**Employment structures**

Traditionally industry and other types of economic activity has been broken down into the main groups of Primary, secondary and tertiary, although now there is also a fourth group, this being the quaternary

Primary – Industries **extract raw materials** directly from earth or sea. e.g. farming, fishing, forestry and mining

Secondary – Industries **process and manufacture the primary products**, e.g. steelmaking and furniture industry and the assembly of component parts made by other secondary industries, e.g. car assembly

Tertiary – Industries **provide a service**. e.g. education, health, office work, retailing, transport and entertainment.

Quaternary – Industries provide information and expertise, mostly **research** and development.

Employment structure 🡪 The proportion of people working in each of the primary, secondary and tertiary sectors is called the employment structure.

This is given in percent % for each sector

Over the last couple centuries multiple changes have taken place in the employment structure.

200 years ago, the primary sector was predominant as most people made their living from the land they owned. The majority were farmers, and few made things out of the products from the farm, such as bread, although some did.

100 years ago, the secondary sector began to take over majority, primarily due to the industrial revolution. More people started to work in factories as technology and advancements required less people to farm for the same amount of yield. Natural recourses also became a lot more abundant, creating an entire new industry for the secondary sector to flourish in.

Present day, only 2% are in the primary sector, 27% secondary sector and 71% tertiary sector. This compared to the previous centuries indicate a shift towards the tertiary sector. This being due to the large development of technology and the growing importance and focus on education and welfare.

Each place on a map will have a different employment structure as there will be a different need or focus point on that territory. A holiday resort for example will not have the same employment structure as a Coal mine.

A diagram of a triangle

Description automatically generatedTriangular Graphs

A triangular graph is an equilateral triangle with each of its three bases divided into percentage scales. Tertiary at the bottom, Secondary at the right and Primary on the left. Each 10cm in dentation will follow 10% of change.

A countries Employment structure can be taken from this graph if you follow the line for each sector and where the dots are. It is important to follow the line for each sector, not just a random one. **Secondary is straight**, Primary is slanted towards tertiary, while tertiary is slanted towards Secondary.

The richer a country is the more Tertiary sector they have, while the poorer a country is the more primary sector they have.

**A diagram of a farm

Description automatically generated**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Farming**

Farms have an Input, Processes and Outputs method

Inputs- Physical and environmental or Human and Economic

Processes- Patterns and methods of farming

Outputs- The final products for sale

Inputs and Processes can vairy greatly around the world, relying heavily on the geographical location of the farm, as well as the economical class of the farmer himself. Obviously, expertise and climate also factor in.

Arable farming 🡪 The farming of crops on soil.

Pastoral farming / Cattle farming 🡪 The farming of animals.

Mixed farming 🡪The farming of both crops and animals.

Commercial farming 🡪 The farming to grow crops with the expectation and mission of selling it for profits.

Subsistence farming 🡪 The farming with the goal of having sufficient food for the farmers own family.

Extensive farming 🡪 Farming where the farm size is very large in comparison with either the amount of money spent on it or the numbers working there.

Intensive farming 🡪 Farming where the farmland is small in comparison with either the numbers working there or the amount of money spent on it.

Shifting and Nomadic farming 🡪 Where farmers move from one area to another

Sedentary farming 🡪 Where the farming takes place in a permanent settlement.

|  |  |  |
| --- | --- | --- |
| **Physical Factors (Environmental)** | **Human / Social Factors** | **Political Factors** |
| Relief and Altitude | Land ownership / tenure | Governments Grants |
| Soils | Size of farms / fields | CAP regulations |
| Temperature / Sunshine | Competition for land |  |
| Rainfall / Water supply | Transport |  |
|  | Markets |  |
|  | Capital (Money) |  |
|  | Technology / Machinery |  |
|  | Processors / Retailers pricing |  |

Arable farms 🡪 Where sunny summers take place and overall, not that harsh climate conditions with good access to water and nourishment for the crops.

Cattle farms 🡪 Where summers are cool and winters are mild, plenty of rain and transport to urban markets is easily within reach

Hill Sheep farming 🡪 Land is high and steep, temperatures are lower, rainfall is heavy and the transportation opportunities out of the farm are limited.

Mixed farming 🡪 Tends to be found in a transitional zone between arable farms and cattle farms

Market Gardening 🡪 Is important near large urban areas and where transport links are good. AS some market garden produce can be grown under cover in artificial conditions (flowers, tomatoes,) human factors tend to be more important than physical factors.

CAP 🡪 Common agriculture policy

Goals of CAP are:

* Create a single market in which agricultural goods could easily be transferred
* Make the EU self-sufficient by giving preference to produce grown within member countries
* Give financial support to EU farmers mainly through guaranteed prices (Subsidies) and markets
* Help to maintain jobs and improve the SOL un farming areas, especially in marginal areas such as hill farms in the UK
* Keep consumer prices table

Concerns regarding the CAP

* 70% of EU budget spent on the program
* Overproduction of certain products due to the payment of subsidies and improvements in technology
* A decrease in the number of farms, as those that were larger and more profitable took over those that were smaller and less efficient
* A decrease in the number of farm workers, due to improvements in technology
* Insufficient care of the environment for example the draining of wetland habitats and the removal of hedgerows when enlarging field sizes in places such as eastern England

|  |  |
| --- | --- |
| Achievements of CAP | Problems of CAP |
| Higher yields for farmers | An increase in food price |
| Average farm size increase in NW Europe | A tendency to overproduce |
| Production has changed according to demands | Dumping unwanted produce on LEDCs |
| Subsidies has reduced rural depopulation | 70% of budget on subsidies |
| Higher income farmers | Five o´clock farmers |
| Less farms Same yield in France | Reduction of imports bad for other - |
| More self sufficient | -side as lack of income makes trade gap |

Subsidies 🡪 Paying farmers money to help them with an income

Quotas 🡪 If a farmer makes too much of produce, they get fined

Set-Aside 🡪 Take 15% of land out of use get given 20 Pounds a hectare

Quotas and Set-Aside are to counter overproduction

Pesticide 🡪 Chemicals applied to crops to control pests

Fertilizer 🡪 Mineral compound or shit to provide for one or more of the six main nutrients needed for successful plant growth.

Phosphate 🡪 Animal manure and untreated human suage that can pollute water supplies near a farm

The removal of hedgerows was done to allow larger farm equipment to move between paddocks, however this had detrimental effects to the wildlife surrounding them

They were costly and time consuming

Took up space to grow crops

Limited machinery space

Got in the way of mechanized hedge-trimmers

Organic farming is farming without the use of any chemicals or outside help, only natural inputs, this has become more common although it has its own set of problems

Yields are lower

More weeding

Wait several years until they can label goods as organic

Extra work means produce costs more to make and buy

GM crops – Genetically modified crops

First developed for commercial production in 1996. Two-thirds of GM crops are produced in the USA. They are made by taking the genes from one species and inserting them into another to give it new qualities, such as improved resistance to pests, heat or cold. Advocates say the technique is sound, safe and can help to increase crop yields or improve animal breeds.

ESS- Environmental Stewardship Scheme

A service to protect land that is special due to historical, wildlife or landscape value. Farmers In these areas must be invited to join and are receiving payment based on the levels of environmental commitment (replacing subsidies with this new thing.)  
They pay at a higher and lower level each year based on how well they can maintain the environment around their farm.

ESS objectives are to, Conserve wildlife, maintain landscape, protect history and promote public access and understand of the countryside.

The growth in population has simultaneously increased the amount of people suffering from malnutrition.

DES – Dietary energy supply

DES is the number of calories per capita (i.e. per person) available each day in a country

Richer countries may have a DES as high as 4000, while poorer LEDCs can go as low as 1500 calories.

Less than 2350 you will suffer chronic malnutrition in tropic, LEDCs

Less than 2600 you will suffer chronic malnutrition in temperature climate, MEDCs

Low birthweight babies are often prone to malnutrition

|  |  |
| --- | --- |
| Marasmus 1st year | Kwashiorkor 1-5 years |
| Hair may be normal | Hair ginger |
| Old mans face | Moon face |
| Anxious look | Thin muscles, fat puffy limbs |
| Skeleton body | Swollen extended belly |
| Thin muscles little fat | Skin change |
| Very underweight | Usually underweight |

The contributing factors to this malnutrition are

* High birth rate
* Few Farmers have money to buy high yielding technology
* When food is scarce Gov can’t afford to import
* Soil is overused and crap now
* Unreliable amounts of rainfall
* Pests and diseases
* Often not enough protein in diet
* Countries are politically instable

In 2016, 28% of children at this age group were suffering from being underweight and potentially malnourished in the developing world.

**Resources (Energy)**

Non-renewable resources are finite and not sustainable, meaning their exploitation will lead to their eventual exhaustion.

Renewable resources are sources that can either be

A flow of nature, so that being continuous, they can be used over and over again

Sustainable, which means they were self-generating like biomass

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Resources |  |  |
|  | Natural (physical) |  | Human / economic |  |
| Renewable |  | Nonrenewable |  |  |
| Continuous |  | Fossil fuels |  |  |
| Sustainable |  | Minerals |  |  |
|  |  |  |  |  |

More countries are demanding more resources, this is due to these factors; population growth, economic development, Increasing wealth and technological advances.

The earth’s resources can be protected by sustainable development, these techniques of sustainable development include

* Conservation
* Recycling
* Greater efficiency in existing resource use
* Developing renewable resources
* Controlling pollution
* Using appropriate technology

Sustainable development 🡪 Improving peoples standard of living and quality of life without wasting resources or spoiling the environment.

|  |
| --- |
| **Coal** |
| | Pros | Cons | | --- | --- | | Abundant and widely available | Major contributor to air pollution and CO₂ emissions | | Reliable for base-load electricity | Mining is environmentally destructive | | Low cost compared to some renewables | Health hazards due to coal dust and emissions | | Established infrastructure | Non-renewable and finite resource | | Supports jobs in mining and energy  Reserves can last up to 300 years | Produces hazardous waste like ash | |

|  |
| --- |
| **Oil and Natural Gas** |
| | Pros | Cons | | --- | --- | | High energy density | Significant greenhouse gas emissions | | Reliable and easy to transport | Risk of oil spills and gas leaks | | Existing global infrastructure | Price volatility in global markets | | Flexible in usage (electricity, heating, transport) | Non-renewable and depleting resources | | Cleaner-burning than coal (natural gas) | Reserves only last 50-70 years | |

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| **Nuclear Energy** |
| | Pros | Cons | | --- | --- | | Low greenhouse gas emissions | Risk of catastrophic accidents (e.g., Chernobyl, Fukushima) | | High energy output from small amounts of fuel | Radioactive waste disposal challenges | | Reliable and consistent power supply | High initial construction costs | | Can operate in any weather condition | Long development and decommissioning timelines | | Reduces reliance on fossil fuels | Public perception and safety concerns | |

|  |
| --- |
| **Hydroelectric Power (HEP)** |
| | Pros | Cons | | --- | --- | | Renewable and sustainable | Ecosystem disruption and habitat loss | | No direct greenhouse gas emissions | High initial costs for dam construction | | Reliable and consistent energy source | Relocation of communities for reservoir creation | | Provides water storage and flood control | Vulnerable to droughts and seasonal changes | | Long lifespan of hydro plants | Potential methane emissions from reservoirs | |

|  |
| --- |
| **Geothermal Energy** |
| | Pros | Cons | | --- | --- | | Renewable and sustainable | Limited to regions with suitable geology | | Low greenhouse gas emissions | High initial drilling and infrastructure costs | | Reliable and not weather-dependent | Potential release of harmful gases from the Earth | | Small land footprint | Can lead to ground subsidence or earthquakes | | Low operational costs | Difficult to scale in certain regions | |

|  |
| --- |
| **Wind Energy** |
| | Pros | Cons | | --- | --- | | Renewable and sustainable | Intermittent energy production (depends on wind) | | No greenhouse gas emissions | Noise pollution and visual impact | | Low operating costs after installation | Requires large areas for wind farms | | Scalable and flexible (onshore and offshore) | Bird and bat mortality | | Reduces reliance on fossil fuels | High initial investment | |

|  |
| --- |
| **Solar Energy** |
| | Pros | Cons | | --- | --- | | Renewable and abundant | Intermittent energy production (depends on sunlight) | | No greenhouse gas emissions | Requires large land areas for utility-scale farms | | Low operational costs | Energy storage (batteries) is expensive | | Scalable for homes and businesses | Manufacturing involves use of rare materials | | Reduces electricity bills | Efficiency affected by weather and location | |

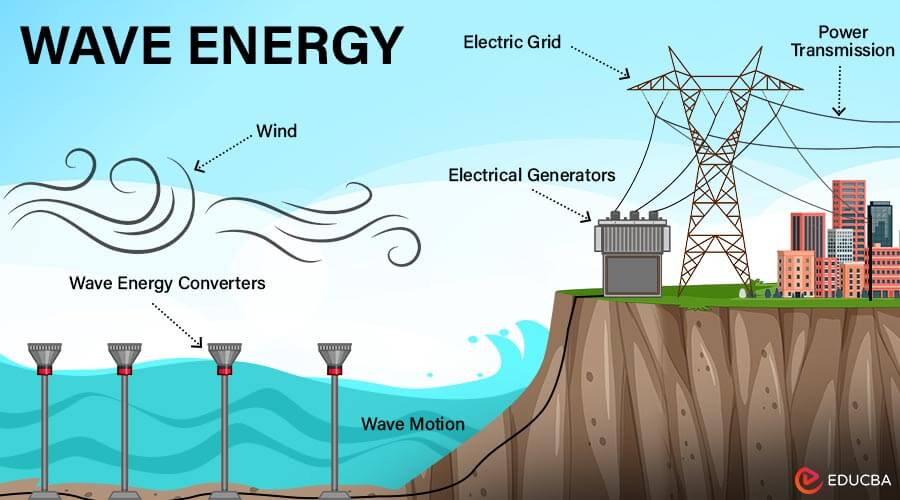
In Itapúa Brazil a dam was completed across the River Parana at Itapúa, on the border of Brazil and Paraguay. The lake behind the dam is 180k long and 5k wide. The 18 turbines fitted at the place make it the world’s largest HEP scheme. Although the venture was a joint one between Paraguay and Brazil, Paraguay receives only its annual needs from just one turbine. By agreement, Brazil purchases the remainder of Paraguay’s share at a reduced price. The electricity is then transmitted to the São Paulo area.

As with other hydro-electric schemes, there are advantages and disadvantages. The advantages include the jobs created during the construction stage, the production of a clean and reliable form of energy, and the relatively cheap price of electricity. The disadvantages include the flooding of farmland, the loss of wildlife habitats, the relocation of 420000 people, the relatively few permanent jobs in relation to the huge cost and now, the slow silting- up of the lake. Although Paraguay and São Paulo get their electricity and Paraguay gets much-needed income, there has been little benefit to the residents of Itapúa.

In New Zealand there are several geothermal fields in the North Island. Some of these fields are used to generate electricity, some are tourist attractions, and some are used for domestic heating, and some are used for industry. Wairakei is currently (2008,) producing 4% of New Zealand’s electricity

Hydrogen: This is the great hope for the future. Obtainable through water, its only by-product is water vapor. By 2050 it is hoped that hydrogen-fuel cells will power emission-free cars, buses and lorries (replacing Oil) and will heat and light factories and homes. Governments are keen on the idea of hydrogen and are willing to spend huge sums on trying to advance this technology

Tidal: Like the Rance in Brittany several British rivers have a large tidal range that could generate electricity. However, schemes such as the proposed Severn and Solway Barrages have been dismissed as being too expensive to build and they would destroy important wildlife habitats.



Waves: Waves, especially during storms, have very high energy levels. At present there are two experimental schemes off the Scottish coast: This first, LIMPET, creates an oscillating water collum on the isle of Islay. The second is the pelamis sea-snake which is hinged device located on Orkney

Biomass: Fermenting dung gives off methane gas which can be used in developing countries instead of fuelwood. Although this energy is cheap to produce, it means the dung can no longer be used as fertilizer, while the methane is a greenhouse gas. Biomass can also be used to produce biofuels, the first being sugar cane which was used to power cars in Brazil. Now oil palm in Malaysia, oilseed rape in the EU and maize in the USA are being grown for use as cheaper, cleaner biomass fuel.

The energy usage per capita is used as a good figure to try to approximate how wealthy a nation is, and how developed it is. As richer countries simply have the leisure of using more energy.

This increased usage of energy in MEDCs is what causes debate between countries, as LEDCs argue that they should be the ones who are allowed to use dirty energy in large sums, not the rich countries that can afford better.

Appropriate technology: This is the introduction and use of technology that is both appropriate to the needs, skills, knowledge and wealth of local people, and suitable to the environment in which they live.

**Industry**

Industry = System

Inputs = Physical (natural) and human / economic (artificial) inputs e.g. timber, iron ore

Processes = First processing stage, e.g. pulp, steel,

Second processing stage, e.g. newspapers or assembling of parts e.g. cars.

Outputs = Waste or Products for sale - REININVESTMENT

Factors affecting the location of industry

|  |  |
| --- | --- |
| **Physical Factors** | **Human / Economic Factors** |
| Raw materials | Labor |
| Power - energy | Capital (money) |
| Natural routes | Markets |
| Site and Land | Transport |
|  | Economies of scale |
|  | Government policies |
|  | Improved technology |

Reasons for job losses

* Exhaustion of resources
* Introduction of new machinery or new methods needing fewer workers
* Fall in demand for product
* Site needed for other uses
* Large-scale redevelopment of inner-city areas
* Closure due to high costs of production, high wages
* Global recession
* Lack of money for investment
* Competition from overseas

Break of bulk location 🡪 When a product must be transferred from one form of transport to another – a process that takes up both time and money.

**CASE STUDIES**

**Farming**

Pastoral Farming in the Lake District

The primary type of farming in the Lake District is **sheep farming**, with approximately 1.5 million sheep reared in the region. The valley floors along the edges of the area are also suitable for cattle farming.

Physical Inputs

* Rainfall: The region experiences heavy rainfall throughout the year, particularly in higher elevations.
* Temperatures: Summers are cool and cloudy, while winters, although mild in the valleys, are much colder at higher altitudes.
* Landscape: The steep valley sides and high fells, with their thin, poor soils and exposed rock, are best suited for sheep grazing.
* Valley Floors: These have deeper, alluvial soil and high-quality grass, making them suitable for cattle farming.

Human Inputs

* The Lake District has poor communication links, with narrow roads and long distances between markets. This increases transport costs and time.
* The land is unsuited to large-scale mechanized farming, and the area has limited capital for investment.

Variable Inputs

* Occasional heavy snowfalls at lambing time.
* Changes in government and EU policies.
* Outbreaks of diseases, such as issues related to radioactive fallout after the Chernobyl disaster (1986).
* Restrictions on the movement of animals, such as the cattle ban due to BSE (Mad Cow Disease) in 1996, and the foot and mouth outbreak in 2001.

Processes

* The key processes in this type of farming include lambing, shearing, collecting hay, and maintaining dry-stone walls.

Outputs

* The main outputs are young lambs, lamb meat, wool, and hay.

Recent Changes in Farming

1. Decline in Prices: A fall in the prices of lamb, lamb meat, and wool.
2. Marginal Land Abandonment: Some less productive farmland has been removed
3. Fewer Farms: A decline in the overall number of farms.
4. Diversification: Farmers are turning to alternative income sources such as tourism, including running B&Bs, camping and caravan sites, and craft shops.

Arable Farming in East Anglia

The main type of farming in East Anglia is commercial arable farming, focusing on cereals (mainly wheat and barley) along with root crops (potatoes and sugar beet) and vegetables (peas and beans).

Physical Inputs

* Rainfall: The region has the lowest rainfall in the UK, with under 650 mm annually. However, rainfall mainly occurs during the summer growing season.
* Climate: Warm, sunny summers are ideal for ripening crops, while frosts during the cold winters help break up the soil.
* Topography: The land is gently undulating and low-lying.
* Soil: Fertile, deep, and well-drained soils are primarily alluvium deposits from rivers or boulder clay deposited during the Ice Age.

Human Inputs

* The flatness of the land has supported the development of a good transport network, with roads and railways connecting East Anglia to large urban markets in southeast England. This infrastructure saves time and costs, making it easier to transport perishable goods in bulk.
* The land is highly suitable for large-scale mechanization using equipment like combine harvesters and sprayers, and the region has access to considerable capital for investment.

Variable Inputs

* Droughts can occasionally occur during summer.
* Changes in government or EU policies (e.g., subsidies).
* Diseases affecting crops.

Processes

* Processes include ploughing, harrowing, weeding, applying fertilizers, pesticides, and herbicides, and maintaining machinery and field boundaries.

Outputs

* The primary outputs are wheat, barley, sugar beet, potatoes, peas, and beans.

Recent Changes in Farming

1. Larger Farms: Encouraged by the EU.
2. Larger Fields: Facilitated by the removal of hedgerows to accommodate larger machinery.
3. Increased Fertilizer Use: To boost productivity.
4. Reduced Subsidies: To reduce overproduction in the EU.
5. Set-Aside Land: End of subsidies for leaving land fallow, promoting alternative land uses.

Shifting Cultivation in Amazon Rainforest

The text discusses shifting cultivation, a traditional farming method practiced in parts of the tropical rainforests. In this method, small areas of rainforest are cleared and burned, and crops like manioc, yams, peppers, pumpkins, and beans are planted in the fertile soil. After a few years, the land is abandoned and left to recover, allowing the rainforest to regenerate. This practice is considered a sustainable form of development as it allows the ecosystem to thrive. However, recent changes like deforestation for logging, ranching, and other activities are threatening the traditional way of life of the Amerindian tribes who practice shifting cultivation. These changes can lead to loss of fertile land and erosion, making it difficult for the tribes to continue their sustainable farming practices.

Plantation agriculture in Malaysia

The text discusses commercial farming in Malaysia, focusing on the transition from rubber to oil palm plantations. Rubber plantations, initially established by British settlers in the 19th century, were labor-intensive and required significant capital investment. However, declining demand and competition from synthetic rubber led to a decline in the rubber industry.

In the 1970s, oil palm plantations emerged as a more profitable alternative. They offer higher yields, lower labor costs, and a wider range of uses, including food, cosmetics, and biofuels. This shift has had significant economic and environmental consequences, as more land is being converted to oil palm cultivation, impacting food production and biodiversity.

Kenya

The text explores the impact of the global market on subsistence farming in Kenya. It highlights how the demand for fresh produce in richer countries has led to a shift from small-scale subsistence farming to large-scale commercial agriculture. This transition has resulted in the conversion of farmland to cash crops, which can lead to food shortages for the local population. Additionally, the use of new technologies and chemicals in commercial farming can have negative environmental consequences, such as water pollution and loss of biodiversity. While this shift can bring economic benefits to Kenya, it is essential to consider the trade-offs and ensure that the needs of the local population are not neglected.

Egypt

The text discusses the impact of the Nile River on ancient and modern Egypt. It highlights how the annual flooding of the Nile, which deposited fertile silt on its floodplain, played a crucial role in the development of Egyptian civilization. Ancient Egyptians grew a variety of crops like wheat, millet, maize, flax, cotton, sugar cane, fruits, and vegetables using irrigation techniques like the sequoia wheel and shaduf.

However, the construction of the Aswan Dam, while controlling the flooding and providing water for crops throughout the year, has also led to problems like the loss of fertile soil, salinization of the land, and water pollution. Additionally, the shift towards growing more crops for export has reduced the availability of food for domestic consumption.

Subsistence rice farming in the Lower Ganges Valley

The rivers Ganges Flows South-Eastwards from the Himalayas. The alluvium (silt) which it carries from the mountains has been deposited over many centuries to form, east of New Delhi, a flat plain ad, where it enters the Bay of Bengal, a large delta. The plain and delta is one of the most densely populated parts of the world. Many of the people who live here are substance farmers, growing mainly rice on an intensive scale. Despite their exceptionally hard work, many farmers can only produce enough food for their own family and, perhaps, village. Rice, with a high nutritional value, can form over three-quarters of the total local diet and is a sustainable form of farming.

Physical Inputs - Wet Padi, a variety of rice, needs a rich soil. It is grown in silt which is deposited annually by the Ganges and its tributaries during the monsoon floods. This part of India and Bangladesh has high temperatures, over 21\*C, throughout the year, and the continuous growing season allows two crops to be grown annually on the same piece of land. Rice, initially grown in nurseries, is transplanted as soon as the monsoon rains flood the Padi-fields. During the dry season, when there is often insufficient water for rice, either vegetables or a cereal crop is grown.

Human inputs - Rice growing is labor intensive. Much manual effort is needed to construct the bunds around the Padi-fields, to build irrigation canals, to prepare the fields, and to plant, weed and harvest the crop. Many farms especially nearer the delta, are very small. They may only measure 1 hectare and be divided into 12 or 15 plots. The smallness of the farms and the poverty of the people means that poverty of the people means that hand-labor has to be used rather than machines. Water buffalo provide manure and are used in preparing the Padi-fields.

Processes - Planting rice in nursery; ploughing and transplanting rice into Padi-field; harvesting rice, planting winter wheat, harvesting wheat; growing vegetables; looking after chickens.

Outputs - Rice and some wheat, vegetables chickens.

Recent Changes

Land Reform: Many farms in the Ganges Basin are very small and broken up into tiny plots that are spread all over the area. This makes efficient farming difficult. Many of the poorest farm workers have no land at all and live in poverty. In contrast, a few wealthy people own much of the farmland. Three aims of land reform are to increase farm size for those with little land, to give any surplus land to landless farm laborers, and to set an upper limit to the amount of land that a wealthy family can own.

Green Revolution and HYVs: The Green Revolution refers to the application of modern, Western-type farming techniques to LEDCs. It began with the development of high-yielding varieties (HYVs) of cereals—new varieties of maize and wheat in Mexico and rice in the Philippines (the latter increased yields by 6 percent in the first year). Although the new seeds were faster growing and disease resistant, they needed large amounts of fertilizer and pesticides, making farming less sustainable. The successes and failures of the Green Revolution are given in Figure 7.41.

Appropriate technology: This is technology suited to the needs, skills, knowledge and wealth of local people (pages 127 and 150). In the Ganges Basin this includes the building of simple, easy-to-maintain water pumps, projects that use human labor rather than machines such as tractors, low-cost irrigation schemes instead of building large dams, and the use of animal manure rather than chemical fertilizer. Such schemes are said to be sustainable (page 184) because they are affordable and help to improve people's standard of living and quality of life without damaging the environment.

Successes and Failures of the Green Revolution

Successes:

* HYVs have increased food production. For example, India, which used to experience food shortages until the 1960s, became self-sufficient in cereals.
* The increase in yields led to a fall in food prices.
* Faster-growing varieties allow an extra crop to be grown each year.
* Yields are more reliable as many new varieties are more disease resistant.
* Higher yields allow other crops, notably vegetables, to be grown, adding variety to the local diet.
* HYVs allow the production of some commercial crops.
* HYVs are not so tall as traditional varieties, enabling them to withstand wind and rain.
* Many of the more well-off farmers who could afford seed, fertilizer and tractors, have become richer.

Failures:

* HYVs need large amounts of fertilizer and pesticides which increase costs, encourage the growth of weeds, and can harm water supplies (page 108).
* HYVs need a more reliable and controlled supply of water. They are more vulnerable to drought and to waterlogging. Irrigation, where used, increases costs and can cause salinization (page 105).
* HYVs are more susceptible to attacks by pests and diseases.
* Many of the poorer farmers who cannot own the land they farm and cannot afford to buy seed, fertilizer and tractors, have become much poorer.
* Mechanization has increased unemployment and migration to the towns.

**Resources**

Oil spill in Alaska by Exxon Valdez

Energy and the environment

Oil exploration in the harsh arctic climate of northern Alaska began in the 1950s. In 1968, two years after exploration began there, North America’s largest oilfield was discovered at Prudhoe Bay (Figure 8.28). The field contains one-third of the USA’s known oil reserves and 12 per cent of its known gas reserves. However, before the oil could be used, a route and a method of transport had to be decided by which the oil could be moved south. Two routes were suggested.

1. By giant oil tankers through the Arctic Ocean and around Alaska. This route was rejected as being too dangerous (the northern ocean is ice-covered for most of the year), and not economically practicable, despite two trial runs by a supertanker.
2. By pipeline, 1242 km in length, southwards across Alaska to the ice-free port of Valdez. This route faced such enormous physical difficulties and environmental opposition that it took until November 1973 before the USA government finally gave the go-ahead for the pipeline to be constructed, and it was June 1977 before the first crude oil was pumped along it.

Physical problems and environmental concerns

Many of the physical problems facing the oil companies and the concerns expressed by numerous environmental groups in 1968.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Physical problems |  | Environmental concern |
| Isolation | No road in 1968 | vegetation | Tundra ecosystem very fragile |
| Climate | Temperatures of -50\*C in winter | Wildlife | Crosses caribou |
|  | Heavy snowfall 1-2m at Valdez |  | Near caribou breeding grounds |
|  | Fog, gales, icebergs |  | Might affect habitats of bears wolves and moose |
| Soil | Permafrost | Wilderness | Crosses or is adjacent to |
|  | Three months surface thaws | Local people | May be forced to sell their land |
|  | Building would raise temp and thaw | Oil spills | Major threat |
| Relieff | Pipeline had to go over three mountain ranges |  |  |
|  | Earthquakes zone – tsunamis on coast + 350 rivers to cross |  |  |

Challenges:

* Permafrost: The pipeline crosses permafrost, a layer of permanently frozen ground that can thaw and cause the pipeline to shift or rupture.
* Extreme Weather: The region experiences harsh winters with heavy snowfall and strong winds, and the pipeline must be able to withstand these conditions.
* Rugged Terrain: The pipeline traverses the Brooks Range, a mountain range with steep slopes and valleys.
* Wildlife: The region is home to caribou, moose, and other wildlife, and the pipeline must be designed to minimize its impact on these animals.

Solutions:

* Elevated Pipeline: The pipeline is elevated on stilts to prevent it from melting the permafrost and to allow wildlife to pass underneath.
* Sliding Shoes: The pipeline rests on "sliding shoes" that allow it to move horizontally during earthquakes.
* Insulation: The oil is heated to about 80°C to prevent it from freezing.
* Concrete Encasement: In some areas, the pipeline is encased in concrete to protect it from the elements and to prevent the ground from thawing.
* Pumping Stations: Pumping stations are located along the pipeline to maintain oil flow.
* Environmental Mitigation: Measures are taken to minimize the environmental impact of the pipeline, such as avoiding sensitive areas and restoring disturbed land.

**Exxon Valdez Oil Spill (1989):**

* Major environmental disaster caused by a tanker spilling 50 million tonnes of crude oil in Prince William Sound, Alaska.
* Contributing factors included captain's intoxication, lack of senior officers, and delayed emergency response by Alyeska Pipeline Company.
* Resulted in the pollution of 26,000 km² of ocean and the surrounding ecosystem.
* Environmental impact included deaths of 35,000 seabirds, 3,000 sea otters, and the destruction of local fisheries and marine ecosystems.
* Cleanup efforts were extensive but could not restore the ecosystem fully.

**Alaska’s Dependence on Oil:**

* Oil accounted for 85% of Alaska’s income for three decades.
* Revenue funded public infrastructure, services, and annual dividends for residents.
* Oil production peaked in 1987 and declined, prompting exploration of new areas like the Arctic National Wildlife Refuge.

|  |
| --- |
| **Arguments For and Against Oil Exploration in Alaska** |
| | **For (Economic and Social)** | **Against (Mainly Environmental)** | | --- | --- | | Oil provides most of Alaska's income, supporting jobs and public services. | Environmental groups advocate for the Arctic National Wildlife Refuge to remain protected from development. | | Revenue from oil funds schools, hospitals, and infrastructure like water supplies and roads. | Native American groups argue that the area should remain undisturbed to preserve traditional ways of life. | | Alaska’s oil contributes significantly to the U.S. energy supply, representing one-third of domestic oil reserves and one-eighth of total natural gas reserves. | High risk of oil spills, pipeline accidents, or tanker disasters that could devastate the fragile Arctic ecosystem. | | Many Alaskans view oil as essential for their prosperity and do not want to sacrifice economic development to protect a small population of caribou or wildlife. | Potential long-term damage to wildlife, including caribou, sea otters, and marine species, as well as the landscape and biodiversity of the region. | | Some policymakers and residents emphasize the strategic importance of domestic oil production for energy security. | Concerns over toxic waste from oil exploration and its impact on ecosystems, water sources, and communities. | |

The Exxon Valdez oil spill, 1989

Valdez is the ice-free port at the end of the Alaskan pipeline. The port was re-sited after the original one was destroyed by an earthquake in 1964. To reach the open sea from Valdez, oil tankers have no option but to follow a potentially dangerous route which takes them through Prince William Sound and then through a narrow gap between two islands.

When the long-feared disasters occurred on 24 March 1989, it was not due to any of the physical dangers shown but to human negligence and incompetence. Shortly after midnight the supertanker *Exxon Valdez,* 40km out of Valdez and carrying 50 million tones of crude oil, ran aground in near-perfect weather conditions on Bligh Reef. It was first assumed that the ship had veered off course to avoid an iceberg, but it was later discovered that the captain was drunk, and no senior officer was on the bridge at the time. The Alyeska Pipeline Company, which was supposed to react to such an emergency within five hours, did nothing for twelve hours … and then took the wrong advice and continued to do nothing. By 2 April, and after several days of bad weather, the oil covered 2600  and the slick extended 900 km from the wreck. At this stage, the Exxon Oil company, which owned the tanker but was under no legal contract to do anything, took over the cleaning – up operations. Exxon worked until the end of the year, at an eventual cost of 600 million dollars, before pulling out and leaving 60% of the spilled oil spill in Prince William Sound or along 1700km of coastline. Even in 1997, traces could be found in remote inlets, and the ecosystem had still to fully recover. The effect of the spillage on wildlife and the marine ecosystem was enormous. The bodies of 35000 seabirds and 3000 sea-otters were recovered. Likewise the local economy, which relied heavily upon fishing was badly hit as salmon hatcheries were polluted and deep- sea fishing ruined.

**Industry**

Iron and steel in South Wales pg. 138 – 139

The valley of South Wales was an ideal location for iron making. Coal and iron ore were often found together on valley sides and limestone was quarried nearby.   
They valley themselves led to coastal ports where iron products and surplus coal were exported to many parts of the world. This industry became centered on places like Ebbw Vale, and Merthyr Tydfil.

1850 there where 45 iron works in the area

In 1856 an improvement was made in iron smelting, which meant that it became economic to manufacture steel rather than the previously brittle iron.

After 1860 steelworks slowly began to replace iron foundries.

Reasons for change in location to Port Talbot are: M4 right nearby, can import iron ore and make it to sell, Coastal port right nearby too meaning no Break of bulk. High tech also there.

1970 only two steelworks left in South Wales. These located on the coast like at Port Talbot, this due to the initial advantages for making steel no longer existing.

Most coal had been exhausted so it was now needed to be important, made most sense to build new center of industry by coast to avoid break of bulk.

Break of bulk 🡪 When a product must be transferred from one form of transport to another, a process that takes up both time and money.

Coal iron and limestone fed into a blast furnace, resulted in things they could sell like car bodies.

Port Talbot is one of Britain’s three remaining Integrated works and uses all latest technology

Integrated 🡪 all the stages in the manufacture take place on the same site

Port is very vulnerable to government and EU policy.

M4 Corridor, pg. 140

High-technology industry 🡪 Industries developed within the last 25 years, and whose processing techniques often involve micro electronics

Footloose industries 🡪Can be put anywhere as they are not tied to any raw materials, like electricians, software development industry, jewelry industry, pharmaceutical industry

Two subdivisions of High-tech industry are:

The sunrise industries which have a high-tech base

Information technology industries involving computers, telecommunications and microelectronics.

The advantages of the M4 corridor, hosting microelectronics industries are:

1. The proximity of M4 and mainline railways
2. Presence of Heathrow Airport
3. Previous location and existence of government research location
4. Large labor force
5. Proximity of other relevant industries, all being on M4
6. Nearness to universities / research facilities
7. Attractive environment

If u have come this far its time to go to bed my love.

Sleep tight xxx