Bdst 2 topic 3: Natural Resources

natural resources-resources from the land, forests, water, minerals

What is coal used for in Bangladesh

- electricity generation / steel production / cement manufacturing / chemical industry / heating homes

Importance of coal

- need coal for industry
- for generating electricity
- can be exported/foreign earnings/GDP
- provides jobs for villagers
- encourage other industries to area
- reduce import bill

How can the use of coal help to reduce deforestation

- use in industry (instead of charcoal)
- example of industry – brickworks, cement, etc.
- for power instead of fuelwood
- energy for steam trains instead of wood
- less need for wood

The development of coal resources in Bangladesh is the best way to guarantee its future energy supply

- coal is cheap
- Bangladesh has coal reserves
- coal is efficient / produces a lot of energy
- gas will run out, need an alternative

Explain the importance of the forests to the people of Bangladesh

- construction/building materials furniture

- vehicle construction agricultural implements
- pulp and paper
- wood products - plywood, hardboard, etc fuel and firewood
- golpata (roofing)
- medicines
- limit soil erosion
- flood control
- climatic effects on rainfall
- employment

Explain how forests are important to the wildlife in Bangladesh

- Sundarbans, Royal Bengal Tiger etc. Habitat / shelter
- Food supply
- Endangered species
- Maintain biodiversity / ecological balance
- Interdependent plants / food chain

Describe two types of forest in Bangladesh

- Mangrove or tidal/with aerial roots because of changing sea levels/evergreen/cope with saline water.
- Evergreen tropical/hardwoods/tall or 45 to 60 M high/many species in forest/dense
- Semi evergreen/tall or 25 to 60 M/many species – more than evergreen forest
- Sal or tropical deciduous/much undergrowth/up to 20M high

State where each type can be found in the country

- Tidal along coast especially in SW and or SE.
- Evergreen mainly in Chittagong Hills/SE
- Semi evergreen Sylhet/Chittagong/ parts of Dinajpur
- Sal mainly on uplands/to north and east of Dhaka/also Dinajpur

Describe four uses of the forests.

- Fuel
- buildings or construction
- furniture

- vehicles
- paper
- biodiversity
- preventing soil erosion
- maintaining ecological balance etc

Mangrove Forests

- Mangrove or tidal forests
- roots branch above ground
- cope with changing sea level/
- grows in saline water
- evergreen
- pneumatophores or roots taking oxygen from air.
- located in the coastal areas of Sundarbans or Chittagong – Cox's Bazaar coast or seaward edge of islands in delta
- threatened by global warming by causing rises in sea level
- more severe typhoons for same reason
- possible disturbance by shrimp fishing

Why are mangrove forests found in coastal areas

Coastal areas are: Waterlogged / swampy Saline

- Roots snorkel for air / pneumetaphorus roots
- Strong root system
- Turn leaves to reduce transpiration
- Seeds can float
- Excess salt lost in old leaves
- Salt lost through glands in leaves etc

Explain why it is important to conserve the mangrove forests

- most productive of the forests
- buffer against storms, tsunamis, etc.
- protect coast from erosion
- diversity of wildlife
- important tourist area

- home of Bengal tiger
- source of fuelwood
- breeding ground of fish/shrimps

Describe the main physical characteristics of the Sundarbans

- barely above sea level / up to 0.91m / low lying
- flat relief
- saline soils / salty conditions
- tidally influenced lands / tidal forests
- pneumatophorus roots (which rise above the ground or water)
- evergreen in nature
- sundari main species / golpata
- small annual temperature range /c13–32 annual rainfall heavy/ usually over 2500 mm
- flooding during the rainy season

It is essential that Bangladesh manages its forests to prevent further reduction in the area covered

- very little forest and can not afford to lose what it has
- forests needed to protect against soil erosion
- need to maintain biodiversity
- combat climate change
- reduce flooding
- reduce risks of desertification
- encourage tourism
- maintain water table

It is necessary to maintain the forests of Bangladesh to prevent environmental problems

- leads to desertification Barind/NW
- soil erosion – leading to flooding
- reduction of rainfall – lack of evaporation from leaves
- climate change/global warming
- loss of habitat and species of plants and animals
- less flooding

Bangladesh must use all of its land, including the forests

- Large and growing population needs to be fed or housed
- timber can be valuable export
- other areas such as Burma (Myanmar) and Himalayas far more suited to being forested

Deforestation is unavoidable with the increasing population of Bangladesh

- more land needed for housing, agriculture, industry
- increased use of timber for housing, industry
- increased need for fuelwood
- expansion of shrimp cultivation

Suggest reasons for the distribution of the natural gas pipelines

- Links gas fields with cities
- concentration of consumers in cities
- industry in or near cities
- northwest not connected because of distance from gas fields
- credit reference to the off shore pipeline
- accept generation of electricity near to cities

Describe three uses of natural gas in Bangladesh

- Production of fertilisers
- generates electricity
- power machines in factories
- power light and equipment in offices and homes
- compressed natural gas or CNG used for cars or transport

Why is natural gas important to Bangladesh’s development

- power – electricity
- industry – fuel for boilers, kilns, ovens
- feedstock for chemical industries – fertilisers
- no imports necessary
- transport
- export
- reserves for future

Suggest reasons for the changes in the production of natural gas

- Growing demand from increasing population
- growing industry
- increased production of fertilisers
- discovery of additional reserves of gas
- extending pipeline network to reach more people
- many companies investing in Bangladesh's gas.

Describe the advantages of these types of natural gas production companies

State:

- production can be linked to needs of Bangladesh
- profits go to state to improve infrastructure and services
- prices will not fluctuate
- gas can be conserved for future use
- profits do not go overseas

Multinational:

- bring expertise and experience from other areas
- newest technology
- access to finance from other countries
- money not lost through corruption
- sale of gas overseas with taxes paid on earnings

What are the problems of extracting gas from the off-shore fields in the Bay of Bengal

- high cost
- lack of technology
- rough seas/poor weather – cyclones, etc

Describe two problems which could develop if production keeps on rising

- reserves will run out more quickly
- fewer reserves for the future
- contribution to global warming

- accept price rising as becomes scarce

Bangladesh should increase its production of natural gas so some can be exported

- Poor country which needs the income
- rising world prices could bring many benefits for Bangladesh
- money needed for e.g. health or education or infrastructure
- money enables development so Bangladesh can diversify its industries

- Bangladesh needs more income for development / increase GDP Foreign exchange earnings
- Rising world prices benefits Bangladesh
- Money needed for education / health / infrastructure
- Money for diversification

Bangladesh should invest in new gas fields for domestic use

- Demand for energy is increasing
- More energy (is needed) for industry / electricity
- Gas is cheap
- Bangladesh has large gas reserves
- Gas is efficient / produces a lot of energy
- Can increase fertiliser production
- Which helps increase food production

Bangladesh should strictly limit the amount of gas produced each year

- Finite resource
- needs to be conserved for future
- prices will increase as global supplies decrease
- other more sustainable sources of energy need to be developed
- Bangladesh needs the gas for its own development
- accept reference to problems caused if gas used up quickly etc.

Name two products that can be made from oil

- transportation fuel – Petroleum/gasoline/diesel/aviation fuel (fuel needs qualifying) energy – electricity/heating/lighting
- (petro)chemicals
- plastics
- fertilisers
- synthetic fibres(nylon, etc)/rope/rubber detergents
- lubricant

Why is the discovery of new oil fields important to Bangladesh

- save on imports
- new source of energy/present supplies low
- new raw material for industry
- possibly export oil/products
- earn money/increase GDP
- not dependent on other countries when a crisis arises

Why will foreign consultants be needed by the company drilling for oil

- lack of knowledge/training/unknown area of expertise
- lack of technology/machinery
- may need investment/capital

Explain what is meant by the term ‘biomass’.

- Organic matter (or living matter) on earth’s surface – trees, animals and plants

sources of biomass

- Wood
- Dry leaves
- Sawdust
- Dung
- Crop residue / agro waste / rice husk / jute stick / sugar-cane bagasse
- Biogas

solid biomass – trees, crop residue, animal and human waste domestic use

biogas – digest animal waste/dung to produce methane gas domestic use

liquid biofuels – organic materials (sugar cane, etc) to produce a liquid fuel ethanol/fuel for vehicles

Advantages of biomass

- biogas and liquid fuel cleaner than solid biomass
- cheap to collect solid biomass around home/farm) cheap by itself once only = 1
- cheaper than imported fuels
- not subject to load shedding/shortages
- use residue as fertiliser
- cleaner than fuelwood/less harm to environment
- readily available/abundant/found naturally
- sustainable/renewable

What are the disadvantages of using biomass in rural areas

- Deforestation - threat to ecological balance
- Atmospheric pollution - greenhouse gases
- Lack of cow dung for fertilizer
- Need large number of cattle to supply one family (idea) / not very efficient
- Poisonous fumes (domestic)

Name two types of biomass found in Bangladesh other than dung.

- Sugar cane/jute/buffalo/cattle or other relevant examples. Accept generic terms such as ‘trees’, ‘plants’ etc

Describe how a biomass digester works

- Dung collected from animals
- placed in digester
- no air or anaerobic
- ref to quantities
- dung decomposes or breaks down
- methane gas given off

- remaining waste or slurry is treated for use as fertilizer

The widespread use of digesters could play a big role in helping to solve Bangladesh's energy problem.

- Dung is plentiful
- provides cheap gas
- provides fertiliser for land
- cheap – doesn't require expensive machinery
- no need for expensive imports
- accept 'could be used to generate electricity'

Digesters are useful but they are not the answers to Bangladesh's energy problems.

- Dung needs collecting
- there is some cost to establishing the equipment
- not appropriate for large cities where dung is less available
- no use for powering electrical machines
- not appropriate for industrial supplies of power

Describe two domestic uses of water

- Washing clothes
- Drinking water
- Cooking
- Cleaning home
- Personal hygiene

Explain two ways in which Bangladesh has improved its domestic water supply

- Allow points about increased or improved water supply
- Legislation / government action Piped water / WASA
- More tube wells
- Dams and reservoirs
- Tunnels and waterways
- Deep-bore wells / >150 m
- Household arsenic filters / free water filters from charities

- Water purification plants
- Rainwater collection
- International agreements

Explain why rivers are an important form of transport in Bangladesh

- large network of rivers/rivers everywhere
- well connected to rest of transport system
- cheap means of transport
- natural/environmentally friendly
- 2/3 country flooded during monsoons – roads/railways limited use
- 2/3 country flooded during monsoons – provide aid/essential services
- roads and railways expensive to build/maintain
- roads congested/traffic jams/pressure on roads
- main towns/commercial centres on river banks
- villages not always accessible by roads/poor quality roads
- large amount/bulky goods carried
- ferries instead of bridges
- inland ports

Advantages

- Extensive
- Environmentally friendly / non-polluting Cheaper
- Able to transport bulky items

Disadvantages

- Slow
- Not always connected to other cities Flooding
- Drought

Hydro-electric power could greatly improve Bangladesh's electricity supply

- cheaper than coal/oil/gas
- renewable/gas running out
- necessary physical features – hilly, high rainfall, fast flowing rivers – available in parts of NE and SE
- 15 rivers identified as having potential for HEP

The scope for increasing the generation of hydro-electric power is very limited in Bangladesh

- only 1 HEP station at Kaptai
- majority of land low and flat/most rivers in final stage
- need to use dams built in neighbouring Myanmar
- causes displacement of people
- expensive to build

What is meant by the term ‘aquaculture’

Water which is managed especially to encourage fish to breed and grow or similar/allow fish farming.

What is aquaculture?

- fish farming/cultivation/rearing
- use of ponds, tanks, lagoons, etc. to rear fish
- use of breeding techniques, nutritious feed, research, etc.

Suggest two reasons why there are large numbers of fish in the Bay of Bengal

- absence of ocean current in the Bay of Bengal
- great volume of fresh water added from rivers
- mixing of fresh and marine waters creates one of the world's biggest brackish-water zones
- huge mass of organic and inorganic nutrients added to the Bay of Bengal by rivers

Describe two methods of fishing in Bangladesh

- Traditional fishing boats with nets and or long lines
- trawlers for open seas with powerful engines which can bring in large catches
- traditional use of bamboo poles or other rods
- methods can refer to types of craft and – or method of capturing fish

Describe methods of inland fishing.

Capture/caught:

- in shallow waters

- rafts/small boats
- use bare hands
- lines/rods and traps of bamboo
- nets of different meshes
- allow traditional names

Aquaculture:

- improved breeding and feeding techniques
- use derelict ponds, irrigation canals, roadside ditches

Polycultures:

- e.g. poultry-fish, rice-fish
- tidal areas – rotation of aquaculture and agriculture
- tidal areas – high salinity – shrimps reared, low salinity – rice grown

Describe two differences between marine and inland fishing.

Marine:

- at sea/in salt water
- larger/powered/specialised vessels needed e.g. trawlers
- mackerel, dogfish, shark, ray

Inland:

- fresh water
- use rods and small nets/small/traditional boats
- carp, catfish, shrimps, tilapia
- cultured, aquaculture, genetically engineered species

Why has it been difficult to increase the amount of fish caught in the marine fishing industry

- short marine fishing season October – March because of adverse weather conditions
- lack of modern methods/need modernised boats/advanced tools
- most traditional boats with small engine – limited to coastal fishing
- over-exploitation of fish in coastal waters
- need for conservation and management
- many fishermen poor – cannot afford to expand/receive no loans
- many fishermen illiterate – do not try new method

Disadvantages of marine fishing

- There are already too many fishermen which has adversely affected their income.
- Overfishing / depletion of fish stocks

Using more large mechanised fishing boats (trawlers) is the best way to increase fish production in Bangladesh

- Most fishermen use non-mechanised / low-cost craft and unskilled workers
- Big trawlers catch more fish
- Bigger boats are safer – the marine fishing season is from October to March – when the sea is rough
- Bangladesh has a vast fishing zone – Bay of Bengal / coastline c480 km/territorial water c20 nautical km from coast – area of the marine fisheries zone is more than 200 000 sq.km.

Developing aquaculture (fish farming) is the best way to increase fish production in Bangladesh

- development of nutritious fish feed
- improvement of breeding techniques and new culture practices for indigenous and endangered species can increase the aquaculture production
- genetically engineered species can increase aquaculture production development of aquaculture in derelict ponds, irrigation canals, roadside ditches and floodplains can increase fish production
- rotation of aquaculture and agriculture can be practiced / During times of high salinity, marine shrimp and fin-fishes are cultured. In times of low salinity, the areas are used to grow paddy rice. Note: known locally as the bheri / gher culture
- aquaculture is sustainable

Why is aquaculture important to the people of Bangladesh

- increase in fish types available
- price of fish reduced
- supplements diet/source of food
- provides protein
- rotation with agriculture/rice in tidal and mangrove areas when floods
- increase fish production
- export earnings

- provides jobs/employment/living
- provides income sustainable

‘Developing aquaculture inland is the best way to increase fish production in a sustainable way.’

- Much of country is under water for at least parts of the year
- many rivers and – or lakes in Bangladesh
- more control over process
- fish are then caught nearer to population
- much easier or cheaper or safer than fishing at sea or on rivers
- less reliant on expensive technology
- water in padi fields
- water in irrigation ditches
- water in derelict ponds
- appropriate for intensive subsistence agriculture
- therefore of benefit to majority of population
- fits with agriculture when water recedes
- GM species may help
- gher culture
- good source of protein for rural dwellers etc.

‘Developing aquaculture inland is not the best way to increase fish production in a sustainable way.’

- Amounts caught may be small
- not appropriate for commercial fishing because of distance to markets and or due to small scale
- shrimp aquaculture can lead to increased salinity
- this in turn can lead to death of trees
- no tradition of fishing for many inland communities
- marine fishing could be much more productive
- marine would increase exports of fish
- taxes could be used to improve rural infrastructure
- problem with ponds, padis– fish could be lost during flooding, due to delayed rains, etc.

Disadvantages of aquaculture

- Aquaculture is contributing to the spread of fish diseases as a result of: overstocking

- overfeeding the stock
- using too much fertiliser (in context of alternating agriculture and aquaculture)
- monoculture
- poor pond management

What is meant by ‘sustainable development’

- to meet needs of generation whilst preserving resources for future generations
- careful use of resources
- not causing damage

Sustainable development-development that meets the needs of the present, without compromising the ability of future generations to meet their own needs

sustainable development

- achieving development without harming the environment
- careful use of resources
- does not use up/deplete all resources
- possible for development to continue/enough left for future

Explain how the sustainable development of natural resources can be achieved

Forests:

- use of biogas/biomass so trees not cut down
- other building materials used
- reforestation
- afforestation
- controlled logging/use of licences/limits imposed
- conservation

Fish:

- Restocking
- quotas allotted
- aquaculture

Energy:

- use of HEP not fossil fuels renewable power – wind, solar, etc

education/awareness

The development of renewable energy in Bangladesh is the best way to guarantee its future energy supply

- renewable energy will not run out
- Bangladesh has potential for solar energy
- Clean / non-polluting / green / eco-friendly
- Improved technology for renewables