



National Development Plan 2007—2013
Science, Technology & Innovation Programme

Marine Research Sub-Programme

**Call for Research Proposals
July 2007**

SEAWEED RESEARCH PROGRAMME

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Office use only: Project Reference:	PBA/SW/07/001
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NDP 2007-2013:
Science, Technology and Innovation (STI) Programme:

Marine Research Sub-Programme

Research Measure:	Industry
Research Programme:	Seaweed
Project Type:	'Defined' Strategic Industry
Project Title:	Development and Demonstration of Viable Hatchery and Ongrowing Methodologies for Seaweed Species with Identified Commercial Potential.

BACKGROUND:

According to the FAO, in 2004 world aquaculture production of aquatic plants was 13.9 million tonnes, worth US\$ 6.8 billion, of which China produced 10.7 million tonnes, valued US\$ 5.1 billion. European, including Irish, seaweed farming has yet to start commercial scale operations¹.

The culture of higher value red algae (*Asparagopsis*, *Palmaria*) has been demonstrated by vegetative propagation however hatchery protocols have yet to be perfected with red algae. Pilot farms and various trials have been undertaken by industry and researchers however the technology has not yet been commercialised.

PROJECT RATIONALE:

A proof of concept approach, that completes the research on life cycles and their manipulation in the hatchery environment and which demonstrates to industry how to farm marketable species of seaweed, is required to stimulate the growth of this sector. A similar approach was taken by Irish semi-state agencies in the 1970's and 1980's with shellfish hatcheries, mussel, oyster and salmon farms and this enabled producers to develop their business rather than to be engaged in pre-commercial research. Development has to some extent being constrained to-date by the lack of support for focused research input to production methodologies.

PROJECT AIM:

The project aims to develop and trial industry-scale hatchery and ongrowing methodologies for identified seaweed species and to provide a platform for transferring the technology to create new business opportunities in seaweed aquaculture.

¹ <http://www.fao.org/fi/website/FIRetrieveAction.do?dom=topic&fid=3459>

RESEARCH OBJECTIVES:

The Marine Institute wishes to invite research proposals from suitably qualified researchers/consortia to:

1. Develop viable, industry-scale hatchery and ongrowing methodologies for *Palmaria palmata* (including a practical assessment of harvesting techniques);
2. Investigate pilot-scale hatchery methodologies and implement a programme of ongrowing trials for *Laminaria digitata* and *Porphyra sp.*;
3. Provide a species-specific, desk-based assessment on the criteria for optimum site selection for seaweed ongrowing operations;
4. Develop an economic model for viable, industrial-scale production of *P. palmata* based on proven aquaculture methodologies. This should include an economic assessment of potential for viable industrial-scale production (based on reasonable assumptions) of *L. digitata* and *Porphyra sp.*; and
5. Develop an appropriate technology-transfer strategy and associated training tools to facilitate interest in, and uptake of, seaweed aquaculture as an emerging business opportunity.

ADDITIONAL SPECIFIC REQUIREMENTS FOR THIS PROJECT:

- The project should have a strong industry linkage.
- The output of the research should inform the Department of Agriculture, Fisheries and Food on any licensing issues in relation to seaweed aquaculture operations.

PROJECT DELIVERABLES:

Major Outputs

1. Protocol for industrial-scale hatchery production of *Palmaria palmata*.
2. Protocol for industrial-scale ongrowing of *P. palmata* in long-line culture and an assessment of potential harvesting techniques.
3. Report on the pilot-scale hatchery production and ongrowing techniques for *Laminaria digitata* and *Porphyra sp.*

Supporting Outputs

3. Report on criteria for optimum site selection for the three listed seaweed species
4. Economic model for viable commercial production of *Palmaria palmata* (including a concise market assessment and marketing strategy).
5. Economic assessment of the potential for viable, industrial-scale production of *L. digitata* and *Porphyra sp.*
6. Costed and time-specific training and technology-transfer strategy and a suite of training tools to achieve efficient commercial roll-out of proven technology.

PROJECT STRUCTURE AND FUNDING:

The project should be managed by a project co-ordinator, who will be responsible for ensuring that project management formalities, as well as research outputs, are delivered in a timely and presentable manner (further details are provided in the *Guidelines for Grantees for Project-Based Awards* under the section on Project Management). The proposal should also clearly outline time commitment of existing and additional researchers. Funding will be provided for a 3 year project.

Further information is available in the *Guidelines for Applicants and Guidelines for Grantees for Project-Based Awards*.

INTENDED IMPACT:

The output of this research project will provide the scientific basis and impetus for commercial roll-out of economically viable and sustainable aquaculture of *Palmaria palmata*, creating new business opportunities for existing shellfish and finfish farmers and new entrants to the aquaculture sector.

The project will also bring to proof-of-concept stage production protocols for *L. digitata* and *Porphyra sp.*. Ultimately, the research will underpin the development of a new aquaculture sector which will exploit proven market opportunities and expand and develop in a planned and sustainable manner at sites assessed and chosen for optimal production.

ADDITIONAL INFORMATION:

Werner, A., Clarke, D. and Kraan, S. (2004) Strategic Review of the Feasibility of Seaweed Aquaculture in Ireland, NDP Marine RTDI Desk Study Series DK/01/008. Marine Institute, Ireland.

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PBA/SW/07/002

NDP 2007-2013:

Science, Technology and Innovation (STI) Programme:

Marine Research Sub-Programme

Research Measure:	Industry
Research Programme:	Seaweed
Project Type:	'Defined' Applied Industry
Project Title:	Development of a Methodology for the Quantitative Assessment of Ireland's Inshore Kelp Resource

BACKGROUND:

In its November 2000 report¹, the National Seaweed Forum identified the potential for developing a mechanical kelp (*Laminaria digitata* and *L. hyperborea*) harvesting industry in Ireland. Specific emphasis was placed on the likely impacts of this activity. In order to develop sustainable harvesting practices, it was felt that further knowledge and information was required on:

1. Current harvesting practices and management strategies in other countries (France and Norway)
2. Environmental impacts of mechanical harvesting methods
3. The amount of resource in Ireland.

Subsequent desk reviews which addressed some of these knowledge gaps included:

Werner, A., & S. Kraan. 2004. Review of the potential mechanisation of kelp harvesting in Ireland. Marine Environment and Health Series, No. 17.

Kelly, E. 2005. The role of kelp in the marine environment. Irish Wildlife Manuals, No. 17 National parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Hennequart F., Dalias N., Barraqué Garat P., Philip de Laborie L. and Scourzic T., 2006. Review of Kelp Biomass Assessment Techniques - Application to the inshore and coastal waters of Ireland. OCEANIDE, 167pp.

Recommendations arising from these studies may contribute to an over-arching assessment of the sustainability of any future activity. However, as no reliable methodology is yet available to accurately quantify kelp biomass, an accurate assessment of the kelp resource available for harvesting has not yet been achieved.

¹ National Seaweed Forum, 2000. National Seaweed Forum Report. Dublin

PROJECT RATIONALE:

Prior to addressing outstanding issues related to the viable mechanical harvesting of kelp in Irish coastal waters, reliable and practicable acoustic methodologies for the quantitative assessment of the standing stock biomass are required.

PROJECT AIMS:

The project will provide a practicable methodology for the quantitative assessment of the inshore kelp resource in order to facilitate the development of appropriate management plans and sustainable harvesting practices.

RESEARCH OBJECTIVES:

The Marine Institute wishes to invite research proposals from suitably qualified researchers/consortia to:

- Develop, trial and assess potential methodologies for the estimation of kelp standing stock biomass at two inshore sites (1 on SW Coast and 1 on West coast);
- Investigate techniques and methodologies to differentiate between the two kelp species, *L. digitata* and *L. hyperborean*; and
- Carry out a series of acoustic trials to estimate kelp biomass (including appropriate ground-truthing) and, where appropriate, fine-tune the methodology.

ADDITIONAL SPECIFIC REQUIREMENTS FOR THIS PROJECT:

- The project should be carried out over two summers (growing seasons).
- All data arising from the project should be available to the Marine Institute (please refer to the *Guidelines for Grantees - Section on Data Sets*).
- Summary results should be available in a common GIS format e.g. ESRISHAPE format or a Geodatabase file (*please refer to the Guidelines for Grantees - Section on Data Sets*).

PROJECT DELIVERABLES:

- Delivery of verified estimates of the kelp standing stock biomass from two selected areas along the south west and western seaboard of Ireland.
- An assessment of the resource methodology in terms of its accuracy, practicability and reliability.
- A robust standard operating procedure to provide estimates of kelp biomass to a high degree of confidence (80%) should be provided.
- If possible, the methodology should be able to distinguish between kelp species.
- The final project report should provide scientific information to inform future management plans for sustainable harvest of kelp.

PROJECT STRUCTURE AND FUNDING:

The project should be managed by a project co-ordinator, who will be responsible for ensuring that project management formalities, as well as research outputs, are delivered in a timely and presentable manner. The proposal should also clearly outline time commitment of existing and additional researchers. Funding will be provided for a 4 year project.

Further information is available in the *Guidelines for Applicants and Guidelines for Grantees for Project-Based Awards*.

INTENDED IMPACTS:

The general impact of this initiative is to provide critical information to feed into the development of a management plan for any future harvest of kelp. The results will provide the scientific basis on which future pilot kelp harvesting trials may be designed and implemented.

ADDITIONAL INFORMATION:

National Seaweed Forum, 2000. National Seaweed Forum Report. Dublin

Werner, A., & S. Kraan. 2004. Review of the potential mechanisation of kelp harvesting in Ireland. Marine Environment and Health Series , No. 17.

Kelly, E. 2005. The role of kelp in the marine environment. Irish Wildlife Manuals, No. 17

National parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Hennequart F., Dalias N., Barraqué Garat P., Philip de Laborie L. and Scourzic T., 2006. Review of Kelp Biomass Assessment Techniques - Application to the inshore and coastal waters of Ireland. OCEANIDE, 167pp.