BARCLAYS

Environmental and Social Risk Briefing

Agriculture and Fisheries

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1. Introduction

This Environmental and Social Risk Briefing covers Agriculture and Fisheries incorporating the harvesting of crops, fruits, vegetables, trees, rearing livestock, and dairy farming. It also covers the operation of Fish Farms and Fish Hatcheries.

2. Agriculture

The agriculture industry includes arable crops, cattle and sheep / livestock rearing, industrial crops (e.g. non- food crops and energy crops (biomass)), eggs, milk and milk products.

Establishments in this sector can be described as farms, dairies, greenhouses, nurseries, orchards or hatcheries. The sector distinguishes two basic activities: agricultural production and agricultural support activities. Agricultural production includes establishments performing the complete farm operation such as farm owner-operators, tenant farm operators and sharecroppers. Agricultural support activities include establishments that perform one or more activities associated with farm operation such as soil preparation, planting, harvesting and management.

2.1 Types of Agriculture

Agricultural crops are usually grown in large monocultures. Modern farming techniques often involve the use of fertilisers and pesticides, herbicides, bacterial seed inoculants, irrigation systems and large scale machinery for ploughing, sowing and harvesting. Can be monoculture (single crop planted over a large area), or polyculture (multiple crops).

Market gardening is the commercial production of vegetables, fruits, flowers and other plants on a scale larger than a home garden, yet small enough that many of the principles of gardening can be applied. Market gardening is often oriented toward local markets although production for shipment to more distant markets is also possible.

Horticulture is agricultural technology distinguished by the use of hand tools to grow domesticated plants. It does not involve animals, irrigation or specially prepared fertilizers.

Dairy farming is the raising of cattle or livestock in order to produce commercial volumes of milk and milk related products. The dairy industry also involves the processing of these milk products such raw milk, butter, cheese, yoghurt, condensed milk, dried (milk powder), ice cream, using processes such as chilling, pasteurisation and homogenisation. Typical by-products of dairy processes include buttermilk, whey and their derivatives.

Animal husbandry is the breeding or purchase of animals and managed weight gain (living regime) prior to resale or slaughter. Husbandry can include the production of by-products from the animals such as eggs and milk. It also takes into account feeding, shelter, disease control and the general welfare of the animals.

2.2 Processing Agriculture Products

There are a range of environmental issues associated with the agricultural sector, including the following:

Land degradation and clearance of natural vegetation can be caused by poor farming practices, shifting cultivation, overgrazing of livestock, and inappropriate irrigation. These can result in soil erosion, acidification and salinisation, which can affect livelihoods and subsistence farming.,

Agriculture is water intensive. Depending on the source of water, impacts can include changes to hydrological conditions, salinisation of soils, eutrophication (excessive nutrients leading to algal blooms) and changes to water availability in adjacent areas.

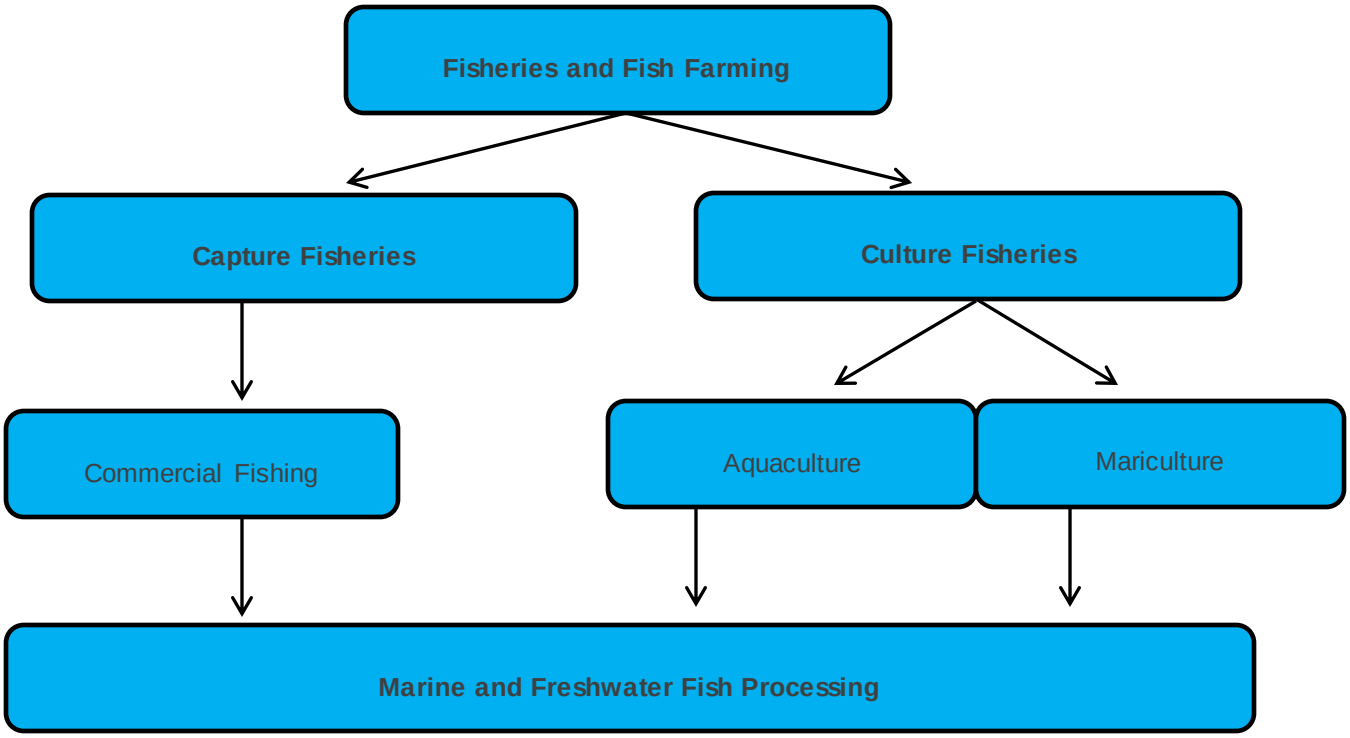
Pesticide use in agriculture is increasing. While this leads to improved yield, impacts include water and land contamination, increase in pesticide resistant strains of pests and diseases, and potential health implications for the local population.

Agriculture both effects, and is affected by, climate change. Agriculture contributes to GHG increases through CO2 release, methane release predominately through rice and livestock, and nitrous oxide releases from fertilizer. Agriculture practices are affected by climatic issues such as temperature and water availability, which can affect productivity and the availability of arable land.

3. Fisheries and Fish Farming

There are two main categories of Fisheries and Fish Farming:

- Capture fisheries that harvest wild stock and operate in marine (offshore and near-shore), fresh and brackish waters (on rivers, lakes, reservoirs and estuarine areas); and
- Culture fisheries (marine, brackish and fresh water) that involve management of resources to increase fishery production beyond that which is normally available from wild stock This includes raising stock in ponds or containing them in naturally productive areas by using cages, pens or nets achieves higher concentrations of fish or shellfish.



3.1 Capture Fisheries

Fishing Methods

The environmental impacts of fishing can depend on the method used to catch fish. While all have some impact on the environment, some have a greater impact than others. In general, the most destructive methods include use of explosives or cyanide, trawling, and seine nets, due to their ability to catch a large number fish at one time, and for the potential for significant by-catch (unintended catch). Environmental impacts can be minimised by use of pole and line, or pots and creels (though these are not suitable for all fish types).

Commercial Fishing

Commercial fishing is the act of catching large volumes of fish at sea by trawler or small vessel. Coastal artisanal fishery vessels are included.

Advances in technology such as the use of global positioning system (GPS), acoustic gear monitoring and fisheries information systems beaming oceanographic data straight to ships at sea have greatly increased the fishing power of individual fishing vessels.

The main environmental impacts of commercial fishing are overfishing (which can affect marine ecosystems) and habitat destruction (onshore and on the sea bed, depending on the fishing method).

3.2 Culture Fisheries

Aquaculture

Aquaculture is the farming of aquatic organisms including fish, molluscs, crustaceans and aquatic plants. Farming implies an intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from predators, etc. Farming also implies individual or corporate ownership of the stock being cultivated.

The stocks raised in aquaculture operations are the private property of aquaculturists, who care for the crop throughout its rearing period by administering basic animal husbandry (e.g. providing housing and feed, protection from predators, veterinary attention, etc.).

Upon reaching the preferred market size, aquaculture stocks are harvested for processing, sale and consumption. Aquaculture is an example of the agri-food business model whereby aquaculture producers invest in production systems, manage livestock to optimize productivity and coordinate sales to earn a return on investment.

Aquaculture for food production is similar to other forms of animal husbandry: the animals are cared for, protected and fed with the intention of increasing their quantity and value. The holding and farming of fish also reduces the effort otherwise required to locate and capture supplies from wild stocks.

Mariculture

Open ocean aquaculture is defined as the 'rearing of marine organisms under controlled conditions in the Economic Exclusion Zone (EEZ) - from the three mile territorial limit of the coast to two hundred miles offshore. Facilities may be floating (e.g. net pens for rearing of fish and rafts from which strings of molluscs are suspended), submerged (fully enclosed net pens or cages moored beneath the water surface) or attached to fixed structures. The terms 'open ocean aquaculture' and 'offshore aquaculture' are interchangeable. Common products include fish/shell fish, fish meal, agar, pearls, or algae such as kelp.

Environmental Impacts

Both aquaculture and mariculture can effect the environment. The main issues include:

- introduction of non-native species, drugs (eg antibiotics, colouring or vitamins) fish meal and herbicides;
- release of genetically modified organisms;
- escape of non-native species;
- incubation of local diseases caused by high concentration of fish;
- introduction of new diseases and parasites by feed stock; and
- increase in fish sewerage, which contains untreated food and waste products.

3.3 Marine & Freshwater Fish Processing

Fish processing is a water intensive industry and generates large quantities of wastewater. Process water is used for washing fish, cleaning process areas, cooling and production purposes. These processes typically require the provision of high quality water and can therefore represent considerable costs to the facility

4. Key Sector Risks and Headline Issues

In large-scale Agriculture and Fishing operations some critical issues of particular public concern may result in reputation or credit risk to a lender or an investor, these include:

- Sustainable community development, including dependence on fishing or agriculture for livelihood and subsistence;
- Involuntary resettlement i.e. relocation of affected populations and associated livelihood restoration;
- Community health and safety;
- Pollution and release of chemicals and effluent into waterways;
- Land and soil degradation and contamination;
- Management of waste;
- Genetically modified crops;
- Loss of biodiversity;
- Cash crops and plantations/intensive farming and monoculture;
- Labour issues.

5. Risks and Controls

5.1 Environmental Risks

5.1.1 Agriculture

Life Cycle Phase and Activity	Risks	Controls
New Build	**Appropriateness of soil and ground conditions** - e.g. irrigation, salt pans, high water tables, unsuitable sub-soils for the enterprise **Habitat depletion, fragmentation and degradation** - land disturbance, land instability and soil erosion potentially leading to loss habitats – natural and manmade e.g. fish farms and spawning areas due to increased siltation and disturbance to protected species, disruption of migration routes **Pressure on natural resources** - overuse of land, increase in soil acidity, availability of water **Impact on terrestrial and aquatic ecology** – due to poor land restoration practices (e.g. monocultures and / or replanting of low quality saplings) **Atmospheric emissions** (i.e. of harvesting and plant vehicles): • Pollutants (VOC, NOX, SOX, PM10, CO, CO2, etc) • Greenhouse gas production • Dust and noise	**Due diligence research** - in establishing a new facility, review data relating to the area including soils, geology, geomorphology, water availability (appropriate to proposed use), vegetation, current land use, climate and interpret suitable uses and recurrent costs of the enterprise for maintaining fertility, erosion protection, change in water table height and chemical composition. If data is not available it needs to be collected and costed in a feasibility study to obtain and analyse. Review weather details and undertake risk likelihood projections and come up with a costed risk mitigation plan **Sustainable forestry (land clearing) and biodiversity management** • Selective rather than clear felling of natural forest • Limit disturbance to other vegetation and landforms • Avoid harvesting at critical time in life cycle of key species • Establish reserved areas for natural regeneration and protect native plant species • Establish environmental baseline to ascertain safe levels of harvesting

Life Cycle Phase and Activity	Risks	Controls
	• Employee health and safety - exposure to dust and harmful substances, e.g. fertilisers and pesticides, herbicides, bacterial seed inoculants and other chemicals **Liquid/solid waste (production and disposal)** - e.g. farm slurry/manure, waste chemicals and chemical containers Disruption and pollution of surface water (hydrological) and groundwater (hydrogeological) systems and flows - fuels, lubricants and ancillary chemicals use of heavy machinery / spillage **Bioaccumulation and contamination of food chain** - e.g. use of fertilizers and pesticides, e.g. crop spraying (wind drift) **Landscape scarring and visual impact** - e.g. clear felling, hedgerow removal Natural hazards and risks - frost, drought, flooding, cyclones **Biological disease and pestilence** - pests e.g. locusts	**Use of Best Available Technology not Entailing Excessive Cost (BATNEEC)** **Water resource management and response planning** - protect / avoid water resources: minimisation and spill prevention, response planning, responsible waste vegetation management, monitoring **Environmental Management Programme (EMP)** - minimisation of facility footprint

5.1.2 Fisheries and Fish Farming

Life Cycle Phase and Activity	Risks	Controls
Capture Fisheries (Commercial Fishing)	**Pressure on natural resources** - natural fish stock depletion	**Sustainable fishing and biodiversity management** • Establishment of sustainable fishing quotas • Limit disturbance to other vegetation and landforms e.g. construction of ponds
Culture Fisheries (Aquaculture, Mariculture)	**Habitat depletion, fragmentation and degradation** • Water / shore disturbance, pH alteration, oxygen depletion • Fragmentation of ocean habitats and loss of species **Pressure on natural resources** - ocean and river water contamination e.g. from fuel, lubricant and chemicals, from use of heavy machinery, fish meal and fish pond effluent **Bioaccumulation and contamination of food chain** - use of pesticides and hormones to combat parasitism and disease, leading to degradation of water quality and chemicals entering the food chain **Impact on terrestrial and aquatic ecology** • Introduction of alien genetically modified species • Accidental release of farmed species into natural environments • Increased inter and intra species competition • Susceptibility of monoculture stock to disease and death	**Water disposal and monitoring systems** - water exchange system including flushing systems **Construct fish farms/aquaculture projects** – design to control drainage and minimise escapees **Sustainable aquaculture and biodiversity management** • Establish reserved areas for natural regeneration, replant, protect and maintain native species • Limit disturbance to other vegetation and landforms • Adequate standards for the use of feeds and agents/antibiotics established **Biodiversity management** - recognition of issues associated with monoculture **Waste management**

Life Cycle Phase and Activity	Risks	Controls
	Liquid waste (production and disposal) – by products handling, storage and disposal, e.g. fish excretion, waste chemicals, hormones, antibiotics, steroids	

5.1.3 Marine / Freshwater Fish Processing

Life Cycle Phase and Activity	Risks	Controls
Processing	**Pressure on natural resources** - high water use **Liquid waste (production and disposal)** - wastewater from fish unloading, equipment sprays, offal transportation and facility cleaning	**Water management** - securing of a sustainable water supply, recycling and reuse wastewater **Waste management**

5.2 Social risks

5.2.1 Agriculture

Life Cycle Phase and Activity	Risks	Controls
	Treatment and working conditions of labour: harsh treatment of employees, safety standards, paying below minimum wage, collective bargaining rights, human trafficking, child labour, forced labour. **Community health and safety** - transport accidents, emissions/discharges (aqueous and gaseous), noise, dust and vibrations	**Risk assessment and audit of supply chain** • procurement, supplier selection to include labour reviews, auditing, monitoring, corrective actions and engagement. Check of requisite documentation and license for labour. See references for best practice initiatives and benchmarks.

Life Cycle Phase and Activity	Risks	Controls
	Strain on infrastructure and public nuisance - noise, odour, vibration, dust creation, transport movement, and air quality and strain on transport networks and local infrastructure **Communicable diseases** – exposure and spread of diseases to humans e.g. Bovine Spongiform Encephalopathy (BSE) "Mad Cow Disease" **Cultural / archaeological heritage** • Damage to/destruction of cultural/ historical/ archaeological/ - religious sites • Competing ownership claims or use rights (i.e. traditional rights of ownership versus titled land) and inequitable distribution (e.g. over grazing rights on communal land) **Loss of livelihoods - economic displacement** e.g. job competition, especially people without formal land title (sharecropper), workers using traditional and/or labour-intensive agro-processing methods **Land acquisition - loss of crops and land access/use** - nutritional source e.g. staple root crops **Land acquisition - displacement** - loss of land leading to poverty, social disruption, migration, involuntary	**Community / stakeholder relations management** • Management of interface between local communities and outsiders/foreign workers through stakeholder identification and consultation (including governmental/national/regional/local stakeholders) • Management of community tensions, grievances and concerns through transparent formal grievance mechanism • Cross-cultural community awareness training for project contractors **Community health and safety management** - instigation of safety buffer zone around land clearing operations **Cultural heritage / archaeology management** - identification, classification and protection of cultural / archaeological sites in accordance with the country's laws/international standards and conventions **Social / community baseline assessment** - establish community profiles (e.g. livelihoods and employment) in project area, through detailed social baseline assessments to inform mitigation measures and the development of long term agreed community investment/development **Resettlement and relocation management** - including proper compensation, restoration of livelihoods and living

Life Cycle Phase and Activity	Risks	Controls
	resettlement requiring relocation and compensation. **Disruption of Social / community cohesion and exclusion of vulnerable groups** • Breakdown of social networks and structures • Socio-economic exclusion of ethnic minorities and indigenous peoples • Socio-cultural tensions between local and foreign workforce from influx and outflow of migrants/ temporary workers and attraction of seasonal residents to project area **Land use planning and zoning activities** **Vandalism and site security**	standards developed based on socioeconomic studies **Community investment and development** - community investment (both long and short term) e.g. health care facilities, micro-finance initiatives and access to employment **Legal framework** - including mechanisms for resolution of conflicts and appeals procedures **Technical and commercial analysis** - appropriate technical and commercial services available to support improved production

5.2.2 Fisheries and Fish Farming

Life Cycle Phase and Activity	Risks	Controls
Capture Fisheries (Commercial Fishing)	**Cultural / archaeological heritage** - artisanal fishing rights, traditional livelihoods cultural heritage, inheritance **Loss of livelihood** - Economic displacement e.g. competing use rights – restricted access to fish landing and market areas; increased costs Disadvantaged groups may turn to destructive or illegal methods of resource use	Community / stakeholder relations management - management of interface between local communities and outsiders through stakeholder identification and consultation (including governmental /national /regional / local stakeholders).

Life Cycle Phase and Activity	Risks	Controls
	Disruption of Social / community cohesion • Breakdown of social networks and structures • Social/community unrest	
Culture Fisheries (Aquaculture, Mariculture)	**Loss of livelihood - economic displacement** **Loss of livelihood (income and employment)** - job competition and dependency on project related jobs at closure **Disruption of social / community cohesion** • Breakdown of social networks and structures • Socio-cultural tensions between local and foreign workforce Influx and outflow of migrants/ temporary workers and attraction of seasonal residents to project area **Bioaccumulation and contamination of food chain** – due to steroids, hormones, and pesticides **Land acquisition** - loss of access to current fishing grounds (either temporary and/or permanent) **Employee health and safety** - Employment and Labour Standards e.g. dangerous employee conditions including health and safety, exposure to chemicals **Stakeholder/public consultation and disclosure** -	**Community / stakeholder relations management** • Management of interface between local communities and outsiders through stakeholder identification and consultation (including governmental /national /regional /local stakeholders) • Community awareness raising and information dissemination on project • Management of community tensions, grievances and concerns through formal grievance mechanism **Social / community baseline assessment** - establish community profiles (e.g. social hierarchy, ethnic groups, socio-cultural and religious practices, skills profile) and public services/resources in a project area **Site security plans** **Community health and safety plans** - vaccinations and awareness raising on communicable diseases **Responsible human resources policies** - maximization of local employment

Life Cycle Phase and Activity	Risks	Controls
	inadequate consultation and disclosure with NGOs, local and national advocacy groups, badly managed social and community relations, negative exposure, compensation claims	

5.2.3 Marine / Freshwater Fish Processing

Life Cycle Phase and Activity	Risks	Controls
	Pressure on natural resources - high water use **Employee health and safety** - employment and poor labour standards, dangerous employee conditions including health and safety, exposure to chemicals **Loss of livelihood** - economic displacement through land take for facilities **Loss of livelihood (income and employment)** - e.g. job competition and dependency on project related jobs at closure **Social / community cohesion** - socio-cultural tensions between local and foreign workforce from influx and outflow of migrants/ temporary workers and attraction of seasonal residents to project area	**Sustainable natural resource management (water)** - Securing of a sustainable water supply, recycling and reuse wastewater **Social and community management** - Management of community tensions, grievances and concerns through transparent consultation and documentation **Stakeholder consultation and management** Stakeholder identification and governmental/national/regional/local consultation **Resettlement and relocation management** - including proper compensation, restoration of livelihoods and living standards developed based on socioeconomic studies

6. Key considerations

1. Does the farmer undertake activities that require authorisation from environmental regulators? If so, is the appropriate authority held?
2. Does the customer potentially face significant capital costs to upgrade storage facilities on site to meet regulatory requirements?
3. Are chemicals or fuels used or stored? If so are they managed in an environmentally acceptable manner and comply with health and safety legislation and good practise?
4. Has the farmer/fish processing company been prosecuted for pollution incidents, e.g. oil or chemical spill/leaking tanks?
5. Is there a surface watercourse, pond or reservoir present on or within 250m of the site?
6. How does the farmer/fish company dispose of waste?
7. Does the farmer spread or dispose of farm slurry or sewage sludge on the site?
8. Does the farmer rear livestock intensively, operate a diary farm or store large amounts of organic waste? If so, has the farmer a formal wastewater management plan in operation? (This can reduce the environmental impacts)
9. Does the business operate a fish farm? If so, are the fish kept in specially designed tanks (low risk), or within a controlled water body (e.g. river or lake), which could give rise to pollution?
10. What kind of fishing is undertaken?
11. Is there a requirement for resettlement or compensation of affected communities?
12. For new sites or extensions to existing sites, has an Environmental Social Impact Assessment (ESIA) been undertaken to assess impacts?
13. If so, has the project and potential impacts been adequately explained to the public based on appropriate procedures, including information disclosure? Are proper responses made to comments from the public and regulatory authorities?
14. For controversial projects, has the ESIA been assessed by an independent third party?
15. Are indigenous communities and cultural heritage impacted as part of the development?
16. Has the company ever been prosecuted for environmental offences?
17. Is the company required to hold consents from the environmental regulator or local authority? Are there current or future costs associated with complying with them?
18. Does the site or has the company ever land filled wastes on sites? (See Utilities and Waste Management Briefing Note)
19. Does the company have a large and/or immigrant labour force?

7. Regulation and Best Practice

Permits, consents and licences are likely to be required for Agriculture and Fishery operations, the specifics of which will depend on the relevant regulatory framework in the location of the facility/operation. In developing regions, weaker governance structures may mean that there is less stringent implementation of local controls and regulations or indeed there may be no controls at all. In such cases, international environmental and social standards and industry best practice should ideally be adopted by the project proponent as a demonstration of Best Practice.

In the case of almost all large-scale new build, expansion and development projects an Environmental and Social Impact Assessment (ESIA) will be required particularly where project debt financing is being sought. A comprehensive ESIA undertaken to international standards allows both the project sponsor and the investors to assess the full range of potential environmental and Social impacts related to a project development, operation and decommissioning. Part of the ESIA process is to design appropriate mitigation measures and environmental and social management plans and to set a framework for the monitoring the performance of these measures on a long-term basis. This limits and controls compliance and remediation costs as well as long term credit and reputation risks.

For smaller scale projects and operations a full ESIA may not be required. Focused studies on particular issues of concern may however, be helpful in identifying potential environmental and Social risks associated with certain project activities.

8. Additional resources

Multilateral:

1) Global Environment Outlook Chapter 2 The State of Our Environment
2) EU Policies: Integrated Pollution prevention and control.
3) EU Water Framework Directive Lessons Learned with regard to Water Pollution
4) Summary of EU Legislation regarding Water Pollution
5) Summary of EU Legislation regarding Air Pollution
6) International Labour Organization: Mandate
7) ILO's Lists of Subjects Standards have been decided upon-
8) Security Issues and Human Rights Asian Development Bank, Handbook on Social Analysis November 2007

Government:

1) Department for Environment Food and Rural Affairs
2) Health and Safety Executive Noise Regulations (complete)
3) Environment Canada Convention on Biological Diversity
4) Defra, Aquatic animal health and movements
5) Department of Fisheries and Oceans (Policies and Regulations)

Industry Association:

1) Canadian Aquaculture Industry Alliance
2) United States Joint Subcommittee on Aquaculture
3) World Aquaculture Society
4) The Centre for Environment, Fisheries and Aquaculture Sciences
5) Responsible Fishing Scheme
6) Business Benchmark on Farm Animal Welfare
7) Aquaculture Stewardship Council
8) Environment Sensitive Farming
9) Environment Sensitive Farming DEFRA FACT SHEET
10) Roundtable on Sustainable Palm Oil (RSPO)
11) Roundtable on Responsible Soy Association (RTRS)
12) Better Cotton Initiative
13) Better Sugarcane Initiative
14) The Walk Free Foundation guidance tool for addressing modern slavery in supply chains
15) Stronger2Gether guidance for UK food suppliers on ethical employment
16) Gangmaster's Licensing Authority (GLA) licences
17) Sustainable Fisheries Partnership
18) International Sustainable Seafood Foundation