chórais ceadúnais. Chuige seo ba cheart dóthain cistithe a chur ar fáil do na ranna i gceist.
6. Gur chóir deiseanna aistrithe teicneolaíochta a aithint agus gur cheart na tionscnaimh atá ann faoi láthair a mhéadú agus a chistiú mar is cúí.
7. Gur chóir d'Áisíneachtaí Stáit agus rialacháin cabhrú le tionscnaimh phíolótacha feirmeoireachta mara, d'fhonn na féidearthachtaí teicniúla agus eacnamúla a bhainfeadh le saothrú cineálacha áirithe feamainne, faoi dhálaf na hÉireann, a scrúdú.
8. Gur chóir tabhairt faoi chúrsaí oideachais insroichte do bhainteoírí, a chlúdódh baint inbhuanaithe agus bealaí triomaithe, cúrsaí dlí agus baint feamainne, agus modhanna feirmeoireachta mara agus gnéithe praiticiúla den fheirmeoireacht mhara.
9. Gur chóir Caighdeáin Cháilíochta agus Caighdeán Próiseála Orgánaí d'fheamainn a leagan síos agus é a bheith faoi smacht ag cigireacht neamhspleách. Ba chóir na caighdeáin seo a chur ar eolas an phobail mar chuid den fheachtas poiblí eolais (féach moladh 10).
10. Gur chóir feachtas a chur ar bun chun eolas a thabhairt don phobal maidir leis an leas a bhaineann le feamainn i gcúrsaí bia, sláinte, slí mhaireachála, garraíodóireachta, talmhaíochta, bithcheimice, bithleigheas agus tionsclaíochta. Ba cheart béim a chur freisin ar inbhuanaitheacht agus ar chineáltas don timpeallacht a bhaineann leis na modhanna bainte agus saothraithe a bhíonn in úsáid.
11. Gur chóir an bonneagar a bhaineann leis an earnáil (m.sh. bóithre agus céanna) a mheas agus a fheabhsú leis an gcistiú is gá.
12. Gur chóir leanacht ar aghaidh ag tabhairt aitheantais d'eagraíocht thionscal na feamainne (faoi láthair Eagraíocht Thionscal Feamainne na hÉireann, an ISIO) mar ionadaí ar earnáil na feamainne, agus dul i gcomhairle leis ar leibhéal náisiúnta.

5 : Recommendations



Aquaculture of nori in Japan

Table 2.
Priority areas
for research
and
development.

Priority Areas for Research and Development

New products

For SMEs to compete effectively on a global scale considerable research, development, technology and innovation is required to develop novel or unique products. New products must be developed for both the bulk species and also for the low volume/high value end of the market

New processing techniques and machinery

Techniques currently in use, particularly those used in the processing of bulk species are old and outdated. R&D in this area could make a significant contribution to the efficiency of many companies.

Applications

Many of the seaweed species currently harvested have possible applications other than those currently exploited in Ireland. An example of this is the opportunity presented by the biomedicine and biochemistry fields but there are several areas that should be investigated.

Harvesting machinery

The development of cost efficient mechanical harvesters for bulk species, that are suitable for use in Irish weather conditions and on the Irish coastline would have a significant impact on the industry in Ireland.

Aquaculture

The development of commercial aquaculture, particularly in the sea-vegetable sector, will provide the regularity and predictability of supply that is required for an SME to compete internationally. The use of aquaculture to supply particular seaweeds to niche markets is another potentially lucrative area that should be investigated.

Harvesting techniques with an emphasis on sustainability and environmental impacts

The current study on the impact of hand and mechanical harvesting on beds of *Ascophyllum nodosum* and its associated biodiversity is an example of the sort of study that is required. Similar studies should be carried out on all commercially harvested species.

Resource surveys for commercial species

To allow the industry to plan for the future a certain degree of knowledge of the extent of the resource at its disposal is required. Commercially exploitable species should be identified, quantified and mapped.

Extraction procedures

Liquid seaweed extracts and biopolymers are two of the areas that would benefit greatly from refinement of extraction procedures. In an industrial context streamlining in this area would lead to significant financial savings.

Mineral and vitamin content

Consumers are becoming more and more aware of the vitamin and mineral content of the foods that they eat. At present accurate information on these levels is not available to sea-vegetable producers. This is partly due to significant variations in the contents according to season, geographical location and other factors. These variations and the factors that influence them should be investigated. Possible variations in the content of cultivated seaweed should also be investigated.

Heavy metal content

The fact that consumers are demanding more information means that accurate knowledge of the heavy metal content of Irish seaweeds is required to market products particularly in the highly competitive American market.

Maërl

This sector has several R&D requirements that are exclusive to it. Assessment of status of beds in terms of whether the material in them is alive or dead and growing *in situ* or drifting into areas is required. As with other species mapping and assessment of the impacts of harvesting are also required.

Evidence to back up anecdotal claims.

Sound scientific research is required to legitimise observed results.

5 : Moltaí

Tábla 2.
Réimsí tús áite
i dtaighde agus
forbairt

Réimsí Tús Áite i dTaighde agus Forbairt

Táirgí nua

Bíonn gá le taighde, forbairt, teicneolaíocht agus nuáil le táirgí inspéise nó uathúla a fhorbairt chun go mbeadh comhlachtaí in ann dul san iomaíocht ar scála domhanda. Ní mór táirgí nua a fhorbairt le haghaidh an bhulcmhargaidh agus don mhargadh beagmhéid/ardluacha.

Teicnící agus meaisíní próiseála nua

Tá na teicnící a úsáidtear faoi láthair, go háirithe i bpróiseáil na mbulcspeiceas, sean agus as dáta. D'fhéadfadh taighde agus forbairt sa réimse seo difríocht mhór a dhéanamh d'éifeachtúlacht a lán comhlachtaí.

Feidhmeanna

Tá feidhmeanna eile seachas iad sin atá ann faoi láthair ag go leor de na speicis feamainne atá á mbaint in Éirinn. Sampla de seo is ea an deis a chuireann bithleigheas agus bithcheimic ar fáil. Tá roinnt eile ba chóir a fhiosrú.

Innealra bainte

Ba chabhair mhór don tionscal in Éirinn meaisíní bainte do bhulcspeicis a bheadh éifeachtúil ó thaobh costais de, a bheadh feilúnach d'aimsir na hÉireann agus do chósta na hÉireann, a fhorbairt.

Feirmeoireacht mhara

Le forbairt na feirmeoireachta mara, go háirithe san earnáil glasraí mara, beidh ar chumas comhlachtaí soláthairtí a fháil go rialta le dul san iomaíocht go hidirnáisiúnta. Ba cheart féachaint freisin ar an úsáid a d'fhéadfaí a bhaint as feirmeoireacht mhara le feamainn a chur ar fáil do mhargáí beaga faoi leith a mbeadh ardluach orthu.

Bealaí bainte, agus an bhéim ar inbhuanaitheacht agus ar thionchar thimpeallachta

Is sampla den chineál staidéir a bhfuil gá leis an staidéir atá á dhéanamh faoi láthair ar an tionchar atá ag modhanna bainte láimhe agus meicniúla ar leapacha *Ascophyllum nodosum* agus an bhitheagsúlacht a bhaineann leis. Ba cheart staidéir mar é a dhéanamh ar gach speiceas a bhaintear.

Suirbhéanna acmhainní ar speicis tráchtála

Ionas go mbeidh an tionscal in ann pleanáil don todhcháí, ní mór roinnt eolais maidir le méid na hacmhainne atá ar fáil a bheith aige. Ba chóir speicis tráchtála a aithint, a chainníochtú agus a léirscáiliú.

Bealaí eastóscha

Tá eastósca leachtacha feamainne agus bithpholaiméirí ar an dá rud is mó a bhainfeadh leas as feabhas a chur ar bhealaí eastóscha. I gcomhthéacs an tionscail, bheadh sábháil mhór airgid i gceist le simpliú den chineál seo.

Toilleadh mianraí agus vitimíní

Tá tomhaltóirí ag éirí níos airdeallaí ar na vitimíní agus na mianraí a bhíonn ina gcuid bia. Faoi láthair níl eolas cruinn den chineál seo ar fáil ag táirgeoirí glasraí mara. Cuid den chúis is ea go mbiann difríochtaí móra idir na glasraí ag brath ar an séasúr, an suíomh geografach agus ar chúinsí eile. Ba chóir na héagsúlachtaí seo agus na cúinsí a bhfuil tionchar acu orthu a fhiosrú. Ba chóir éagsúlachtaí maidir le feamainn feirme a fhiosrú freisin.

Toilleadh trom-mhiotail

Toisc tomhaltóirí a bheith ag iarraidh tuilleadh eolais, tá gá le heolas cruinn maidir leis an toilleadh trom-mhiotail atá i bhfeamainn na hÉireann, le táirgí a dhíol go háirithe ar mhargadh iomaíoch na Stát Aontaithe.

Griúán

Tá riachtanais taighde agus forbartha ag an earnáil seo nach bhfuil ag aon cheann eile. Is gá a dhéanamh amach an bhfuil an t-ábhar sna leapacha beo nó marbh agus an bhfuil sé ag fás ann nó ar thug sruth ann as áit éigin eile é. Ar nós na speiceas eile, tá gá le léirscáiliú agus measúnú ar thionchar an bhailithe.

Cruthúnas chun maíomh starógach a fhíorú.

Teastaíonn taighde eolaíoch chun torthaí a breathnaíodh a dhlisteanú.

Appendix I

National Seaweed Forum Personnel

FORUM MEMBERS

Dr Henry Lyons (Chairman)	Institute of Technology, Tralee and Kerry Algae
Mr Graham Casburn	Seaweed Ltd., Co. Galway
Mr Declan Clarke	Bord Iascaigh Mhara
Mr Val Clarke	Harvester, Co. Galway
Mr Micheál Ó Corrduibh	Údarás na Gaeltachta
Prof. Michael Guiry	Martin Ryan Marine Science Institute, NUI, Galway
Dr John Joyce	Marine Institute
Ms Lorna Kelly	Irish Seaweed Industry Organisation
Mr David Lennon	Nominated by Senator Frank Chambers, Co. Mayo
Mr Séamus McGarvey	Arramara Teoranta, Co. Tír Chonaill & Co. na Gaillimhe
Mr Frank Melvin	Carraig Fhada Seaweed, Co. Sligo
Ms Kaye Mulrooney	Seavite Bodycare Ltd., Co. Galway
Mr Declan O'Rourke	Coastal Zone Administration Division, Dept. of the Marine and Natural Resources Roaringwater Bay Seaweed Co-operative, Co. Cork
Ms Diana Pitcher	Celtic Sea Minerals, Co. Cork
Mr Michael Ryan	Chemistry Dept., NUI, Galway
Dr Angela Savage	Department of Plant Science, NUI, Cork
Dr Pádraig Whelan	
SECRETARIAT (ISIO, NUI, GALWAY)	
Ms Eilís Nic Dhonncha	Report Writing and Realisation/Administration
Mr Jim Morrissey	Recording Secretary
Irish Dept., NUI, Galway	Translation
Prof. Michael Guiry, Mr Stefan Kraan, Mr Aengus McMahon, Dr John Huisman A&D	Photography (All copyrights held by individual photographers) Design

Aguisín I

Pearsanra an Fhórait Náisiúnta Feamainne

BAILL AN FHÓRAIM

An Dr Anraoi Ó Liatháin (Cathaoirleach)	Institiúid Teicneolaíochta, Trá Lí agus Kerry Algae
Graham Casburn	Seaweed Ltd. Co. na Gaillimhe
Deaglán Ó Cléirigh	Bord Iascaigh Mhara
Val Ó Cléirigh	Bainteoir, Co. na Gaillimhe
Micheál Ó Corrduibh	Údarás na Gaeltachta
An tOll. Micheál Ó Gadhra	Institiúid Mhuireolaíochta Mháirtín Uí Riain, Ollscoil na hÉireann, Gaillimh
An Dr. Seán Seoighe	Foras na Mara
Lorna Ni Cheallaigh	Cumann Thionscal Feamainne na hÉireann
Dáithí Ó Linnáin	Arna ainmiú ag an Seanadóir Frank Chambers, Co. Mhaigh Eo
Séamus Mac Gairbhith	Arramara Teoranta, Co. Thír Chonaill & Co. na Gaillimhe
Proinsias Melvin	Carraig Fhada Seaweed, Co. Shligigh
Kaye Mulrooney	Seavite Bodycare Ltd., Co. na Gaillimhe
Deaglán Ó Ruairc	Rannóg Riaracháin Crios an Chósta, Roinn na Mara agus Acmhainní Náidúrtha Roaringwater Bay Seaweed Co-operative, Co. Chorcaí
Diana Pitcher	Celtic Sea Minerals, Co. Chorcaí
Micheál Ó Riain	Roinn na Ceimice, Ollscoil na hÉireann, Gaillimh
An Dr Aingéal Ní Shamhaois	Roinn na Plandeolaíochta, Ollscoil na hÉireann, Corcaigh
An Dr Pádraig Ó Faoláin	
RÚNAITHE (ISIO, OLLSCOIL NA hÉIREANN, GAILLIMH)	
Eilís Nic Dhonncha	Scriobh agus Réadú na tuarascála/Riarachán
Séamus Ó Muiríosa	Rúnaí taifeadta
Roinn na Gaeilge, OÉ, Gaillimh	Aistriúcháin
An tOll. Micheál Ó Gadhra, Stefan Kraan, Aengus Mac Mathúna, An Dr. John Huisman A&D	Grianghrafadóireach (Is ag na grianghrafadóirí aonair amháin atá an chóipcheart) Dearadh

Appendix II

Meetings and Presentations

MEETINGS OF THE NATIONAL SEAWEED FORUM

Friday 22nd October 1999	Ardilaun House Hotel, Taylor's Hill, Galway
Friday 26th November 1999	Martin Ryan Institute, NUI, Galway
Friday 14th January 2000	Quality Hotel, Oranmore, Co. Galway
Monday 28th February 2000	Quality Hotel, Oranmore, Co. Galway
Friday 31st March 2000	Ardilaun House Hotel, Taylor's Hill, Galway
Monday 8th May 2000	Quality Hotel, Oranmore, Co. Galway

PRESENTATIONS MADE TO THE NATIONAL SEAWEED FORUM

Ms Iris Van Zanten Irises Seaweed Centre	Thalassotherapy and uses of Seaweed in Cosmetics
Dr Maria Tuohy Department of Biochemistry, NUI, Galway	Applications of Seaweed in Biotechnology
Mr Ross Campbell Quest International Ltd.	Global Marine Hydrocolloid Market
Mr Séamus McGarvey Arramara Teoranta	Uses of Seaweed in Horticulture and Agriculture
Mr Michael Sweeney Dúchas	Marine Special Areas of Conservation (SACs) and how they will impact the seaweed sector.

Aguisín II

Cruinnithe agus Cur i Láthair

CRUINNITHE AN FHÓRAIM NÁISIÚNTA FEAMAINNE

Dé hAoine 22 D. Fómhair 1999	Óstán an Ardilaun, An Bóthar Ard, Gaillimh
Dé hAoine 26 Samhain 1999	Institiúid Mháirtín Uí Riain, Ollscoil na hÉireann, Gaillimh
Dé hAoine 14 Eanáir 2000	Quality Hotel, Órán Mór, Co. na Gaillimhe
Dé Luain 28 Feabhra 2000	Quality Hotel, Órán Mór, Co. na Gaillimhe
Dé hAoine 31 Márta 2000	Óstán an Ardilaun, An Bóthar Ard, Gaillimh
Dé Luain 8 Bealtaine 2000	Quality Hotel, Órán Mór, Co. na Gaillimhe

CUR I LÁTHAIR A RINNEADH DON FHÓRAM NÁISIÚNTA FEAMAINNE

Iris Van Zanten Irises Seaweed Centre	Teiripe Mara agus úsáid feamainne i gCosmaid
Dr. Maria Ní Thuathaigh Roinn na Bitheicimice, OÉ, Gaillimh	Úsáid feamainne i mBiteicneolaíocht
Ross Campbell Quest International Limited	Margadh Hidreacollóideach Mara Domhanda
Séamus Mac Gairbhith Arramara Teoranta	Úsáid feamainne i nGarraíodóireacht agus Talmhaíocht
Micheál Mac Suibhne Dúchas	CSC agus cé mar a chuirfidh siad isteach ar eamáil na feamainne



Appendix III

Submission Received

SUBMISSIONS WERE RECEIVED FROM THE FOLLOWING:

Peter Gillespie	Derrybeg, Co. Donegal.
Sinéad Malone	Network Services & Mobility, Aqua TT
Paul Mullins	Brandon Products Ltd.
Nicholas Paul	Waterford Sea Vegetables Ltd.
Peter PA Smith	Endocrine Laboratory, NUI, Dublin.
Michael Ward	Sliogéisc Mhic Dhara Teo.

Appendix IV

Legal Status of Seaweed Harvesting Rights

Seaweed Harvesting Rights: The Legal Position

As a general principle the onus of proving the existence in law, of a right, easement or beneficial interest claimed on foot of title to lands adjoining the foreshore rests with the claimant.

As the great majority of the foreshore is State owned, permission to exploit the benefits of a natural foreshore resource such as seaweed, is for the State to give or withhold in accordance with the provisions of the Foreshore Acts 1933 - 1998.

In certain areas the transfer of title to tenants which occurred on the break-up of large private estates, may have included seaweed harvesting rights. In practical terms the validity of such rights would depend directly on the express provisions of the title documents. It is not considered, however, that the enjoyment of such rights would be extensive and/or would not constitute a major impediment to the harvesting of seaweed in coastal areas.

Access to the Foreshore by Harvesters

While it is within the rights of a landowner to refuse permission to the foreshore via their property, alternative access may be available via public road or right of way. Access by sea from a local pier would also be commonly available. On areas of foreshore below the mean high water mark, adjoining landowners would not be considered to possess any veto on the activities which the state may sanction by way of a foreshore licence in consideration of the public interest.

Definition of Seaweed under the Foreshore Acts

In the Foreshore Act 1933, the definition of 'beach material' includes 'seaweed whether growing or rooted on the seashore or deposited or washed up thereon by the action of the tides, winds, and waves or any one of them'.

Under Section 3(1) the Minister is empowered to grant licences of foreshore for *inter alia*, 'to remove any beach material from such foreshore'. The level of return to the State for the material so removed is at the Minister's discretion. It is, therefore, considered that the *existing* powers at the Minister's disposal are adequate to cater for the licensing of or the grant of permission for the harvesting of seaweed.



Aquaculture in Japan

Aguisín III

Aighneachtaí a fuarthas

Fuarthas aighneachtaí uathu seo a leanas:

Peadar Mac Giolla Easpaig	Doiri Beaga, Co. Dhún na nGall
Sinéad Ní Mhaoileoin	Network Services & Mobility, Aqua TT
Pól Ó Maoláin	Brandon Products Ltd.
Níoclás Paul	Waterford Sea Vegetables Ltd.
Peadar PA Mac Gabhann	Endocrine Laboratory, Ollscoil na hÉireann, Baile Átha Cliath
Micheál Mac an Bháird	Sliogéisc Mhic Dara Teo.

Aguisín IV

Stádas Dílíthiúil maidir le Ceart Bainte Feamainne

Ceartha bainte feamainne: Stádas Dílíthiúil

Go hiondúil, is ar an éilitheoir a bhíonn a chruthú go bhfuil ceart, éasúint, nó leas tairbhiúil faoin dlí aige de bharr teidil do thailte ag síneadh leis an urthrá.

Toisc gur leis an Stát formhór na hurthrá, is leis an Stát cead a thabhairt nó a dhiúltú chun leas a bhaint as acmhainn nádúrtha urthrá ar nós feamainne, de réir na nAchtanna Urthrá 1933 -1998.

I gcásanna áirithe tharlódh go bhfuil cearta bainte feamainne ag tionóntaí a fuair teideal nuair a theip ar eastáit mhóra phriobháideacha. Go praiticiúil, braitheann bailíocht na gcearta sin ar na forálacha atá sna cáipéisí teidil. Ní mheastar go mbeadh na cearta seo forleathan agus/ná nach bac dosháraithe a bheadh iontu ar bhaint na feamainne cois farraige.

Rochtain chun na hUrthrá do Bhainteoirí

Cé go bhfuil sé de cheart ag úinéir talún cead a dhiúltú trína chuid talún go dtí an urthrá, d'fhéadfadh bealach eile a bheith ar fáil trí bhóthar poiblí nó ceart slí. Bheadh fáil air freisin thar farraige ó ché áitiúil. Ní mheastar go mbeadh aon cheart ag úinéir talún a bheadh ag síneadh leis an urthrá, bac a chur ar ghníomhaíocht ar bith faoin meánlíne bharr lán, a cheadódh an Stát, trí cheadúnas urthrá ar mhaithe leis an bpobal.

Deifníd Feamainne sna hAchtanna Cladaigh

In Acht Urthrá 1933, ciallaíonn 'ábhar cladaigh' feamainn atá ag fás nó fréamhaithe ar an gcladach nó caite air nó scuabtha suas air ag taoídí, gaoth, tonnta, nó aon cheann díobh'. Faoi Chuid 3 (1) tá sé de chumhacht ag an Aire ceadúnais urthrá a thabhairt *inter alia* chun 'ábhar cladaigh a thógáil as a leithéid d'urthrá'. Is leis an Aire a shocrú cén t-aisíoc a dhéanfar leis an Stát ar an ábhar a tógadh. Meastar mar sin gur leor na cumhachtaí atá faoi láthair ag an Aire le ceadúnas nó cead a thabhairt feamainn a bhaint.

Appendix V

Legislation Consulted

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Appendix VI

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Aquaculture of seaweed in Connemara

Aguisín V

Reachtaíocht a Scrúdaíodh

Acht Urthrá (1933)

Acht Tionscal Ailgionáite (Éire) Teoranta (Glacadh Scaranna), 1954 (Uimh. 29 de 1954)

Rialacha Feirmeoireachta Mara (Iarratas Ceadúnais agus Táillí Ceadúnais) (Uimh. 2), 1988. S.I Uimh. 324 de 1998) Oifig Foilseacháin Rialtais

Bille Iascaireachta (Leasú), 1996. Oifig Dhíolta Foilseacháin Rialtais

Acht Iascaireachta (Leasú), 1997 (Uimh. 23 de 1997)

Acht Iascaireachta agus Urthrá (Leasú), 1998. (Uimh. 54 de 1998)

Rannóg Riaracháin Cladaigh, Roinn na Mara agus Acmhainní Nádúrtha (1998) Feirmeoireacht Mara - Ceadúnas faoi Acht Iascaireachta (Leasú) 1997 agus Acht Urthrá, 1933. Nótaí Treorach le haghaidh iarrthóirí ar Cheadúnais Feirmeoireachta Mara agus Ceadúnais Urthrá.

Aguisín VI

Tagairtí

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A comparison of Ireland with nearest neighbours

Ireland

The seaweed industry in Ireland contributes a small but significant amount to the Irish economy. This figure has also shown a steady increase over the last number of years since the ISIO started collecting figures in 1994. This increase is shown in Table 1.

Table 1 Total turnover of companies in financial years (5th April - 4th April) shown.

Year	1994/'95	1997/'98	1998/'99
Turnover	IRE2.4 million	IRE4.3 million	IRE5.9 million

SOURCE: ISIO

Between 60 and 70% of the turnover is from exports. The majority of this revenue (as well as the majority of employment) is generated in remote rural areas many of which are in the BMW region and which have Objective 1 status for development.

The employment generated by the seaweed industry is also a small but growing figure. The role of employment in promoting social inclusion is stressed in the National Development Plan (2000-2006) and the location of the seaweed industry in target areas identified by the Plan makes it vital on a national scale to retain the number of jobs that exist already and to promote increased employment in these areas.

Table 2 No. of employees in Irish Seaweed Industry broken down into full-time, part-time and seasonal groups.

Year	1996/'97	1997/'98	1998/'99
Full-time	260	265	281
Part-time	300	305	310
Seasonal	91	98	104

SOURCE: ISIO

Table 3 No. of employees in Irish Seaweed Industry broken down into harvesters and processors.

Year	1996/'97	1997/'98	1998/'99
Harvesting	557	564	569
Processing	75	90	112

SOURCE: ISIO

Table 4 Total no. of employees in the Irish Seaweed Industry including full-time, part-time and seasonal employees.

Year	1996/'97	1997/'98	1998/'99
Total Employment	632	654	681

SOURCE: ISIO

Brown Algae

Ascophyllum nodosum (Asco) is by far the most economically important seaweed in Ireland. However, a 1998 study has shown that the quantity of *Ascophyllum* harvested in 1996 was only about 50% of the total harvestable amount. Harvesting is predominantly carried out for a semi-state company, Arramara Teoranta, and takes place in Cos. Donegal, Mayo and Galway. All seaweed is cut by hand using short sickles or knives. Research has been done into the viability of using mechanical harvesters similar to those used in Norway. It is thought that these machines would have to be modified or new machines designed to be financially viable. Research by the ISIO into the effects of both hand and mechanical harvesting on the crops of *Ascophyllum* and their associated biomass are underway and the results are expected in summer 2000.

Comparáid idir Éire agus ár gcomharsana

Éire

Is mír bheag ach mír shuntasach i tionscal na feamainne i saol eacnamaíoch na hÉireann. Tá fás rialta tagtha air ó 1994 nuair a thosaigh an ISIO ag bailiú figiúirí. Léiríonn Tábla 1 an méadú seo.

Tábla 1 Láimhdeachas iomlán comhlachtaí i mblianta airgeadais (5 Aibreán - 4 Aibreán).

Bliain	1994/95	1997/98	1998/99
Láimhdeachas	£2.4 milliún	£4.3 milliún	£5.9 milliún

FOINSE: ISIO

Is ó easpartáil a thagann idir 60% agus 70% den láimhdeachas. Gintear an chuid is mó den ioncam seo (chomh maith leis an gcuid is mó den fhostaíocht) i gceantair iargúlta tuaithe, a bhformhór i réigiún BMW agus stádas Chuspóir a hAon chun forbartha acu.

Tá an fhostaíocht a thagann ó thionscal na feamainne beag ach tá sí ag fás. Tá béim ar an bpáirt atá ag fostaíocht i gcur chun cinn áireamh sóisialta sa Phlean Náisiúnta Forbartha 2000 - 2006) agus tá suíomh thionscal na feamainne sna sprioc-cheantair an-tábhachtach leis an méid fostaíochta atá ann a choomhnú agus fostaíocht a mhéadú sna ceantair seo.

Tábla 2 Líon fostaíthe lánaimseartha, páirtaimseartha agus séasúracha i dTionscal Feamainne na hÉireann.

Bliain	1996/97	1997/98	1998/99
Lánaimseartha	260	265	281
Páirtaimseartha	300	305	310
Séasúrach	91	98	104

FOINSE: ISIO

Tábla 3 Líon fostaíthe i dTionscal Feamainne na hÉireann de réir bainteoirí agus próiseálaithe.

Bliain	1996/97	1997/98	1998/99
Baint	557	265	281
Próiseáil	75	98	104

FOINSE: ISIO

Tábla 4 Líon iomlán fostaíthe i dTionscal Feamainne na hÉireann (lánaimseartha, páirtaimseartha agus séasúrach).

Bliain	1996/97	1997/98	1998/99
Fostaíocht iomlán	632	654	681

FOINSE: ISIO

Algaí Donna

Is í *Ascophyllum nodosum* (Asco) an fheamainn is tábhachtaí, ó thaobh na heacnamaíochta de, in Éirinn. Ach léiríonn staidéar a rinneadh i 1998 nár baineadh sa bhliain 1996 ach tuairim is 50% den mhéid a d'fhéadfaí a bhaint. Baintear an chuid is mó den fheamainn do chomhlacht leathstáit, Arramara Teoranta, i gcontaetha Thír Chonaill, Mhaigh Eo, agus na Gaillimhe. Baintear an fheamainn le corraín ghearra nó seana. Tá taighde déanta maidir le bainteoirí mheicniúla cosúil leis na cinn san Ioruaidh a úsáid. Ceaptar go gcaithefear na meaisíní a chur in oiriúint nó cinn nua a dhearadh, chun go mbeidís inmharthana ó thaobh an airgid de. Tá taighde ar siúl faoi láthair ag an ISIO ar an tionchar atá ag baint láimhe agus baint mheicniúil ar an mbarr *Ascophyllum* agus an bithmhais a théann leis agus tá siúl leis na torthaí i Samhradh 2000.

Appendix VII

A comparison of Ireland with nearest neighbours: Ireland

Some *Fucus* species are harvested in Ireland but all on a much smaller scale than *Ascophyllum*. They are collected for use in seaweed baths and the cosmetics industry. *Alaria esculenta*, *Laminaria saccharina*, *Laminaria digitata*, *Laminaria hyperborea* and *Himantalia elongata* are all collected on a small scale for use as high quality, high value human foods for the home and export markets. There is growing interest in the use of *Alaria esculenta* as food for high value farmed shellfish (e.g. abalone) and for inclusion as a constituent of food pellets for farmed fish. Studies are underway to ascertain the nutritional value of this and other species.

Red Algae

Carrageen moss and Irish moss are generic names for a mixture of *Chondrus crispus* and *Mastocarpus stellatus*. Both species frequently grow together and are harvested in Ireland. While these species are extensively harvested and cultivated in other areas to produce an extract known as carrageenan for use as stabilisers in food etc., it is not thought this would prove economically viable in Ireland. Many tropical countries (e.g. the Philippines) produce large amounts of seaweed for this market at relatively low cost due to lower labour costs and other factors. One company in Ireland that deals in carrageenans for the food industry has found that using plants from the Philippines proves more financially viable than using seaweed from Ireland, even when the extra costs of transport are taken into account.

Most of the *Chondrus* and *Mastocarpus* harvested in Ireland is used as food for the home and export markets. Due to the presence of many personal and black-market collectors in Ireland, actual quantities of this seaweed harvested each year are very difficult to estimate. Apart from food, possible future markets for Irish carrageen moss include the cosmetics, biochemical and pharmaceutical industries world-wide.

Dulse, dillisk and creathnach are all common names for a red alga known as *Palmaria palmata*. This species is harvested extensively in Ireland for use as food. ISIO companies have found that their supply consistently does not meet the demand (particularly in N. Ireland where dulse is widely eaten). The priority for this species is first to fully supply the food market and then to develop other possible markets.

France

Approximately 36 companies combine to form the seaweed industry of France. Together they employ about 2000 people though a large portion of the harvesting section of this number would come under the heading of 'hobby gatherers' i.e. people who gather seaweed for supplementary income or pocket money. Many of these people are involved in the gathering of carrageen moss and many are students, children or pensioners.

Table 5 People in seaweed related employment in France in 2000.

	Harvesting	Processing	Other
Total	1395-1400	583	80

SOURCE: ARZEL, PERS. COMM.

The turnover of the industry was estimated in 1998 to be approximately 1000 million Francs of which approximately 50% was exports. The general pattern of usage is as follows: agriculture 42%, phycocolloids 40%, cosmetics 13%; the remaining 5% is used in the primary processing of many and varied products.

Brown Algae

Laminaria digitata accounts for 80% of the total fresh seaweed production in France. It is mainly used for the production of alginate and most of this harvesting and processing takes place in Brittany. The fronds are harvested by means of boats equipped with a hydraulic arm from which is suspended a curved iron hook called the 'scoubidou'. The boats operate from May to October.

Aguisín VII

Comparáid idir Éire agus ár gcomharsana: Éire

Déantar roinnt speiceas *Fucus* a bhaint in Éirinn ach i bhfad níos lú ná *Ascophyllum*. Bailítear iad le húsáid i bhfolcthaí feamainne agus sa tionscal cosmaid. Bailítear beagán de *Alaria esculenta*, *Laminaria saccharina*, *Laminaria digitata*, *Laminaria hyperborea* agus *Himantalia elongata* le húsáid mar bhia daonna ar chaothaighdeán, sa tír seo agus thar lear. Tá speis ag méadú in *Alaria esculenta* mar bheathú do shliogiasc ardluacha (m.sh. abalone) agus mar chomhábhar i millíní beaga bia le haghaidh éisc feirme. Tá staidéar idir lámha ag féachaint cén fiúntas cothaithe atá ann agus i speicis eile.

Algaí Dearga

Ainm aicmeach é carraigín ar *Chondrus crispus* agus *Mastocarpus stellatus*. Go minic fásann an dá speiceas le chéile agus bíonn siad le baint in Éirinn. Saothraítear agus baintear go leor den dá speiceas seo in áiteanna eile le heastósc a bhaint astu ar a dtugtar carraigínín le húsáid mar chobhsaitheoir i mbia agus eile ach ní cheaptar gur fiú é seo a dhéanamh in Éirinn. Cuireann go leor tíortha trópaiceacha (m. sh. na hOileáin Fhilipíneacha) cuid mhaith feamainne ar fáil don mhargadh seo, ar chostas íseal de bharr costais saothair a bheith íseal mar aon le cúinsí eile. Tá sé faighte amach ag comhlacht amháin in Éirinn, a bhíonn ag déileáil i gcarraigínín le haghaidh thionscal an bhia, go bhfuil sé níos saoire feamainn a cheannach ó na hOileáin Fhilipíneacha ná in Éirinn, fiú agus an costas iompair curtha san áireamh.

Usáidtear an chuid is mó den *Chondrus* agus *Mastocarpus* a tháirgtear in Éirinn mar bhia don mhargadh baile agus thar lear. Toisc go mbaineann go leor daoine príobháideacha agus lucht an mhargaidh dhuibh an fheamainn seo, tá sé an-deacair a mheas cé mhéad den fheamainn seo a bhaintear. Taobh amuigh de bhia, d'fhéadfaí úsáid a fháil do charraigín na hÉireann i dtionscal na gcosmaid, bithcheimice agus cógaseolaíochta ar an margadh domhanda.

Is iad duileasc agus creathnach na gnáthainmneacha ar an alga dearg *Palmaria palmata*. Baintear an speiceas seo go forleathan in Éirinn mar bhia. Tá sé faighte amach ag comhlachtaí ISIO nach leor a soláthar don éileamh atá ann (go háirithe i dtuaisceart Éireann, áit a n-itear duileasc go forleathan). Is é an sprioc don speiceas seo dóthain a chur ar fáil do mhargadh an bhia i dtosach agus ansin margáí eile a fhorbairt.

An Fhrainc

Tá tuairim agus 36 comhlacht i dtionscal feamainne na Fraince. Tugann siad fostaíocht eatarthu do thimpeall 2000 duine cé go mbeadh cuid mhaith den lucht bainte le háireamh mar 'bhainteoirí caitimh aimsire' i.e. daoine a bhaineann feamainn mar ioncam forlíontach nó mar airgead póca. Baineann go leor díobh seo carraigín agus is mic léinn, gasúir nó pinsinéirí cuid mhaith díobh.

Tábla 5 Daoine a bhain fostaíocht as feamainn sa Fhrainc i 2000.

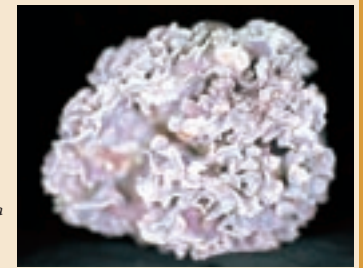
	Baint	Próiseáil	Eile
Iomlán	1395-1400	583	80

FOINSE: ARZEL, PERS. COMM.

Meastar láimhdeachas an tionscail i 1998 a bheith thart ar 1000 milliún Franc, agus de seo ba le haghaidh easportála tuairim is 50%. Is mar seo a úsáidtear é: talmhaíocht 42%, ficeachollóidí 40%, cosmaid 13%; baintear úsáid as an 5% eile sa bhunphróiseáil ina lán táirgí éagsúla.

Algaí Donna

Laminaria digitata 80% den fheamainn úr a bhaintear sa Fhrainc. Usáidtear é le hailgionáit a tháirgeadh den chuid is mó agus déantar an chuid is mó den bhaint agus den phróiseáil seo sa Bhriotáin. Baintear an fheamainn as báid le géag hidrálach as a gcrochtar corrán iarainn ar a dtugtar 'scoubidou'. Oibríonn na báid ó Bhealtaine go Deireadh Fómhair.



Lithophyllum Dentatum - speiceas mór de griúán

Appendix VII

A comparison of Ireland with nearest neighbours: France

The *Laminaria digitata* harvest has been experiencing serious problems meeting the requirements of the factories. It is thought that the only way to counteract these problems is to move into new harvesting areas. There is also a possibility of harvesting *Laminaria hyperborea* to supplement the algininate factories and work has been carried out to investigate different types of mechanical harvesting for this species.



Aquaculture long-lines

Red Algae

The annual French production of *Chondrus crispus* and *Mastocarpus stellatus* is approximately 1200 tonnes (dry weight) which satisfies only 9% of the needs of the French carrageenan industry. This level of harvesting has remained unchanged since 1975. It seems that while some of this stabilisation may have a biological cause, much of it is social. Owing to the low and stable price paid to harvesters and other factors, harvesting is increasingly becoming viewed as a hobby activity rather than a job. It is not thought that this harvest can be mechanised in any financially viable way. Regarding the problem of reaching the limits of the natural stocks it is thought that aquaculture is the only avenue open. A trial farm has been established and is now in production.

Scotland (Western Isles)

The numbers of people employed in 1994 in supplying seaweed from the Western Isles to outside buyers is summarised below in Table 6. While very minimal collection of tangle still goes on, the main *Ascophyllum* harvest no longer employs anyone in the Western Isles.

Tavay Organic Products was formed in 1980. They harvested mainly *Ascophyllum nodosum* and have flexible staff who switch between working in the factory and harvesting as required. In 1995 they were employing 10-15 people. Their harvest for 1998-1999 was only a few hundred tonnes and it is now thought that they have closed down completely though this has not been confirmed.

Table 6: Seaweed industry generated jobs in the Western Isles in 1994.

	Regular	Occasional
Tavay Organic Products Ltd.	10-15	
Kelco	10-11	ca 35
Total	20-26	ca 35

SOURCE: SCOTTISH NATURAL HERITAGE AND WESTERN ISLES ISLAND COUNCIL, 1995

According to a 1995 report 'in very broad terms... total gross income from seaweed in 1994 would appear to lie somewhere between £270,000 - £450,000 (stg.), with a probability that the true figure lies towards the lower end of this range' (SNH & WIIC, 1995). Since the decline of the algininate industry and so the harvesting/processing industry in the Western Isles, the revenue from this activity is no longer available to this already financially deprived area. Several groups have been attempting to revive the Scottish seaweed Industry but to date none have been successful.

Brown Algae

It has been estimated that the total amount of *Ascophyllum nodosum* available for harvest on the Western Isles is 107,552 t (wet weight). When seaweed was being cut for the algininate industry it was estimated that the annual harvest was 3,000 - 4,000 wet tonnes per year. Collection of washed up tangle (stipes of *Laminaria hyperborea*) was done along beaches, by hand, after storms. To date, there has been no mechanical harvesting in Scotland.

Aguisín VII

Comparáid idir Éire agus ár gcomharsana: An Fhrainc

Tá fadhbanna móra ag bainteoirí an *Laminaria digitata* dóthain a chur ar fáil don éileamh ó na monarchana. Meastar gurb é an t-aon bhealach leis na fadhbanna seo a sháru dul ag baint i limistéir nua. B'fhéidir freisin go bhféadfaí dul ag baint *Laminaria hyperborea* mar chabhair do na monarchana ailgionáite agus tá taighde déanta ar bhealaí difriúla leis an bhfeamainn seo a bhaint le deiseanna meicniúla.

Algaí Dearga

Is é táirgeadh bliantúil na Fraince de *Chondrus crispus* agus *Mastocarpus stellatus* tuairim is 1200 tonna (meáchan tirim) agus níl anseo ach 9% de riachtanais thionscal charraiginín na Fraince. Níl aon athrú tagtha ar an méid seo bainte ó 1975. Cé go bhféadfadh cúis bhitheolaíoch a bheith mar chuid den chobhsú seo, is cosúil gur cúiseanna sóisialta is mó atá leis. Mar gheall ar an íocaíocht íseal chobhsaí do na bainteoirí agus de bharr cúiseanna eile, féachtar anois ar bhaint na feamainne mar chaitheamh aimsire níos mó ná fostaíocht. Ceaptar nach féidir baint na feamainne seo a mheicniú ar aon bhealach fiúntach. Maidir leis an bhfadhb le teorainneacha an stoic nádúrtha a thrasnú, ceaptar gur feirmeoireacht mhara an t-aon leigheas atá air. Tá feirm thrialach bunaithe agus í ag táirgeadh faoi láthair.

Albain (Na hOileáin Thiar)

Tá an méid daoine a bhí fostaite i 1994 ag cur feamainne ar fáil ó na hOileáin Thiar do cheannaitheoirí ón taobh amuigh le fáil i dTábla 6. Cé go mbailítear beagán feamainne reatha fós, níl aon fhostaíocht anois ag éinne sna hOileáin Thiar ag baint *Ascophyllum*.

Bunaíodh Tavay Organic Products i 1980. *Ascophyllum nodosum* is mó a bhain siad agus an fhoireann oibre sásta oibriú sa mhonarcha nó baint mar ba ghá. I 1995 bhí 10 - 15 duine fostaite. Ní raibh mar bharr acu i 1998 - 99 ach cúpla céad tonna agus ceaptar anois go bhfuil an mhonarcha dúnta cé nach bhfuil sé seo dearbhaithe go fóill.

Tábla 6 Poist sa tionscal feamainne sna hOileáin Thiar i 1994.

	Rialta	Ócáidíúil
Tavay Organic Products Ltd.	10 -15	
Kelco	10 -11	ca 35
Iomlán	20 - 26	ca 35

SOURCE: SCOTTISH NATURAL HERITAGE AND WESTERN ISLES ISLAND COUNCIL, 1995

De réir tuarascála i 1995, 'go ginearálta, is cosúil go bhfuil an t-ioncam comhlán iomlán don bhliain 1994 idir £270,000 - £450,000 (stg), ach gur dócha go bhfuil an uimhir cheart níos gaire don uimhir íseal' (SNH & WIIC, 1995). Ó tháinig meath ar thionscal na hailgionáite agus ar an tionscal bainte agus próiseála sna hOileáin Thiar, níl an t-ioncam a tháinig as an obair seo ar fáil níos mó don cheantar easnamhach seo. Tá iarrachtaí déanta ag grúpaí éagsúla an tionscal a athbhunú ach níor éirigh leo fós.

Algaí Donna

Meastar gur 107,552 tonna (meáchan fluich) an méid iomlán *Ascophyllum nodosum* atá ar fáil le baint sna hOileáin Thiar. Nuair a bhí feamainn á baint do thionscal na hailgionáite, meastar gur baineadh 3000 - 4000 tonna fluich sa bhliain. Bhailít slata mara (slata *Laminaria hyperborea*) ar chladaí, le lámh, tar éis stoirm. Níl aon bhaint meicniúil go dtí seo in Albain.

Appendix VII

A comparison of Ireland with nearest neighbours

Norway

In 1998 the total wet weight of seaweed produced in Norway was 179,800 wet tons at an estimated value of 28.9 million Kroner. Details of the weights and values of harvests in Norway over from 1994-1998 are given in Table 7

Table 7 Quantity and Value of Marine catches in Norway 1994-1998.

	1000 tons live/wet weight	Million Kroner
1994	185.1	34.8
1995	185.0	29.2
1996	173.2	27.5
1997	191.7	30.7
1998	179.8	28.9

SOURCE: SIV GRØNNING

Brown Algae

In recent times only two species have been harvested commercially in Norway, *Ascophyllum nodosum* and *Laminaria hyperborea*. Both are harvested mechanically using specially designed machines. *Laminaria hyperborea* is harvested using boats that bear a 'seaweed dredge', developed for this purpose. *Ascophyllum nodosum* is traditionally cut by hand using a sickle or short scythe. This method is still used in some areas. Most of the seaweed is now cut by means of a specially designed harvester. This is a flat-bottomed water-jet propulsion vessel, fitted with a rotating knife at the end of a steel suction pipe. The harvester has the capacity to cut approximately 10 tonnes wet material per hour.

The total seaweed harvested commercially in Norway per year since 1990 ranges from a low of 169,600 tons (wet) in 1993 to a high of 197,000 tons (wet) in 1990. In recent years the annual value seems to vary between these two figures. In 1998 (the most recent data available) the harvest was 179.8 thousand tonnes (wet weight).

Iceland

In Iceland at present only one fucoid species, *Ascophyllum nodosum*, is harvested commercially. The seaweed is turned into meal and goes to the alginate, fertiliser and fodder markets.

Laminaria digitata is harvested by boat in the winter months using combs similar to those used in France. The kelp meal is mainly exported for pharmaceutical and cosmetic applications.

There is one company operating in Iceland, Thorverk hf., which currently employs 21 people full time in processing and approximately 10 full time seasonally (summer) as harvesters.

Iceland has a huge advantage in the presence of hot geothermal springs which provide low cost energy for drying the seaweed. This lowers the production costs and confers a huge advantage on Thorverk. More than 95% of production is for export. The total export value of this meal was US\$1.821 million.

Thorverk's seaweed meals have recently (Oct. 1999) been certified organic by the Icelandic certification agency, TÚN ehf., which is an inspection agency for the American certification agency Quality Assurance International (QAI). Thorverk now uses the logos of both TÚN and QAI on the packaging of all products. It is expected that this should open up the substantial organic market to Thorverk and that their sales should increase correspondingly over the coming years.

Aguisín VII

Comparáid idir Éire agus ár gcomharsana

An Ioruaidh

I 1998 táirgeadh 179,800 tonna fliuch feamainne san Ioruaidh ar luach 28.9 milliún Kroner. Tugtar sonraí maidir le meáchan agus luach na mbarraí feamainne san Ioruaidh ó 1994 go 1998 i dTábla 7.

Tábla 7 Méid agus Luach na mBarraí Feamainne san Ioruaidh 1994 - 1998.

	1000 tonna beo/meáchan fliuch	Milliún Kroner
1994	185.1	34.8
1995	185.0	29.2
1996	173.2	27.5
1997	191.7	30.7
1998	179.8	28.9

FOINSE: SIV GRØNNING

Algaí Donna

Le blianta beaga anuas, níl á mbaint san Ioruaidh ach dhá speiceas, *Ascophyllum nodosum* agus *Laminaria hyperborea*. Baintear iad go meicniúil le meaisíní speisialta. Baintear *Laminaria hyperborea* le báid a úsáideann 'dreidire feamainne', a rinneadh le haghaidh na hócáide. Baintear *Ascophyllum nodosum* go traidisiúnta le lámh, le corrán nó speal ghearr. Úsáidtear an modh bainte seo fós i geantair áirithe. Baintear formhór na feamainne anois le baintoir speisialta. Seo bád réthónach tiomáinte ag scaird uisce, le scian rothlach ar cheann píopa súite cruaiche. Tá an deis seo in ann 10 tonna fliuch a bhaint san uair.

Tá iomlán na feamainne a baineadh san Ioruaidh idir 169,600 tonna (fliuch) i 1993 agus 197,000 tonna (fliuch) i 1990. Le gairid bíonn an luach bliantúil idir na figiúirí sin. I 1998 (an dáta is deireanaí le fáil) baineadh 179.8 míle tonna (fliuch).

An Íoslainn

Ní bhaintear ach aon speiceas amháin feamainne, *Ascophyllum nodosum*, san Íoslainn ar bhonn tráchtála. Déantar min den fheamainn agus úsáidtear í mar ailgionáit, leasú agus beatha beithíoch.

Baintear *Laminaria digitata* as báid i rith an gheimhridh ag úsáid cioranna cosúil leo sin a bhíonn in úsáid sa Fhrainc. Déantar min cheilpe a easpórtáil don mhargadh cógaseolaíochta agus cosmaid.

Tá comhlacht amháin ag gníomhú san Íoslainn, Thorverk hf., a fhostaíonn 21 duine faoi láthair ag próiseáil agus tuairim agus 10 lánaimseartha séasúrach (samhradh) mar bhaintoirí.

Tá buntáiste an-mhór ag an Íoslainn sna toibreacha te a chuireann fuinneamh ar fáil ar chostas beag leis an bhfeamainn a thriomú. Laghdaíonn sé seo ar an gcostas táirgthe agus tugann sé buntáiste an-mhór do Thorverk. Téann thar 95% den táirge thar lear. Ba é luach iomlán na heasportála seo US\$1.821 milliún.



Alaria Esculenta ar ropaí i gContae an Chláir

Tá min feamainne Thorverk deimhnithe le gairid (D. Fómhair 1999) a bheith orgánach ag an áisíneacht deimhnithe Íoslainneach TÚN ehf., a dhéanann cigireacht don áisíneacht cigireachta Meiriceánach Quality Assurance International (QAI). Baineann Thorverk úsáid anois as suaiteantais TÚN agus QAI ar phacáistiú a gcuid táirgí anois. Ceaptar go n-oscloídh sé seo suas an margadh mór orgánach do Thorverk agus go dtiocfaidh méadú dá réir ar a gcuid díolacháin sna blianta atá le teacht.

Appendix VII

A comparison of Ireland with nearest neighbours: Iceland

Brown Algae

The only fucoid being exploited in Iceland is *Ascophyllum nodosum*. The *Ascophyllum* is harvested from early spring to autumn from the intertidal zone using specialised harvesting machines that are built on site. Small amounts of *Laminaria digitata* are also harvested from the subtidal kelp belt. *Laminaria digitata*, is harvested by boat in the winter months using combs similar to those used in France.

Eastern Canada (Maritime Provinces)

Due to the nature of the data available from Canada it is quite difficult to narrow down the differences seen to a particular crop but an overall decline of the Industry is evident.

Table 8 Total value of the landed seaweed in (CAN\$ '000)

	Nova Scotia	New Brunswick	Prince Edward Is.	Total
1990	1,885	646	3,648	6,719
1998	915	732	1,031	2,678

At present the largest seaweed company in the Maritime Provinces (Acadian Seaplants Ltd.) employs 220 people full-time and 870 people seasonally (May to October).

Brown Algae

Traditionally *Ascophyllum* was cut using hand-held knives or sickles at low tide or from boats with a toothed rake with a long wooden pole. In the late 1980s the Norwegian suction cutter machine was introduced to Canada. These machines have very high efficiency and quickly put Canada second in the world (after Norway) for *Ascophyllum* production. Lack of effective management and competition between companies led to over-harvesting of the stocks, putting the sustainability of the resource in jeopardy. Since 1993 there has been a reversion to hand harvesting methods. There has also been reallocation of areas between harvesters and buyers and part or full closure of some areas. A priority of the authorities in New Brunswick is the maximising of employment. For this reason it is unlikely that mechanical harvesting will be reintroduced into New Brunswick in the foreseeable future.



Delivering *Ascophyllum* to the factory

Access to landing data for the *Ascophyllum* industry in the Maritime Provinces is limited. Total value for landings of 'Marine Plants' by region is available. These figures show that the total Atlantic Coast Commercial Landings of Marine Plants in 1998 was 27,435 metric tonnes, wet weight. When this figure is compared to the same figure for 1990, when 41,517 wet tonnes were harvested, it can easily be seen that the seaweed industry in Canada is no longer as important as it has been in the past. It is hoped that with new, more stringent management strategies in place this decline can be reversed in years to come.

Red Algae

Large beds of *Chondrus crispus* were identified in the Maritime Provinces as early as 1830. Traditionally 'mossing' was carried out using a hand rake. From the 1940s on with a peak around 1970 Canada was the main supplier of carrageen moss to the USA. From the late 1970s onwards the US began to import cheaper species for carrageenan production from Indonesia and the Philippines and the Canadian industry went into a corresponding decline. In recent years harvesting of this species has become a complementary fishery. The carrageenans found in *Chondrus crispus* have some specific physical and chemical properties that are irreplaceable in some applications and so the Canadian stocks are still exported for some processes.

Aguisín VII

Comparáid idir Éire agus ár gcomharsana: An Íoslainn

Algaí Donna

Is é *Ascophyllum nodosum* an t-aon fheamainn fúcióideach atá á baint san Íoslainn. Baintear an *Ascophyllum* ó luath san earrach go fómhar suas ón gcrios idirthoaidmhear le meaisíní speisialta bainte a dhéantar ar an láthair. Baintear beagán *Laminaria digitata* ón gcrios fothoaidmhear ceilpe. Baintear *Laminaria digitata* sa gheimhreadh agus úsáid cioranna cosúil leo sin sa bhFrainc.

Ceanada Thoir (Cúigí na Mara)

Mar gheall ar an gcineál eolais atá ar fáil as Ceanada tá sé deacair na difríochtaí atá le feiceáil a leagan ar bharr amháin ach is léir go bhfuil meath tagtha ar an tionscal.

Tábla 8 Luach iomlán na feamainne a baineadh i (Can\$ '000)

	Nova Scotia	New Brunswick	Prince Edward Is.	Iomlán
1990	1885	646	3648	6719
1998	91	732	1031	2678

Faoi láthair tugann an comhlacht feamainne is mó sna Cúigí Mara (Acadian Seaplants Ltd.) fostaíocht do 220 duine go lánaimeartha agus 870 duine go séasúrach (Bealtaine go Deireadh Fómhair).

Algaí Donna

Go traidisiúnta bhaintí *Ascophyllum* le sceana nó le corráin ar thaoide íseal nó as báid le raca coshuda agus fiacta ann. Sna 1980í tugadh isteach an meaisín súiteáin as an Ioruaidh. Tá na meaisíní seo an-éifeachtach agus is gearr go raibh Canada sa dara háit (i ndiaidh na hIoruaidhe) i dtáirgeadh *Ascophyllum*. Ach de bharr easpa dea-bhainistíochta agus iomaíochta idir comhlachtaí, rinneadh róbhaint ar an bhfeamainn, rud a d'fhág an stoc feamainne i gcontúirt. Ó 1993 táthar ag filleadh ar bhaint le lámh. Tá roinnt déanta freisin ar na háiteanna ina bhfásann an fheamainn idir na bainteoír agus na ceannaithe agus tá cuid de na háiteanna páirt dhúnta nó dúnta go hiomlán. Tá údarais New Brunswick ag iarraidh lánfhostaíochta thar aon rud eile. Dá bharr seo, ní dócha go dtabharfar isteach baint mheicniúil go luath i New Brunswick.

Tá an t-eolas faoin méid *Ascophyllum* a thugtar i dtír sna Cúigí Mara teoranta. Tá eolas le fáil faoi luach iomlán 'Plandaí Mara' de réir réigiúin. Taispeánann na figiúirí seo gur tugadh i dtír 27,435 tonna fliuch de Phlandaí Mara ar an gCósta Atlantach. Nuair a chuirtear an figiúir seo i gcomparáid le figiúir 1990, nuair a baineadh 41,517 tonna fliuch, tá sé soiléir nach bhfuil an tábhacht chéanna ag baint le tionscal na feamainne i gCeanada. Táthar ag súil, le cabhair ó bhainistíocht níos géire, gur féidir an meath seo a cheartú sa todhchaí.

Algaí Dearga

Fuarthas leapacha móra *Chondrus crispus* sna Cúigí Mara chomh luath le 1830. Go traidisiúnta dhéantaí 'mossing' le raca láimhe. Ó na 1940í, agus an buaicphointe thart ar 1970, ba í Ceanada an soláthraí carragáin ba mhó do mhargadh na Stát Aontaithe. Ó dheireadh na seachtóidí thosaigh na Stáit Aontaithe ag iomportáil speiceas níos saoire le haghaidh carragáinín ón Indinéis agus ó na hOileáin Philipíneacha agus tháinig meath dá réir ar thionscal Ceanada. Le blianta beaga anuas níl í mbaint an speicis seo ach iascaireacht chomhlántach. Tá sainchálíochtaí fisiciúla agus ceimiceacha ag baint leis an gcarraigínín a bhíonn le fáil i *Chondrus crispus* nach féidir déanamh dá n-uireasa le haghaidh úsáidí áirithe agus mar sin déantar cuid de stoc Ceanada a easpórtáil le haghaidh próiseála.

