FULL REVISION NOTE BOOK- ASSOCIATE IEMA EXAM

1.0 - Understanding environmental and Sustainability principles

1.1 Describe the main natural cycles (carbon, nitrogen, phosphorus and water) and ecological systems (plants and animals and their interaction with non living components).

Water cycle

The water cycle describes the cyclical movement of water (earths water represents 332.5 million cubic miles), between stores or reservoirs, within our environment. Out of the 332.5 million cubic miles 4% fresh 96% saline. Out of the 4% fresh, 68% is ice and 30 % groundwater, 0.075% of which is a renewable resource and what 6.5 billion people, the earth's animal and plant populous depend on. More than half of this is seasonally or geographically inaccessible so 0.0375 of the world's water is accessible to the humanity. The transfers betWEEn these reservoirs represent the physical movement of water, driven by energy transfers. These physical processes are:

- Evaporation of water into water vapour from the major stores, predominantly the sea (96% saline), but also from other fresh water bodies such as rivers and lakes (which makes up 4%) ; as well as the evaporation of water held in plants (known as evapotranspiration, which represents the majority of water vapour production over land masses);
- Condensation of this water vapour out of the air as it rises and cools, predominantly over land masses, after which it precipitates back to the ground;
- The physical transfer of this water back to the sea under gravity, known as infiltration (water "soaking" into the ground and returning to reservoirs as groundwater flown, also known as base flow), surface runoff (the direct flow of water back into the sea and other stores across the land surface, notable exacerbated in urban areas by the presence of hard standing and other anthropogenic structures), and surface flow (the "collection" of water by river catchment areas, and the subsequent flow of this water back to the see via established water courses such as rivers and streams).

The physical processes of evaporation and condensation represent significant energy transfers within our ecosystem, and in many areas of the world can dominate local climate. In warmer, tropical areas for example, where evaporation and evapotranspiration rates are particularly high, storms and heavy rainfall occur very regularly and predictably.

While these heavy downpours may be problematic in some areas due to their impact on the land, such as severe erosion of soils, the global pattern of having a net movement of water from seas onto land masses acts as a vital service to many areas. The constant cycle of fresh water, having been purified by the action of evaporation, being deposited in areas dependant on agriculture means natural irrigation, as well as the transfer of other nutrients helps sustain these areas and any dependant local communities and economies.

Liquid, ice and vapour

Fundamentally under the EU's sustainable development strategy, however, the EC is introducing legislation relating to lifecycle thinking, which includes:

Sustainable Production Action Plan by the EC in 2008 intends to reduce environmental impact and use of resources throughout the life cycles of products, goods and services, ideas on how to do so while incentivising the use of sustainable goods and BATs. "A range of policies at EU and national level already foster resource efficient and eco-friendly products and raise consumer awareness. The proposals complement policy instruments and provide measures where gaps exist."

Integrated Product Policy: designers, industry, marketing, retailers, consumers, attempting to 'stimulate each part of these individual phases to improve environmental performance'. Refers to 'whole variety of tools, both voluntary and mandatory – that can be used to achieve this objective, including economic instruments, substance bans, voluntary agreements, environmental labelling and product design guidelines'.

In law, strict liability is a standard for liability which may exist in either a criminal or civil context. A rule specifying strict liability makes a person legally responsible for the damage and loss caused by his or her acts and omissions regardless of culpability.

UK

Before the 2008 Act, the UK voluntarily committed to reduce its CO_2 levels by 20% by 2010, and by 60% by 2050.

Under the Kyoto Protocol, the EU agreed to meet a collective target of 8% reduction in CO_2 and GHGs below 1990 levels in the 2008-2012 period. The UKs share of this reduction is 12.5%

This act makes the government targets legally binding, and imposed a tougher target of 80% reduction in GHGs by 2050.

Resources

(The Common Fisheries Policy (CFP))

The CFP is a set of rules for managing European fishing fleets and conserving fish stocks. It manages an international common resource and prevents a 'tragedy of the commons'. It addresses an open access resource problem by giving fleets equal access to EU waters and fishing grounds, and allows fishermen to compete fairly.

CFP aims to ensure To ensure that fishing and aquaculture are environmentally, socially and economically sustainable and provide a sustainable source of healthy food for EU citizens,

Its goal is to create a dynamic fishing industry and fair standard of living for fishing communities.

The impact of commercial fishing is not fully known and the precautionary principle is used.

As the impact of fishing is still not fully understood, in order to limit potentially adverse effects on marine environments, the CFP:

- Adopts a cautious approach which recognises the impact of human activity on all components of the ecosystem.
- Seeks to make fishing practices more selective in what the catch,
- Attempts to phase out the practice of discarding unwanted fish The current policy gives EU countries greater control over its management at a national and regional level. This is achieved through 4 main policy areas:
- Fisheries management,
- International policy,
- Market and trade policy,
- Funding of the policy.

Ref - http://ec.europa.eu/fisheries/cfp/index_en.htm

3.2 Outline the main types of law (common and statute law, civil and criminal law – in jurisdictions where they exist)

Codified = statues that have been created with subject matter. Smaller laws making up Codes may also be codified, such as regulations, principles of law. Not codified example: a bill, which only applies to one or a few people, e.g. getting divorced before the divorce bill in Canada, whereby senate would vote and make the judgement into law.

Common Law – UK, North America, Australia, Canada – 1/3 of World Population
Precedent, case law (Fisher vs Brady, 2013) two types private and public law.

Public = person vs state or society. Includes criminal justice system, regulation + control, statutory notices to control ongoing problematic companies or stop damaging actions. Can lead to criminal sanctions and occasionally civil sanctions in England and Wales (On occasion, private law is used to protect the environment, usually through court action based on nuisance, negligence – mainly personal injury claims – or trespass)

Private = person vs person (includes companies)

Example- Waste environmental damage storage Common Law – Rylands vs Fletcher – Neighbours or down-gradient users of groundwater could have an action in damages against a site owner in tort (a civil wrong), nuisance or the rule in Rylands & Fletcher, e.g. for negligent storage and treatment of waste or nuisance caused by their use of land. Third parties could seek to assert riparian rights over the downstream water which has been impacted or for personal injury or property damage.

Often uses precedent system

Law is developed by judges based on the decisions of courts and previous cases of a similar nature. It does also include statutes, ie. laws passed by legislative bodies, however these are often based around areas that are not covered by case law – case law will often take priority where it is available from historic precedent cases.
Both systems usually include legally enforced regulations which are often codified.

Precedence binds future decisions based on the intention to avoid inconsistency between similar cases at different times from different judges. If a similar case has been resolved in the past then the court is generally bound to use the same reasoning in the case of interest (through stare decisions). Otherwise, judges are allowed (and it is their duty) to make their own judgement, creating precedent for any future similar cases. Resultantly, consistency improves with ever y similar case, as does the focus on detail and difference between cases.

Complicated because of differing power between differing courts – lower courts may be bound to the precedence set by higher courts, whilst higher courts may not be bound to precedence based on lower courts, especially where lower courts with smaller, simpler cases had fewer principles to consider, with potentially smaller fines, sentences or other punishments.
Also further complicated when common law interacts with frequently amended regulations, statues and constitutional law and European Law, but stare decisis is fundamental to common law.

Civil Law – Most of EU, Asia, Russia, South America, China – Most used in world
Codified, core principles

Based on an interactive web of legislation based on codified, core principles which aim to encompass

National air quality strategy as set out in Part IV of the environmental protection act focuses mainly on human health but also standard for the protection of vegetation and ecosystems in respect to nitrogen dioxide and sulphur dioxide.

The mechanism for ensuring the standards within the national air quality strategy are met is the EPR "Environmental Permitting Regulations". Permits will need to reflect limits set out in the Air quality directive 2008 'limit and target values'

Water

Water Framework Directive

In October 2000 the 'Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy' (Water Framework Directive or WFD) was adopted and came into force in December 2000. The purpose of the Directive is to establish a framework for the protection of inland surface waters (rivers and lakes), transitional waters (estuaries), coastal waters and groundwater. It will ensure that all aquatic ecosystems and, with regard to their water needs, terrestrial ecosystems and wetlands meet 'good status' by 2015.

Its aim is to Establish an integrated framework for the management of inland and coastal waters across the EU so that issues of water availability and maintenance are considered as a whole.

UK implementation

To enable the objectives of the Water Framework Directive to be met requires the transposition of measures into national law. These are implemented through The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 in England and Wales .

In Scotland it is implemented through The Water Environment and Water Services (Scotland) Act2003 and in Northern Ireland through The Water Environment (Water Framework Directive) Regulations (Northern Ireland)2003.

Much of the work to implement the Water Framework Directive in the UK will be undertaken by what the Directive refers to as the Competent Authorities- The Environment agency

DEFRA:

"We need to improve the quality of our open waters, also known as 'water-bodies'. These include rivers, streams, lakes, estuaries, coastal waters and groundwater.

We need to do this as only 27% of our water-bodies in England are currently classified as being of 'good status' under new standards set down by the EU Water Framework Directive.

Improving water quality in our rivers, streams and other water-bodies has many benefits. These include:

- safeguarding jobs and businesses which rely on good quality water-bodies
- making natural habitats better for wildlife"

Differs throughout the UK. Environment agency the governing agency – water resource act 1991.

laws and regulations

- Given the complexity of legal requirements regarding environmental protection
- Significant challenge for organisations
- Find out what laws and regulations actually apply
- Understand how they apply and what needs to be done to comply
- Ensure compliance on an ongoing basis.
- Time and resources
- Strong management

Registration to a Compliance scheme: EEE (Electric and Electrical Equipment)

If you are a producer you will need to register with us by joining a producer compliance scheme."

Companies register as EEE producers through producer compliance schemes which ensure legal obligations are met and obtain on the companies' behalf evidence of re-use, recovery and recycling. Must register every year and if a company starts placing EEE on the marketplace they must join a producer compliance scheme within 28 days.

Practical company registering compliance scheme:

- Pay a registration fee,
- Tell the scheme the weight of EEE placed on the UK market each year,
- Tell scheme whether it is supplied for household or business use,
- Receive product registration number to give to anyone who distributes or sells product,
- Take advice from compliance scheme re funding cost of treating/recovering/disposing of products
- Mark products with EEE brand (crossed out wheel bin and brand name or producer ID)

Producers that don't comply are breaking the law. They need to register with a compliance scheme as soon as possible. If they delay, they could be fined up to £5000 in a Magistrate's Court or receive an unlimited fine in a Crown Court.

Renewables obligations

Requires a specified proportion of energy to be supplied by companies to be from eligible renewable sources. These obligations incentivise renewables with the use of ROC's renewable obligation certificates:

The level of the annual obligation on electricity suppliers is published by 1 October in the year before it comes into effect, e.g. the obligation for the financial year starting 1 April 2013 was published on 28 September 2012.

- Eligible renewable electricity generators report the amount of renewable electricity they generate on a monthly basis to the Office of the Gas and Electricity Markets (Ofgem).
- Ofgem issues Renewables Obligation Certificates (ROCs) to electricity generators relating to the amount of eligible renewable electricity they generate.
- Generators sell their ROCs to suppliers (or traders), which allows them to receive a premium in addition to the wholesale electricity price.
- Suppliers present their ROCs to Ofgem to demonstrate their compliance with the RO. Suppliers who do not present enough ROCs to meet their obligation must pay a penalty (known as the 'buy-out price').
- The money Ofgem collects in the buy-out and late payment funds is re-distributed on a pro-rata basis to suppliers who presented ROCs.

appropriate treatment and disposal of mining waste produced during the borehole drilling and hydraulic fracturing process

suitable treatment and management of any naturally occurring radioactive materials (NORM)

EA also publishes a worst polluters report every year

4.0- Understanding Environmental management and sustainable development in a business context

4.1- Outline how environmental issues present risks and opportunities for organisations (risks at an operational level, risks to the environment, and risks presented by changing environment)

Operational level opportunities

Producing a product or service with zero environmental impact may not be able to be achievable with current technology. Organisations can develop their technology to not only meet their needs but also the wider society in reducing environmental impact of their products.

Closer cooperation with not only partners but also competitors to create best available techniques to reduce environmental impact. Businesses have to put environment before competition.

Existing and forthcoming regulations and governance, environmental risk and liability can influence an organisation's:

- financial performance,
- reputation and brand,
- cash flow,
- and shareholder value
    - Staff loyalty, customer preference/trust, supply chain's own requirements/EMS, general public opinion, likelihood of investment from shareholders, overall company value

Talk about commercial developers, contaminated land risk, liability, Responsible for remedial measures or insuring against contaminated land investigation.

Resources need to be used to formulate an environmental management plan. And develop new technologies.

Businesses need to change their production and how they handle waste and could put strain on the already cash strapped struggling businesses.

Risk to the environment

Richo – identifies the environmental impact of its products throughout their life cycles and developing technologies to reduce the impact.

(Hazardous) waste

Increased use of eco system services in an unsustainable way- e.g. fishing

Changing environment

Resources become scarce- business's may not be able to operate. Businesses' plan for the future developing new technology and researching alternative resources, improving product designs and renovating product processes. This phase of development and research could be akin to the surge in inventions produced by both the world wars – radar being an example of this.

The UK Accounting Standards Board is currently producing a new Financial Reporting Standard that all companies must use to report on their environmental risks. Their auditors will use the same standard to ensure that companies follow the regulations.
Environment Agency research (by Trucost plc) has shown that although 89 per cent of the 550 FTSE all-share companies made environmental disclosures in their Annual Reports and Accounts, the majority currently lack depth, rigour and sufficient detail for shareholders to properly assess environmental risks or opportunities which they currently face. Only 24 per cent made quantitative disclosures.
Our research (by Innovest) on corporate environmental governance and financial performance leaves no doubt that environmental issues do have a material impact on the financial success of stock market listed companies.

Technological

Manufactures need to research and develop how they make their products sustainable. Products-life cycle assessment due to pressure from extended producer responsibility.

Strategic

Environmental insight & Data
-Such as GroundSure reports, landmark, envirocheck, CON29 reports. Very large array of environmental hazards are covered by these reports.

- Highlight potential risk areas requiring further assessment
- Often include insurance policies where information is wrong or misleading
- Provide advice on how and where to get further information
- Also refer to insurance companies, site surveys, etc.

DEFRA Key Performance Indicators – Reporting Guidelines for UK Businesses (Incl Climate Change)
There is an increasing recognition that good environmental performance makes good Business sense. Environmental risks and uncertainties impact to some extent on all companies, and affect investment decisions, consumer behaviour and Government policy. Management of energy, natural resources or waste will affect current performance; failure to plan for a future in which environmental factors are likely to be increasingly significant may risk the long-term future of a business.
Companies that measure, manage and communicate their environmental performance are inherently well placed. They understand how to improve their processes, reduce their costs, comply with regulatory requirements and stakeholder expectations and take advantage of new market opportunities. Over a third of FTSE 350 companies already report KPIs according to the guidance specified here. Nevertheless, the landscape of environmental, sustainability and corporate responsibility reporting can be complex. These Guidelines seek to help companies report their environmental impacts in a meaningful and cost-effective way.
The Guidelines are consistent with other standards and reporting guidance as far as possible.
http://archive.defra.gov.uk/environment/business/reporting/pdf/envkpi-guidelines.pdf

Manage and observe links between financial and environmental performance to better understand the benefits/costs of improving environmental performance. Quantitative, relevance, comparability.

Human

6.0 Being able to apply environmental management and assessment tools

6.1 Describe the application (purpose, stages in the process of implementation, relevant standards and guidelines) of environmental and assessment tools

Risk assessment

Environmental management systems

An Environmental Management System (EMS) is a structured framework for managing an organisation's significant environmental impacts. The latter vary between organisations, but typically will include waste, emissions, energy use, transport and consumption of materials

EMS is "a system and database which integrates procedures and processes for training of personnel, monitoring, summarizing, and reporting of specialized environmental performance information to internal and external stakeholders of a firm."

EMS is voluntary, international. It is continuous and follows a systematic – Plan, Do, Check, Act

Examples of an EMS is ISO14001, ISO14002, ISO14003

Environmental audit - identifies environmental compliance and management system implementation gaps, along with related corrective actions. Similar to financial audits. There are generally two different types of environmental audits: compliance audits and management systems audits.

There is no standard protocol, either in form or content. Typically, companies develop their own protocols to meet their specific compliance requirements and management systems. Audit firms frequently develop general protocols that can be applied to a broad range of companies/operations.

Example of this is 14011

Life cycle assessment

A systematic set of procedures for compiling and examining the inputs and outputs of materials and energy and the associated environmental impacts directly attributable to the functioning of a product or service system throughout its life cycle.

cradle-to-grave" impacts include the extraction of raw materials; the processing, manufacturing, and fabrication of the product; the transportation or distribution of the product to the consumer; the use of the product by the consumer; and the disposal or recovery of the product after its useful life.

4 components-
Goal definition and scoping
Life cycle inventory
Impact analysis

- **Cardiff & Vale NHS Trust** uses a simple 5x5 scoring matrix, which scores aspects and impacts against two broad categories: "control" and "severity". Control of the aspect is scored from one, where there is a high degree of control in place, to five, where there is negligible or no control. Severity of the impact ranges from one (insignificant or positive impact) to five (severe). The scores are multiplied to give results up to 25 and ranked as low significance (1–6), medium (8–10) or high (12–25).

- Electronics manufacturer **Raytheon Systems** also uses a 5x5 matrix, which compares "likelihood" against "severity", with a maximum score of 25. Although legislation is not included in the numerical scoring system, it is considered in the aspects register, which, at nearly 300 lines long, includes a range of aspects, such as energy consumption, use of chemicals and disposal of hazardous waste. Unusually, each aspect is scored twice, both before and after controls are implemented, to show how risks are managed.

A slightly more detailed system, tailored to the relevant needs and activities of the organisation, is preferable

A bespoke risk matrix could, for example, include categories such as CO2 emissions (amount of carbon produced); frequency (how often the aspect occurs); severity (degree of impact on the environment); likelihood (probability impact will occur); controllable (extent of control or influence, and resources required); and regulated (degree of regulation).

These are fairly standard categories, but a tailored approach means they can be supplemented by others that are important to the organisation, such as stakeholder interest, financial impact or business continuity.

Each category must then be scored for significance – using five levels of severity is a common approach.

Scoring is then applied on a scale of 1–5, with, for instance, "minimal" carbon emissions scoring one, and "major" scoring five. Under such a matrix, an overall score of 19 or more would be regarded significant.

My matrix would be likelihood against severity against stakeholder interest 5x5x5 125 top score. The inclusion of stakeholder interest brings a new element as the aspect could be an opportunity which can be capitalised on and therefore be more significant. It is also kept simple and transparent, and does not dilute the potency of each input into the matrix. Mark Grahm Brown performance measurement expert comments overload of measures is common and most serious problem a business can have with its measurement system. Regular assessment particularly when with new acquisitions or when processes change.

When creating an approach to determine significance keep it simple, make it relevant and ensure it is replicable. And don't forget to review it regularly.

Regualr assessment particuarly during new aquisitions process change

When creating an approach to determine significance?

- **Keep it simple**
- make it relevant
- ensure it is replicable.
- review it regularly.

7.3 Propose sustainable solutions and programmes to address environmental problems and opportunities

International

Eco design – shark fin to harness tidal energy

By product synergy and industrial ecology

Emissions trading schemes – making reduction in greenhouse gases law- Kyoto Protocol

Implement legislation that forces companies to continually reduce their carbon footprint based on 2010 levels.

Environmental insight & Data
-Such as GroundSure reports, landmark, envirocheck, CON29 reports. Very large array of environmental hazards are covered by these reports.

- Highlight potential risk areas requiring further assessment
- Often include insurance policies where information is wrong or misleading
- Provide advice on how and where to get further information
- Refer to insurance companies, site surveys, etc.

Risk Matrices – establish whether risks have reduced/changed

<u>Data analysis: see Section 5</u>

Obtained by measurement- this may require specialist equipment or specially trained persons.

Quantative – water consumption, electricity usage, waste sent for disposal, outstanding audit non-conformance, noise level at boundary fence.

Metred sources, waste- bin loads, bills invoices for fuel consumption. Weigh bridges for raw materials and waste.

Ways to monitor-

- Absolute data - raw data
- normalised data- makes a relationship between two figures, facilitataes benchmarking-internal and external
- trend data- performance over time
- Qualitative data- important, provides valuable insights into data. Can give reasons why data is unusual.

9.0- Being able to communicate effectively with internal and external stakeholders

Presenting data- plan. Why? To whom? How?

9.1 Identify internal and external stakeholders (stakeholder groups e.g. employees, suppliers, shareholders, regulators local community)

Stakeholders can have three categories- the proponent, the decision maker, third parties (Professor Brian Clark)

Internal- Employees, board members, former board members, volunteers, donors

External stakeholders- Clients, suppliers, regulators, local community, members of groups served by our organisation who are not directly accessing our services, government- policy makers

Stakeholder matrix- to choose who are the most important stakeholders and can assess how sensitive these groups are to a particular environmental aspect.

9.2 Describe the environmental information needs of stakeholders and why

Stakeholders want to know what environmental aspects of the organisation are affecting them so they can give feedback before an activity is implemented. Other stakeholder who are not directly affected may want to be involved as this would show that the organisation wants to listen to their concerns or ideas.

The needs of stakeholders can differ and it is important that this is understood so communication can be tailored to that particular group. There may be sensitivity to the subject and therefore

9.3 Explain the importance of effective communication to stakeholders

It is important to effectively communicate with stakeholders because they provide a valuable resource for the organisation. Whether this is through free consultancy on projects to product development, reactive issue resolution, proactive issue avoidance or simply to demonstrate that they are listening.

Organisations can use it to influence others and may be used as a complex form of outward communication.

An inefficient communication to stakeholders can result in negative publicity and local knowledge can be overlooked. Effective communication can yield an improved image, trust and can resolve issues faster when an organisation develops in a new way.

If engagement is on a rolling programme it can be strategically important as it can be a source of free market analysis and companies are better equipped to handle problems as they are proactively seeking them rather than reacting to stakeholders.

Efficient engagement can be the deciding factor in whether a new venture succeeds or fails as people like to be informed or changes before they happen, even if it is to show an organisation is just listening to their concerns.

Engagement can enhance stakeholder trust and heighten an organisation's reputation by showing transparency and a willingness to engage.

10.5 Outline the implications and consequences of decisions

Nothing is done

If engagement is not undertaken then there could be resistance to any change.

Stagnation- Decisions are taken and then not continually reviewed.