on these slopes can grow at higher altitudes than on north-facing slopes. Evapotranspiration rates as well as temperatures are lower on north-facing slopes.

Slope

Slope angle affects rates of erosion and use of machinery. Slope also has a significant impact on soil depth and drainage and thus the crops that can be grown. On steep slopes, soils are often thin, poorly developed and excessively drained. Soils at the base of a slope can become waterlogged. On gentler slopes there is less movement of water through the soil and as a result less erosion and **leaching**.

Activities

1 Various theories and models have been put forward to explain the location of farming types. Research one such theory, such as the optima and limits model (McCarty and Lindberg), locational rent theories or the theory of three agricultural revolutions in the UK. Summarise your chosen theory.

2 Modern technology can be used to combat problems with the physical environment such as infrared technology in Kenya and famine early-warning systems (FEWS) in the Sahel. Research an example of the use of modern technology to combat problems with the physical environment in an AC and an LIDC.

The social, economic and political factors affecting food security

Land ownership

Farmers may be owner-occupiers, tenants or landless labourers/employees on state-owned farms or on commercial enterprises. There are many different types of land ownership (Table 13.8).

Fieldwork idea

An investigation of the factors affecting food production on a located farm

The success of farm studies is highly dependent on the help and co-operation of the farm owner or manager. A local contact can be used or the organisations listed below offer support to schools in finding a suitable farm:

- Farms for schools – www.farmsforschools.org.uk
- Farming and countryside education – www.face-online.org.uk

a) Fieldwork focus: the range of factors – physical, human and political – which explain production, i.e. what is grown, where, in what quantity and why.

b) Primary data can include:

- **i)** mapping of field use and layout – 1:10,000 map, classification agreed in class or researched (AC – arable cereals, SA set aside, etc.)
- **ii)** soil sampling – texture, organic content, soil profiles
- **iii)** slope study – using clinometers and ranging poles
- **iv)** soil infiltration – inserting a section of plastic piping into the ground, filling it with water and measuring the fall in water level in 1 minute intervals.

c) Supporting secondary data on government policy, soil and climate can be researched using, for example:

- National Farmers Union – www.nfu.org.uk
- Natural England – www.gov.uk/government/organisations/natural-england
- Countryside Grant and Stewardship Schemes – www.defra.gov.uk
- Soil Association (for maps and theory) – www.soilassociation.org

d) Qualitative data – written transcript of interview with the farm manager.

Table 13.8 Global examples of land ownership

Russia	China	Bangladesh
In 2001 President Vladimir Putin sought to address the issue of land ownership in Russia. Regarding agricultural land, overall, the demand for private ownership has been low. In some regions where farmers have purchased their own land, such as Saratov and Tatarstan, farming has become more productive. Private farmers now total 26,000 in Russia, but the vast majority of land remains under state ownership.	China has gone through several types of land ownership: • Pre-1949 – small intensive farms, owned by absentee landlords, were worked by tenant farmers. They often paid half of their produce to the landlord. • Post-1949 – the Communist Party appropriated farmland and redistributed it among peasant farmers. Output was low and so the farms were joined together into state-run communes. • 1982 – the commune system was abolished and farmers took out contracts with the government to farm land rent-free. After producing a quota they could sell any surplus and this improved food security. Farmers are now able to sub-let land.	**Share-cropping** is when the farmers have to pay a 'rent in kind' to the landowner in order to occupy the land. In Bangladesh this usually involves an arrangement where the landlord supplies fertilisers, seeds and machinery in exchange for a share of the harvest, which is usually 50 per cent plus. As a result, many farmers remain poor and are food insecure.

Capital

In ACs, farming is **capital intensive**, with investment supplied by banks, private investments and governments. In LIDCs there is often a shortage of capital leading to **labour-intensive** methods of farming. This situation can limit output and lead to food insecurity.

Competition

Competition is a crucial dimension of food security. There are two main issues:

Competition in food markets

The growing dominance of retail chains, agribusinesses and TNCs means a lack of competition in food markets. This leads to concerns over the prices paid to farmers for their produce and the prices consumers must pay for food, particularly the poorest income groups in both ACs and LIDCs who spend a high proportion of their income on food.

In addition, where increased competition in agricultural trade does exist between ACs and LIDCs, any comparative advantage of producers in LIDCs is often off set by the ability of ACs to offer subsidies, for example in the European market where this resulted in food surpluses and low global prices.

Competition for scarce resources

Food producers are experiencing greater competition for land, water and energy resources. Increasingly agricultural land has been lost to urbanisation and government decisions to grow biofuels on good quality agricultural land.

Technology

Technological developments such as new strains of seeds and fertilisers, advances in mechanisation and land management such as new methods of irrigation can improve production. ACs are more able to take advantage of technological innovations than LIDCs, thanks to their greater capital reserves and expertise. In LIDCs, appropriate technology is a more effective way to reduce food insecurity – for example, small-scale drip irrigation schemes based on bore holes rather than huge multi-purpose dams, and simple tools manufactured locally rather than tractors, grain dryers and combine harvesters.

Land grabbing

Land grabbing refers to the acquisition of farmland in developing countries by other countries seeking to ensure their own food security. A number of 'push' factors, such as water scarcity, export restrictions on major producers and price fluctuations in global markets, have forced countries short of productive land and water, such as China and India, to find alternative ways of sourcing food (Table 13.9). As a result, poor people in the target country risk losing access to the land and food supplies on which they themselves depend.

The main investors in Table 13.9 form two groups:

- countries with land and water constraints but rich in capital, e.g. the Gulf states
- countries with large populations and food security concerns, e.g. China and India.

Benefits to target countries include the creation of local employment, the development of rural infrastructure, the resourcing and introduction of new agricultural technologies, the creation of local food surpluses and enhanced food security.

But there are disadvantages for target countries – for instance, local farmers may be displaced from their land with no prospect of alternative employment, and the creation of unequal power relations between

Table 13.9 Overseas land investments to secure food supply in Africa (Source: IFPRI)

Target country	Investor country	Nature of the deal
Democratic Republic of Congo	China	2.8 million ha for biofuel
Ethiopia	India	$4 billion invested for growing of flowers and sugar
Kenya	Qatar	40,000 ha for fruit and vegetable cultivation in exchange for funding a $2.3 billion port
Malawi	Djibouti	Unknown area of farmland
Mali	Libya	100,000 ha for rice
Mozambique	China	$800 million investment for rice
Sudan	Egypt	Land for 2 million tonnes of wheat annually
Sudan	Jordan	25,000 ha for crops and livestock
Sudan	Kuwait	Unknown
Sudan	Qatar	Unknown
Sudan	Saudi Arabia	10,000 ha for wheat and vegetables