EUROPEAN COMMISSION

SCIENCE
RESEARCH
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Practical Information and Programmes

Directorate-General XII:	Science, Research and Development
Directorate-General VI:	Agriculture and Rural Development
Directorate-General XIV:	Fisheries

Agriculture and Fisheries

(including agro-industry, food-technologies, forestry, aquaculture and rural development)

1994-1998

Information Package

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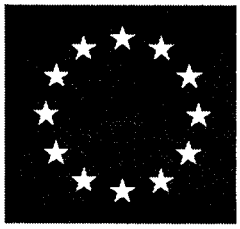

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8 INFORMATION AND ASSISTANCE

Indicative Timetable

DATE	ACTIVITY
15 - 12 - 94	**Publication of first call for proposals**
15 - 03 - 95	**Deadline for receipt of proposals***
01 - 07 - 95	**Results of evaluation communicated to proposers**
15 - 09 - 95	**First contract negotiations**
01 - 12 - 95	**Probable earliest start of contracts**
Please refer to Table III of the Workprogramme	**Second call for proposals** **Third call for proposals** **Fourth call for proposals**

* Proposals must arrive at the Commission by 12H00 on the date of the official deadline for receipt of proposals.

Introduction

THE FRAMEWORK PROGRAMME IV (1994-1998)

Following the ratification of the Treaty on the European Union (EU) all Community activities in the field of research, technological development and demonstration are covered by the European Community (EC) Framework Programme for Research and Technological Development (RTD).

On 26 April 1994, Framework Programme IV was adopted. It has a duration of 5 years (1994-1998) and a budget of 12.3 billion ECU (to which in 1996 an amount of 0.7 billion might be added if certain conditions are fulfilled).

Framework Programme IV contains 4 activities and a number of specific RTD programmes which cover the following areas:

Field	Funding in million ECU (MECU)
Activity 1 RTD and Demonstration Programmes	**10 686**
I. Information and communication technologies	***3 405***
1. Telematics	843
2. Communication technologies	630
3. Information technologies	1 932
II. Industrial technologies	***1 995***
4. Industrial and materials technologies	1 707*
5. Standardisation, measurements and testing	288
III. Environment	***1 080***
6. Environment and climate	852
7. Marine science and technology	228

IV. Life sciences and technologies	***1 572***
8. Biotechnologies	552
9. Biomedicine and health	336
10. Agriculture and fisheries (including agro-industry, food technologies, forestry, aquaculture and rural development)	684
V. Energy	***2 256***
11. Non-nuclear energy	1 002
12. Nuclear fission safety	414
13. Controlled thermonuclear fusion	840
VI. Transport	***240***
14. Transport	240
VII. Targeted socio-economic research	***138***
15. Targeted socio-economic research	138
Activity 2 Cooperation with third countries and international organisations	**540**
Activity 3 Dissemination and exploitation of results	**330**
Activity 4 Stimulation of the training and mobility of researchers	**744**
Total	**12 300***

** including 1028 MECU for the Joint Research Centre (JRC) programmes.*

IMPLEMENTATION

Most of the specific RTD programmes will be carried out through:

- **Shared cost actions** (Community participation in the costs of RTD is not more than 50 % of the total project costs; for thematic networks and training and mobility of researchers the Community funds up to 100 % of the additional costs).
- **Concerted actions** (the Community does not participate in the costs of the research itself, but reimburses only coordination costs, such as meetings, travel, etc., up to 100 %.
- **Preparatory, accompanying and support measures** (the Community pays up to 100 % of the foreseen costs).

In addition to these actions, the Community supports coal and steel research projects, and carries out its own research activities in the Community Joint Research Centre (direct actions).

NOTES:

- *For Community training and mobility actions a separate information package is available.*

  Directorate-General VI:
  Agriculture and Rural Development
  fax: 32-2-296 30 29

  Directorate-General XII:
  Science, Research and Development
  fax: 32-2-296 43 22

  Directorate-General XIV:
  Fisheries
  fax: 32-2-295 78 62

- *To promote the participation of SMEs special arrangements are foreseen (e.g. exploratory awards, cooperative research projects). A special information package (including forms) on this can be requested at the following fax n°: +32.2.296.20.07.*

1 *Agriculture and Fisheries*

(including Agro-industry, Food technologies, Forestry, Aquaculture and Rural Development).

RATIONALE AND OBJECTIVES

This programme aims to promote and harmonize research in the major European primary production food and non-food sectors of agriculture, horticulture, forestry, fisheries and aquaculture, and its links with the input and processing industries, together with the rural activities, the end user and the consumer.

This linkage is important firstly in helping primary production to adapt and respond to changing Community policies, but also to link the primary production sector with the agro-industrial processing sector by matching the production of biological raw materials with the needs, and requirements of industry, the end user, and consumers. The programme will therefore place considerable emphasis on the development of new markets, products and processes for the raw materials coming from agriculture, forestry and fisheries.

Pre-normative research will be initiated and supported in order to provide a sound scientific base for the setting of standards and regulations relating to production, transformation and use of biological resources.

The programme itself will operate on the following **three levels**:

Level I Objectives requiring **concentrated means**, Areas 1 to 5:

- **Area 1 Integrated Production and Processing Chains;**
- **Area 2 Scaling-up and Processing Methodologies;**
- **Area 3 Generic Science and Advanced Technologies for Nutritious Foods;**
- **Area 4 Agriculture, Forestry and Rural Development;**
- **Area 5 Fisheries and Aquaculture.**

Level II Objectives addressed by **concertation means is the sixth area of the programme** , where co-

NOTE:
For more detailed information on the technical areas covered by the first call for proposals, please consult the Workprogramme in Annex I to this information package.

ordination and consolidation on a European level will be sought by building upon national and industrial research programmes and activities in any of the fields covered by the specific programme, for both food and non-food products and processes where member states have extensive programmes. This area will build upon these activities by establishing European Networks through concerted actions, and as appropriate through shared cost actions, bringing together the relevant actors in the particular field with a view to improving coordination and cooperation at a European level.

Level III Objectives addressed by **horizontal activities**, which involve specific actions of a research, market and legislative analysis, and administrative nature. Actions envisaged are implemented in any of the areas covered by the specific programme as follows: CRAFT type schemes for the increased involvement of SME's; Demonstration type projects; Analysis of social and ethical issues; Training and mobility of scientists; Dissemination, exploitation and publication of results; Funding of workshops and conferences.

TECHNICAL AREAS

LEVEL I OBJECTIVES ADDRESSED BY CONCENTRATED MEANS

Level I is divided into 5 areas, which are described briefly below.

Area 1 Integrated production and processing chains (64 MECU)[1]

"Integrated production and processing chains" is dedicated principally to the non-food sector and especially to the use

NOTE:

(1) The amounts in brackets are indicative of the budget available for shared cost actions. They are for reference only and do not legally bind the Commission.

and processing of plant raw materials, such as timber, fibres, carbohydrates, oils, proteins and speciality chemicals contained in new and traditional crops and trees. It will also concern the extraction and processing of higher value-added materials from animals and crop agro-industrial wastes. Emphasis within these chains is on the final product and its market niche, which will direct from the top down the production requirements and specifications of the original biological raw material.

Area 2 Scaling-up and processing methodologies (30 MECU)

This area is closely aligned towards the development of the non-food industry and will have links to the bioenergy, chemicals, and forest products integrated chains of Area 1. Scale-up and processing methodologies are concerned specifically with activities a stage further from the applied and basic research approaches of Area 1. It is intrinsically a process for designing and operating a larger-scale system on the basis of the results of experiments with small-scale or laboratory models which will permit a better evaluation of both the technical feasibility and costs.

Area 3 Generic science and advanced technologies for nutritious foods (68 MECU)

Research in this sector has the major objective to improve the competitive position of the food industry which is composed of leading multinationals and a wide range of specialist food SMEs throughout Europe.

An equally important objective is to improve the understanding of the role of food in the general health and well-being of the European consumer. Food can play a major role in maintenance and improvement of human health and well-being and in prevention of major diseases. This will also lead to the design of special or tailored

foodstuffs and ingredients for specific population groups or for specific health benefits. This will be an expanding area for the food industry in the future and European industry, building on the considerable European research expertise, must be at the forefront here. This will involve multidisciplinary research projects combining the expertise of scientific partners such as nutritionists, medicals, process technologists.

Area 4 Agriculture, forestry and rural development (157 MECU)

The research in this area is aimed at increasing the competitivity, efficiency and viability of agriculture while responding to the needs of the reformed Common Agricultural Policy and Rural Development.

Particular attention will be given to RTD which can help adjust farming and production systems to the new conditions arising from the reform of the C.A.P., can improve the competitive position of Union's Agriculture and can develop agriculture more protective of the environment. Also, improving tools for quantitative analysis, control, and impact assessment; increasing the efforts of extensification, conversion and diversification of agricultural production and producer's activities; to fostering the development of quality products; improving plant and animal health and welfare; supporting sustained multifunctional management of forests.

The results will encourage rural development and the improvement of socio-economic conditions in areas lagging behind in development.

Particular emphasis will be given to RTD efforts which can improve the knowledge indispensable for defining the diversity of situations encountered.

Area 5 Fisheries and aquaculture (72 MECU)

The overall objective is to provide a sound scientific basis for the balanced, sustainable exploitation of the fisheries resources of the Community, and the further controlled development of Aquaculture. This is to be achieved by a better knowledge and understanding of the aquatic ecosystem, including the interactions between fishing activities, aquaculture and the environment. Socio-economic considerations and the upgrading of fishery products are recognised as an integral part of the programme, together with the associated requirement to develop appropriate methodologies for evaluating fisheries and aquaculture policies.

LEVEL II CONCERTATION ACTIVITIES

Area 6 Objectives addressed by concertation (34 MECU)

Throughout Europe there is significant research on-going at a National level in agriculture, fisheries and agro-industries. In line with the principle of subsidiarity this programme does not seek to duplicate this valuable and often country specific research. However, in an effort to co-ordinate, and provide means for the efficient exchange of information, European networks will be established to bring together scientists in these areas. This will be implemented through concerted actions and as appropriate through shared cost actions,preferably by thematic networks.

LEVEL III OBJECTIVES ADDRESSED BY MEANS OF HORIZONTAL ACTIVITIES

1. Demonstration activities

As defined in Framework Programme IV, the objective of demonstration is to prove the technical viability of a new technology, method or system of production, together with, as appropriate, its possible economic advantage. The projects will be precompetitive and should as such, focus on the application of new technologies, methodologies or systems of production, and involve participation by both technology producers and users. This definition provides a means to clearly differentiate demonstration projects from research and technological development projects.

Demonstration Projects:

Demonstration projects will provide a means to verify the techno-economic performance of newly-developed technologies, methods or systems of production, under realistic operating conditions. The scale at which these projects will be implemented will depend on the specific nature of the problem, but should be, in any case, the minimum scale necessary and sufficient to produce reliable information. Utilization of existing infrastructures (e.g. pilot plants, idle industrial capacity) shall be preferred with respect to the construction of new facilities. Whenever possible, and while preserving the rights of project partners to exploit project results, demonstration projects will have well-identified target audiences which go beyond the executing partnership itself. Such "extended audiences" might include for example, professional associations, cooperatives, industrial platforms or groupings interested in the utilization of the new technology, method or system of production under demonstration, consumer organizations, etc.

Demonstration Networks:

In order to enhance the impact of certain demonstrations and to increase the diffusion of the new technologies, methods or systems of production under demonstration, selected projects addressing the demonstration of related technologies, methods or systems of production, can be grouped under a common European coordinator and executed in a concerted and synchronic manner.

2. Ethical, legal and social aspects - ELSA

Research on ethical, legal and social aspects of the areas included in this programme will have the objectives to:

- understand and take account of public attitudes and diversity of viewpoints, throughout the Community including producers, users, social partners, environmentalists, welfare groups, consumer groups, etc., to improve rationality and balance in the ongoing public dialogue;
- fulfil a prospective role, anticipate emerging problems and provide early warnings to decision-makers and the public for new ethical/legal/social issues, particularly regarding new experiments, technologies, production systems and products;
- investigate factors (cultural, economic, historic, religious, etc.) affecting public response and varying perceptions of ethical issues.

3. Specific measures in support of SMEs

Measures of technological stimulation based on the experience of the Cooperative Research Action for Technology (CRAFT) and exploratory awards will be implemented in order to encourage and facilitate the participation of SMEs, taking into account of the needs of those from less advanced regions.

IMPLEMENTATION

The programme will be executed through indirect actions, whereby the Community makes a financial contribution to RTD activities carried out by third parties or by JRC institutes in association with third parties. There are three types of indirect actions envisaged: Shared-cost actions, Concerted actions and Preparatory, Accompanying and Support measures.

I. Shared-cost actions of the following types:

1 **Research and Technological Development projects**, carried out by research centres, universities, private companies and cooperatives, will concern applied research, basic research and consortia for integrated projects or projects of relevance to Community Policies.

Community financial participation will be up to 50% of the total cost of the project. Universities, institutions and other undertakings which do not have analytical budget accountancy systems will be reimbursed on the basis of 100% of the allowable additional costs.

2 **Demonstration projects and networks**, as defined in Annex III of the Framework Programme, are intended to prove the technical viability of new technologies, together with, as appropriate, their economic advantages, and to build bridges between technology producers and users.

Community funding for demonstration projects will be reduced the nearer the project is to the market.

For those projects with the objective of verifying the technical viability of a non-proven new technology or new systems and methods of production, on a pilot-industrial scale, Community funding might be up to 50% of the total allowable cost of the project (i.e., excluding the cost of infrastructure and products which could be used in the market once the project is finished). For those projects with the objective of demonstrating, on a full-industrial scale, the technical viability and, if appropriate, the economic advantage of the new technology or new systems and methods of production, Community funding might be up to 35% of the total allowable costs of the project (up to 45% if the demonstration is executed by a SME), the rate decreasing the nearer the project is to the market. The cumulative total of public funds, including Community support, cannot be above 49% of the total cost of these projects.

In general, the financial contribution from the Commission will be below 2.0 million ECU for the biggest projects.

3 **Thematic networks**, bringing together primary producers, manufacturers, end-users, universities and research centres on a particular generic technology, in order to facilitate the incorporation and transfer of knowledge and mobility of researchers including training workshops, and to ensure that greater account is taken of Community Policies and market needs.

Community funding will normally not exceed 20.000 ECU, on average per partner and per year, covering up to 100% of the additional costs for the coordination of the action.

NOTE:

- *To promote the participation of SMEs special arrangements are foreseen (e.g. exploratory awards, cooperative research projects). A special information package (including forms) on this can be requested at the following fax n°: +32.2.296.20.07.*

4 **Technology stimulation** to encourage and facilitate participation of SMEs in RTD activities

(i) by granting awards for carrying out the exploratory phase of and RTD activity, including the search for partners, during a period of up to 12 months. The award will be granted following the selection of an outline proposal to be submitted normally by at least two non-affiliated SMEs from two different Member States. The award will cover up to 75% of the cost of the exploratory phase, without exceeding ECU 45.000 or ECU 22.500 in the exceptional case of a single applicant SME, and

(ii) by supporting cooperative research projects, whereby SMEs having similar technical problems but not having adequate own research facilities, engage other legal entities to carry out RTD on their behalf. Community funding for cooperative research projects, involving normally at least four non-affiliated SME's from at least two different Member States, will normally cover 50% of the cost of the research.
Following an initial call, in both cases proposals may be submitted at any time during the period covered by the work programme being implemented.

5 **Ethical, social and legal aspects - ELSA**

Where appropriate shared-cost projects will cover issues on Ethical, Social and Legal aspects.

II. **Concerted actions,** consisting of the coordination of RTD projects including where appropriate ethical, legal and social aspects, already funded by public authorities or private bodies. Community funding is aimed at the development of proper coordination and includes support for:

- preparation and exchange of material
- mobility of participating scientists
- organization of and participation in meetings under the leadership of the coordinator
- provision of scientific and administrative support
- support for centralized facilities
- publications

The concerted action option can also be used by the programme as a way of establishing the feasibility and identifying proposals for shared-cost research activities.

Community funding will cover up to 100% of the costs of the concertation.

III. **Preparatory, accompanying and support measures, such as:**

- training and mobility grants,

- studies in support of this programme and in preparation for future activities,
- support for exchange of information, conferences, seminars, workshops or other scientific or technical meetings, including intersectoral or multidisciplinary coordination meetings,

- use of external experts and access to scientific databases,

- scientific publications and activities for the dissemination, promotion and exploitation of results including ethical, legal and social aspects, in coordination with the activities carried out under the third activity,

- analysis of possible socio-economic consequences and technological risks associated with the programmme, which will also contribute to the programme "Targeted Socio-economic Research",

- training actions related to research covered by this programme in order to enhance employment skills and to facilitate technology to industry,

- independent evaluation of the management and execution of the programme and of the implementation of the activities,

- measures in support of the operation of networks for increasing awareness and providing decentralized assistance to SMEs, in coordination with the Euromanagement auditing activity of RTD,

- promotion of co-operation with third countries and international organizations.

Community funding may cover up to 100% of the costs of these measures.

❷ *Who can participate?*

FROM MEMBER STATES

The programme is open to all natural persons and organisations established in the Member States of the European Union (industrial firms – both large companies and SMEs –, universities, higher education institutes, research organisations, etc.), and to the Joint Research Center.

FROM OTHER COUNTRIES[1]

Full participation

If a non-Member State has signed an agreement with the Community associating it with the programme[2], legal entities from that country can participate in the programme and will receive a financial contribution from the Community (but there must always be at least one participant from a Member State).

Project by project participation

The participation in this programme without financial support[3] from the Community is also allowed on a project by project basis to:

- legal entities established and carrying out RTD activities in a European third country,
- legal entities established and carrying out RTD activities in a country having a scientific and technological cooperation agreement with the Community covering activities of this programme[4]
- international organisations[5]

on condition that the participation is in the interests of Community policies and the minimum number of legal entities from the Community, and any state associated with the programme are involved.

NOTES:

(1) The participation possibilities for international organisations and entities from third countries is partly based on a separate Council decision of 21 November 1994.

(2) For example, through the EEA Agreement for Austria, Finland, Iceland, Norway and Sweden. (Please note that some of these countries will become members of the EU in 1995.)

(3) Please refer to the attached sheet.

(4) At the time of preparing this information package, (Australia) had concluded an Agreement covering all of the activities covered by this programme. (With other countries such as Canada, South-Africa and Israel negotiations for an agreement are underway.)

(5) In duly specified cases, international research organisations situated in Europe may receive financial support.

❸ What are the criteria for proposals?

ELIGIBILITY CRITERIA

Conformity with the scope and objectives of the programme

Your proposal must fall within the scope and objectives of the programme (see Chapter I) and in particular within the terms set out in the call for proposals (see Annex I). The proposal may relate to more than one of the listed objectives in the call.

Transnational collaboration

Your proposal must be transnational and involve at least two non affiliated[1] participants from different Member States or from at least one Member State and one State associated with the programme. Collaboration in projects must be more than symbolic and the proposal must show a significant and balanced participation between project partners.

If you are an organisation from a non-Member State and are proposing to collaborate on a project by project basis (i.e. where your country has no full association with the programme) your proposal should clearly describe the benefits to the European Community from the participation of your organisation.

NOTE:

(1) Two organisations are affiliated if either one directly or indirectly controls the other or if both are directly or indirectly controlled by the same parent organisation. Organisation A is considered as controlling B if:

- *A holds more than 50% of the share capital of B;*
- *A holds more than 50% of the shareholders' voting rights of B;*
- *A holds the decision making powers of B.*

GENERAL CRITERIA

Scientific and technical excellence and novelty

Your proposal must be of a high scientific/technical quality:

- The objectives of the proposal must be convincing and feasible.
- The proposal must be innovative, i.e. represent a significant step forward beyond the state-of-the-art and include substantial original work. Proposals must not unnecessarily duplicate existing RTD.

- The scientific/technical aspects of the proposal should be clearly described.
- For any untried techniques, you should explain why your new approach is likely to succeed.

Precompetitive character

Your proposed research must be precompetitive in character, i.e. its results will require further development to produce marketable products or processes.

Scientific, technical and economic benefits

You should give a realistic description of any expected scientific, technical and economic benefits from your proposed RTD.

European dimension

Your proposal must have a European dimension. You must indicate the importance of the project to the Community and explain why the proposal merits European Community funding.

Quality of management

You must convincingly indicate an ability to exercise a high quality of management and describe how you will achieve this.

Potential exploitation of results

You must indicate the routes of potential exploitation of your results and your own commitment to such exploitation.

Technical competence

Your proposal must indicate the technical credibility and effectiveness of the partnership involved.

NOTE:
You should give special attention to:
- *the participation of SMEs*
- *relevance to Community Policies*
- *social and economic cohesion*
- *environmental considerations*

SPECIFIC CRITERIA

In addition to the above mentioned general criteria, submitted proposals should also meet the following specific criteria:

Clear and immediate relevance to Community policies

Proposals with a clear and immediate relevance to Community policies related to this programme - such as the Internal Market, the Common Agricultural Policy, the Common Fishery Policy, the Environment Policy - will be particularly appreciated.

Market orientation

Projects dealing with the primary production and/or processing of biological material should aim at economically feasible responses to the quantitative and qualitative demands of the market and consumers. In certain cases, for example in the non-food field, increases in quantity might be sought, mainly in the context of more efficient integrated production systems.

Quality

Projects should focus on improvements in quality:

- of production methods, including more environmentally friendly[1] systems in primary production and industry.

- of products, e.g. improved taste and aroma of food, healthier foods, environmentally friendly non-food products.

NOTE:

(1) Environmentally friendly means having beneficial or at least no deleterious effects on the environment.

Multidisciplinary and integrated approach

Proposals should have a multidisiciplinary and integrated approach wherever possible and appropriate. In such complex projects you should indicate your ability to handle the difficult task of co-ordination.

Technology assessment

If possible and appropriate, your project proposal should consider the socio-economic impact of the new technologies used.

Private Sector Participation

For shared cost contracts, private sector participation is welcomed (e.g. farm-cooperatives, private research institutes, industries). SMEs are particularly invited to take part.

Project size and duration

Preference will be given to balanced projects involving at least one man-year per year for each of the main participants (contractors or associated contractors). The duration of the project should not exceed five years.

DEMONSTRATION PROJECTS

For demonstration projects, in addition to the above general and specific criteria, the following criteria should also be met:

Novelty and Risks

For Demonstration projects, novelty to be demonstrated is a requirement. Therefore, proposals should describe and discuss in detail the novelty and related risks aspects of the technology, method, or system of production to be demonstrated. In particular, it should be clearly indicated whether the technology, method or system of production is new, or if the novelty relates to the first time application of an existing technology.

A Sufficient Knowledge to Allow for Demonstration

Proposals must also reflect that project partners have a sufficient level of knowledge about the new technology, method, or system of production to be demonstrated and justify why the stage of development it has reached makes a demonstration phase possible. The existing technical risks and uncertainties must be also described and discussed in detail, and you should indicate why the demonstration project is needed for eliminating or reducing such risks.

A Large Economic Potential

Priority will be given to generic technologies showing a high economic potential.

Comparative Advantages

Your proposal should present an evaluation of the advantages of the new technology, method, or system of production, with respect to established and competing technological alternatives.

Participation of Producers and Users

Projects must be carried out by partnerships of critical mass which include technology users and technology producers. This will ensure a balance within the partnership of a demand-driven component with a technology-push component and a sound methodological approach.

4 How to prepare and write a proposal

Before writing a project proposal it is important to take note of the different roles which the partners to a RTD contract might play (e.g. project coordinator, contractor, sub-contractor see page 35-36).

Each proposal should be presented in two parts :

- the financial and administrative form (possibly an optical reading form)
- the scientific and technical content.

FINANCIAL AND ADMINISTRATIVE FORM

The official application form is for the financial and administrative details of the proposal and for a short description of the proposal. This form may be processed by automatic optical reading. Please therefore follow carefully the detailed instructions (please no diagrams or formulae) on the form provided in Annex II.

SCIENTIFIC AND TECHNICAL CONTENT

A detailed description must be given of the proposed project and of each participant's contribution as follows:

Detailed description of the project

This will include:

1 Objectives

Describe the objectives of the project and the advances that it represents in relation to the current state of the art and the industrial context;

2 Work content

Give a detailed scientific and technical description of the proposal project, identifying the different options available to meet the objectives and the main scientific, technological and industrial bottlenecks or difficulties. Proposers should provide justification as to why the proposal belongs to a particular area.

3 Project milestones and deliverables

Give a list of major project milestones and deliverable items and their links to the work tasks;

4 Benefits

This section should provide a full scientific, technical, and economic justification for the proposed project;

5 Socio-economic impacts and ethical implications

Identify and quantify where possible any socio-economic and environmental impacts as well as any ethical implications arising from the proposed project.

6 Project management structure

Give a descripton of the management structure and techniques to be used for the proposed project;

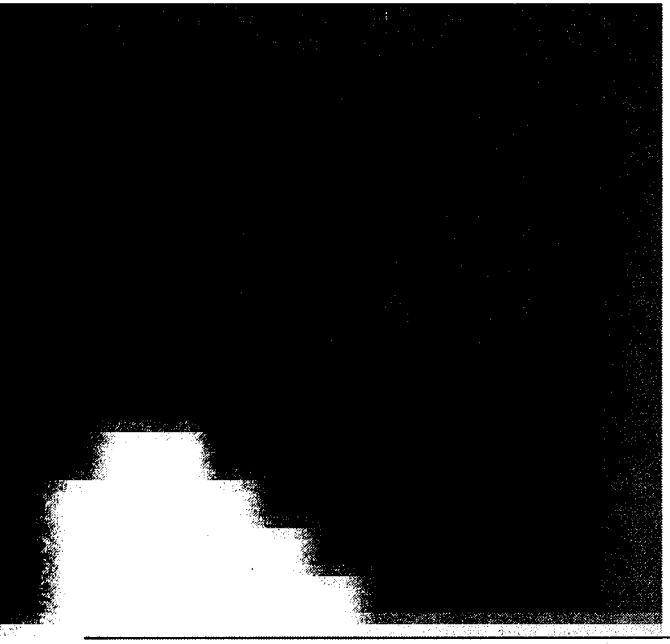
7 The partnership

Summarise the role and contribution of each of the partners and associated partners, their qualifications for their role, their capacity to provide their contribution to the project, the experience and knowledge which they will contribute and why their qualifications and experience make them particularly suited for the work allocated to them;

8 Financial Information

Fill in the table provided in the PROPOSAL DESCRIPTION (summary of partner cost breakdown) giving a breakdown of each partner's costs under the following headings:

- labour
- equipment
- external services
- travel and subsistence
- consumables
- other costs (computing etc.)
- overheads



9 Exploitation plans

Describe the partnership's plans for exploiting and/or disseminating the results of the proposed project;

10 Ongoing projects and previous proposals

If the same (or a related) application has been or is being submitted to a Community programme or to another European programme such as EUREKA or COST, please give details of the application and indicate any differences between the proposals.

5 *How to submit a proposal?*

Each proposal must be submitted by the "project coordinator".

It is you – the project coordinator – who will be responsible for the internal management and administration of the proposal and liaison with the Commission.

- You should submit one original of each proposal plus 5 copies.
- You may submit proposals in any official language of the EU. However, it is advisable to supply at least a summary in English. This will accelerate the assessment of proposals.

DEADLINE

The Commission must receive proposals on or before the closing date stated in the Call. The Commission reserves the right not to evaluate proposals received after the closing deadline.

It is your responsibility to assemble the proposal and ensure that it is submitted in one parcel. If it is in more than one parcel, you must ensure that the separate parcels are easily identifiable and can be associated.

It is also your responsibility to ensure that proposals are delivered by 12H00 at the latest on the closing date.

DELIVERY

You should address and send the parcel to:

The European Commission
Secretariat of the RTD&D Programme Agriculture and Fisheries
Rue Montoyer 75
B-1040 Brussels

You must clearly mark on the parcel:
"Confidential: Proposal for the programme on Agriculture and Fisheries (including Agro-industry, Food Technologies, Forestry, Aquaculture and Rural Development)".

In exceptional circumstances, the parcel may be delivered before the closing date to an Information Office of the Commission located in one of the Member States (Special rules apply; the responsible Commission services should receive a written request for this, well in advance).

ACKNOWLEDGEMENT OF RECEIPT FORM

NOTE:
Do not send proposals by fax (not even to announce proposals that are in the mail). Faxes will not be acknowledged.

You should include – in the parcel in which the proposal is delivered – the official "Acknowledgement of Receipt" form. On this you – the project coordinator – must put the organisation's name and address and the title of the proposed project. This will ensure that the acknowledgement is returned to you correctly addressed.

Before it is returned, however, the Commission's reception staff will record the date of receipt and a unique reference number on the form, for use in all subsequent correspondence relating to the proposal.

You should ensure that all members of the consortium are given the proposal reference number and you should use it in all contact with the Commission.

If you do not receive an "Acknowledgement of Receipt" within two weeks of the closing date of the call, you should assume that the application was not received and should contact the appropriate Commission offices. You are strongly advised to retain proof of dispatch if the proposal is mailed.

6 *Evaluation and selection of proposals*

The Commission will ensure a confidential, fair and equitable evaluation of proposals. This evaluation will have due regard to the criteria set out in Chapter III, and will be carried out by independent experts chosen by the Commission, under the responsibility and coordination of the Commission.

The evaluation and selection of proposals will proceed as follows:

- Verification of eligibility of proposals by Commission staff
- Confidential evaluation of the proposals by independent experts
- Initial ranking of proposals by the Commission and the preparation of a draft shortlist of the proposals the Commission intends to fund
- Examination of the evaluation process, a discussion on the results and the provision of an opinion on the Commission's shortlist by the responsible Advisory or Regulatory Committee for the programme
- Final selection by the Commission of shortlisted proposals and communication of the results of the evaluation and selection to the proposal coordinators

7 Contracts: procedures and principles

GENERAL PROCEDURES

NOTE:

The negotiation process will be terminated, for example, if:

- *the project consortium seeks to substantially modify the proposal or*
- *any of the partners fails to complete the negotiation process within the agreed time.*
- *the Commission has evidence, such as duplication of research efforts, that the project should not be selected.*

Negotiation of Contracts

Soon after the selection process the Commission services will ask successful proposers to provide:

- more detailed financial information
- an appropriate project description for inclusion in the contract.

The Commission may require changes to your proposed project on the basis of the evaluation. Participants in selected projects may be required to travel to Brussels to negotiate the details of the contract.

The negotiation process will be completed as quickly as possible but still may take some months, depending on the complexity of the project, or the nature of any technical or financial modifications required by the Commission. Therefore successful proposers should plan their work accordingly. The Commission will not contribute to any costs incurred before the formal commencement date specified in the contract.

In order to facilitate the negotiation process, you should:

- be familiar with the allowable costs which can be included in EU supported projects
- provide rapidly all the detailed information requested, and submit it through the project coordinator
- keep the number of main participants in a project to a minimum and decide at the outset how best to participate (contractor, associated contractor, sub-contractor).

This will help to get the project started as quickly as possible, and contribute to the effectiveness of its management.

Form of Contract

The Commission will prepare a contract setting out the conditions of EU support for projects selected.

The contract with successful proposers will be based on the model RTD contracts. The main principles of RTD contracts are outlined in the following pages.

These model contracts may be adapted to take into account specific conditions of the particular RTD programme or project.

The model RTD contracts form a flexible mechanism for participating in projects. However, participants may conclude cooperation agreements amongst themselves to complement the conditions of the model RTD contracts (but in doing so, they must respect competition rules under the EC Treaty and the principles concerning the ownership, exploitation and dissemination of results).

The role of "project coordinator"

All projects must have a "project coordinator" who will be responsible for the management of the project and who therefore should have the appropriate management expertise, as well as the technical expertise, to direct the project. The coordinator's responsibilities also include administrative responsibilities, such as general liaison with the Commission, the submission of all documents — including technical reports giving an overview of the project — and the distribution of the financial support paid by the Commission.

Two types of contractor

Participants who contribute to the costs of, and carry out, the work may be:

- **contractors**, in which case they will sign the contract with the Commission and assume joint and several liability for completing the work envisaged

or

- **associated contractors,** in which case they will not sign the contract with the Commission. This is particularly appropriate for projects involving a large number of participants or for organisations making small contributions to the project.

Contractors should grant fair and reasonable rights to the associated contractors for their contribution to the project. They should conclude appropriate arrangements between themselves; these arrangements can be a simple exchange of letters or a more formal written agreement, but they must conform with principles specified in the model RTD contracts (Article 3.2 of Annex II) and be submitted to the Commission for approval.

Subcontractors

Participants who are fully reimbursed by the contractors or associated contractors for their work should be treated as subcontractors. Minor subcontracts do not generally require the approval of the Commission, but approval is required for subcontracting of the project work in particular for major subcontracts where the value of the work exceeds 100.000 ECU or 20% of the costs of the participant placing the work. (See the model contract for further details of when approval is required.)

European Economic Interest Groupings

Some or all participants may wish to establish a European Economic Interest Grouping (EEIG) as a separate legal entity to enter into the contract with the Commission and perform the work. An EEIG is a useful mechanism for participating in EC RTD programmes and can easily be created, or dissolved, or new members added with minimum formalities. The existence of an EEIG can help:

- in dealing quickly with the procedural stages prior to the beginning of the project
- in the management of the project.

A guide to the role of EEIGs in RTD can be obtained from Directorate-General XII and more detailed documentation is also available from Directorate-General XV (Financial Institutions and Company Law).

Participation by Organisations from non Member States

Organisations from countries which are not Member States or which are not associated in the Community RTD programme covered by this information package will only be eligible to participate in projects as outlined in Chapter 2.

These organisations will:

- not receive any financial support from the EU (consequently, statements of effort, rather than cost statements, will be required for actual cost contracts)
- normally not be able to act as project coordinator
- not have access to results generated from other Community RTD programmes

- be required to comply with the same selection criteria requirements as EU organisations.

Organisations from industrialised countries may be required to contribute towards the general administrative costs of the programme.

Organisations from non-Member States which are associated in the RTD programme covered by this information package will be able to participate in projects under the same conditions as EU organisations. Access to results will, however, be limited to the RTD programmes to which the non Member State is associated.

Affiliated Companies

Affiliated companies of participants (whether controlling, controlled by, or under the same control as, the participant) are only entitled to have access to the results generated by the project in specified circumstances. They must comply with the framework for the exploitation of results, and the criteria defining affiliated companies.

Arrangements involving associated contracts and subcontracts between affiliated companies do not generally require the approval of the Commission (although such arrangements must be notified).

MODEL RTD CONTRACT: MAIN PRINCIPLES AND SPECIFIC PROCEDURES

NOTE:

Please note that the model RTD contract is currently being revised.

Procedures

- Two copies of the contract will be sent to each partner (coordinator and contractors) for signature; the Commission will only sign after the return of the documents by all the partners.

- Only one language version of the contract will be prepared for signature -the language and law will usually be that of the "project coordinator".

- The operative commencement date of the project will normally be the first day of the month following the signature of the contract by the Commission; only costs incurred after this date will be allowable (as an exception, durable equipment purchased for the project up to six months prior to its commencement may be charged to the project, but only for the period of its use after the start of the work.)

Payments

- All payments will be made in ECU through the "project coordinator".

- An advance payment will be made after the signature of the contract by the Commission (for indicative purposes only, approximately 40% of the EU support for a typical three-year project).

- Periodic payments, normally at 12 monthly intervals, will depend on the submission and approval of progress reports, and appropriate cost claims. For smaller projects, the Commission may decide to use, with the agreement of the contractors, a fixed contribution contract under which the EU support will be reimbursed in fixed percentage instalments; for larger projects, cost statements setting out some specified details of actual costs incurred are required.

- A retention (normally 10% of the EU contribution or 500,000 ECU, whichever is the lower) is withheld until all the final documents (technical and financial) have been received and approved by the Commission. For larger projects where cost statements are required, a consolidated cost statement must be submitted within three months of the end of the project after which no further cost claims will be accepted.

Costs

- The allowable costs to which the EU support will be given are the full costs of the project (the EU contribution will not normally exceed 50%). Additional costs shall be met by higher education establishments and other research centres for RTD activities where, in the view of the Commission, the analytical budget accountancy used by the legal entity does not enable the full costs of the activity to be substantiated with sufficient precision (the EU contribution will normally be 100% of the additional costs).

- Allowable costs may include:
  - labour (for those using additional costs, only additional research staff, not permanent teaching staff)
  - capital equipment (depreciated over 3 years for computers costing less than 10,000 ECU, and over 5 years for all other equipment)
  - other direct running costs (travel, consumable materials, computing, external assistance, etc.)
  - indirect overhead costs (necessary to support the research activities) (for those using additional costs, a maximum of 20% of costs excluding associated contracts and VAT)

- Rates approved by national governments for research may be charged if they are adjusted to take account of any differences with Commission principles for costs.

- No profit may be included in any costs charged to the Commission. Costs should also exclude interest or return on capital employed; notional or opportunity costs or revaluations (use historic costs); distribution, marketing and advertising costs for products and activities; and patent protection costs.

- No VAT should be included in proposals in the estimated costs. VAT and customs duties paid in connection with the project should be reclaimed from, or accounted for to, national authorities. Those organisations unable to reclaim the VAT may be able to include some of the amounts separately in the cost statements. (Limits vary between Member States.)

Reports

- The "project coordinator" must provide technical progress reports giving an overview of the project to assist the Commission to monitor the work and results; individual contributions by other contractors to be appended to these global reports must be submitted through the "project coordinator".

- During the project these reports must be submitted normally at 6 or 12 monthly intervals.

- At the end of the project, a final report covering all the work, objectives achieved and conclusions, together with a confidential report on the intentions and potential for protecting and exploiting results, must be submitted.

- All reports will be treated as confidential, but reports suitable for publication, excluding any commercially sensitive information, must be provided with the 12 monthly and final reports. These are intended to inform the industrial and scientific community of new developments from EU funded research so that third parties may become aware of the opportunities to licence technology developed or to expand the collaborative research.

Ownership and Exploitation of Results

- All intellectual property rights generated under the research project will be owned by the relevant contractor or associated contractor who must:
  - exploit or commercialise them in conformity with the interests of the Community (this includes the need to grant licences on commercial conditions to other organisations established in the EU where the necessary exploitation or commercialisation cannot be undertaken or arranged by the participants themselves – results cannot be locked away).
  - freely grant licences and user rights amongst themselves for carrying out the research project, and any subsequent exploitation and commercialisation. Non-commercial organisations may be paid royalties in certain circumstances, but any financial negotiations must not hinder or prejudice such exploitation or commercialisation.
  - grant licences and user rights to others needing access to the results in specified circumstances. A table summarising the granting of licences and user rights can be found on pages 44-47. Adequate protection is included to safeguard legitimate business interests and intentions concerning the exploitation or commercialisation of the results; Community requirements relating to a broad access to the results for legitimate research and compliance with competition rules are also reflected in this framework. In limited circumstances, and against payment, background results developed without Community support must also be made available to facilitate the use of the foreground results.

- Participants must inform the Commission in the proposal of any interests which could affect their obligations concerning the exploitation and dissemination of results.

- In certain circumstances, the Commission may protect the foreground results where the contractors do not wish to take out patents, etc. Researchers, particularly those in non-commercial organisations are advised to consult experts in their organisations or their partners on the commercial potential of results before unrestricted disclosure of information which could subsequently prejudice patent applications.

- Assistance is available from the Commission in technology transfer under EU initiative and further information can be obtained from Directorate General XIII - Telecommunications, Information Industries and Innovation (Directorate XIII.C, Bâtiment Jean Monnet, Rue Alcide de Gasperi, L-2920 Luxembourg).

Specific conditions for the RTD programme in the field of Agriculture and Fisheries (including Agro-industry, Food Technologies, Forestry, Aquaculture and Rural Development)

Proposals, and subsequent projects, have to include, if appropriate:

- an environmental and ethical statement which outlines the expected impact on the environment and on public opinion of the proposed work
- a signed undertaking to comply with the applicable national and international safety regulations as well as the ethical guarantees of the 4th Framework Programme[1] .

SPECIFIC CONDITIONS

NOTE:

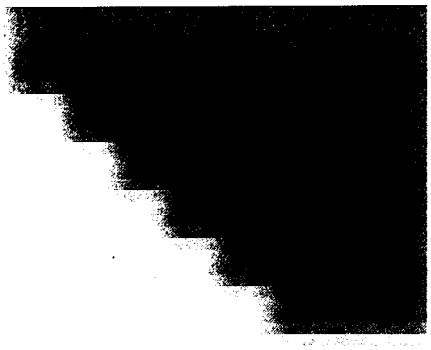
(1) "Whenever possible, experimentation and testing on animals should be replaced by in vitro or other methods."
Decision n° 1110/94/EC of the European Parliament and of the Council of 26 April 1994 concerning the fourth framework programme - Annex 3 -First Activity - Section 4 : Life Sciences (OJ C126 dated 18.5.94).

Recipient	For Research and Development Purposes	
	Foreground Information (User Rights) /Foreground Patents (Licences)	**Background Information (User Rights) /Background Patents (Licences)**
1 Partners/signatories; Complementary contractors (projects with technical inter-dependence)	**Royalty-free** if necessary for carrying out their EC contracts (Art. 16.1.1)	**On non discriminatory transfer conditions** if necessary for carrying out their EC contracts, but only if the contractor is free to disclose or grant licences (Art 16.2.1)
2 Entities carrying out research in the EU and participating in the same RTD programme	**On transfer conditions** if necessary for carrying out their EC contracts (Art. 16.1.2)	**On favourable conditions** if necessary for Foreground Information available under Art. 16.1.2 for carrying out their EC contracts, provided the contractor: • is free to disclose or grant licences • may oppose the grant **for major business interests** (Art. 16.2.2)
3 Entities carrying out research outside the EU and participating in the same RTD programme	**On transfer conditions** if necessary for carrying out their EC contracts (Art. 16.1.2)	To the extent agreed by the contractors **on favourable conditions** if necessary for Foreground Information made available under Art. 16.1.2, provided the contractor is free to disclose or grant licences. Contractors shall have regard to the interests of the EU in the implementation of the programme as well as their business interests in reaching a decision (Art. 16.2.3)

USER RIGHTS

For Exploitation or commercialisation

Foreground Information (User Rights) /Foreground Patents (Licences)	Background Information (User Rights) /Background Patents (Licences)	Notes
Royalty-free non exclusive rights: • for the exploitation or commercialisation of the results of their EC contracts, or • to have products manufactured for exploitation or commercialisation by or on its behalf. (A prior right to undertake manufacture/ marketing on fair and reasonable terms is to be given to other partners). Non commercial bodies (e.g. universities) may grant licences against financial compensation, but must give up their right of commercialisation and discussions and must not delay or prejudice the commercialisation (Art. 17.2)	**On favourable conditions** for the exploitation or commercialisation of Foreground Information/Patents if the contractor is free to grant the licence. The right to withhold: • **for major business interests** (these must not abusively restrict the grant) • if the Foreground Information/Patents relate to products about to become commercially available (Art. 17.5)	• Article numbers refer to provisions in Part B of Annex II to the EC Model RTD contracts. • The contractors have an obligation to exploit or commercialise, or have exploited or commercialised – in the interest of the EC – the results within a period of time to be agreed. This obligation has a maximum ten year time limit after the expiration of the contract. • Associated contractors must be granted fair and reasonable rights and benefits. • Where user rights are to be granted outside the project consortium or complementary contractors for non protectable information, they are subject to the limitation that suitable arrangements required by the grantor are concluded to ensure that the information will not be used (by the grantee) for any purpose other than that for which it is granted. • All obligations specified in this table have a five year time limit after the expiration of the contract unless otherwise indicated. • "commercial conditions" means open market payments and other conditions. • "favourable conditions" means conditions that have a value lower than commercial conditions.
Not to unreasonably refuse to grant **on favourable conditions** non exclusive rights or licences if required for the exploitation or commercialisation of the results of their EC contracts. The right to refuse, inter alia, for major business interests (these must not abusively restrict the grant) or if the licences relate to products about to become commercially available (Art. 17.3)	No obligations	
(as 2 above) (Art. 17.3)	No obligations	



Recipient	For Research and Development Purposes	
	Foreground Information (User Rights) /Foreground Patents (Licences)	**Background Information (User Rights) /Background Patents (Licences)**
4 Entities carrying out research in the EU and participating in a different RTD programme in related fields or with related objectives	**On transfer conditions** if necessary for carrying out their EC contracts (Art. 16.1.2)	**On favourable conditions** if necessary for Foreground Information available under Art. 16.1.2 for carrying out their EC contracts, provided the contractor: • is free to disclose or grant licences • may oppose the grant for major business interests (Art. 16.2.2)
5 Entities carrying out research in the EU	Not to unreasonably refuse to grant **on favourable conditions** if necessary for R&D in the same or related fields. The right to refuse, inter alia, for major business interests or if adequate steps are being taken by contractors or their licensees to exploit or commercialise Foreground Information/Patents in the Community (Art. 16.1.3)	No obligations
6 Any entity established or incorporated in the EU	No obligations	No obligations
7 EC (JRC or joint undertakings)	**Royalty-free** non exclusive licences to use, if requested for its needs, but no right to grant sublicences and must remain confidential (Art. 19) (No time limit)	No obligations

USER RIGHTS

For Exploitation or commercialisation		Notes
Foreground Information (User Rights) /Foreground Patents (Licences)	**Background Information (User Rights) /Background Patents (Licences)**	
(as 2 above) (Art. 17.3)	No obligations	• "transfer conditions" means conditions that have a value lower than favourable conditions – normally the cost of making the licences and user rights available. • "royalty-free" means at no cost and against no conditions other than those specified in Part B of Annex II to the Model EC RTD contracts. • In principle, entities from states associated to RTD programmes have the same rights as entities from the EU.
Not to unreasonably refuse to grant, **on commercial conditions** if necessary for the exploitation or commercialisation of R&D in the same or related fields. The right to refuse as 2 above (Art. 17.4(a)) (ten year time limit)	No obligations	
If no exploitation or commercialisation by the contractors or their licensees in accordance with the contract (Art 17.1), then not to unreasonably refuse to grant on commercial conditions for manufacture, exploitation or commercialisation, in conformity with the interests of the Community. The right to refuse as 2 above (Art. 17.4(b)) (ten year time limit)	No obligations	
No obligations	No obligations	

8 *Information and assistance*

DATABASES AND SERVICES

Research telematics system for data recording: ARCADE

ARCADE (Ampere Remote Control Access Data Entry) is the interactive telematics system of the European Commission, that has been developed by the Directorate General for Science, Research and Development. The aim is to improve the communication between the Commission and organisations potentially interested in participating in RTD programmes. It offers the following features to users:

- information and guide for applicants on-line,
- tele-registration of EOIs and consultation of the EOI database,
- confidential tele-submission of proposals.

ARCADE is available on-line throughout the Community in all nine official languages via a simple modem and a local telephone call through the respective national telecommunications authorities.

ARCADE
European Commission
Directorate-General for Science, Research and Development
Rue Montoyer, 34
B-1040 Brussels
Tel: 32 2 295 07 45
Fax: 32 2 296 06 26

Electronic information on EC research policy: CORDIS

A central source of information is crucial for any organisation that wishes to participate in a Community funded research programme. It is important that all research policy makers and researchers in industrial and academic establishments alike are made aware of research possibilities, trends and projects being undertaken in the European Union. The Community Research and Development Information Service CORDIS addresses these issues and consists of an on-line service providing information on all Community research programmes, RTD activities and RTD partners.

CORDIS
Customer Service
ECHO
BP. 2373
L-1020 Luxemburg
Tel: 352 34981240
Fax: 352 34981248

Information days

The Commission and national associations organize events in a number of countries to publicise and promote participations in the new programme. You are invited to attend these events where Commission staff will give you information and answer your questions on the programme and on the procedures for submitting proposals. The events will also give you the opportunity to meet possible partners with the complementary skills required for the proposals you have in mind.

National contact points and networks

- National contact points are designated in the Member States, Associated States and other European countries to help you if you have any questions concerning the programme or more specifically concerning the preparation or presentation of proposals.

For national contact points, see the following sections.

- Decentralised assistance will be provided through the operation of networks which provide information to SMEs in coordination with the Euromanagement auditing activity of RTD.

Value Relay Service

The Value Relay Service is a dedicated network of pro-active advisory centres bringing the Community RTD activities closer to its clients. It aims to promote the dissemination and exploitation of RTD results but also to facilitate participation in the RTD programmes themselves. Value Relay Centres are hosted by national organisations and are spread across Europe.

Your local Value Relay Centre is your window to European Research and Technology Development funding and research results. Value Relay Centres run information seminars, technology transfer days and other events, and are always there to answer your questions and help you get started.

VALUE RELAY SERVICE
European Commission
Directorate-General XIII D-3
Jean Monnet Building
L-2940 Luxembourg
Tel: 352 43014008
Fax: 352 43014009

Management manual

To ensure that researchers understand the processes of managing this programmes within the Commission, the Commission has prepared a manual to provide clear information about the procedures applied. The manual is intended to give a clear step by step guide for applicants to the processes of project submission and selection. It may be ordered at the Office for Official publications of the European Communities (ISBN 92-826-7076-7)

You may directly contact the Commission, but please try first to benefit from the national contact persons as far as possible.

European Commission

Secretariat of the RTD&D Programme Agriculture and Fisheries (including Agro-Industry, Food Technologies, Forestry, Aquaculture and Rural Development)
Rue Montoyer 75
B-1040 Brussels

CONTACT POINTS AT THE EUROPEAN COMMISSION

Directorate-General VI: Agriculture and Rural Development

Concerning Research, Technological Development and Demonstration activities in areas 4 and 6 and horizontal activities:

D. DESSYLAS
DG VI-FII-3

Tel: 32-2-295.86.12
Fax: 32-2-296.30.29

Directorate-General XII: Science, Research and Development

Concerning Research, Technological Development activities in areas 1, 2, 3 and 6 and horizontal activities:

L. BRESLIN
DG XII-E-2

Tel: 32-2-295.04.77
Fax: 32-2-296.43.22

NOTE:

If you have any questions concerning this information package or more specifically concerning the preparation or presentation of proposals under this programme, please contact in the first instance the contact person in your own country. He or she is in direct contact with the responsible Commission personnel in Brussels.

Concerning Demonstration activities in areas 1, 2, 3 and 5:

A. HERRERO MOLINA
DG XII-E-3

Tel: 32-2-295.46.83
Fax: 32-2-295.53.65

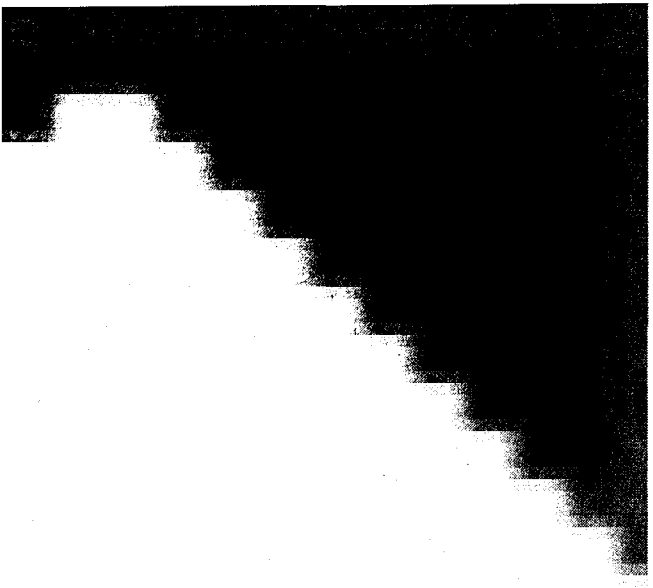
Directorate-General XIV: Fisheries

Concerning Research and Technological Development in areas 5 and 6 and horizontal activities:

W. J. BRUGGE
DG XIV-C-2

Tel: 32-2-295.51.37
Fax: 32-2-295.78.62

Additional copies of this information package, model RTD contracts, EEIG guide as well as general information may be obtained by the Commission's Information Offices in the Member States.



CONTACT POINTS IN THE MEMBER STATES

NOTE:

If you have any questions concerning this information package or more specifically concerning the preparation or presentation of proposals under this programme, please contact in the first instance the contact person in your own country. He or she is in direct contact with the responsible Commision personnel in Brussels.

BELGIUM

Mr J. DE BRABANDERE
Opdrachthouder
D.P.W.B.
Wetenschapsstraat 8
BE - 1040 BRUSSEL

Tel: +32-2-238.35.20
Fax: +32-2-230.59.12

Mr M. VANQUAILLIE
DGTRE
Avenue Prince de Liège 7
BE - 5100 JAMBES

Tel: +32-81-32.16.80
Fax: +32-81-30.66.00

DENMARK

Mr Morten BENNUM
Ministry of Research
H.C. Andersens Boulevard 40
DK - 1553 COPENHAGEN V

Tel: +45-3311-43.00, Ext 311
Fax: +45-3315-02.05

FRANCE

Mr R. CASSINI
Ministère de l'Agriculture et de la Pêche
INRA
147, rue de l'Université
FR - 75338 PARIS Cédex 07

Tel: +33-1-42.75.91.38
Fax: +33-1-42.75.94.26

Mr J. CROUZET
Ministère de l'Enseignement Supérieur et de la Recherche
DSPT 9
77 avenue Denfert - Rochereau
FR - 75014 PARIS

Tel: +33-1-40.51.21.18
Fax: +33-1-40.51.20.40

GERMANY

Frau Dipl.-Ing. agr. A. HOFFMANN
Projektträger Biologie, Energie, Ökologie
Außenstelle Berlin
Hannoversche Straße 30
DE - 10115 BERLIN

Tel: +49-30-399.81.255
Fax: +49-30-399.81.318

Herr Dr C. HUBRICH
Bundesministerium für Ernährung,
Landwirtschaft und Forsten
Rochusstraße 1
DE-53123 BONN

Tel.: +49-228-529.3378
Fax : +49-228-529.4312

GREECE

Dr A. M. ZYGOMALA
Forest Engineer
General Secretariat of Research & Technology
Mesogion 14-18
GR-115 10 ATHENS

Tel: +30-1-77.52.222 ext. 346
Fax: +30-1-77.13.810/7714 153

Mr E. PANAGOU
National Agricultural Research Foundation
Directorate of International Relations,
Documentation & Informatics
19 Egialias & Chalepa Str. Amaroussion
GR-151 25 ATHENS

Tel: +30-1-68.43.465
Fax: +30-1-68.46.700

IRELAND

Mr J. FLANAGAN
Deputy Chief Inspector
Department of Agriculture, Food & Forestry
Kildare Street
IE-DUBLIN 2

Tel: +353-1-678.90.11
Fax: +353-1-676.29.89

Mr David GRIFFITH
Director
Fisheries Research Centre
Department of the Marine
Abbotstown
IE-DUBLIN 15

Tel: +353-1-821.01.11
Fax: +353-1-678.54.44/820.50.78

ITALY

Prof. M. BUIATTI
Università degli Studi di Firenze
Dipartimento di Biologia Animale e Genetica "Leo Pardi"
Via Romana 17/19
IT-50125 FIRENZE

Tel.: +39.55.229.453
Fax : +39.55.222.565

Mrs L. DELLI COLLI
Ministero della Università e Ricerca Scientifica,
URI-CEE
Piazzale Kennedy 20
IT-00144 ROMA

Tel.: +39.6.599.12.713
Fax : +39.6.599.12.368

LUXEMBOURG

Mr R. BRAUN
Lycée Technique Agricole
72 Avenue Salentiny
LU-9080 LUXEMBOURG`

Tel: +352-81.85.25
Fax: +352-82.17.0

Mr L. HOFFMANN
Docteur ès sciences
Centre de Recherche Public du Centre Universitaire
162a, Avenue de la Faïencerie
LU-1511 LUXEMBOURG

Tel: +352-47.02.61
Fax: +352-47.02.64

PORTUGAL

Prof. A. GUIMARAES DE MEDINA
Av. Dr. António Bernardino de Almeida
PT-4200 PORTO

Tel.: +351-2-59.96.22
Fax : +351-2-59.03.51

Prof. C. SOUSA REIS
Instituto Português de Investigacão Marítima
Av. Brasília
PT-1400 LISBOA

Tel.: +351-1-301.53.14
Fax : +351-1-301.59.48

SPAIN

Mr E. RAMOS RODRÍGUEZ
Instituto Nacional de Investigación y Tecnologia
Agraria y Alimentaria (INIA)
José Abascal 56
ES-28003 MADRID

Tel: +34-1-347.39.96/347.39.90
Fax: +34-1-442.35.87

Mr A. BELTRAN
Centro para el Desarrollo Tecnológico Industrial (CDTI)
Edificio Cuzco IV
Paseo de la Castellana 141, 12°
ES-28046 MADRID

Tel: +34-1-581.55.66
Fax: +34-1-581.55.84

THE NETHERLANDS

Ir W. VAN VUURE
Ministerie van Landbouw, Natuurbeheer en Visserij
Directie Wetenschap en Technologie
Bezuidenhoutseweg 73
P.O. Box 20401
NL-2500 EK THE HAGUE

Tel.: +31.70.379.26.50
Fax : +31.70.347.81.67

Dr P.A. Th. J. WERRY
Dienst Landbouwkundig Onderzoek - DLO
Postbus 59
NL-6700 AB WAGENINGEN

Tel.: +31.8370.740.23
Fax : +31.8370.240.60

UNITED KINGDOM

Dr M. M. PARKER
MAFF
Nobel House - Room G34B
17 Smith Square
GB-LONDON SW1P 3JR

Tel: +44-71-238.55.24
Fax: +44-71-238.61.29

Dr D.G. LINDSAY
MAFF
Nobel House - Room 219
17 Smith Square
GB-LONDON SW1P 3JR

Tel: +44-71-238.55.44
Fax: +44-71-238.60.21

CONTACT POINTS IN STATES ASSOCIATED WITH THE PROGRAMME

NOTE:
Please refer to the attached sheet.

AUSTRIA

Mag. Dipl.-Ing. V. VEITS
Bundesministerium für Land-und
Forstwirtschaft
Stubenring 1
AT-1012 WIEN

Tel.: +43-1-711.00.65.67
Fax : +43-1-711.00.65.07

Mrs Martina HÖLBLING
Büro für Internationale Forschungs- und
Technologiekooperation
Wiedner Hauptstraße 76
A-1042 WIEN

Tel.: +43-1-581.16.16.107
Fax : +43-1-581.16.16.16

FINLAND

Mrs M. SUURNÄKKI
Ministry of Agriculture and Forestry
Mariankatu 23 (Box 232)
FI-00170 HELSINKI

Tel: +358-0-160.24.20
Fax: +358-0-160.24.43

Mrs P. M.A. NYBERGH
Technology Development Centre, TEKES
Box 69
FI-00101 HELSINKI

Tel: +358-0-6936.78.23
Fax: +358-0-6936.77.93

ICELAND

Mr H. JÓNSSON
National Research Council
Laugavegi 13
IS-101 REYKJAVIK

Tel: +354-1-621.320
Fax: +354-1-298.14

Mrs E. ANDRESDOTTIR
Icelandic Council of Science
Barugata 3
IS-101 REYKJAVIK

Tel: +354-1-102.33
Fax: +354-1-253.93

LIECHTENSTEIN

Dr V.M. RHEINBERGER
Liechtenstein Chamber of Industry
IVOCLAR AG
Benderertrasse 2
LI-9494 SCHAAN

Tel: +41-75.235.35.35
Fax: +41-75.235.33.60

NORWAY

Mrs T. VISLIE
The Research Council of Norway
Department of Bioproduction and Processing
Stensberggata 26
P.O. BOX 2700 St. Hanshaugen
NO-0131 OSLO

Tel: +47-22-03.70.00
Fax: +47-22-03.70.01

Mrs A. HOLE
Royal Ministry of Agriculture
Department of Adm. and Economy
Akirsgt 42 - P.O BOX 8007 Dep
NO-0030 OSLO

Tel: +47-22-03.71.22
Fax: +47-22-34.95.55

SWEDEN

Mr C. HOEL
Head of Secretariat
Swedish Council for Forestry and Agricultural Research (SJFR)
Odengatan 61 - Box 6488
SE - 113 82 STOCKHOLM

Tel: +46-8-736.09.10
Fax: +46-8-33.29.15

Mrs M. CARLSSON-ULIN
NUTEK
Lilgeholms V 32
SE - 117 86 STOCKHOLM

Tel: +46-8-681.91.00
Fax: +46-8-681.93.65

SWITZERLAND

Mr F. CERUTTI
OFAG
Mattenhofstr. 5
CH-3003 BERN

Tel.: +41-31-322.59.50
Fax : +41-31-322.26.34

Prof. F. ESCHER
ETH-Zürich
Institut für Lebensmittel-
wissenschaften
CH-8092 ZÜRICH

Tel.: +41-1-632.32.87
Fax : +41-1-261.68.08

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Practical Information and Programmes

Directorate-General XII: Science, Research and Development
Directorate-General VI: Agriculture and Rural Development
Directorate-General XIV: Fisheries

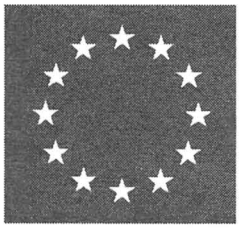
Agriculture and Fisheries

(including agro-industry, food-technologies, forestry, aquaculture and rural development)

1994-1998

Workprogramme

Edition 1994



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WORK PROGRAMME

Introduction

The objectives of this programme are to promote and harmonize research in the major European primary production food and non-food sectors of agriculture, horticulture, forestry, fisheries and aquaculture and its links with the input and processing industries, together with the rural activities, the end user and the consumer. The programme is extremely diverse in nature, covering all aspects of the production and utilization of biological raw materials, with the aim of developing new markets, products and processes for the raw materials coming from agriculture, forestry and fisheries. It will support evolving Community policies in the fields of agriculture, fisheries, forestry, industry, energy and the environment, and will particularly underpin the conclusions of the White Paper on "Growth, Competitiveness and Employment", especially in relation to European objectives concerning the development of biotechnology and the protection of the environment.

This work programme has evolved from the experience and results gained in the previous and ongoing "Agriculture and Agro-Industry, including Fisheries" RTD programme, and prior to that, the agricultural, fisheries and agro-industrial programmes of the Second Framework Programme. This new programme is an integral part of a more comprehensive effort initiated under the 4th Framework Programme to promote the application of Life Sciences and Technologies, which is implemented via three associated specific programmes, Agricultural and Fisheries Research, Biomedical and Health Research, and Biotechnology. The programme itself works on the following three levels:

I. Objectives requiring **concentrated means**, Areas 1 to 5:

Area 1 Integrated Production and Processing Chains;
Area 2 Scaling-up and Processing Methodologies;
Area 3 Generic Science and Advanced Technologies for Nutritious Foods;
Area 4 Agriculture, Forestry and Rural Development;
Area 5 Fisheries and Aquaculture.

II. Objectives addressed by **concertation means** are contained in the sixth area of the programme, where coordination and consolidation on a European level will be sought through specific networks which build upon national and industrial research programmes and activities in the fields of fisheries, agriculture and agro-industry, for both food and non-food products and processes where Member States have extensive programmes.

III. Objectives addressed by **horizontal activities**, which involve specific actions of a research, market and legislative analysis and administrative nature, actions such as Demonstration, Ethical Issues, Training and Mobility, SME Involvement and Dissemination of Results.

LEVEL I : OBJECTIVES REQUIRING CONCENTRATED MEANS

AREA 1 INTEGRATED PRODUCTION AND PROCESSING CHAINS

"Integrated Production and Processing Chains" are dedicated principally to the non-food sector and especially to the use of plant raw materials, such as timber, fibres, carbohydrates, oils, proteins and speciality chemicals contained in new and traditional crops and trees. It will also concern the extraction and processing of higher value-added materials from animal and crop agro-industrial wastes. Projects can be large in nature encompassing the key objectives along a given chain. Research projects within a chain should be pre-competitive, of an applied and/or basic nature, involving at least one or more industrial partners. A good balance of participants is also required, in that producers, processors including SMEs, and ultimate users from the North and South of Europe are involved in the network, communicating their specific needs and objectives along the chain. Bearing in mind that this is a high risk but already quite active research sector, projects should strive to be highly innovative, with particular focus upon the application of new and generic technologies, particularly biotechnology, chemical engineering and information science.

For the sake of clarity and easier identification, integrated chains have been broken down into the following three sub-areas or chains, which concern the ultimate final products and industries of the non-food sector, namely, energy, chemicals and wood products:

Sub-area 1.1 The biomass and bioenergy chain

Sub-area 1.2 The "green" chemical and polymer chain

Sub-area 1.3 The forestry-wood chain

AREA 2 SCALING-UP AND PROCESSING METHODOLOGIES

This area is closely aligned to the development of the non-food industry and will have links with the bioenergy, chemicals and forest products integrated chains of Area I. Scale-up and processing methodologies are concerned specifically with activities a stage further from the applied and basic research approaches of Area 1. It is intrinsically a process for designing and operating a larger scale system on the basis of the results of experiments with small scale or laboratory models which will permit a better evaluation of both the technical feasibility and costs. The specific objectives of this area are to address the problems associated with the transfer of basic or applied research and technology from the laboratory level to the development steps of industrial scale. This step is normally characterized by major problems and bottlenecks, such as homogeneity and quality of raw material supply, and a lack of understanding of the basic physical and chemical characteristics and relationships of the bio-materials being processed and produced. Problems, such as fluid dynamics, heat transfer, flocculation, product recovery, etc., are common when applied and basic research models are scaled up in the development or pilot scale phase of R&D.

There are three main sub-areas where scale-up problems will be addressed:

Sub-area 2.1 Chemical and physical processes

Sub-area 2.2 Bioprocessing

Sub-area 2.3 Control systems

AREA 3 GENERIC SCIENCE AND ADVANCED TECHNOLOGIES FOR NUTRITIOUS FOODS

Research in this sector has the major objective to improve the competitive position of the food industry which is composed of leading multinationals and a wide range of specialist food SMEs throughout Europe. This is consistent with the objectives of the White Paper on "Growth, Competitiveness and Employment" which foresees the transfer of research innovations in Life Sciences into technologies which will improve the competitiveness and growth position of European industries, particularly the agro-industrial sector.

An equally important objective is to improve the role and understanding of food in the general health and well-being of the European consumer. Food can play a major role in maintenance and improvement of human health and well-being and in prevention of major diseases. This will also lead to the design of special or tailored foodstuffs and ingredients for specific population groups or for specific health benefits. This will be an expanding area for the food industry in the future, and European industry, building on the considerable European research expertise, must be at the forefront here. This will involve multidisciplinary research projects combining the expertise of scientific partners, such as nutritionists, medicals, process technologists.

Finally, to develop these technologies and products, this area will concentrate on the generic underpinning sciences, the improved understanding of these and how they can better lead to improved processing, products and a healthier metabolism. The application of biotechnology for specific nutritional requirements will be particularly important. This area will have important cross-links with Area 4 (Agriculture) and Area 5 (Fisheries) of this programme, as well as with the other programmes in Life Sciences, namely, Biotechnology and Biomedicine.

The following are the main areas which will be addressed in Food Science and found in detail in the annex:

Sub-area 3.1 Consumer nutrition and well-being

Sub-area 3.2 New and optimized food materials and nutritious food products

Sub-area 3.3 Advanced and optimized technologies and processes

Sub-area 3.4 Generic food science

AREA 4 AGRICULTURE, FORESTRY AND RURAL DEVELOPMENT

The aim of the programme of work for research in the area of "Agriculture, Forestry and Rural Development" is to develop the necessary scientific and technical basis for the preparation, implementation, monitoring, control and adjustment, where required, of Community policy in these important domains. Six areas of research, to which must be added the support activities to be carried out by the Joint Research Centre, have been selected. They have the following objectives:

- to adjust agricultural production methods and systems to the new conditions arising from the reform of the CAP, make a serious effort to develop environmentally and economically sustainable agriculture which is more environmentally friendly, and to perfect the tools of analysis and control which are indispensable for managers and decision makers in agriculture;

- to encourage the development of quality products, the various characteristics of which fulfil the expectations of consumers and are likely to bring an increase in value added by all sections of the sectors concerned;
- to accompany these new approaches of the Common Agricultural Policy with an increased effort to diversify agricultural products and activities;

- to improve plant and animal health and animal well-being and to develop the means necessary for fulfilling the Community's responsibilities in these areas;

- to support protection, development and exploitation of European forests and the Union's commitment to sustained multifunctional management of forests;

- to accompany the considerably increased effort in favour of rural development by developing the knowledge indispensable for effective Community measures and their adjustment to the diversity of situations encountered.

The content of each of the above areas is set out in the annex, with details of the specific objectives and the relevant research themes. Finally, special emphasis is given in the programme to the application of biotechnology. The most promising subjects from this point of view are mentioned in each of the work programme areas:

Sub-area 4.1 Reformed CAP: optimization of methods, systems and primary production chains. Agriculture-environment interactions. Policy relevant economic analysis and impact assessment.

Sub-area 4.2 Quality policy

Sub-area 4.3 Diversification

Sub-area 4.4 Animal and plant health, animal welfare

Sub-area 4.5 Multifunctional management of forests

Sub-area 4.6 Rural development

Sub-area 4.7 Complementary activities by JRC in support of DG V1

AREA 5 FISHERIES AND AQUACULTURE

The overall objective is to provide a sound scientific basis for the balanced, sustainable exploitation of the fisheries resources of the Community and the further controlled development of aquaculture. This is to be achieved by a better knowledge and understanding of the aquatic ecosystem, including the interactions between fishing activities, aquaculture and the environment. Socio-economic considerations are recognized as an integral part of the programme, together with the associated requirement to develop appropriate methodologies for evaluating fisheries and aquaculture policies.

Emphasis will be given to environmental interactions with fish, fisheries and aquaculture, in order to improve the assessment of :

- the impact of environmental variables on living resources (at all stages of their life history), including their abundance, distribution and migration;

- the impact of environmental conditions on all phases of aquaculture production;

- the impact of fishing and aquaculture (marine and continental) activities on the aquatic ecosystem.

Research, aiming at improved knowledge of the biological and physiological issues (genetics, pathology, reproduction, etc.) of aquacultured stocks as well as of new species which allow a diversification of the aquaculture production, will be promoted.

Emphasis will be placed on socio-economic aspects of the fishing and aquaculture industries in order to improve understanding of their operation and management.

In order to achieve sustainable exploitation of biological resources, improved fish stock assessment techniques are required. Emphasis will be placed, therefore, on the development of new methodologies, including those which take account of innovations in sciences other than fisheries, in order to improve the present "state-of-the-art".

The following sub-areas are addressed in detail in the annex:

Sub-area 5.1 Impact of environmental factors on aquatic resources

Sub-area 5.2 Ecological impact of fisheries and aquaculture

Sub-area 5.3 Biology of species for optimization of aquaculture

Sub-area 5.4 Socio-economic aspects of the fishing industry

Sub-area 5.5 Improved methodology

With the objective of supporting the competitiveness of the European industry through pre-competitive research and development, research dealing with the upgrading of fishery products, which is included within Area 3, "Generic Science and Advanced Technologies for Nutritious Foods", is considered a relevant matter in the context of fisheries research. Moreover, taking into consideration the influence of production systems on the quality of fisheries and aquaculture products, research on these subjects will be considered.

LEVEL II: CONCERTATION ACTIVITIES

AREA 6 OBJECTIVES ADDRESSED BY CONCERTATION

Throughout Europe there is significant research ongoing at a national level in agriculture, fisheries and agro-industries. In line with the principle of subsidiarity, this programme does not seek to duplicate this valuable and often country specific research. However, in an effort to co-ordinate and provide means for the efficient exchange of information, European networks will be established to bring together scientists in these areas. This will be implemented through concerted actions and, as appropriate, through shared cost actions, preferably by Thematic Networks.

LEVEL III: OBJECTIVES ADDRESSED BY MEANS OF HORIZONTAL ACTIVITIES

1. DEMONSTRATION

The objective of demonstration is to prove the technical viability of a new technology or new systems and methods of production, together with, as appropriate, their possible economic advantages. The projects will be pre-competitive and should as such focus on the application of new technologies and new systems and methods of production and involve participation by both technology producers and technology users. The aims of demonstration in the context of this programme are: i) to speed up the adoption of new technologies and new systems and methods of production, by reducing the techno-economic uncertainties

and risks associated with innovation and ii) to enhance the attractiveness of new approaches in farms, forests, industries and services, contributing to the message that new technologies and new systems and methods of production are developed for the benefit of society as a whole and in support of the evolving Community policies.

2. ETHICAL, LEGAL AND SOCIAL ASPECTS - ELSA

Research on ethical, legal and social aspects of the areas included in this programme will have the objectives to:

- understand and respond to public attitudes and the diversity of viewpoints throughout the Community, including producers, users, social partners, environmentalists, welfare groups, consumer groups, etc., in order to improve rationality and balance in the ongoing public dialogue;

- fulfil a prospective role, anticipate emerging problems and provide early warnings to decision makers and the public of new ethical/legal/social issues, particularly regarding new experiments, technologies, production systems and products;

- investigate factors (cultural, economic, historic, religious, etc.) affecting public response to and varying perceptions of ethical issues.

3. SPECIFIC MEASURES IN SUPPORT OF SMEs

Exploratory awards: Exploratory awards will consist of grants of up to approximately 45,000 ECU (up to 75 % of total costs) to consortia of at least two SMEs from at least two participating countries. Outline proposals (5-6 pages), aiming at preparing subsequent full research proposals for collaborative RTD and demonstration or cooperative research, will be submitted. The exploratory award may also cover verification of the technical feasibility of a concept, process or material, a preliminary market study and/or a patent/novelty search. All areas of the work programme will be open to this activity. Outline proposals will be accepted on an open call basis during the lifetime of the programme.

Cooperative research: Cooperative research projects will be targeted at SMEs which have common technological problems or which have complementary expertise. At least four SMEs from at least two participating countries will be involved, one of which will act as coordinator, and a significant part of the research will be carried out by one or more research centres. Proposals can be submitted through an open call. All areas of the work programme will be open to this type of activity.

Up to 10% of the budget of the programme is allocated to the above SME activities.

TABLE I : AIR II Programme - IMPLEMENTATION MODALITIES

(See Information Package text, Annex to the Work Programme and Proposal Description Forms for more details)

IMPLEMENTATION MODALITIES	*DEFINITION*	*NATURE OF TASKS*	*INITIAL PROPOSAL*	*FINAL FORMAT*	*RANGE OF PARTNERS*	*RANGE OF SUPPORT*	*TOPICS*
CONCENTRATION, CONCERTATION AND PREPARATORY ACTIONS							
R&D PROJECTS	Knowledge-producing Exploratory approach Theoretically an unlimited number of projects per area Basic, applied/industrial and developmental research	Shared cost research (SC), including thematic networks, ELSA	2 partners or more Coordinated by prime proposer Scientific exploration within the pre-defined field	Stand-alone SC Projects Cooperation between projects within "integrated chains" forming sub-networks with the possibility for overall coordination by thematic network	From 2 to 16 for stand-alone SC No upper limit for integrated chains Partnership accepted as resulting from the selected proposal For integrated chain type project proposers may be brought together to form the chain	Up to 50 % of total costs with 100% additional costs to public research institutions and universities	All areas and sub-areas
CONCERTED ACTIONS	Creating the links between national programmes Pooling data, harmonizing practices	Coordination of research	2 partners and preferably more Coordinated by prime proposer	Centrally coordinated Partnership re-negotiated from selected proposals	From 15 to 50 normally Attempt at involving possibly all key players	10,000 ECU per year on average for each participation of an individual laboratory Up to 100 % of eligible costs	All areas and horizontal activities
DEMONSTRATION PROJECTS	Prove technical viability of new technologies, new systems and methods of production Assess the techno-economic performance Address factors interfering with the transfer of results to users	Exposure to real technical, socio-economic conditions Exploitation and/or dissemination of new technologies, new systems and methods of production	2 partners or more Coordinated by prime proposer Clear identification of target institution(s) or group(s) to receive project deliverables	Diversity of geographical, legal or socio-economic situations at EC level to be reflected wherever applicable	From 2 to 10 normally Involving representative groups of producers, intermediates and end-users	Directly proportionate to the nature of tasks Up to 50 % of total costs	All areas

TABLE I : AIR II Programme - IMPLEMENTATION MODALITIES (contd.)

IMPLEMENTATION MODALITIES	*DEFINITION*	*NATURE OF TASKS*	*INITIAL PROPOSAL*	*FINAL FORMAT*	*RANGE OF PARTNERS*	*RANGE OF SUPPORT*	*TOPICS*
PROJECT EXPLORATORY AWARDS	Short-term support to prepare more substantial proposals For SMEs to participate in RTD shared cost projects	Search for partners Negotiation of consortium Drafting of project proposal Solving legal aspects Technical feasibility study	2 partners or more Submissions will be made through an open call for proposals	Towards an actual multi-partner project proposal	Not applicable initially An effort to bring in partners would attract support	Below a maximum of 45,000 ECU according to different tasks	All
COOPERATIVE PROJECTS	Enable groups of agro-industrial SMEs with no or inadequate R&D means of their own to engage third parties to carry out research on their behalf to solve common or similar problems Duration 1-2 years	Shared cost research At least 50% of the work to be carried out by the R&D performers on behalf of the proposers	4 non-affiliated SMEs or more Prime proposer is an SME Submission will be made through an open call for proposals	Project proceeding on its own	From 4 to 20 Partnership accepted as resulting from the selected proposal	From 0.2 M to 1 MECU to the project Up to 50% of total costs RTD performers are normally paid 100% of the costs of their work	All
PREPARATORY, ACCOMPANYING AND SUPPORT MEASURES	Support to on-going research policy and actions via meetings, publications, studies, etc.	Coordination of research Dissemination of results Scientific monitoring Evaluation Promotion of exploitation	Calls for studies in pre-defined fields Otherwise, measures to be defined on the initiative of the EC	Used by the Commission as a management tool	At the discretion of Commission services	Studies: up to 50,000 ECU per study	All

TABLE I : AIR II Programme - IMPLEMENTATION MODALITIES (contd.)

IMPLEMENTATION MODALITIES	*DEFINITION*	*NATURE OF TASKS*	*INITIAL PROPOSAL*	*FINAL FORMAT*	*RANGE OF PARTNERS*	*RANGE OF SUPPORT*	*TOPICS*
TRAINING	6-24 months fellowships (exceptional prolongation to 36 months)	Training through research with special emphasis on technology transfer	Individual applications Open calls	As applied for	Host-laboratory in a different country	Standard rates (see training information package)	All

TABLE II : INTERPROGRAMME COORDINATION : AIR II

SYNERGIES WITH OTHER PROGRAMMES															
Sub-areas (AIR II)	**TM**	**CT**	**IT**	**ITMT**	**SMT**	**ENV**	**BT**	**BM**	**MAST**	**NNE**	**T**	**TSER**	**CTC**	**DE**	**ST**
1.1 The biomass and bioenergy chain				P		P	P			P				P	P
1.2 The "green" chemical and polymer chain				P		P	P							P	P
1.3 The forestry-wood chain				P		P	P							P	P
2.1 Chemical and physical processes				P			P							P	P
2.2 Bioprocessing				P			P							P	P
2.3 Control systems				P			P							P	P
3.1 Consumer nutrition and well-being								P						P	P
3.2 New and optimized raw materials and nutritious food products							P							P	P
3.3 Advanced and optimized technologies and processes				P										P	P
3.4 Generic food science							P							P	P
4.1 Reformed CAP (*)	C*	C*	C*		C*	C*	C*	C*		C*		C*	C*	C*	C*
4.2 Quality policy (*)	C*	C*	C*		C*	C*	C*	C*		C*		C*	C*	C*	C*
4.3 Diversification (*)	C*	C*	C*		C*	C*	C*	C*		C*		C*	C*	C*	C*
4.4 Animal and plant health, animal welfare (*)	C*	C*	C*		C*	C*	C*	C*		C*		C*	C*	C*	C*
4.5 Multifunctional management of forests (*)	C*	C*	C*		C*	C*	C*	C*		C*		C*	C*	C*	C*
4.6 Rural development (*)	C*	C*	C*		C*	C*	C*	C*		C*		C*	C*	C*	C*
5.1 Impact of environmental factors on aquatic resources						P			P					P	P
5.2 Ecological impact of fisheries and aquaculture						P			P					P	P
5.3 Biology of species for optimization of aquaculture						P			P					P	P
5.4 Socio-ecomomic aspects of the fishing industry														P	P
5.5 Improved methodology														P	P

(*) Area 4 requires the formation of a coordination group at director level for each individual programme.

RTD PROGRAMMES

TM : Telematics
CT : Communications Technologies
IT: Information Technologies
ITMT : Industrial Technologies and Materials Technologies
SMT : Standardization, Measurement and Testing
ENV : Environment and Climate
BT : Biotechnology
BM : Biomedicine and Health
MAST : Marine Sciences and Technology
NNE : Non-Nuclear Energy
T : Transport
TSER : Targeted Socio-Economic Research
CTC : Cooperation with Third Countries and International Organizations
DE : Dissemination and Exploitation of Results
ST : Stimulation of the Training and Mobility of Researchers

MEANS OF COORDINATION

P = Coordinated review of technical annexes of projects
C* = Permanent coordination group at director's level

TABLE III A : FINANCIAL PROVISIONS AND CALL FOR PROPOSALS

Activity	*Indicative budget [607 MECU]*	*Areas*	*Calls Open*	*Deadline*	*Review and Selection of Proposals*	*Likely Sart of Commitments*	*Likely Sart of Contracts*
1st Call: RTD Projects	81	1, 3.1, 3.2, 4, 5, 6, ELSA, Demonstration: 4,5	December 94	March 95	Apr/May 95	October 95	November 95
2nd Call: RTD Projects	36	2.1, 2.2, 2.3, 3.3, 3.4, Demonstration: 1, 2, 3	June 95	September 95	Oct/Nov 95	February 96	March 96
3rd Call: RTD Projects	114	1, 4, 5, 6, ELSA, Demonstration: 4, 5	December 95	March 96	Apr/May 96	October 96	November 96
4th Call: RTD Projects	48	2.1, 2.2, 2.3, 3, Demonstration: 1, 2, 3	June 96	September 96	Oct/Nov 96	February 97	March 97
5th Call: RTD Projects	141	1*, 4, 5, 6, ELSA, Demonstration: all areas	December 96	March 97	Apr/May 97	October 97 - February 98	November 97 - February 98
6th Call: RTD Projects	47	3*, 4*, 5*	June 97	September 97	Oct/Nov 97	February 98	March 98
Exploratory Awards and Cooperative Research	60	1, 2, 3, 4, 5	Continuously open until June 97		From April 95, 3 times per year	June 95 **	July 95 **
Training	30	1, 2, 3, 4, 5	Continuously open until December 97		From April 95	June 95	July 95
Dissemination Activities and Valorization of Results	6						
Programme Administration	44						
Total	607						

* *Targeted depending on outcome of previous calls*

** *For projects selected in December, commitments and start of contracts will be in the following year*

Annex 1

Detailed scientific contents and implementation

Detailed Scientific contents and implementation

INTRODUCTION

This programme aims to promote and harmonize research in the major European primary production food and non-food sectors of agriculture, horticulture, forestry, fisheries and aquaculture and its links with the input and processing industries, together with the rural activities, the end user and the consumer.

This linkage is important firstly in helping primary production to adapt and respond to changing Community policies, but also to link the primary production sector with the agro-industrial processing sector by matching the production of biological raw materials with the needs and requirements of industry, the end user and consumers. The programme will therefore place considerable emphasis on the development of new markets, products and processes for the raw materials coming from agriculture, forestry and fisheries.

It will support evolving Community policies and help primary production to produce higher quality raw materials, compatible with the environment and adapted to policy changes. It will seek to improve the competitiveness, efficiency and viability of the agricultural, forestry, agro-industrial, fisheries and related industry sectors while promoting and maintaining rural and coastal development. The agro-industrial sector, in direct connection with the agricultural, forestry, rural development and fisheries sectors, has the potential for further growth and increased global competitiveness, reflecting the conclusions of the White Paper on "Growth, Competitiveness and Employment", particularly in relation to European objectives concerning the development of biotechnology and the protection of the environment. Every effort will be made to ensure that this programme contributes strongly to these objectives. At the same time pre-normative research will be initiated and supported in order to provide a sound scientific base for the setting of standards and regulations relating to production, transformation and use of biological resources.

This work programme has evolved from the experience and results gained in the previous and ongoing "Agriculture and Agro-Industry, including Fisheries" RTD programme, and prior to that, the agricultural, fisheries and agro-industrial programmes of the Second Framework Programme. This new programme is an integral part of a more comprehensive effort initiated under the 4th Framework Programme to promote the application of Life Sciences and Technologies, which is implemented via three associated specific programmes, Agricultural and Fisheries Research, Biomedical and Health Research, and Biotechnology. The latter programme is concerned specifically with elucidating the mechanisms of living processes with a view to possible further uses, and the former two programmes are concerned with the actual application and use of this knowledge towards improved agricultural and forestry raw materials, medical care, food and industrial products. The multidisciplinary nature of the Agriculture and Fisheries programme also necessitates co-ordination and synergy with other EC programmes and national activities, particularly in relation to energy, the environment, fisheries, processing and materials technologies, and information science.

The programme itself works on the following three levels:

I. Objectives requiring **concentrated means**, where the objective is to seek the highest potential returns in the medium term by funding task-oriented projects which will have measurable impacts and significantly change the state-of-the-art. It will involve the linkage of academic institutions, research laboratories and industry, (particularly SMEs) working within specific networks. This is divided into the

first five specific areas of the programme, namely: **Integrated Production and Processing Chains; Scaling-up and Processing Methodologies; Generic Science and Advanced Technologies for Nutritious Foods; Agriculture, Forestry and Rural Development; Fisheries and Aquaculture.**

II. Objectives addressed by **concertation means** are contained in the sixth area of the programme, where coordination and consolidation on a European level will be sought by building upon national and industrial research programmes and activities in any of the fields covered by the specific programme, for both food and non-food products and processes where Member States have extensive programmes. This area will build upon these activities by establishing European Networks through concerted actions, and, as appropriate, through shared cost actions, bringing together the relevant actors in the particular field with a view to improving coordination and cooperation at a European level.

III. Objectives addressed by **horizontal activities**, which involve specific actions of a research, market and legislative analysis and administrative nature. Actions envisaged are implemented in any of the areas covered by the specific programme as follows: CRAFT type schemes for the increased involvement of SMEs; demonstration type projects; analysis of social and ethical issues; training and mobility of scientists; dissemination, exploitation and publication of results; funding of workshops and conferences.

This programme will aim to improve, consolidate and harmonize research activities in the agricultural, horticultural, forestry, agro-industrial and fisheries sectors within Europe, by the transfer and the application of new and generic technologies, by improving the quality and diversity of biological raw materials, the reduction of their production costs, the improvement of the environment and increasing the role and understanding of sustainable and renewable biological raw materials for both food and non-food uses. The expected developments will play a major role in shaping and underpinning new agricultural, forestry, rural development, environmental, energy, fisheries and industrial Community policies for a changing world.

LEVEL I: OBJECTIVES REQUIRING CONCENTRATED MEANS

AREA 1 INTEGRATED PRODUCTION AND PROCESSING CHAINS

Objectives

The objective of research in this area is to develop integrated, multidisciplinary projects and networks which will bring together producers and users of biological raw materials in co-operation with academics and industry. It is envisaged that this combination of applied and basic research towards new products and processes from biological raw materials should endeavour to minimize environmental impact, create new markets, support rural economies and thus contribute towards shaping new agricultural, industrial and other related policies.

Local or regional operating systems, working in a Europe-wide network, will be developed, aiming to integrate production lines with a range of products and processes for the forest products, energy and "green" chemical industries. Research shall address the logistics required to overcome major bottlenecks and problems, aiming towards an integrated supply of raw materials consistent in quality, quantity and cost for the processing industries. Processing research should in turn focus upon significantly increasing the range, quality and quantity of solid and liquid biofuels, forest products, chemicals and polymers based on these biological raw materials. Research on the development of "closed cycle" industrial production systems,, including systems that strive for optimal utilization of the main products (e.g. starch, sugars, oils, proteins, fibres) and the by- and co-products (e.g. plant cell wall wastes, secondary metabolites, other carbohydrates, lignin and proteins) will be promoted, together with steps towards an efficient "life cycle analysis" of the raw material and the ultimate products from each given chain in relation to ecological and energy balances. Research projects should identify the following five key objectives along the chain from production to the final end product, and it should be noted that the emphasis within these chains is on **the final product and its market niche**, which will direct from the top down the production requirements and specifications of the original biological raw material:

1. To define market functional requirements and potential market size for given product types and to assess possibilities for biological materials to meet these requirements and in support of the objectives of Community policies.

2. To employ traditional and modern biotechnological methods in an effort to improve the quality and develop a better understanding of the function of biological materials within industrial crops and trees, with a view to their subsequent utilization as raw materials by the energy, chemical and forest products industries.

3. To develop integrated models and systems that improve the homogeneity and security of supply and use of biological raw materials for these industries.

4. To develop or improve separation, extraction, fractionation and mechanical processing technologies for biological materials which are cost-efficient, environmentally acceptable and increase not only the use and value of the main products, but also that of the by-products and co-products.

5. To develop new cost-efficient and environmentally sound physical, chemical and biochemical transformation, conversion and recovery processes for biological raw materials, intermediates, end-products and by-products.

"Integrated Production and Processing Chains" are dedicated principally to the non-food sector and especially to the use of plant raw materials, such as timber, fibres, carbohydrates, oils, proteins and speciality chemicals contained in new and traditional crops and trees. It will also concern the extraction and processing of higher value-added materials from animals and crop agro-industrial wastes. Projects can be large in nature encompassing the above mentioned five key objectives along a given chain. Networks may be developed by the Commission to form "Integrated Production and Processing Chains" to bring together suitable individual proposals which could include some parts of the whole chain submitted to this area and to other areas, such as Area 2 "Scaling-up and Processing Methodologies" and Area 4 "Agriculture, Forestry and Rural Development". Research projects within a chain should be pre-competitive, of an applied and/or basic nature, involving at least one or more industrial partners. A good balance of participants is also required, in that producers, processors including SMEs, and ultimate users from the North and South of Europe, are involved in the network, communicating their specific needs and objectives along the chain. Bearing in mind that this is a high risk but already quite active research sector, projects should strive to be highly innovative, with particular focus upon the application of new and generic technologies, particularly biotechnology, chemical engineering and information science.

For the sake of clarity and easier identification, integrated chains have been broken down into three sub-areas or main chains, which concern the ultimate final products and industries of the non-food sector, namely, energy, chemicals and wood products. It is understood that, while it is convenient to categorize on the basis of final products, the original raw material is in general a homogenous entity, and in this respect the chains cannot be considered as mutually exclusive from one another. Therefore, projects which horizontally address more than one chain will be considered.

- **The biomass and bioenergy chain:** the use of agricultural and forest crops, grown and processed in order to produce liquid and solid biofuels for heat and power, along with the efficient use of the resulting by-products.

- **The "green" chemical and polymer chain:** the use of crops and agro-industrial wastes, grown and processed in order to produce new and traditional bulk, fine and speciality chemicals and polymers.

- **The forestry-wood chain:** the use of forest trees, grown and processed in order to produce timber wood products, paper and composites.

Even though strong competition from established products is anticipated in the short-term, innovation and advances towards agricultural and forest raw materials for industry and energy will help to address the main factors which are driving the current interest in this sector, including: the increasing size in European arable

land which is regarded as surplus, a desire to maintain and enhance rural economies, the gamut of environmental issues that impinge on established products and finally the finite nature and instability of fossil fuel supplies. The above integrated chains are now explained in more detail indicating the specific research tasks required along the chain

1.1 THE BIOMASS AND BIOENERGY CHAIN

The objective of research within this chain is to develop local/regional integrated, multidisciplinary systems of seasonal production lines of woody, agricultural, perennial and C4 plant crops, which will provide a range of raw materials to be processed into energy carriers. Investigations shall address the logistics required to overcome the major bottlenecks and problems in an integrated approach, concerning primary production, pre-treatment, transport, storage and a regular supply of uniform feedstock to the processing industries. Heat and power generation and processing of by-products into higher added-value products should be improved by adapting farming output to industrial practices, which will create new market outlets for the farming and rural communities. These processes and products should support farming and rural structures and economies and have minimal environmental impact.

Research Tasks

In an integrated approach -

1.1.1 PRODUCTION OF RAW MATERIALS

1.1.1.1 Improvement of production systems

- New site-specific and traditional energy crops, including wild species, will be sought, with improved traits with respect to yield, quality, energy potential and costs of fuel products.

  Type of crops to be considered :

- woody crops, such as Short Rotation Forestry (SRF), agro-forestry, all tree production systems, unmanaged low quality stands;

- agricultural and novel perennial and ligno-cellulosic C4 plant crops and agricultural wastes, such as straw.

1.1.1.2 Pre-treatment, transport and storage

- Improve machinery for harvesting, drying, separation, grinding, pelletizing, pressing, extraction, transportation and storage, to reduce costs and optimize logistics on small and large scales.

- Develop methodologies for biomass feedstock characterization, with respect to size distribution, shape, basic and bulk density, moisture content, bridging, friction, heating value, ash content and degree of contamination, etc., in relation to quality control procedures and industrial requirements.

1.1.2 PROCESSING OF RAW MATERIALS

1.1.2.1 Anaerobic digestion

- Examine barriers/constraints to economic biogas production, and explore solutions for overcoming these restrictions, closely coordinated with an integrated waste management of future municipal solid wastes and agricultural wastes.

- Industry involvement and collaboration towards a digester industry for waste treatment, with improved stability and energy production.

1.1.2.2 Liquid biofuels

- Improvement of whole crop use and the extraction and upgrading of liquid biofuels from energy crops, applying chemical, mechanical and biotechnological processes for the preparation of high-grade liquid biofuels with respect to costs of extraction, up-grading, transportation, storage and disposal of effluent.

- Fundamental research to improve the energy, economic and environmental balance of the whole chain of liquid biofuel production (e.g. water degradable fuels or oil for use in forest and surface water applications), taking into account the potential energy available in by-products (straw, pulp and paper, glycerine and protein) and the credits from their sale as feed or chemical intermediates.

- Fundamental aspects of the chemical and enzymatic hydrolysis of cellulose.

1.1.2.3 Solid biofuel conversion

- Improvement of the efficiency and environmental acceptability of biomass burning/combustion for heat and electricity on both small and large scales (20-200 KW_{th}; 0.5-2 MW_{th}), e.g. reduction of gaseous and particle emissions, uses and disposal of inorganics and ashes (low emission biomass furnaces), reduction of the installation and operational costs, improvement of the economics of scale and logistics.

- Innovative catalytic combustion systems and the impacts of biomass feedstock on combustor operation and design.

- Combustion of non-woody biomass, including straw and other agricultural residues, and co-combustion of various biological raw materials, including coal (10-30 MWe).

- Examination of the technical and operational high investment aspects of biomass gasifiers and gasification systems (IGCC) in an integrated approach, biomass resource requirements and difficulties concerning feed material supply.

1.1.3 END-USE OF PRODUCTS AND MARKET REQUIREMENTS

1.1.3.1 End-use of products

- Fuel upgrading optimization and efficient supply with respect to conversion technologies, to allow cost-effective systems.

- Quality testing of fuel products according to specific end-uses, e.g. development of standards and tests to evaluate liquid biofuels with respect to physical, chemical and engineering properties, and regulations related to air quality, human health and the environment.

- Exploitation and market potential for by-products and waste feedstock, to produce pulp and paper, chemicals, compost fertilizer and animal feed, identification of global and local niche markets.

- Further technological development and utilization of vegetable oils in diesel-engines for electricity and transport.

- Increased industrial participation in the total integrated system of agricultural energy crop products and wastes utilization, especially straw, for heat and power on a local and rural level, and the logistics concerning their efficient development.

- Methods to improve the supply of agricultural energy crops to existing power plants.

1.1.3.2 Systems studies

- To develop systems models of bioenergy supply and use in order to investigate the critical factors in the supply chain towards effective markets, including the micro- (e.g. production costs, profitability) and macro-economic aspects (e.g. overall costs for the EU, employment prospects) related to the development of biomass and bioenergy chains.

- To investigate the non-technical barriers to the development of biomass production and supply systems, e.g. population, urban structure, biomass availability, and other local parameters (life cycle analysis, energy balances, etc.).

1.1.3.3 Environmental issues

- To investigate and characterize the environmental consequences of biomass transformation systems.

- To investigate processing technologies, in order to analyse and meet environmental requirements, e.g. waste streams and atmospheric emissions from conversion systems and defining options for treatment and remedial actions.

1.2 THE "GREEN" CHEMICAL AND POLYMER CHAIN

Plants contain a host of compounds that are chemically useful in making industrial products and should be thought of as "living factories" for chemical raw materials and not just as commodities. The major materials contained in plant components, such as seeds, cell walls, husks, stems, etc., are oils, starches, other carbohydrates, lignocellulosic fibres, proteins and secondary metabolites, such as naturally derived chemicals. These chains of raw materials, along with the higher added-value products derived from plant and animal waste, are the source of a broad range of industrial products for the food, medical and pharmaceutical, plastic, paper, chemical, textile and cosmetic industries, amongst others. So called "green" agricultural products offer the only renewable source of materials essential for everyday life. Taking advantage of the extremely productive European agricultural system, industrial products from agricultural sources can provide a potentially substantial market for new and traditional crops and for the surpluses of agricultural and agro-industrial wastes (such as crop, dairy, fish and animal wastes) currently produced in Europe. Research projects should address the following specific tasks within this chain.

Research tasks

In an integrated approach -

1.2.1 PRODUCTION OF RAW MATERIALS

- Adapting industrial crops for the requirements of the non-food industry by genetically improving the content and quality of the raw materials, such as fatty acids, carbohydrates, proteins, fibres and speciality chemicals (pharmaceuticals, volatile oils, flavours, fragrances, natural colours and dyes, etc.).

- Post-harvest industrial pre-treatments of biological raw materials for more homogeneous and constant quality, such as heating for drying, moisture content, cleaning, crushing, retting, etc.

- Improved grading of raw materials and intermediates.

- Economical methods for conservation, collection, storage and transport, which ensure the quality of the raw material and improve the stability of supply and the monitoring and control during storage and transport.

1.2.2 PROCESSING OF RAW MATERIALS

- Preparation, extraction and separation techniques for biological raw materials which improve the yield, industrial quality and purity of the specific raw material components.

- Improved diversity and preparation of raw material substrates for industrial fermentations and enzymatic and chemical conversions for the production of market relevant chemicals, such as pharmaceuticals, flavours, biocontrol agents, biopolymers, surfactants, paints, lubricants, textiles and geotextiles, bulk chemicals, food products, etc.

- Screening and genetic modification of microorganisms and eucaryotic cells capable of using novel agricultural feedstock to produce market relevant chemicals.

- Application of host/vector systems facilitating gene transfer into industrially relevant microorganisms and the increased gene amplification of desired chemicals and polymers.

- Design of new reactors and new fermentation processes, adapting traditional ones, and the design of new and efficient upstream and downstream equipment, for effective feed preparation and product recovery.

- Physical, chemical, microbial and enzymatic modification of oils, proteins, starch, sugars and lignocellulosic materials to produce new higher added-value chemicals, textiles and polymers.

- The integration and combination of solid-state and liquid biochemical and chemical processes for the transformation of biological materials into final or intermediate products.

1.2.3 END-USE AND MARKET REQUIREMENTS

- Generic market assessment of the economic feasibility of biodegradable polymers, chemicals and chemical intermediates, traditional and non-traditional textile materials, composites and new biochemicals, with increased market potential and environmental advantages.

- Investigations into non-food raw materials, concerning their molecular composition and structure, and their physical, chemical and biochemical properties, with a view to optimizing chemical and physical modifications for end-use.

- Establishment of quality profiles and methods to quantify the quality of raw materials for the specific demands of industry.

- Life cycle analysis of the complete chain, from production, extraction and disposal of waste, including the actual flow of development of the product and the by- and co-products, in relation to the micro- and macro-economic situations, the material, energy and environmental balance.

1.3 THE FORESTRY-WOOD CHAIN

Research in this chain should aim to enhance the efficiency, strengthen the competitiveness and better integrate all three main sectors which comprise the European Forestry-Wood Chain, namely, the primary forest production, the wood processing industries and the pulp and paper industries. Emphasis will be placed on strengthening the scientific base concerning the diversification and re-orientation of production, as well as the development of environmentally friendly, market-led and renewable products.

Research Tasks

In an integrated approach -

To improve the quality and ensure the yield of industrial raw materials, taking into consideration economic, social and environmental requirements.

1.3.1 PRODUCTION OF RAW MATERIALS

1.3.1.1 To increase current levels of productivity and quality through selection and breeding

- Application of advanced biotechnologies (e.g. molecular markers, micro-propagation, recombinant DNA) for tree selection and breeding, aiming towards improved fibre and wood quality.

- Authentication of forest species genetic material, for example, for wood quality factors, by improving the reliability of existing chemical methods (terpenes, isozymes, DNA probes) or developing new methodologies.

1.3.1.2 To enhance fibrous and mechanical properties of wood

- Biosynthesis of cell wall components.

- Wood formation mechanisms, including cambium activity.

- Tree growth physiological and biomechanical processes in relation to nutrition, site conditions and stand dynamics.

1.3.1.3 To improve existing forest management and harvesting systems

- Development of growth and yield models which take into account wood quality factors, adaptable to changing economic conditions and silvicultural strategies.

- Silvicultural and management practices, including integrated forest protection systems, aiming at improved wood and fibre quality.

- Decision support tools for forest planning and management which take account of industrial requirements.

- Rationalization and integration of harvesting operations, taking into consideration industrial requirements, cost, ergonomics, environmental and social impact.

1.3.2 WOOD PRODUCTS

1.3.2.1 To improve the efficiency of wood processing technologies

- Advanced process automation techniques and quality control methods.

- New technologies for the utilization of low-grade timber and small diameter logs, including recycling of wood residues.

1.3.2.2 To improve the quality of current production and to develop new wood-based products

- Novel approaches to drying sawn timber (especially for species prone to distortion) leading to uniform moisture content and improved wood quality.

- Environment-friendly methods and products for protection from biodegradation.

- New methods of joining or bonding, aiming at improved product performance.

- Development of innovative, modified or composite products with enhanced properties (e.g. strength, durability, dimensional stability).

1.3.3 PULP AND PAPER

1.3.3.1 To develop environment-friendly processing technologies

- Identification and classification of the basic structure and properties of fibres (physical, chemical and mechanical characterization).

- Development of biochemical, chemical and mechanical separation methods which eradicate the use of toxic chemicals.

- Study of the reactivity of the lignin in the fibre (e.g. sulphur-free cooking reactions) coupled with the search for novel environmentally sound bleaching processes. Substitution of chemicals by biological means.

- Efficient high yield pulping processes, in particular for the utilization of fast grown species.

- Development of closed-loop technologies to minimize environmental impact and re-cycling of waste materials.

- Enhancement of functional properties of paper and optimization of sheet forming processes. Investigation of the interaction of paper surface with other materials (e.g. paper-printing ink, paper-new surface coatings).

1.3.4 END-USE AND MARKET REQUIREMENTS

- Life cycle assessment of typical end-products.

- Economic studies on national and international markets for wood, wood-based and pulp and paper products.

- Long term performance characteristics of wood, wood-based and pulp and paper products.

- Definition and measurement of bio-degradability for wood, wood-based and pulp and paper products.

SYNERGIES WITH OTHER SPECIFIC PROGRAMMES

The intrinsic multidisciplinary nature of agro-industrial processes highlights the need to seek coordination and synergy, both within this programme and with other related programmes. In this respect coordination and coherence will be sought with the Environment, Biotechnology, Clean and Efficient Energy Technologies and Industrial Technologies programmes, and with Area 4 of this programme "Agriculture, Forestry and Rural Development". In particular, with regard to the Biomass and Bioenergy chain, the strategic approach will be

jointly elaborated with the Energy programme. Whereas this research programme will focus on raw material production, logistics and processing, the activities in the Energy programme will focus on work linked to conversion and use of solid biomass. Integrated projects extending themselves to areas relevant to both programmes are encouraged. These should be submitted either to JOULE-THERMIE or this programme, depending on the main emphasis of the proposed work. The Commission will ensure programme coordination, including the possible transfer of proposals to the relevant programme in case of error of allocation of a proposal.

These programmes and areas cover inter-related work in the production and processing aspects of integrated chains from both a fundamental and applied viewpoint, and a close scrutiny, harmonization, evaluation and networking of related projects and tasks selected from these programmes can only consolidate and enhance the European integrated chain approach promoted in Area 1 for the development of a strong and competitive non-food industry.

AREA 2 SCALING-UP AND PROCESSING METHODOLOGIES

Objectives

This area is closely aligned to the development of the non-food industry and will have links with the bioenergy, chemicals and forest products integrated chains of Area 1. Scale-up and processing methodologies are concerned specifically with activities a stage further from the applied and basic research approaches of Area 1. It is intrinsically a process for designing and operating a larger scale system on the basis of the results of experiments with small scale or laboratory models which will permit a better evaluation of both the technical feasibility and costs. The specific objectives of this area are to address the problems associated with the transfer of basic or applied research and technology from the laboratory level to the development steps of industrial scale. This step is normally characterized by major problems and bottlenecks, such as homogeneity and quality of raw material supply, and a lack of understanding of the basic physical and chemical characteristics and relationships of the bio-materials being processed and produced. Problems, such as fluid dynamics, heat transfer, flocculation, product recovery, etc., are common when applied and basic research models are scaled up in the development or pilot scale phase of R&D.

This area will thus attempt to carry forward some of the fundamental advances derived, for example, from the previous ECLAIR and Biotechnology programmes. The knowledge base developed so far, within these and other national and international activities, towards novel and improved methodologies, will be further stimulated on a European level towards new and innovative agro-industrial processes, with the potential to work on an industrial scale. The application, adaptation and improvement of traditional and new generic technologies, such as biotechnology, will be encouraged, along with processes that take into account the economic feasibility of investing in new technology, including small scale and on-farm technologies.

In multidisciplinary projects scientists and engineers will be brought together in order to understand the specific problems directly resulting from increasing the scale from laboratory to industrial levels. Fundamental and strategic studies are necessary to unravel the basic physical and chemical characteristics of biological materials, an approach which will be promoted here concurrent with Area 1 and activities within the Biotechnology programme. In particular, the development and improvement of methodologies (e.g. specialized and robust process and control instrumentation, automation, structured models and simulation methods) used for scale-up, design and testing of agro-industrial processes will be jointly developed, along with new process technologies and technology transfer from other industrial sectors.

The upstream 'green' biobased chemistry, applied biotechnologies involving enzymatic and fermentative biosynthesis, and the downstream activities of fractionation, separation and product development, are typical examples of bioprocesses which pose technological scale-up difficulties. This is where collaboration between chemical engineers in the areas of design, instrumentation and equipment, and the physical and life scientists, as regards the necessary biochemical parameters of the raw materials for optimal transformation and the properties of the final product, will be most effective. Synergy between the scientists, the marketing sectors and legislators is also of utmost importance in defining the market viability of any new product and should be intrinsic to any project.

Research on upgrading of products and by-products from fermentations and other processing industries will also be undertaken, including the treatment of agricultural and agro-industrial wastes, but excluding urban waste, to obtain, for example, new pharmaceuticals, biopolymers, bulk and fine chemicals, such as citric acid, solvents and fuels, such as ethanol and agricultural fertilizers. One of the potential positive effects of research in this field is the lowering of the cost and the enhanced environmental impact of 'green' based industrial processes, particularly when attention is paid to the life-cycle analysis of a 'natural' product.

Research Tasks

2.1 CHEMICAL AND PHYSICAL PROCESSES

- Scale-up of the processing of **fats and oils** into industrial and consumer products, such as paints, lubricants, surfactants, biopolymers and other chemicals, with regard to biochemical, chemical and physical reactions, such as distillation, chemical and enzymatic hydrolysis, purification, saponification, oxidation, dimerization, dehydration, polymerization and reactions with other chemicals.

- Address scale-up processes concerning **natural fibre,** including solid wood, production and processing in relation to decortication, retting, scutching, thrashing, grafting, blending, bonding and pulping, for the production of paper, building materials and composites and textiles.

- Scale-up of the processing of **starches, sugars and proteins** from crops and plant and animal wastes into industrial and consumer products, such as bulk and fine chemicals, polymers, pharmaceuticals, flavours, liquid biofuels, etc., in relation to fermentation processes, thermochemical and enzymatic conversion, sterilization, polymerization, grafting, crosslinking, oxidation, hydrolysis and other related chemical reactions.

- Development and application of innovatory **generic processes** for the production of non-food products, such as operations in supercritical fluids, membrane extractions, unsteady-state reactions, electrochemical processes and continuous chromatography separations.

2.2 BIOPROCESSING

- Screening, selection, modification and application of microorganisms, plant and animal cell cultures, with the objective of attaining similar or improved levels of productivity to those obtained by chemical processes (see "Green Chemical and Polymer Chain" of Area 1).

- Address scale-up problems associated with the **raw material quality and supply**, and fermentation medium preparation, subsequent product formation and its recovery, purification and preparation for industrial use, for both batch-fed and continuous fermentations.

- Investigation of novel fermentation feedstock, such as **plant cell walls, straw and the cellulose and C5 hemicellulose** waste fraction from the paper and pulp industry.

- Address the **classic fermentation problems** concerning low product concentrations, end product inhibition and toxicity, enzymatic conversions in organic solvents with low water content, continuous extractions in apolar solvents and resins, removal of volatiles by effective adsorbents, gas stripping, vacuum fermentation, extraction methods which do not introduce infection, processes with reduced steps and energy consumption, biological stability and variability, sterilization and aseptic processing.

- Investigate **novel scale-up fermentation processes**, such as solid state fermentation, aqueous two-phase systems, fermentations for new types of organisms, such as extremophiles, special reactor designs for plant and animal cells, alternative bioreactors to stirred tanks, such as bubble-column and air-lift fermenters.

2.3 CONTROL SYSTEMS

- Prediction and **decision support based systems** using mathematical and/or information based models, with a view to preparing information concerning the **thermodynamic, physiological, physical and chemical parameters** of the biological species, substrates and mediums in the process.

- **Process on-line control** which will adapt and apply more robust instrumentation, such as spectroscopic techniques, for improved measurement of physical and chemical parameters involved with increasing the scale.

- Research and systems studies which will address issues, such as the **labelling of products** like flavours, chemicals or polymers, as 'Natural' or 'Biodegradable'.

- **Environmental aspects** which will look at the complete use and recycling of agro-industrial waste streams, such as the spent aqueous phase or residual biomass recycling back through the process, or its use, e.g., as a novel fertilizer.

SYNERGIES WITH OTHER SPECIFIC PROGRAMMES

On an intra-programme level, projects selected in this area will be of an innovative nature, have industrial involvement or relevance and will be expected to link closely with the upstream and downstream activities of integrated chains depicted within Area 1, the agronomical aspects of the raw material production from Area 4 and any horizontal non-food process related 'demonstration activities' of this particular programme.

On an inter-programme level, these projects will be complementary to and synergistic with the fundamentally oriented bioprocess engineering activities within the Biotechnology programme and the more applied, specific and generic activities within the Industrial and Materials programme.

AREA 3 GENERIC SCIENCE AND ADVANCED TECHNOLOGIES FOR NUTRITIOUS FOODS

Objective

The food and drink industry, including fish processing, ranks as a major European industry processing raw materials from agriculture, horticulture, fisheries and aquaculture into the diverse range of quality foodstuffs which are produced throughout Europe. This industry is the major user of primary raw materials from European agriculture and fisheries.

Research in this sector has the major objective to improve the competitive position of the food industry which is composed of leading multinationals and a wide range of specialist food SMEs throughout Europe. This is consistent with the objectives of the White Paper on "Growth, Competitiveness and Employment" which foresees the transfer of research innovations in Life Sciences into technologies which will improve the competitiveness and growth position of European industries, particularly the agro-industrial sector.

An equally important objective is to improve the understanding of the role of food in the general health and well-being of the European consumer. Food can play a major role in maintenance and improvement of human health and well-being and in prevention of major diseases. This will also lead to the design of special or tailored foodstuffs and ingredients for specific population groups or for specific health benefits. This will be an expanding area for the food industry in the future, and European industry, building on the considerable European research expertise, must be at the forefront here. This will involve multidisciplinary research projects combining the expertise of scientific partners, such as nutritionists, medicals, process technologists.

Finally, to develop these technologies and products, this area will concentrate on the generic underpinning sciences, the improved understanding of these and how they can better lead to improved processing, products and a healthier metabolism. The application of biotechnology for specific nutritional requirements will be particularly important. This area will have important cross-links with Area 4 (Agriculture) and Area 5 (Fisheries) of this programme as well as with the other programmes in Life Sciences, namely, Biotechnology and Biomedicine.

The following are the four main areas which will be addressed in Food Science :

3.1 Consumer nutrition and well-being.

3.2 New and optimized food materials and nutritious food products.

3.3 Advanced and optimized technologies and processes.

3.4 Generic food science.

3.1 CONSUMER NUTRITION AND WELL-BEING

This area is targeted towards an improved understanding of the role of food in general health and maintenance, its role in the development of diseases and disorders, the optimal delivery of nutrients and the molecular mechanisms of absorption within the human body throughout life.

It will also include direct consumer aspects, such as food consumption trends, food choice and consumer response to traditional and innovative products.

Objectives :

- to understand the role of nutrients in cell metabolism and development;
- to achieve a better understanding of how nutrition modulates the development and the mechanisms of diseases and disorders;
- to examine direct and indirect effects of nutrients on gene expression and pre-disposition to disease;
- to ensure that the diet optimally delivers the nutrient requirements of defined population groups;
- to maintain an ongoing awareness of the nutritional status of the European population and changes in eating patterns;
- to develop an improved understanding of the health aspects of fish and fish products.

3.1.1 Nutritional adequacy and bioavailability

- The development of novel methodologies for the measurement of food intake and bioavailability, e.g. non-invasive biomarkers.
- Analysis of bioavailability from, and speciation of (micro)nutrients in processed food.
- To improve knowledge of the role of nutrient intake and nutritive properties of products, interactions and metabolism, especially trace elements and minerals (e.g. zinc, selenium, calcium, iron), vitamins (e.g. tocopherols, folic acid, Vit C), other biologically active non-nutrients (e.g. antioxidants, polyphenols, carotenoids, flavonoids), fats (absorption, N-3 and N-6 acid requirements, cis and trans fatty acids, very long chain polyunsaturated fatty acids) and proteins (amino acid requirements and metabolism).

3.1.2 Role of diet in diseases and disorders

- Understanding of the role of diet in the mechanisms of development of cardiovascular disease and its prevention: especially qualitative composition of fat in the diet, influence of fatty acids and the role of oxidants vs antioxidants.

- The role of diet, phytoprotectants, DNA repair mechanisms, polyunsaturated fatty acids, energy and protein intake, membrane function in promotion and progression of cancer.

- The influence of dietary factors on weight control and the pathogenesis of obesity, the development of high blood pressure, osteoporosis, the development of allergies and other adverse reactions to food and food additives, including possible contribution to chronic systematic diseases, such as arthritis.

3.1.3 Nutritional modulation of the genetic potential of the individual

- Investigate the consequences of early nutrition and pre-disposition to degenerative diseases (e.g. CHD, osteoporosis, cancer), effect of nutrition on cell ageing, immunotolerance and immunofunction; development of taste preferences, micro- nutrients and brain development and neurophysiological functions.

3.1.4 Physico-chemical aspects of food absorption and metabolism

Research tasks should focus on the following mechanisms :

- **absorption** : molecular mechanisms of nutrient passage and uptake through membranes; effects of diet on intestinal mucosa, nutrient interaction, effects on uptake;

- **metabolism** : studies of nutrient metabolism in humans using non-invasive techniques and statistical methods, e.g. NMR, stable isotopes;

- **intestinal flora** : new methodologies, e.g. recombinant DNA; effects of non-metabolizable bulk foods (e.g. fat replacers) and pathogen free foods (e.g. UHT milk) on flora; role of oligo- and polysaccharides; effect of intestinal flora/nutritional interactions on status of host nutritional balance and health; unbalanced flora, population groups, colonization resistance of a normal intestinal flora.

3.1.5 Food consumption trends, consumer behaviour and nutritional status and sensory analysis

- To investigate the availability, accuracy and comparability of total food consumption data; food related attitude and lifestyle data; dietary patterns and health status : particularly health aspects relative to diet and eating patterns, taking account of the diversity of European diet, culture and age structure.

- The role of factors influencing food consumption trends, e.g. demographic, external (e.g. telecommunications, transport), enjoyment and food, traditional and modern food patterns (e.g. cooking skills, convenience) and functionality.

- The physiological basis of appetite, satiety and weight control.

- The key issues affecting consumer behaviour, consumer attitudes and acceptability, implications of novel technologies on consumer confidence; improved understanding of food choice, environmental and ethical aspects, socio-economic factors, access and availability; and finally communication and information flows to consumers, retailers, manufacturers, primary producers.

- Methodologies of sensory analysis, establishment of consumer and expert description and evaluation of critical product attributes in sensory quality assessment.

- Harmonization of standards and regulations in fisheries, including harmonization of procedures used in official grading for fish freshness, spoilage and for the detection of off-flavours and taints.

3.2 NEW AND OPTIMIZED FOOD MATERIALS AND NUTRITIOUS FOOD PRODUCTS

A major challenge for the agro-food industry will be to produce and develop new and improved biological raw materials and ingredients to provide the range of food products which contribute to optimum human health. Nutritionally-optimized food substrates will have to be provided which contribute to consumer well-being and health, such as functional foods with specific health benefits.

Biotechnology will be applied in combination with traditional crop breeding to produce genetically modified commercial crop plants with enhanced performance and improved nutritional and organoleptic qualities. Microorganisms (including yeasts and other fungi) will also be developed, with a view to increase food quality and also to be used as components in food or as sources of food ingredients. This research will complement fundamentally oriented research within the Biotechnology programme and will have a synergy with related biotechnological aspects of Area 4 "Agriculture, Forestry and Rural Development" of this programme.

Objectives :

- to apply biotechnology to develop food materials (crops, microorganisms) with the desired functionalities and nutritional processing properties for the food industry;

- to develop food products and ingredients which provide specific health and nutritional benefits to consumers (functional foods or ingredients).

3.2.1 Application of biotechnology to food materials

- The development of molecular markers better matched to applications, e.g. in breeding, diagnostics and as yardsticks in biodiversity (mapping of historic lineages and provenances), robust/reliable transformation and expression methods, including new marker genes and selection technology in key crops, including fruits, vegetables and fish from aquaculture, enlarging the catalogue of regulatory elements (e.g. gene promoters and enhancers).

- This should lead to raw material improvements, such as improved nutritional quality of plant material through modification of metabolism : carbohydrates, fats/oils, proteins, fibre, malt, antioxidants, selected secondary metabolites.

- Plant raw materials with proven health benefits, e.g. phytoprotectants, antioxidants.

- Enhancement of specific characteristics of plants of nutritional and health interest; removal of undesirable anti-nutritional factors.

- Access to new traits (biodiversity) for providing new opportunities in food quality (e.g. aromas, flavours, nutraceuticals).

- Molecular farming : engineering into plants of exogenous high added-value compounds (e.g. aromas, flavours, nutraceuticals, edible vaccines, phytoprotectants, etc.).

- To obtain raw materials with improved processing quality, including generation of less waste.

- To improve organoleptic quality of plant food products.

- Controlled ripening and increased storage life in fruits, vegetables and fish products.

- Reshaping of plant structure and development, including source-sink relationships.

- Biological alternatives (including microorganisms) for bio-control with a view to improve food quality by reduction of contaminating chemical pesticides.

- Use of biofertilizers based on bacteria, fungi or other microorganisms to increase food quality.

- Development of microorganisms as components in food or as sources of food ingredients.

3.2.2 Functional foods

- Focus will be towards building on fundamental nutritional and biotechnological research leading to the development of functional and probiotic foods for specific population groups and nutritional requirements, e.g. infants, adolescents, ageing population and ethnic groups.

3.3 ADVANCED AND OPTIMIZED TECHNOLOGIES AND PROCESSES

This area encompasses the improvement of existing process technologies and equipment and the development of new advanced technologies which will be applied to food processing in the future. Novel partnerships between mainstream food technologies and other industrial technologies or disciplines will be encouraged in the development of these technologies.

Objectives :

- to optimize existing process technologies leading to safe, high quality foods;
- to develop advanced food processing technologies;
- to improve quality monitoring and quality assurance for fish and fish products;
- to minimize damage to the environment from food processes;
- improved utilization of underexploited and underutilized fish species and wastes;
- to develop minimal, functional and safe food packaging processes.

3.3.1 Process optimization

- Research tasks will concentrate on optimization of existing food processes, improved quality control systems, including rapid methods to assess large variations in the quality of raw materials, particularly quality measurement, e.g. spectroscopy, physical properties of raw materials and products; origin identification and authentication.

- Improvement of traditional processing and storage techniques, improvement and characterization of safety and quality definition of artisanal, regional, speciality and ethnic foods, including the influence of fish processing techniques and home preparation on nutritional values.

- The production of raw materials low in contaminants and natural toxins, implications of reducing natural toxins, consensus for guidelines for safe setting of processes, redesign of food fermentation processes to improve shelf life, palatability and health aspects, modelling and simulation of products, unit operations, processes and plants.

3.3.2 Advanced technologies

Advanced technologies will be developed in line with the following process concepts :

- **minimal processes** : clean room, cold room, modified atmospheres, improved preservation methods, non-thermal processing;

- **combination processes** : high pressure treatment and ultrasound or heat; bioprocesses and membrane processes or pressure; reduced water content with heat and packaging;

- **emerging unit operations** : such as membrane processes, aseptic techniques, non-thermal processes, high electric pulses, laser systems, supercritical fluid systems, ohmic, microwave, high frequency heat systems;

- **robotics and automation technology** : specific and sensitive sensors (e.g. chemical sensors, biosensors); signal processing and integration; sensor architecture and positioning; adapted control systems, e.g. fuzzy logic, neural logic/networks, minimal control systems; automatic handling, cutting, packaging, assembling, sorting; robotics and sensors applied to high risk, unfriendly or conditioned environments (e.g. low temperatures or CO_2 atmospheres);

- **process flexibility**: to develop process design for continuous or batch production, for raw materials of variable quality, for production of wide varieties of regional or traditional products, for coping with seasonal influences; technologies for development and production of new food products (including ready meals, speciality foods, pre-processed and 'coded' therapeutics foods, reconstituted foods);

- **technology transfer from other industrial sectors**: particularly from medical equipment manufacturers, from the engineering sector, in line physical detection and control systems, decision making and training systems, materials handling to minimize damage.

3.3.3 Quality monitoring and quality assurance for fish and fish products

- Development of rapid, robust and simple methods for measuring quality of fish and for predicting shelf life.

- Development of objective quality criteria for different fish species.

- Harmonization and standardization of analytical methods for measuring quality.

- Identification of process parameters which need to be controlled in order to meet the pre-set quality requirements in the final product.

- Development of optimum layout, equipment design and materials selection for production facilities.

- Development of systems which will allow the history (time / temperature) of fish to be recorded from catching to consumer.

3.3.4 Development of environmentally friendly procedures and processes

- The conversion of waste streams into useful products, low waste food production, energy efficient systems, minimum chemical additives/inputs, environmental impact of products and processes (e.g. life cycle analysis).

3.3.5 Upgrading of underexploited and underutilized fish species and by-products

- Development of more efficient machines to separate intact flesh from bones and skin, e.g. recovery of edible flesh from process waste.

- Development of food products from lean and fatty fish species of small size.

- Development of new feeds for aquaculture and animals.

3.3.6 Packaging and packaging processes

Processes which will incorporate aspects such as:

- safe edible coatings, biodegradable packaging, functional layers for protection of foods, smart and minimal packaging, tamper evidence, food contact with packaging, migration, functional barriers, safety of recycled plastics, leakage detection, food packaging/storage/transport/distribution interaction.

3.4 GENERIC FOOD SCIENCE

This basic scientific area will study the generic understanding underpinning food science, such as biochemistry, biophysics, biotechnology, toxicology and microbiology, which will lead to a better knowledge and definition of the internal quality of food and raw materials at various stages of processing, leading to better quality and safer food products. It will complement the work on the food themes already described, particularly in nutrition, optimized raw materials and development of food technologies.

Objectives :

- to examine the underlying biochemistry of foods;

- to study the physics of food components;

- to integrate fundamental biotechnological research into food processing;

- to quantify the real toxicological risk to consumers from residues and other food components within complex food systems;

- to achieve a better understanding of the behaviour of micro-organisms in complex food systems.

3.4.1 Biochemistry

- Research should focus on the underlying biochemistry particularly related to preservation of quality, correlation between molecular structure of components and flavours and effect on sensory attributes, molecular basis of quality, structure /function relationships.

- The role of enzymatic activity on quality and shelf life - enzymatic reactions in complex insoluble substrates, structure and function of multi-enzyme complexes, interactions between enzymes, ligands and co-factors.

- Biochemistry of *in-vivo* micro-structure of plant and animal foods, of nutrition and of nutrient metabolism.

3.4.2 Biophysics and bioengineering

- This novel area should address methods to measure distances between molecules (e.g. gels), to measure orientation effects, development of adapted models for super molecular structures from polymer science.

- Aspects, such as physico-chemical properties, food rheology, molecular interaction and structure creation, aggregation, crystallization, concentration phenomena, characterization of product microstructure, kinetics of quality change as a function of food microstructure (e.g. glassy states, surface physics, compartmentalized structures).

- Investigation of the role of water, especially water inter-relationships, water migration in foods, enzymes in a restricted water environment, the relationship between structural properties and mode of action of certain biopolymers, interaction between small and large molecules, flavours, macro-molecules, micro-engineering at the cell level (e.g. basic structure of food material, of membranes, of tissues), optimization/modelling/simulation of biomaterial processing and mass transfer phenomena.

3.4.3 Biotechnology

- This area should complement other areas of food science where biotechnology is applied but will have a close synergy with fundamentally oriented research carried on in the Biotechnology programme, and more specifically, it will concentrate on biotechnological methods to evaluate quality (including

biomarkers, probes biosensors), biotechnological production with improved processing tolerances (e.g. processing acids, antioxidants, enzymes with new specifications, e.g. resistant to high temperature). Enhancement of natural preservation characteristics, antimicrobials, beneficial micro-organisms, removal of undesirable anti-nutritional factors, enhancement of desirable compounds.

- An improved understanding of natural biocontrol and conversion systems to make high value intermediate products from low value materials (e.g. flavours), and further identification of areas where biotechnology can be applied during food processing or used as tools (e.g. methods for detection of pathogens and allergens).

3.4.4 Toxicology

- The chronic influence of potential residues in foods, role of biomarkers for presence of toxic substances, the interaction of compounds which have a positive or negative health effect.

- Toxicological implications of new preservation and processing techniques, new in-vitro biological assays for detection, the synergistic effects of residues in foods and toxicological repair mechanisms.

- Establishment of limits for the presence of marine toxins.

3.4.5 Food microbiology

- Effects of new processing and preservation techniques and emerging pathogens, including viruses, taxonomy, physiology, predictive microbiology with emphasis on food spoilage microorganisms, and methods which extend lag times indefinitely. Validation of models in the whole food matrix and throughout the whole food chain, interaction of micro-organisms with the micro-structure and micro-environment of foods, e.g. emulsions, fermented meats, cheese.

- Microbial ecology, particularly the competition between microflora in complex food systems, effective elimination of pathogens from food while maintaining quality.

- Rapid and on-line sensor technology for microbiological quality and safety related factors, development of sampling and analysis procedures and new detection methods concentrating on viability of organisms and screening for specific groups of micro-organisms.

- Use of natural products and systems for food preservation in combined processing, e.g. spices, bacteriocins, essential oils and the development of integrated control systems for total food chains: quality indices, HACCP, total quality management systems.

- Microbiology of newly introduced fish species, composite products incorporating fish and new processes.

- Studies of epidemiological risk assessment in molluscs.

SYNERGIES WITH OTHER SPECIFIC PROGRAMMES

Close synergies will be developed with other programmes, particularly the Biomedical programme in the area of food nutrition, Biotechnology in the areas of generic science and technologies, Environment for wastes and packaging, Industrial and Material Technologies for advanced and optimized technologies.

Research projects in Area 3, which concern subjects covered by the quality policy in agriculture, plant and animal health and animal welfare, must be coherent and in synergy with Area 4 of this programme.

AREA 4 AGRICULTURE, FORESTRY AND RURAL DEVELOPMENT

INTRODUCTION

The aim of the programme of work for research in the area of "Agriculture, Forestry and Rural Development" is to develop the necessary scientific and technical basis for the preparation, implementation, monitoring and adjustment, where required, of Community policy in these important domains. Six areas of research, to which must be added the support activities to be carried out by the Joint Research Centre, have been selected. They have the following objectives:

- to adjust agricultural production methods and systems to the new conditions arising from the reform of the CAP, make a serious effort to develop environmentally and economically sustainable agriculture which is more environmentally friendly, and to perfect the tools of analysis and control which are indispensable for managers and decision makers in agriculture;

- to encourage the development of quality products, the various characteristics of which fulfil the expectations of consumers and are likely to bring an increase in value added by all sections of the sectors concerned;

- to accompany these new approaches of the Common Agricultural Policy with an increased effort to diversify agricultural products and activities;

- to improve plant and animal health and animal well-being and to develop the means necessary for fulfilling the Community's responsibilities in these areas;

- to support protection, development and exploitation of European forests and the Union's commitment to sustained multifunctional management of forests;

- to accompany the considerably increased effort in favour of rural development by developing the knowledge indispensable for effective Community measures and their adjustment to the diversity of situations encountered.

The content of each of the above areas is set out below, with details of the specific objectives and the relevant research themes. Finally, special emphasis is given in the programme to the application of biotechnology. The most promising subjects from this point of view are mentioned in each of the work programme areas.

4.1 REFORMED CAP: OPTIMIZATION OF METHODS, SYSTEMS AND PRIMARY PRODUCTION CHAINS. AGRICULTURE-ENVIRONMENT INTERACTIONS. POLICY RELEVANT ECONOMIC ANALYSIS AND IMPACT ASSESSMENT.

Objectives

The aim is to develop the scientific and technical basis necessary for the progressive redirection of Community agriculture towards new, less intensive production systems which are not only more environmentally friendly but which are also economically viable and maintain a sufficient level of employment.

Three themes have been chosen:

- the adjustment of animal- and crop-production methods, techniques, systems and production chains in line with the reform of the CAP, and the preservation of biodiversity in agriculture, the development of organic farming, an analysis of set-aside and the management of rare water resources;

- the expansion of knowledge of the interaction of agriculture and the environment, an analysis of the environmental impact of political decisions and a wide-ranging development of agricultural practices which are more environmentally friendly;

- the development of the socio-economic tools necessary for a better understanding of the operation, markets and competitiveness of Community agriculture, the study of the consequences of political decisions and in particular the reform of the CAP and the provision of support for decisions.

Research tasks

4.1.1 Optimization of methods, systems and primary production chains

- Promotion of crop production techniques, methods and systems which permit a reduction of inputs, better protection of the environment and the countryside and an improvement in quality. The genetic improvement towards low input crops (in particular through the application of biotechnology). Development of variety tests in the light of new harmonized rules on plant varieties.

- Promotion of less intensive, environment-friendly animal production, handling and housing systems, to increase efficiency in the use of inputs having particular regard to product quality, animal welfare and the environment. Studies to improve animal nutrition and feed; new processes to improve the nutritional value of by-products (e.g. lignocellulose), methods to predict feeding values. Development of new animal genotypes (including biotechnology). Assessment of environmental implications of veterinary products.

- Preservation and encouragement of the genetic heritage and biodiversity in crops, including wild species and animals. Preservation and development of varieties adapted to harsh climates and soil conditions (biotic and abiotic stresses).

- Comparison of the productivity of organic (biological) and conventional production systems.

- Analysis of set-aside. Socio-economic and environmental impact, impact on the countryside, biological diversity and rural areas. Study and comparison of the various uses made of set-aside land, in particular non-food production, non-agricultural uses (natural parks, reserves, long-term set-aside, etc.).

- Development of water management models for preserving crops when precipitation is rare or irregular and for preventing salinization of water.

4.1.2 Agriculture-environment interactions

- Development of non-chemical or low-chemical methods (e.g. integrated crop management), mechanical equipment and techniques promoting practices which are more environmentally friendly and giving greater protection to the environment (water, soil, landscape, etc.) to reduce contamination and erosion and increase production efficiency (including biological means of pest control and biotechnology).

- Measurement and control of the environmental impact of the CAP: definition of suitable indicators, compilation of comparative data, measurement of the overall environmental impact of the reformed CAP, development of models to predict the environmental impact of decisions adopted under the CAP.

- Development of system-based (plant, animal and farm management) global approaches to meet the various objectives of the reformed CAP with the emphasis on competitiveness, the environment and food quality. Optimization of low input farm models based on the integration of food and non-food production with other economic activities and services.

4.1.3 Policy relevant economic analysis. Impact assessment.

- Analysis and control of the impact of the reform of the CAP: effect on production (areas, yields) and location, the markets concerned, employment and income; the response of farmers (production systems, farming structures, use of new technology); adjustment of agriculture and related sectors.

- Analysis of the operation of Community agriculture and its international context. Analysis of the consequences of the Union's international commitments. Ex-ante and ex-post analyses of the CAP instruments. Elaboration of quantitative analysis tools and econometric simulation models permitting forecasts of the development of agriculture, identification of the necessary adjustments and evaluation of the potential impact of agricultural policy decisions (markets, income, employment, utilization of land, etc.).

- Measurement and analysis of the factors which determine changes in the consumption of agricultural raw materials (human consumption, consumption of animal feed).

- Development of information and decision support systems for farmers and decision makers.

4.2 QUALITY POLICY

Objectives

Research in this area reflects the increased importance of quality products and the consequent introduction of rules (geographical indications, certificates of specific character, etc.) adopted under the reform of the Common Agricultural Policy. Three themes have been selected at the farm level which will be complementary to Area 3 "Generic Science and Advanced Technologies for Nutritious Foods":

- analysis of the markets for quality products and, more generally, a study of the increasingly complex expectations of the consumers of agricultural products and the ways of responding, in terms of products or otherwise;

- the development of methods, technologies and parameters for the measurement and control of all aspects of quality (health, nutritional, organoleptic, technological aspects, etc.) and ways of increasing the safety of consumers.

- identification of the criteria which define product quality, analysis of the factors which enhance the value of quality products and examination of the branches concerned and their operation.

Research tasks

4.2.1 Consumers' expectations

- Analysis of the various expectations of consumers (price, production processes, quality, social aspects, etc.); identification of the types of product fulfilling those expectations (standards, specific characteristics, taste, cooking, suitability of varietal research for new crops, etc.) and ways of ensuring that products fulfil those expectations;

- Analysis of the markets for quality products within the meaning of Community rules (designations of origin, geographical indications and certificates of specific character, organic farming) and the factors determining consumer choice for those products.

4.2.2 Technological instruments and methods

- Improvement of methods and equipment for measuring and controlling product quality (technological, health, nutritional, sensory, organoleptic, criteria of distinctness, uniformity and stability within the framework of the technical examination of plant varieties, etc.) and of adding value to local products.

- Development of technology for forecasting and certifying the quality of agricultural products and/or improving their nutritional and organoleptic quality.
- Development of analysis methods for improving the security of consumers. Identification of the critical points for preventing the risk of contamination. The establishment of objective criteria for various contaminants found in foodstuffs. Development of safety inspired production methods with low input for improving the quality of traditional agricultural products.

- Impact on the raw materials of results of research on human health (complementing Area 3.1 "Consumer Nutrition and Well-Being") and their implications for primary agricultural products.

- Establishment of objective analytical parameters for identifying agricultural products produced using organic methods. Definition of maximum acceptable limits for certain characteristic elements in organic farming.

4.2.3 Organizational aspects

- Identification of the factors distinguishing quality products and analysis of the technical, economic and organizational conditions to be fulfilled before quality can produce a higher return. Identification of the factors determining success or failure (actual cases).

- Definition of criteria which facilitate the comparison of products and bring out their special characteristics according to whether they belong to the area of "products" (designation of origin) or "country" (geographical identification).

- Analysis of the production chains for quality products at different geographical levels (local, regional, etc.), identification of partners, organization, quality control, distribution of value-added.

- Development of methodological tools for the establishment of specifications and other forms of quality certification. Integration and development of "total" quality through the whole production chain for quality products.

4.3 DIVERSIFICATION

Objectives

In addition to the adjustment of the principal agricultural products and the redirection of production towards quality products, the diversification of production and farming activities is a priority which requires a significant research effort concentrated in the following areas:

- the identification of as wide a range as possible of new diversified agricultural products and the definition of technical and economic references, optimization of production-farming systems with the emphasis on economic viability and the preservation of the environment;

- for biomass production and the recycling of agricultural and processing residues, both renewable sources of raw materials, the same themes and an analysis of the factors determining increased use of these products;

- identification and analysis of traditional and new non-farming activities for farmers, study of the possible use of agricultural resources for non-agricultural activities and ways to optimize the integration of non-farming activities with farming;

- socio-economic analysis of the process of diversification, identification of the means of increasing the take-up of the opportunities for diversification, optimization of diversified farming systems and production chains at the different geographical levels.

Research tasks

4.3.1 Speciality products

- Identification and optimization of new forms of product diversification;
  development of technical and economic references.

- Analysis and improvement of the specific characteristics of crops and animals (genotype and phenotype improvement), especially for organic farming, niche products, aromatic plants, speciality animal fibre products, etc.

- Improvement of crop and animal production, harvesting and transport methods and equipment (low inputs, low environmental impact, high output of marketable products, responding to needs of users, socio-economic conditions).

- Improvement and further development of new integrated processes for the valorization and extraction of valuable crop components. Development of reformulated materials and products by combination of crop-derived components.

4.3.2 Biomass production (food, feed, non-food and energy uses)

- Identification and analysis of crops for non-food uses.

- Application of biotechnology and other technologies to improve yield and quality of energy crops and of other non-food crops (e.g. carbohydrate and oil content, ash content of fuel crops, etc.) and to increase the recycling of agricultural and processing residues at the farm level.

- Development and optimization of production techniques and methods, harvesting, storage, on-farm processing (complementary to Area 1 "Integrated Production and Processing Chains"), and transport of vegetable and woody products for non-food uses: reduction of the environmental impact, suitability for processing, improvement of profitability, development of employment. Socio-economic, political, etc. conditions for the development of these products.

4.3.3 Development of complementary on-farm activities

- Identification and analysis of environmentally friendly complementary on-farm activities (e.g. farm tourism, farm crafts, agri-forestry, distance working, educational and environmental services, etc.); definition and evaluation of technical and economic references. Studies of the various factors (economic, social, legal, political, etc.) influencing the development of these activities.

- Study of the potential uses for traditional agricultural skills, equipment and other resources in diversified non-agricultural activities, e.g. farm tourism, agri-forestry, recreational farming, etc.

- Optimization of the parameters influencing the development of complementary activities as part of diversification (technical, economic, social and organizational factors necessary for an increase in the value-added produced by the farmer).

4.3.4 Socio-economic research to facilitate diversification

- Analysis of the take-up process and the ability of rural communities to adapt to diversification opportunities; development of strategies to allow the take-up of diversification opportunities.

- Optimization and simulation of diversified farming systems through an analysis of farm incomes, economic risks and decision costs associated with different diversification opportunities at the farm level.

- At the production-chain level, optimization of production costs through an analysis of technological options, local scale effects, local supply and demand. Creation of networks to link farmers to processing and distribution industries at regional and national level. Analysis of optimal production chains for different regions.

4.4 ANIMAL AND PLANT HEALTH, ANIMAL WELFARE

Objectives

The purpose of research in this area is to provide the scientific and technical basis necessary for the preparation, application and monitoring of Community rules, the importance of which has grown with the completion of the Single Market.

The following research themes have been selected:

- as regards plant health, rapid, reliable, cost-effective and user-friendly standard methods for detecting, monitoring, identifying, sampling and quantifying harmful organisms, examination of the effects on the environment and food chain of crop treatment products and the search for new prevention and treatment methods, tools to support Community policies (forecasts, epidemiology, information systems, monitoring, etc.);

- as regards animal health, methods and tools for the prevention, control and eradication of economically important diseases, the development of diagnostic tests, vaccines, genetic improvement with a view to improved resistance, the control of the sources of disease, analysis of contaminants of animal feedingstuffs and the means to support Community policies as for plant health;

- with regard to animal well-being, the development of evaluation methods, analysis of the response to stress, identification of ways of improving animal well-being on and off farms and the relationship between animal well-being and product quality.

Research tasks

4.4.1 Plant health

- Study of the taxonomy, development of rapid, reliable, methods for detection, identification and quantification of harmful organisms, with particular reference to risk assessment. Standardize and exploit the results.

- Improvement of methods for forecasting pests, diseases and weeds with particular reference to risk assessment. Study of biology and epidemiology, in particular studies of the harmful and quarantine organisms mentioned in Community Regulations.

- Improvement of non-chemical (mechanical techniques, crop management, genetic resistance) and low-chemical and biological methods of crop protection (major and minor crops) and post-harvest treatment, in particular for the most harmful organisms. Control methods or eradication methods for quarantine organisms. Application of biotechnology.

- Prediction of environmental fate of agrochemicals and effect on the environment and on human health.

- Policy support through improved sampling and inspection methods (at points of entry, points of production).

- Definition (cartography), justification and monitoring of protected zones.

4.4.2 Animal health

- Development of improved diagnostic tests (including application of biotechnology) and systems for zoonoses and diseases of economic significance.

- Improvement of predictive epidemiology and reporting systems for animal disease surveillance.

- Prevention and control (vaccines, genetic resistance, improved husbandry systems, improvement of therapeutics) of zoonoses and diseases of economic significance.

- Control of domestic and wild animal sources of human pathogens.

- Control of diseases related to the management and utilization of animal effluents.

- Development of systems to control, monitor and report epidemic diseases; analysis of economic and public sector implications.

- Identification and control of contaminants of animal feedingstuffs.

- Study of pathological processes of wild animals.

4.4.3 Animal welfare

- Improvement of methods (behavioural, immunological, endocrinological) for assessing welfare of farm animals and welfare related to housing and transport.

- Behavioural studies (including free-choice methods) to improve housing and management.

- Improvement of welfare of farm animals with special emphasis on housing, transport and slaughter.

- Assessment of genetic susceptibility to stress.

- Establishment of relationship between welfare and product quality.

4.5 MULTIFUNCTIONAL MANAGEMENT OF FORESTS

Objectives

Research in this area supports the Community's active commitment to the protection and sustainable development of forests following the Rio Summit. It forms part of the activities coordinated at European level decided upon at the ministerial conferences on the protection of forests in Europe aiming to provide better protection and ecologically viable management of forestry resources and part of the forestry measures implemented through the Community financial instruments (forestry measures in agriculture, Structural Funds, other instruments). Five research themes have been selected, some of which are complementary to the environmental research programme:

- the socio-economic situation of the forestry sector and the policies applied therein; the prospects for supply and demand in the short, medium and long-term;

- the functioning of forestry ecosystems and the interaction between forestry and ecosystems;

- the impact of natural hazards and human activities; the causes of forest dieback, the adaptive capacity of forests, forestry protection and the restoration of damaged forests;

- the sustainable and multifunctional management of forests, analysis methods and suitable indicators, the appropriate afforestation, management and exploitation techniques and methods, the genetic improvement of trees for better growth, resistance and quality, and the optimization of agri-forestry systems;

- support for cork production through genetic improvement and the improvement of production, management, health protection and exploitation techniques.

Research tasks

4.5.1 Forestry policy and socio-economic aspects

- Analysis of forestry policy and related policies to promote the forestry sector; analysis of the socio-economic situation of the sector.

- Analysis of the supply and demand for forestry raw materials and services in the short, medium and long-term in relation to the various political options. Development of predictive models.

4.5.2 The functioning of the forestry ecosystem

- Analysis of the various forest ecosystems and the way they function.

- Analysis of the interaction between forestry and ecosystems.

4.5.3 Forest conservation and protection

- Prevention and control of major pests and diseases. Protection and restoration of fragile and damaged forests, as well as of protective forests.

- Adaptation of forests to climatic changes and fluctuations; influence on land use, biodiversity, productivity, eco-physiology, forests as carbon sinks. Analysis of the impact of environmental hazards and human pressure (fire, wind, abiotic and biotic stresses, including leisure and grazing use), definition of tolerance limits.

- Detailed study of the causes of forest die-back.

4.5.4 Afforestation, sustainable management of forests, integration of functions, agro-forestry

- Planning of new woodlands (land use, site classification, environment, landscape, etc.).

- Systems, techniques and plant supply for afforestation (establishment, vegetation management).

- Breeding and genetic improvement (including biotechnology and molecular biology) for increment, quality and resistance.

- Monitoring and evaluation methods for resources and diversity, e.g. indicators.

- Forestry systems producing for higher diversity (species, age, etc.) and the integration of multiple functions in forestry (including wood, amenity protection, landscape, rural development, wildlife).

- Cost-effective and environmentally friendly production and exploitation methods. Management techniques, planning and decision support.

- Optimization of agri-forestry systems taking account of farming and forestry aspects, small-scale sustainable forestry management.

- Multiple forest production systems (products and services, niche markets).

4.5.5 Cork and cork-oak

- Production, regeneration and exploitation methods (including reduced damage). Reproductive material for increment, quality and resistance. Breeding and genetic improvement (including biotechnology and molecular biology).

- Improvement of the health situation of cork-oak.

- Influence of management on cork formation; field determination of cork quality.

4.6 RURAL DEVELOPMENT

Objectives

The aim of the special effort planned in this sector is to provide a suitable scientific and technical basis for supporting the Community rural development policy which is to be significantly developed during the 1994-99 period. Four themes have been selected:

- deepening the knowledge of the situation in the Union's rural areas by establishing harmonized indicators, a zone typology and an analysis of their prospects compared with other types of regions; analysis of the important technical, economic and social changes taking place in rural areas and the creation of models to enable forecasts to be made of their development;

- study of the possibilities and conditions for and the limits of development in rural areas, identifying the activities with most potential and the people who can bring about development and analysing the conditions for introducing and disseminating innovation;

- improvement of Community rural development measures by analysing existing policies, studying the impact of other policies on rural areas and developing different methodological support tools.

Areas of research

4.6.1 Situation of rural areas

- Definition of indicators for rural areas (economic, social, environmental, etc.) and establishment of comparable data throughout the European Union.

- Typology of rural areas, definition of criteria and corresponding indicators, studies of representative cases, the results of which can be extrapolated to represent various types of rural areas.

- Analysis of the principal problems, structural trends, potential and constraints on development in rural areas, comparison with other areas.

4.6.2 Changes underway in rural areas

- Analysis of technological and economic changes: development of agriculture and land use; assessment of the impacts of changing patterns of land use on soil, eco-systems and socio-economic systems; development of other economic activities; changes in the relationship between farming and other sectors; growing economic sectors; dissemination of technological progress and new technologies; competitiveness of rural areas.

- Analysis of social changes: demographic changes; changes in the socio-professional composition; new interest groups; changes in the attitudes and aspirations of the rural population; new links between town and countryside; new functions for rural areas. Development of power and decision-making structures in rural areas.

- Development of models for forecasting structural changes in rural areas in the short, medium and long-term: the construction of models showing changes in agricultural structures (farms, labour force, type of products, land use, livestock, income, etc.); multisectoral models covering all activities (demography, employment, sectors of activity, competitiveness, level of training, income, etc.).

4.6.3 Development of rural areas

- Identification and mobilization of partners and bodies able to effectively participate in rural development measures. The role of women in rural areas. Involvement of the population in rural development. Promotion of coordinated approaches by different groups for the creation of employment.

- Potential, conditions and constraints on the development of new economic activities (SMEs, craft industry, tourism, etc.) in vulnerable rural areas, in particular Objective 1 and 5(b) areas.

- Analysis of the introduction of new technologies and new forms of activity in rural areas: multi-job holding, distance working, environmental services, development of endogenous potential, decentralization of activities, management of rural areas, the need for networks, etc. Integration of various activities at individual and family level. Identification of those responsible for innovation in rural areas.

4.6.4 Rural development policy

- Analysis of policies for the improvement of agricultural structures and rural development at the various geographical levels (local, regional, national, Community). Identification of suitable levels for measures. Rural development policy actors and partners. Identification of factors determining the success or failure of programmes and measures (actual cases).

- Analysis of integrated approaches to local development and sectoral or structuring approaches, definition of approaches. Reexamination of dissemination services with regard to the objectives of integrated development.

- Analysis of the impact of the different Community policies on the situation and development of rural areas. Creation of the relevant predictive models.

- Methodological tools for the assessment, monitoring and evaluation of rural development programmes (multi-sectoral tools) and measures (sectoral tools) supported by the Community. Improvement of indicators for the selection of areas for Community assistance. Development of methods for the comparison of rural development processes and the conditions for the transfer of successful experiments between rural areas.

4.7 COMPLEMENTARY ACTIVITIES BY JRC IN SUPPORT OF DG VI

4.7.1 Institutional support activities

- Research into and development of new remote sensing techniques enabling an improvement in the methods used to monitor European agricultural policy:

- The follow up or second phase of the pilot project applied to agricultural statistics (MARS-STAT).

- The full-scale application of measures for the monitoring and control of the Common Agricultural Policy (MARS-PAC-FEOGA).

- Scientific and technical support for full application of Community rules in the wine sector (control of wines, origin of ethanol, etc.).

- Development of reference measurements and materials for quality control of foodstuffs (certified reference materials, analytical procedures).

AREA 5 FISHERIES AND AQUACULTURE

Objectives

The overall objective is to provide a sound scientific basis for the balanced, sustainable exploitation of the fisheries resources of the Community and the further controlled development of Aquaculture. This is to be achieved by a better knowledge and understanding of the aquatic ecosystem, including the interactions between fishing activities, aquaculture and the environment. Socio-economic considerations are recognized as an integral part of the programme, together with the associated requirement to develop appropriate methodologies for evaluating fisheries and aquaculture policies.

Emphasis will be given to environmental interactions with fish, fisheries and aquaculture, in order to improve the assessment of :

- the impact of environmental variables on living resources (at all stages of their life history), including their abundance, distribution and migration;

- the impact of environmental conditions on all phases of aquaculture production;

- the impact of fishing and aquaculture (marine and continental) on the aquatic ecosystem.

Research, aiming at improved knowledge of the biological and physiological issues (genetics, pathology, reproduction, etc.) of aquacultured stocks as well as of new species which allow a diversification of the aquaculture production, will be promoted.

Emphasis will be placed on socio-economic aspects of the fishing and aquaculture industries in order to improve understanding of their operation and management.

In order to achieve sustainable exploitation of biological resources, improved fish stock assessment techniques are required. Emphasis will be placed, therefore, on the development of new methodologies, including those which take account of innovations in sciences other than fisheries, in order to improve the present "state-of-the-art".

The following headings are therefore addressed in detail below :

5.1 Impact of environmental factors on aquatic resources

5.2 Ecological impact of fisheries and aquaculture

5.3 Biology of species for optimization of aquaculture

5.4 Socio-economic aspects of the fishing industry

5.5 Improved methodology

With the objective of supporting the competitiveness of the European industry through pre-competitive research and development, research dealing with the upgrading of fishery products, which is included within Area 3, "Generic Science and Advanced Technologies for Nutritious Foods", is considered a relevant matter in the context of fisheries research. Moreover, taking into consideration the influence of production systems on the quality of fisheries and aquaculture products, research on these subjects will be considered.

5.1 IMPACT OF ENVIRONMENTAL FACTORS ON AQUATIC RESOURCES

Objectives

The objective is to generate a better understanding of the ecosystem. In particular, the influence of environmental factors, both natural (oceanographic, climate, primary production) and man-made (excluding fisheries and aquaculture), on the key biological parameters (e.g. recruitment, distribution, natural mortality) of aquatic resources will be studied.

Research Tasks

5.1.1 Effects of environmental factors on fish and fisheries

- Analyse environmentally induced changes in the distribution, abundance and migration of fish, especially the identification and description of nursery areas and migration patterns.

- Analyse changes in vital parameters, such as natural mortality, growth, maturation and fecundity.

- Study the incidence and prevalence and mortality rates due to fish diseases and their relationship (if any) to environmental factors.

- Determination of the effects of environmental factors on the recruitment of young fish and shellfish, in particular the separation of environmentally induced fluctuations from the systematic effects of stock size.

- Study the incidence and effects of pollution and other forms of environmental degradation, especially on the very earliest life stages (eggs, embryos and larvae).

- Toxic algal blooms: the detection of toxins and the environmental factors which promote toxic algal blooms. Calibration studies, including research on contamination and decontamination dynamics.

- Evaluate the impact on the natural production of rural and industrial practices (chemical processing, water use, etc.), in particular on shellfish production areas.

5.1.2 Multispecies interactions

- Extension of existing multispecies models by integrating environmental factors, top predators and non-target species.

5.2 ECOLOGICAL IMPACT OF FISHERIES AND AQUACULTURE

Objectives

Research will result in a better understanding of the effects that fisheries and aquaculture have on the ecosystem, with the aim of limiting their impact on the aquatic environment, particularly reducing the mortality of juveniles and non-target species. Research will include fishery/top predator relationships, gear selectivity, sea-bed degradation and fish farm effluents, and will be undertaken against the background of other perturbations in the environment caused by natural (e.g. hydrographic) and anthropogenic factors other than fisheries (e.g. pollution, eutrophication, gravel extraction).

Research tasks

5.2.1 The effects of fisheries on the environment

- Development of appropriate ecosystem descriptors (e.g. biodiversity, carrying capacity, assemblage structure, size spectrum) for evaluating direct and indirect effects of fishing.

- Analyses of long-term trends in population parameters in targeted and non-targeted species as well as in selected ecosystem descriptors.

- Improve methodology for measuring the direct impact of fishing activities with special emphasis on fishery-top predator interactions and seabed degradation.

- Describe the micro-distribution of fishing effort in relation to associated benthic assemblages.

- Development of more selective fishing gear, which avoids unwanted by-catches of juveniles and non-target fish species, benthic organisms and marine mammals.

5.2.2 The effects of aquaculture on the environment

- Quantification of the impact of fish farm effluents (organic, chemicals, pathogens) and development of methods for its assessment and reduction, including monitoring, control systems and management strategies.

- Assessment of the impact and implications of introductions, transfers and escapes, including research on the passive transfer of diseases.

- Evaluation and modelling of carrying capacity and holding capacity for aquaculture, including the development of appropriate descriptors for the environment and ecosystem for detecting changes.

5.2.3 Modelling

- Development of relatively simple ecosystem models for assessing the impact of fisheries and aquaculture.

- Analysis of the relationship between fishing capacity, fishing effort and fishing mortality.

5.3 BIOLOGY OF SPECIES FOR OPTIMIZATION OF AQUACULTURE

Objectives

The work under this heading will contribute to a better knowledge of the biology of aquatic species, with the objective of encouraging the development of an economically profitable industry. Special emphasis will be put on the genetic adaptation of aquacultured species and pathological issues. Multidisciplinary approaches will be adopted where relevant, including the application of biotechnology. Research into new species as a means of diversification will be promoted.

Research Tasks

5.3.1 Genetics

- Quantitative genetics : defining heritabilities of important traits and developing selection programmes for improving the production characteristics of cultured shellfish and finfish (e.g. disease resistance, delayed maturity, growth improvements, meat quality).

- Development and application of molecular techniques for the genetic improvement of cultured shellfish and finfish. Research related to gene modification and transfer, sex and ploidy manipulations, and cryopreservation of gametes and embryos.

5.3.2 Health of aquacultured species

- Development of immunological and molecular detection methods for aquacultured species, including the development of cell lines for diagnosis.

- Study of defence mechanisms in shellfish with the aim of enhancing the endogenous immune response.

- Host-pathogen interactions in finfish, including studies on the immune system, vaccination and substitution and optimization of therapeutics.

- Research to investigate, quantify and reduce stress.

5.3.3 New species

- Research on diversification of species and strains supported by economic analyses (cost-benefit and market analyses) and risk assessments.

5.3.4 Reproduction

- Management of broodstock and control of spawning.

- Identification and understanding of factors influencing growth rate and the quality of early life stages.

5.3.5 Fish nutrition

- Quality of food, including the replacement of fishmeal with other protein sources and quality of the product.

- Feeding strategies, including feeding rhythms and cost-effective feeding.

5.4 SOCIO-ECONOMIC ASPECTS OF THE FISHING INDUSTRY

Objectives

The objective is to generate better knowledge and understanding of the operation and management of all sectors of the fishing industry, including associated industries. Particular emphasis will be placed on multi-disciplinary research, including evaluating the social and economic consequences of alternative management options.

Research tasks

5.4.1 Behaviour and strategies in the fishing sector

- Elaboration or evaluation and improvement of methods for the analysis of operational behaviours, especially in the harvesting sector (e.g. choice of target species and of fishing areas) and for the assessment of the impacts of these behaviours upon the fisheries (e.g. distribution of effort according to time and space) and upon management policies (e.g. compliance with regulations, self regulation).

- Elaboration or evaluation and improvement of methods for the analysis of investment behaviours (e.g. combination of input factors) and integration strategies, both within and between the fishing industry and the associated sectors, and for the assessment of the impacts of these behaviours and strategies upon management policies.

5.4.2 Fishery management systems

- Development of appropriate methods for the evaluation of the socio-economic effects of the application of various management strategies (management of resources, catching capacities and fleet activities), especially those incorporating multi-species, multi-fleet or multi-sector concepts.

- Elaboration or improvement of techniques for the evaluation of public policies, including allocation of fishing rights, as well as financial policies (taxation and subsidies) and the assessment of their impacts upon sectors associated with fisheries and aquaculture and upon different social groups.

- Identification of demands for control and supervision of fishery operations, catch and landing statistics, and development of control mechanisms for the improvement of the effectiveness of fishery management.

5.4.3 Integrated coastal area management

- Analysis of the interactions between economic sectors connected with coastal resources (e.g. aquaculture, tourism), evaluation of the dependence of coastal communities upon these sectors and elaboration of appropriate methods for the integration of the resulting information into fisheries policies.

5.5 IMPROVED METHODOLOGY

Objectives

The aim is to improve existing methodologies for fish stock assessment (e.g. novel methods of data collection and analysis) and the development of new instruments and techniques for fisheries and aquaculture research.

Research tasks

5.5.1 Improved methodology

- Rationalization and optimization of the collection of data from different sources (surveys, observers, commercial data).

- Development of new assessment methods, especially those for which the data availability is low.

- Development of new instruments and measurement techniques.

- Analysis of the interactions between management and assessment procedures; development of integrated procedures.

- Development of improved technology for designing, evaluating and operating fishing gear, with a view to enhancing technical conservation measures.

- Development of methodologies to evaluate the effect of stocking and artificial reefs based on biological, economic, social and legal considerations.

LEVEL II : CONCERTATION ACTIVITIES

AREA 6 OBJECTIVES ADDRESSED BY CONCERTATION

Throughout Europe there is significant research on-going at a national level in agriculture, fisheries and agro-industries. In line with the principle of subsidiarity, this programme does not seek to duplicate this valuable and often country specific research. However, in an effort to coordinate and provide means for the efficient exchange of information, European networks will be established to bring together scientists in these areas. This will be implemented through concerted actions and, as appropriate, through shared cost actions, preferably by Thematic Networks. The following are some examples where concerted type activities could be appropriate:

- primary production in agriculture, forestry, fisheries and aquaculture, with main emphasis on competitiveness, sustainability, quality, security of supply and interactions with the environment;

- conservation, development and management of the natural, semi-natural and man- made landscape;

- rural (including mountain and coastal development): the RTD activities at Member State level, which could be relevant to rural and coastal development, are quite diverse. By providing a European forum in the area of research for the exchange of experience, know-how and methods, European concertation activities will help to develop innovative approaches to overcome the problems of these regions. Special attention will be paid to the opportunities offered by new economic activities in rural and coastal regions, training, as well as the assessment of their socio-economic and environmental impact;

- food production and processing: networks will be created which better integrate research on-going at national level, especially bringing together research in food production, quality (including organoleptic quality), safety, health and socio-economic aspects strategies for informing the consumer and incorporating this experience with food processing.

LEVEL III: OBJECTIVES ADDRESSED BY MEANS OF HORIZONTAL ACTIVITIES

HORIZONTAL ACTIVITIES

1. DEMONSTRATION

The objective of demonstration is to prove the technical viability of a new technology or new systems and methods of production, together with, as appropriate, their possible economic advantages. The projects will be precompetitive and should as such focus on the application of new technologies, systems and methods of production and involve participation by both technology producers and technology users. The aims of demonstration in the context of this programme are: i) to speed up the adoption of new technologies and new systems and methods of production, by reducing the techno-economic uncertainties and risks associated with innovation and ii) to enhance the attractiveness of new approaches in farms, forests, fisheries, industries and services, contributing to the message that new technologies and new systems and methods of production are developed for the benefit of society as a whole and in support of the evolving Community policies.

Partnerships executing demonstration projects should have a clear vision of the exploitation of project-deliverables and/or a clear commitment to provide reliable information to public entities, such as consumer associations, regulatory bodies, industrial and professional groupings, etc. Priority will be given to projects addressing the specific hurdles which hamper the successful utilization of these new technologies, such as the existence of strong competing technological alternatives and production systems, the resistance of potential users to change their current practices by new approaches, a public perception of modern biotechnologies and the need to demonstrate compliance with constraining regulatory requirements.

Scale-up problems will have to be solved before undertaking the demonstration. Technical excellence, economic outlook, a sufficient level of prior knowledge about the new technology or production system, novelty and appropriate experience on the part of the executing partnership, will be required.

Demonstration actions to be implemented by this programme will focus especially on novel technologies and systems and methods of production offering environmental advantages and a high social benefit and economic potential. The required integration of technology producers and technology users in consortia of sufficient critical mass for project implementation is justified by the need to guarantee, on the one hand, a clear technological objective and, on the other, a significant commitment to using the new technology once its demonstration has been successfully accomplished. This integration will also include, when appropriate, producers and users of agricultural, forestry, and fisheries raw materials.

2. ETHICAL, LEGAL AND SOCIAL ASPECTS - ELSA

Objectives

Research on ethical, legal and social aspects of the areas included in this programme will have the objectives to:

- understand and respond to public attitudes and the diversity of viewpoints throughout the Community, including producers, users, social partners, environmentalists, welfare groups, consumer groups, etc., to improve rationality and balance in the ongoing public dialogue;

- fulfil a prospective role, anticipate emerging problems and provide early warnings to decision makers and the public of new ethical/legal/social issues, particularly regarding new experiments, technologies, production systems and products;

- investigate factors (cultural, economic, historic, religious, etc.) affecting public response to and varying perceptions of ethical issues.

Topics

- Information and communication, in particular to consumers

- Education on scientific and environmental matters related to agriculture, forestry, rural development and fisheries

- Patenting and intellectual property issues

- Food safety and food habit, including toxicology

- Transgenic organisms and products

- Animal welfare

- Crop protection

- Xenobiotics, performance enhancers and pesticides

- Biodiversity and sustainable agriculture, forestry and fisheries, etc.

Multidisciplinary approaches of all these selected topics will be promoted. Comparative analysis will be fostered.

Synergies with other programmes, in particular BIOTECH and BIOMED, will be sought.

3. SPECIFIC MEASURES IN SUPPORT OF SMEs

Exploratory awards: Exploratory awards will consist of grants of up to approximately 45,000 ECU (up to 75 % of total costs) to consortia of at least two SMEs from at least two participating countries. Outline proposals (5-6 pages), aiming at preparing subsequent full research proposals for collaborative RTD and demonstration or cooperative research, will be submitted. The exploratory award may also cover verification of the technical feasibility of a concept, process or material, a preliminary market study and/or a patent/novelty search. All areas of the work programme will be open to this activity. Outline proposals will be accepted on an open call basis during the life time of the programme.

Cooperative research: Cooperative research projects will be targeted at SMEs which have common technological problems or which have complementary expertise. At least four SMEs from at least two participating countries will be involved, one of which will act as coordinator, and a significant part of the research will be carried out by one or more research centres. Proposals can be submitted through an open call. All areas of the work programme will be open to this type of activity.

Up to 10% of the budget of the programme is allocated to the above SME activities.

IMPLEMENTATION OF THE PROGRAMME

The programme will be implemented by means of shared cost actions, concerted actions and accompanying measures.

In addition, some interprogramme and project coordination and exploitation arrangements are envisaged in order to improve synergies among different participants and to speed up the dissemination and exploitation of results.

For timing of calls for proposals, please refer to Table III A of the work programme.

1. MODALITIES

The programme will be executed through indirect actions, whereby the Community makes a financial contribution to RTD activities carried out by third parties (industry, universities and research organizations) or by JRC institutes in association with third parties. There are three types of indirect action envisaged: shared cost actions; concerted actions; and preparatory, accompanying and support measures.

1.1 Shared cost actions (research projects, demonstration projects, thematic networks, technology stimulation actions, ethical, legal and social aspects)

Shared cost will include the following types of actions:

a) RTD projects

These are projects carried out by research centres, universities, private companies and cooperatives, and these projects will concern applied research, basic research and consortia for integrated projects or projects of relevance to Community policies.

- Applied or basic research projects, with or without industrial participation, will have a minimum size of at least 0.3 MECU total costs, cover a period of 2 to 4 years and include at least two non-affiliated partners from two different EEA States, one being a Community Member State.

Community financial participation will be up to 50% of the total cost of the project. Those universities and similar institutions which do not have analytical budget accountancy will be reimbursed on the basis of up to 100% of the allowable additional costs.

b) Demonstration

Demonstration projects: in these projects the resources and interdisciplinary skills of producers of new technologies or of new systems and methods of production will be combined with those of technology users (such as primary producers, processors, etc.) to show, on a meaningful scale of operations (i.e. the minimum scale required to obtain reliable information), the techno- and socio-economic advantages offered by state-of-the-art concepts with respect to existing practices.

A demonstration project will entail the evaluation of performance of a new technology or production approach under realistic operating conditions; however, the actual scale at which projects will be implemented will depend on the specific nature of the problem. Thus, in some instances, pilot scale testing will be sufficient to obtain the reliable information sought, while in others cases, full industrial or field scale testing might be necessary. Likewise, the production and testing of just one prototype (eg. novel reactor, a new on-line sensor, a new field crop, etc.) may fulfil the objective of the demonstration project, while in other cases, several prototypes will be required in order to test the technology under the diverse geographic and socio-economic environments encountered across the Community.

Whenever possible, and in accordance with the terms and conditions established in the Commission Model RTD contract to guarantee the intellectual property and exploitation rights of contractors, industrial platforms, or, in a more general sense, platforms of users, will be associated with these demonstration projects in order to provide the project with an "extended audience". These platforms should serve to show the techno-economic advantages of new technologies to the widest possible range of users and to facilitate technology transfer and the adaptation of new technologies, production systems and methods to local conditions.

Efforts should be made to keep the cost of projects at reasonable levels. For instance, subcontracting of existing industrial or pilot facilities should be considered, rather than constructing new plants.

Community funding for demonstration projects will normally not exceed 50% of the cost of the project, with progressively lower participation the nearer the project is to the market place. Those universities and other institutions which do not have analytical budget accountancy will be reimbursed on the basis of 100% of the additional costs.

Demonstration networks: in order to enhance the impact of certain demonstrations and to increase the diffusion of the technologies, production systems and methods under demonstration, independent projects addressing the demonstration of related technologies can be grouped under a common European coordinator and executed in a concerted and synchronized manner. European consortia should emerge to implement these demonstrations over a wide geographic scope and diverse socio-economic conditions throughout the Community. This will maximize the visibility of the new approach under demonstration, and will enhance its attraction for the relevant sectors and users.

c) Thematic networks

This type of action will bring together research carried out by manufacturers and processors, primary producers, end-users, universities and research centres on a particular generic technology, in order to facilitate the incorporation and transfer of knowledge and mobility of researchers, including training workshops, and to ensure that greater account is taken of Community policies and market needs.

Two types of thematic network can be envisaged:

- Networks bringing together researchers, primary producers, users, processors covering the same research objective will be established. The task of the participants in the network will be to organise research between themselves towards as efficient a collaboration as possible. If appropriate, steps will be taken to transfer knowledge to industry, farms and services, including exchanges (such as short secondments) and training of personnel. On the basis of a critical examination of the state-of-the-art and of the market needs, the network could recommend complementary research to be supported by the Community as separate RTD projects.

This type of network is not intended to cover research already funded by the specific EEC programmes, but will concentrate on particular areas where Member States research is strong.

- Networks linking clusters of RTD projects (applied, with or without industrial participation, basic research and demonstration) and cooperative research projects, selected and funded in the framework of the normal calls for proposals issued by this programme, which deal with a common objective.

Community funding for both types of networks will normally be limited to the cost of coordination, and will not normally exceed 20 kECU on average per partner/per year, covering up to 100% of the additional costs for the coordination of the action and the implementation of the above activities. Members of the network could also apply for research projects under normal procedures.

d) Technology stimulation

Two types of measure are envisaged for encouraging and facilitating participation of SMEs in RTD activities:

- Exploratory awards for carrying out the exploratory phase of an RTD activity, including the search for partners, during a period of up to 12 months. The award will be granted following the selections of an outline proposal to be submitted normally by at least two non-affiliated SMEs from two different Member States. The award will cover up to 75% of the cost of the exploratory phase, without exceeding 45.000 ECU or 22.500 ECU in the exceptional case of a single applicant SME. The prime proposer must be an SME.

- Cooperative research projects, whereby SMEs having similar technical problems but not having adequate research facilities of their own, engage other legal entities to carry out RTD on their behalf. Community funding for cooperative research projects, involving at least four non-affiliated SMEs from at least two

different Member States, will normally cover 50% of the cost of the research. The total cost must be in the range of 0.2 to 1 million ECU for a normal project of one to two years. The prime proposer must be an SME and the RTD performers can be research centres, universities, private companies with well established RTD facilities.

e) Ethical, legal and social aspects - ELSA

These topics will be investigated using scientific studies, concerted actions and, where appropriate, shared cost projects. Other topics, where ad-hoc working groups, experts and/or the Commission services have identified a need for further research and/or publications, will be considered. Proposals combining either research or demonstration activities with ELSA activities will also be eligible for support.

Other accompanying measures, such as workshops and conferences, training activities, publications and exchange of information, will be supported.

1.2 Concerted actions

Concerted actions will involve the coordination of RTD projects already funded by public authorities and private bodies. The Member States will help the Commission to identify relevant laboratories or institutes, in order to ensure that no major activities are left out of this concertation process. Concertation actions involve some or all of the following activities: information exchange and travel; production of handbooks and catalogues; exchange of personnel and materials; cooperation between national programmes; dissemination of results; identification of new research projects; development and application of models, decision support systems and databases; workshops and conferences, etc.

The concerted action option can also be used under the programme as a way of establishing the feasibility and defining the content of shared cost research activities.

Community funding will cover up to 100% of the costs of the concertation.

1.3 Preparatory, accompanying and support measures

These measures are intended to make the programme more effective by making it more accessible to potential participants and enhancing its impact through, for example, the publishing of its progress and results.

These measures and actions are implemented by the Commission, according to the opinion of the Programme Regulatory Committee, to complement or coordinate research activities. Preparatory, accompanying and support measures are not implemented directly through a call for proposals. As such, some measures are essentially a management tool operated by the Commission and which only offer

opportunities for specific contracts or financial support. Other measures will be closely integrated with ongoing project activities.

Work will be carried out by way of:

a) Support for conferences

This will include support for exchanges of information, conferences, seminars, workshops or other scientific or technical meetings, including multidisciplinary coordination meetings.

b) Mobility and training

The programme will aim to promote by means of training and mobility of scientists the exchange of scientific and technological know-how between the participating countries and economic and institutional sectors.

Fellowships for a period of 6-24 months (exceptionally with a prolongation to 36 months) will be available for pre-doctoral, post-doctoral and established scientists within all areas of the programme and will be selected following an evaluation. Support of the training directed at providing technical skills and for ensuring technology transfer and cohesion among public institutions, industry and primary producers, will be particularly encouraged.

Synergy with activity IV of the Framework Programme, "Stimulation of Training and Mobility of Researchers in the Community", will be sought.

c) Studies

Scientific studies in support of this programme will be carried out to investigate the state-of-the-art and the technological and economic aspects of specific scientific fields. Studies will be used to analyse prospects and for the preparation of future activities.

d) Dissemination and optimization of results

The programme will aim to promote the diffusion and exploitation of results obtained in research projects and fellowships, by supporting the following measures: publications, dissemination projects and networks (e.g. thematic networks), specific workshops for dissemination and exploitation of results, and the use of audiovisual and electronic (e.g. CD-ROM, Internet) media. The technological and economical impact, including assessment of ethical, legal and social aspects of the application of the research results, will also be analysed. Intrinsic to these measures is the adaptation of the results to suit particular target audiences, e.g. the public, industry, farmers, policy makers, etc.

Coordination with activity III of the Framework Programme, "Dissemination and Optimization of the Results of Activities in Community RTD", will be sought.

PROPOSAL DESCRIPTION FOR SHARED COST OR CONCERTED ACTION

THE EUROPEAN COMMUNITY SPECIFIC PROGRAMME FOR RESEARCH, TECHNOLOGICAL DEVELOPMENT AND DEMONSTRATION IN THE FIELD OF AGRICULTURE AND FISHERIES (INCLUDING AGRO-INDUSTRY, FOOD TECHNOLOGIES, FORESTRY, AQUACULTURE AND RURAL DEVELOPMENT) 1994-1998

PART A: SCIENTIFIC AND TECHNICAL CONTENT
PART B: MANAGEMENT STRUCTURE AND PARTNERSHIP

PROJECT TITLE:

Tick only ONE box and indicate the area code in Table 1

TYPE OF ACTION :

* Shared Cost Actions
  - Shared Cost Research Project ☐
  - Demonstration Project ☐
  - Ethical, Legal and Social Aspects (ELSA) Project ☐
  - Thematic Network ☐
* Concerted Actions
  - Concerted Action ☐
  - Ethical, Legal and Social Aspects (ELSA) ☐

PROPOSAL DESCRIPTION - GENERAL GUIDELINES

The **Optical Reader Forms** are to be used primarily by the Commission services to electronically encode the proposal while the **Proposal Description form** is the part evaluated by the experts and hence it describes the actual proposal in greater detail. It is divided into two parts comprising ten separate sections. Please complete these sections on standard A4 pages, beginning each section on the sheet provided and numbering the accompanying sheets consecutively. At the top of each page please mark clearly the project title and acronym.

Proposal description is divided into two parts; **PART A the "Scientific and Technical Content"** which during evaluation is objectively evaluated from the point of view of scientific excellence and innovation. Following this, **PART B, the "management structure, and partnership"** is evaluated.

PART A Comprises sections 1 to 5. **The identity of the participants should not be revealed in these sections.**

PART B Comprises sections 6 to 10. **Here the identity of the participants should be revealed.**

It is in your interest to make sure that your proposal can be easily understood by the expert evaluators who will examine it and that it is as clear and **concise** as possible. Please **do not exceed the maximum number of pages requested** and use diagrams and flow charts wherever asked and elsewhere if they would make the proposal easier to understand.

On the **front page** please mark the title of your proposal, and the type of action of your proposal, whether it is a shared cost (SC), or a concerted action (CA), and the type of SC or CA concerned.

Table 1. PROPOSAL AREA CODES

Here you indicate the area code which best fits your proposal. There are three levels of code, Area (1 digit)/ Sub-area (2 digits) / Topic (3 digits). Please pick the code, or codes your proposal best corresponds to and mark the corresponding box or boxes on the table.

It is in your interest to focus as much as possible on the area of the programme you want to address so please avoid multi-area references both here and on page A of the Optical Reader forms.

Table 2 and Table 3. SUMMARY OF COST BREAKDOWN (kECU) FOR SHARED COST PROPOSALS AND CONCERTED ACTIONS

For instructions concerning these tables please see Section 8 of this form "Financial information".

Shared Cost (SC) proposals should fill in all 10 sections of this form.

Concerted action (CA) type proposals should adapt and apply the individual sections of both parts to their proposals (in general less detail is required than for shared cost type proposals). CA proposals should also supply the full co-ordinates of all participants in the intended consortium and for this exercise you are requested to fill out for each individual participant in the consortium page C in the optical reader forms concerning "DEPARTMENT/INSTITUTE/LABORATORY CARRYING OUT THE WORK".

Please supply 6 copies of the Proposal Description (including the original).
Do not bind the Proposal Description;
Staple separately part A and B of the Proposal Description;
Do not bind or staple the Optical Reader Forms.

The working language of the evaluation procedure is often in English and it is therefore in your interest to supply as much as possible of the information required in this language.

There are separate forms for Technology Stimulation type shared cost actions, and for Training and Mobility Grants.

TABLE 1 : PROPOSAL AREA CODES

Please mark out the box(es) which correspond most accurately to the proposed work. There are 3 levels - area/sub area/topic.

AREA 1 INTEGRATED PRODUCTION AND PROCESSING CHAINS 1□

THE BIOMASS AND BIOENERGY CHAIN 11□

Production of raw materials 111□

Processing of raw materials 112□

End-use of products and market requirements 113□

THE "GREEN" CHEMICAL AND POLYMER CHAIN 12□

Production of raw materials 121□

Processing of raw materials 122□

End-use and market requirements 123□

THE FORESTRY-WOOD CHAIN 13□

Production of raw materials 131□

Wood products 132□

Pulp and Paper 133□

End-use and market requirements 134□

AREA 2 SCALING-UP AND PROCESSING METHODOLOGIES 2□

CHEMICAL AND PHYSICAL PROCESSES 21□

BIOPROCESSING 22□

CONTROL SYSTEMS 23□

AREA 3 GENERIC SCIENCE AND ADVANCED TECHNOLOGIES FOR NUTRITIOUS FOODS 3□

CONSUMER NUTRITION AND WELL BEING 31□

Nutritional adequacy and bioavailability 311□

Role of diet in diseases and disorders 312□

Nutritional modulation of the genetic potential of the individual 313□

Physico-chemical aspects of food absorption and metabolism 314□

Food consumption trends, consumer behaviour and nutritional status,and sensory analysis 315□

NEW AND OPTIMISED FOOD MATERIALS AND NUTRITIOUS FOOD PRODUCTS 32□

Application of biotechnology to food materials 321□

Functional foods 322□

ADVANCED AND OPTIMISED TECHNOLOGIES AND PROCESSES 33□

Process optimisation 331□

Advanced technologies 332□

Quality monitoring and quality assurance for fish and fish products 333□

Development of environmentally friendly procedures and processes 334□

Upgrading of underexploited and underutilised fish species and by-products 335□

Packaging and packaging processes 336□

GENERIC FOOD SCIENCE 34□

Biochemistry 341□

Biophysics and bioengineering 342□

Biotechnology 343□

Toxicology 344□

Food microbiology 345□

PROPOSAL DESCRIPTION

PART A

SCIENTIFIC AND TECHNICAL CONTENT

1. OBJECTIVES

Describe the objectives of the project and the advances that it represents in relation to the current state of the art, and where appropriate the links to industry and Community policy measures that it concerns.

Among others, this section should address the following points:

- The objectives

- An explanation of how the proposal objectives comply with the objectives of the workprogramme and its priorities.

- A brief summary of the issues involved, and the current state of the art (please mention the most **up-to-date scientific references** relevant to the proposal objectives).

For demonstration projects, justify the need to undertake a demonstration phase and explain why the level of knowledge reached so far makes demonstration viable.

(Maximum of 2 A4 pages including this page as the first page)

BEGIN HERE:

2. WORK CONTENT

Give a detailed scientific and technical description of the proposed project, identifying the different options available to meet the objectives and the main scientific, technological and industrial, difficulties to be overcome. Proposers should also justify why the proposal belongs to a particular Area.

The overall project proposed must be broken down into tasks (with possible further divisions into subtasks), with an indication of the partners involved in each task (**do not name the participant in this part, refer to him/her by number e.g. participant 1 etc,.**), their role, and the effort required in man-months and any other resources required (e.g. major equipment, special laboratory facilities, services, etc.) for each task. The interrelationships between the tasks and the partners should be indicated. A flow chart is useful here. For demonstration projects note that laboratory research activities should not be included and the proposed scale should be justified.

The format and presentation of this section should include the following headings:

- Objectives
- Detailed description of the work proposed
- Methodology to be applied
- Relationship between Tasks and Partners
- Indicate areas where methodology is not fully developed
- List of references relevant to the proposal

(Maximum of 20 A4 pages including this page as the first page)

BEGIN HERE:

3. PROJECT MILESTONES AND DELIVERABLES

Give a list of major project milestones and deliverable items and their links to the tasks.

Milestones are "landmark" results which are to be achieved at intervals during the project's lifetime and which are crucial to the successful continuation and assessment of the project. They are not to be confused with a **research task** as they could be an amalgamation of outputs of more than one research task.

The set of **deliverables** constitutes the results of the project and is divided into **contract deliverables** (progress reports, final reports, etc.) and **technical deliverables** (e.g. samples, prototypes, computer codes such as databases, etc.). Project monitoring is based on reviews of milestones and deliverables and therefore this section should normally determine their type, content and timing. Access to the deliverables (e.g. public, restricted, confidential) should also be mentioned in this section.

(Maximum of 2 A4 pages including this page as the first page)

BEGIN HERE:

4. BENEFITS

This section should provide a full scientific, technical, and economic justification for the proposed project. In particular it should indicate in a quantitative manner why the project is best carried out at the Community level and how it will contribute to European competitiveness, standards and the fulfilment of Community policies (e.g. The EU RTD Framework Programme, Common Agricultural Policy, Common Fisheries Policy, Environment, Consumer Protection, Trans-European networks, etc.)

(Maximum of 2 A4 pages including this page as the first page)

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5. SOCIO-ECONOMIC AND ENVIRONMENTAL IMPACT AND ETHICAL IMPLICATIONS

A signed environmental and ethical impact statement is required if appropriate.

The accompanying text should identify and quantify, where possible, any social, environmental and economic impacts of the proposed project. These may include: changed working or living conditions, including health aspects; opportunities for education and training; employment opportunities; conservation of scarce materials and environmental benefits; opportunities for technology transfer, in particular to less developed regions and/or for rural and regional development.

The external risks of the proposed project and any particular legal or ethical considerations should also be described. Identify for example any legal or ethical questions related with the implementation of the research or with the results of such research, any issues related to the public acceptability of the research and/or its results.

(Maximum of 2 A4 pages including this page as the first page)

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PROPOSAL DESCRIPTION

PART B

MANAGEMENT STRUCTURE AND PARTNERSHIP

6. PROJECT MANAGEMENT STRUCTURE

Give a description of the management structure and organisation to be used for the proposed project. In particular, the **methods** used for internal monitoring and reporting progress, including the identification of project milestones, should be outlined. During the lifetime of a selected project there should be a mid-term review by the participants and the procedure used should be indicated and the assessment criteria to be used for the review should be outlined. The use of diagrams (such as a PERT chart), bar charts etc, to show the scheduling of tasks, their integration and the involvement of the different partners is recommended. This presentation should be harmonized with the presentation of tasks. (see section 2 above). Wherever possible in this section, applicants should use tabular presentations to summarise the management tasks. An indication should be given of those tasks for which major facilities and equipment need to be provided or purchased.

(Maximum of 4 A4 pages plus tables and charts including this page as the first page)

BEGIN HERE:

7. THE PARTNERSHIP

Summarise the role and contribution of each of the partners and associated partners, their qualifications for their role, their capacity to provide their contribution to the project, the experience and knowledge which they will contribute and why their qualifications and experience make them particularly suited for the work allocated to them. Financial or legal links between partners, if any, should be indicated.

Each partner should also supply a list of the principal scientific or technical personnel involved and their relevant experience, indicating who will be responsible for each research task and subtask. For each partner list the personnel's most recent publications and/or patents relevant to the project (no more than twenty per partner).

If it is intended to subcontract any of the work this must be mentioned in the profile of each partner and an indication should be given of the proposed subcontractor and the degree to which that particular partner's contribution will be subcontracted. In particular, details of subcontractors should include their name and type of organisation, country, and type and cost of service provided.

No page limit but include this page as the first page:

BEGIN HERE:

8. FINANCIAL INFORMATION

Shared cost proposals.

For shared cost proposals the coordinator must fill in **table 2** for all the partners (summary of cost breakdown) giving a breakdown of each partner's costs under the following headings :

- labour
- equipment
- external services
- travel and subsistence
- consumables
- other costs (computing etc,)
- overheads

Remember that depreciation of equipment is calculated at 20% per year of the project (33% for computing equipment costing less than 10,000 ECU).

See the information package for details of eligible costs.

Concerted actions

The coordinator only should fill out the details requested in **table 3** for concerted action type proposals.

Maximum of 1 A4 page. Use tables provided:

9. EXPLOITATION PLANS

Describe the plans for exploiting and/or disseminating the results of the proposed project.

This section should give a clear indication of the connection between the proposed work and the internal industrial or policy priorities of the partners, and their plans for exploiting the results. It should demonstrate the capacity of the partnership for industrial exploitation of the results and explain the partnership policy in respect of securing patents or granting licences for the technology. It should deal with any possible agreements between the partners to extend their cooperation in the exploitation phase and relevant agreements with companies, in particular users, external to the partnership. It should also, where relevant, describe how results will be made available to the general public where such information is in the public domain.

For demonstration projects indicate if you intend to establish an extended audience (e.g., an industrial platform, a platform of technology users etc.) and to what extent project results and deliverables will be accessible to this audience

Maximum 2 A4 pages including this page as the first page

BEGIN HERE:

TABLE 2 : SUMMARY OF COST BREAKDOWN (kECU) FOR SHARED COST PROJECTS **

	1	2	3	4	5	6	7	8	9	Total
PARTNERS (abbreviated names)										
LABOUR										
EQUIPMENT *										
EXTERNAL SERVICES										
TRAVEL & SUBSISTENCE										
CONSUMABLES *										
OTHER COSTS (e.g. computing)										
OVERHEADS										
TOTAL										
PARTNER CONTRIBUTION										
REQUESTED EU CONTRIBUTION										
%										
MAN MONTHS										

If more than 9 partners, please photocopy this page

** Not applicable for thematic network*

*** Further information on significant cost categories, for which no detail has been provided in other parts of the proposal, may be added if necesaary (maximum 1 A4 page).*

TABLE 3 : SUMMARY OF COST BREAKDOWN (kECU) FOR CONCERTED ACTIONS

To be filled in by the coordinator only

COORDINATOR :	
COUNTRY :	
PROJECT DURATION (months) :	
N° OF PARTICIPANTS :	

ALLOWABLE COSTS	**AMOUNTS IN kECU**
Labour (1) :	
Exchange and mobility costs (2):	
Support Services (3):	
Overheads (max. 10 % of total costs) (4): (1+2+3 above)	
TOTAL	

Please give full co-ordinates of intended participants (for this purpose, fill in the section entitled "DEPARTMENT/INSTITUTE/LABORATORY CARRYING OUT THE WORK" on page C of the Optical Reader)

(1) Labour costs shall include only administrative, management and coordination costs that are associated with the Project and shall not include any research costs.

(2) E.g. organisation of meetings in participant Member States for some or all the participants, travel and subsistence relating to visits to, and meetings with other participants in the project

(3) E.g. cost of external services, centralised data handling, publications, laboratory services,...

(4) E.g. telephone, heating,lighting, electronic mail, fax, electricity,...

10. ONGOING PROJECTS AND PREVIOUS PROPOSALS

If the same, or a related application has been or is being submitted by you to a past or present Community programme or to another European programme such as EUREKA or COST, please give details of the application (date, programme, title, proposal reference number) and indicate any differences between the proposals (e.g. different partners, modified aims or technical content, etc.). The outcome of any previous applications should be given.

In addition please specify if this proposal complements (or addresses issues in) already ongoing related EU projects from this or previous programmes or in ongoing National research programmes.

Maximum of 1 A4 page per project.

BEGIN HERE:

CHECK LIST FOR PROPOSALS

IS THE PROPOSAL ELIGIBLE FOR THIS CALL ?

ARE THE OPTICAL READER FORMS CORRECTLY COMPLETED FOR EACH PARTNER ?

IS THE PROPOSAL DESCRIPTION CORRECTLY COMPLETED FOR ALL SECTIONS OF PART "A" AND "B"?

HAVE YOU MADE ANY CONTACT WITH THE COUNTRY CONTACT POINTS LISTED IN THE INFORMATION PACK ?

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