

#### **4.0 HUMAN ACTIVITIES**

##### **4.1 Drivers and Pressures**

The key drivers inducing environmental pressures on the status of the waters and facilities of the South Eastern River Basin District are an increase in human population coupled with greater demand for production from all industrial sectors as the national economy has been growing.

Ireland's population reached its lowest recorded census figure of 2.82 million in 1961 after a long period of decline caused by high emigration; however, since 1961 the population has increased by approximately 39% to 3.92 million in 2002. Continued population growth is expected although the population is becoming more urbanised with rural areas becoming residential areas for a commuting population and some rural areas suffering from population loss. The rural fraction of the population in Ireland has been decreasing from 67% rural to 33% urban at the start of the 20<sup>th</sup> century to less than 40% rural population at present.

According to the EPA's Environment in Focus Report (2002) Ireland's record GDP growth in the late 1990's is linked to similar growth in the volumes of household and commercial waste placing demand on existing facilities and infrastructure.

The level and distribution of human activities are drivers which can induce environmental pressures, with significant potential to impact on water quality and quantity. The Department of Environment and Local Government developed the National Spatial Strategy for Ireland (NSS) in 2002. The Strategy is a twenty year planning framework designed to achieve a better balance of social, economic, physical development and population growth between regions. An important measure in aiming to achieve this balance has been the identification of gateways and hub centres. Within the South Eastern River Basin District the Strategy identified Waterford City as a gateway and Kilkenny City and Wexford Town as supporting regional hub centres.

These anthropogenic pressures are generally considered in terms of point or diffuse sources. Point sources are associated with WWTP, industrial outfalls, storm overflows and landfills. Water abstraction is also considered as a point pressure. Farmland runoff, forestry, peat extraction and other land uses are considered diffuse activities. Farmyard discharges and rural septic tank discharges are point based activities however due to difficulties in identifying the locations of these on a catchment-wide basis, these discharges are generally considered to contribute to diffuse pollution.

##### **4.2 General Description of Human Activities within the South Eastern River Basin District**

The South Eastern River Basin District has had a traditionally strong rural dimension but in recent years increasing portions of the population are locating within urban areas, particularly those located on the main arterial routes from the Dublin Metropolitan area.

Agriculture is still one of the south east region's main activities, particularly tillage and dairying enterprises. Agricultural related industries include slaughterhouses, agricultural machinery and services related industries and sugar refining. The importance of agriculture to the overall wealth of the local economy is not reflected in the direct employment figures as both food manufacturing and service industries are interrelated and partly dependant on agricultural activity.

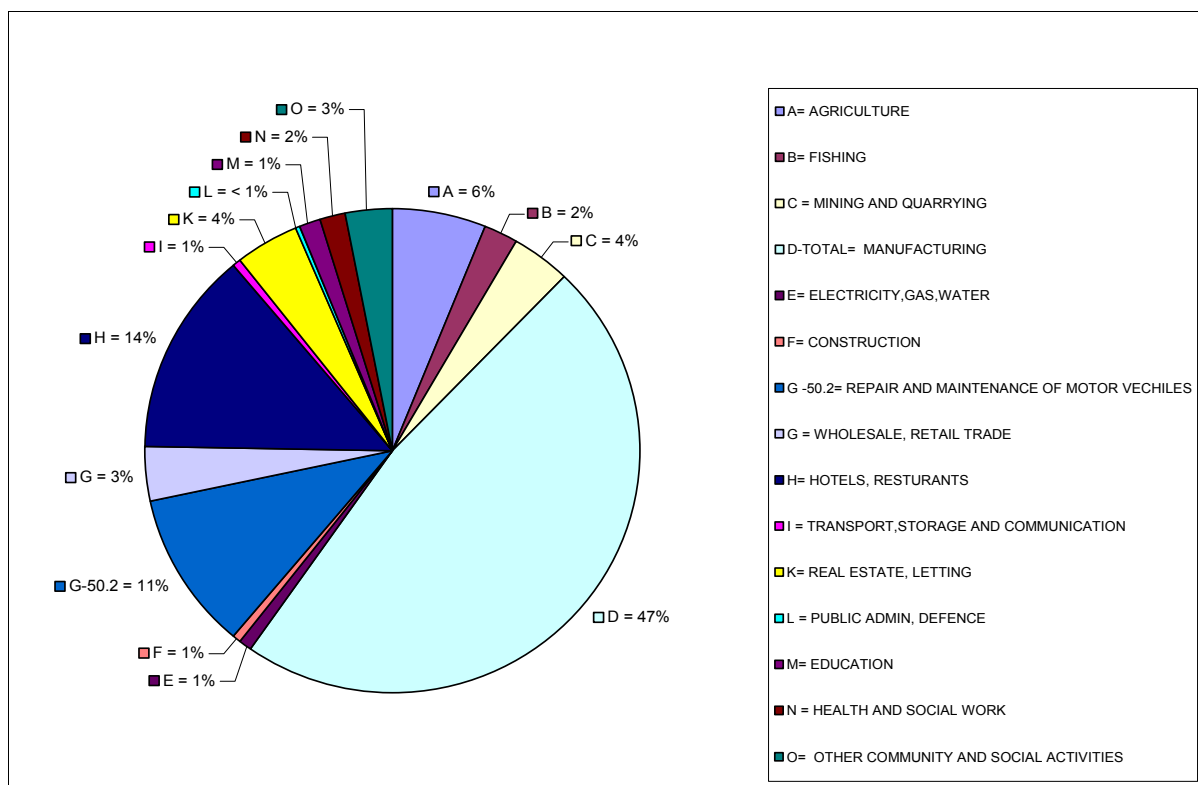
Throughout the counties within the South Eastern River Basin District agriculture generally accounts for between 15 and 25% of all employment. Employment trends in the agricultural sector are decreasing with more people becoming part time farmers or leaving agriculture for other occupations.

The 1996 census indicated that employment is likely to decline in the agricultural sector, with reliance growing on the industrial and service sectors. Light industry and commercial businesses are mainly centred around urban areas.

Manufacturing accounts for less than 25% of employment in all counties within the South Eastern River Basin District.

Generally less than 50% of the population in 1996 was employed in all service sectors.

In the South Eastern River Basin District there are a total of 379 licensed industries, 111 IPC industries, 128 Section 4 industries and 140 Section 16 industries. All the Licensed Industries within South Eastern River Basin District were classified in accordance with the NACE – Classification of Economic Activities in the European Community. Figure 4.1 shows the percentage of licensed industries activities in the South Eastern River Basin as classified under the particular NACE categories.



**Figure 4.1 Proportion of Licensed Industry by NACE Classification within the South Eastern River Basin District**

47% of the licensed Industries in the South Eastern River Basin District fall under the manufacturing category with approximately half of these are involved in the manufacturing of food and beverages.

Hotels and restaurants account for 14% of the total industries in the South Eastern River Basin District. All of these recreational industries are Local Authority licensed with approximately one third having discharges to waters and licensed as Section 4 industries.

11% of industries licensed in the river basin are associated with the repair and maintenance of vehicles. This category mainly comprises service stations and car washing facilities and all sites are licensed by Local Authority mostly as Section 16 discharges.

6% of the industries in the South Eastern River Basin District are associated with agriculture; most of these are IPC licensed piggeries.

4 % of the industries in the South Eastern River Basin District are associated with mining and quarrying.

The remaining 18% include activities such as fishing, electricity, construction, wholesale, transport, defence, education, health and social work and other community activities.

**Risk Assessment**

This initial characterisation report identifies, as far as possible, the point and diffuse activities within the South Eastern River Basin District, this first pass will form the basis of the Project's risk assessment identifying the most significant pressures which will be developed during 2003.

**4.3 Point Source Activities within the South Eastern River Basin District**

As part of the initial characterisation exercise for the South Eastern River Basin District the Project team undertook an extensive data collection exercise to create an inventory of known point activities with the district. Registers, metadata and monitoring results (where available) were collated for the following activities:

- Wastewater treatment plants;
- Section 4 licensed industries discharging to waters;
- Section 16 licensed industries discharging to sewers
- Integrated pollution control licensed industries/activities;
- Licensed landfill sites;
- Water abstractions (serving more than 50 people or yielding over 10 m<sup>3</sup>/day).

These datasets were geographically referenced, creating for the first time, a verified GIS database of point sources for the entire South Eastern River Basin District. The Project has obtained a digital licence to enable the maps to be displayed on the Project website ([www.serbd.com](http://www.serbd.com)).

The data collection exercise also identified data gaps which are to be addressed during the Project.

**4.3.1 Waste Water Treatment Plants**

Register 4.1 and Map 4.1 identify the 95 WWTP within the South Eastern River Basin District with population equivalent above 500. Upgrading works have recently been completed at various plants and further works are proposed at a number of sites throughout the river basin district. The agglomerations where schemes are proposed are highlighted in Table 4.2.

**Table 4.1 Proposed WWTP Schemes within South Eastern River Basin District**  
(Status: December 2002)

County	WWTP	Proposals or Recent Upgrades	Status
Carlow	Carlow Town (Mortarstown)	Recently upgraded to include nutrient removal	Completed in late 2002
	Muine Bheag	Currently under review by consultants	
	Tullogh	Currently under review	
	Hacketstown	Currently under review	
	Borris	Environmental Improvement programme.	Completed
	Rathvilly	Currently under review	
	Tinnahinch	Proposed to pump wastewater to Graiguenamanagh's new WWTP.	Constructions underway. Due to be completed July 2003.
	Leighlinbridge	Proposed to pump wastewater to Bagenalstown WWTP.	Advanced design stage.
Kilkenny	Ballyragget	Upgrade proposed.	
	Glemore	Upgrade proposed.	
	Mooncoin	Upgrade proposed.	
	Johnstown	Upgrade proposed.	
	Callan	Upgrade and Nutrient removal proposed.	
	Tulloroan	Upgrade proposed.	
	Dunnamaggan	Upgrade proposed.	
	Kilkenny (Purcellsinch)	Upgrade and Nutrient removal proposed. (Kilkenny WWTP)	Scheme to commence construction in 2004.
	Kilmacow	Upgrade proposed.	
	Goresbridge	Upgrade proposed.	
	Freshford	Upgrade proposed.	
	Kilmaganny	Upgrade proposed.	
Gowran	Upgrade proposed.		
Laois	Durrow	Upgrade proposed as part of Laois Group towns scheme.	Schemes to commence construction in 2004.
	Rathdowney	Upgrade proposed as part of Laois Group towns scheme.	Schemes to commence construction in 2004.
	Stradbally	Upgrade proposed as part of Laois Group towns scheme.	Schemes to commence construction in 2004.
	Clonaslee	Upgrade proposed as part of Laois Group towns scheme.	Schemes to commence construction in 2004.
	Mountrath	Upgrade proposed as part of Laois Group towns scheme.	Schemes to commence construction in 2004.
	Abbeyleix	Upgrade proposed as part of Laois Group towns scheme.	Schemes to commence construction in 2004.
	Portlaoise	Upgrade proposed. - Design Build Operate Contract.	Schemes to commence construction in 2004.
Tipperary South	Clogheen	New WWTP proposed ( South Tipperary Grouped DBO WWT Scheme)	Scheme to commence construction in 2003.
	Ardfinnan	New WWTP proposed ( South Tipperary Grouped DBO WWT Scheme)	Scheme to commence construction in 2003.
	Ballyporeen	New WWTP proposed ( South Tipperary Grouped DBO WWT Scheme)	Scheme to commence construction in 2003.
	Ballycleirhan	New WWTP proposed ( South Tipperary Grouped DBO WWT Scheme)	Scheme to commence construction in 2003.
	Carrick-on Suir	New WWTP proposed – Secondary treatment and Nutrient Removal. ( South Tipperary Grouped DBO WWT Scheme)	Scheme to commence construction in 2003.
	Clonmel	Upgrade proposed	
	Cahir	Upgrade of treatment plant. Design Build and Operate Contract.	Scheme to commence construction in 2003.
	Fethard	Upgrade of treatment plant. Design Build and Operate Contract.	Scheme to commence construction in 2003.
	Killenaule	Upgrade proposed. - Design Build and Operate Contract.	
	Kilshellan	Upgrade proposed. - Design Build and Operate Contract.	

<b>County</b>	<b>WWTP</b>	<b>Proposals or Recent Upgrades</b>	<b>Status</b>
	Cashel	Upgrade proposed. - Design Build and Operate Contract.	Scheme to commence construction in 2003.
	Mullinahone	Upgrading to Nutrient removal – Design Build and Operate.	2003/4
Waterford County	Dungrarvan	New WWTP proposed – Secondary treatment – DBO Contract.	Tender evaluation.
	Tramore	New WWTP proposed - Secondary treatment - DBO Contract.	Constructions due to start Summer 2003.
	Cheekpoint	Upgrade proposed.	
	Ardmore	Upgrade to secondary treatment as part of Group village scheme	Preliminary report stage –PR with DELG for approval
	Kilmacthomas	Upgrade proposed.	
	Ballingoul	Upgrade proposed.	
	Stradbally	Upgrade to at least secondary treatment as part of Group village scheme	Preliminary report stage –PR with DELG for approval
	Dunmore East	Upgrade to secondary treatment as part of Group village scheme	Preliminary report stage –PR with DELG for approval
	Ballyduff Lower	Upgrade proposed.	
	Dungravan Sludge Centre	New Centre proposed.	
	Aglish	Upgrade proposed.	
	Dunhill	Upgrade proposed.	
	Annestown	Upgrade proposed.	
	Clonea Power	Upgrade proposed.	
	Knockmahon	Upgrade proposed.	
Waterford City	Waterford City	New WWTP proposed. --Secondary treatment - Nutrient removal.	DBO documents.
Wexford	Wexford town	New WWTP proposed - secondary treatment with nutrient removal and UV disinfection.	Under construction due for completion Summer 2003
	Courtown	New WWTP proposed - secondary treatment.	Completed – opening Jan 2003.
	Rosslare Harbour	New WWTP proposed - secondary treatment.	Contract documents with the DELG for approval.
	Enniscorthy	Upgrade proposed. (Enniscorthy Main Drainage Scheme- Phase III )	Scheme to commence construction in 2004
	New Ross	New WWTP proposed – secondary treatment and provision for nutrient removal. (New Ross Main Drainage Scheme)	Scheme to commence construction in 2004.
	Gorey	Proposed to pump wastewater to Courtown WWTP.	Preliminary report 2002. Due for completion 2008.
	Rosslare Strand	Proposed upgrade to secondary treatment	Completed.
Kildare	Castledermot	New WWTP proposed - Secondary treatment and nutrient removal	Under construction due for completion May '03.
	Calverstown	Proposed upgrade – nutrient removal.	Design completed.
	Coildubh	New WWTP - nutrient removal	Under construction due for completion April 2003.
	Brownstown/ Suncroft/Cutbush/C urragh greater area	A new sewage disposal system by constructing pumping stations at various locations and pumping sewage into Newbridge and Osberstown.	Council has gone through Part 8 of planning procedure.
	Nurney	Upgrade proposed	
	Derrinturn	Upgrade proposed	Council applied for funding under Serviced Land Initiative (SLI) to upgrade it.
	Kildare town	Upgrade and interim works proposed	On-going.
	Monasterevin	New WWTP proposed.	With DOELG for funding
Offaly	Clonbulloge	Upgrade proposed - secondary treatment.	Construction due to start 2003.
Tipperary North	Templemore	Upgrade proposed –nutrient removal	Due for completion 2005.
	Thurles	Upgrade proposed –nutrient removal	Due for completion 2005.
	Borrisoleigh	Upgrade proposed –nutrient removal	Due for completion 2005.
	Templetuohy	Upgrade proposed –nutrient removal	Due for completion 2005.

<b>County</b>	<b>WWTP</b>	<b>Proposals or Recent Upgrades</b>	<b>Status</b>
Wicklow	Stratford	Currently under review	
	Donard	Currently under review	
	Dunlavin	Currently under review	
	Grangecon	Currently under review	
Limerick	Galbally	Upgrade proposed	Initial Planning stage

**Source: South Eastern River Basin District Local Authorities**

#### **4.3.2 Section 4 Licensed Industries**

Register 4.2 and Map 4.2 identify the 128 industries within the South Eastern River Basin District which discharge to water bodies, licensed by Local Authorities under Section 4 of the Water Pollution Acts.

Activities include aquaculture sites, quarries agriculture related activities (such as food processing and cattle marts), leisure and tourism facilities, pharmaceuticals, light manufacturing and engineering, hospitals, schools and food related industries.

Several Local Authorities are reviewing licenses and putting in place programmes to identify activities which are currently unregulated but should be licenced.

There is shellfish aquaculture associated in the following bays/estuaries – Wexford Harbour, Bannow Bay, Dungarvan Harbour and Waterford Harbour.

#### **4.3.3 Section 16 Licensed Industries**

Register 4.3 and Map 4.3 identify the 140 industries within the South Eastern River Basin District which discharge to sewer, licensed under Section 16 of the water pollution acts.

These discharges do not produce a direct load to watercourses but are catered for by the industrial population equivalent allowance for collection systems and downstream treatment plants, however, unregulated drainage from such industries to collection systems can effect treatment processes in downstream plants resulting in reduced operational efficiency or in the worst case failure of the plant treatment processes resulting in discharge of untreated industrial and domestic sewage.

Activities included within the Section 16 register for the South Eastern River Basin District include service stations, food processing, glassworks, livestock marts, restaurants, pharmaceuticals, creameries, light industry, hospitals and food and drink premises.

#### **4.3.4 IPC Licensed Industries**

The 111 industries and activities within the South Eastern River Basin District managed under IPC licenses are summarised in Register 4.4 and presented in Map 4.4 (5 licenses are still at the application

stage). Some of these industries discharge to sewers, others to watercourses or by land spreading and some have no aqueous discharge. Activities include, food and drink processing, intensive farming activities, mines and quarries, pharmaceuticals, manufacturing, forestry processing and peat extraction.

Map 4.12 and Register 4.12 present the current database of known mines, quarries and pits within the South Eastern River Basin District, including those that have IPC Licences, collation of this dataset is ongoing.

#### **4.3.5 Waste Management**

Fourteen licensed waste facilities including landfill sites and waste transfer stations within the South Eastern River Basin District are identified in Register 4.5 and shown on Map 4.5. This dataset will be expanded to include known disused and private landfill sites.

#### **4.3.6 Water Abstractions**

There are over 550 surface water and groundwater abstraction points within the South Eastern River Basin District providing more than 10 m<sup>3</sup> per day (average) or serving more than 50 persons and these are presented in Map 4.6. The sources include public, group and (where known) private supplies. The water abstraction register is still being developed and therefore has not been included in this initial characterisation report.

As an abstraction rather than discharge these activities are of interest as they may reduce water resource for other users (eg fisheries, impact on wetlands) or reduce assimilative capacity in the river to accept other discharges.

##### **Water Abstractions**

The DELG has commissioned a National Drinking Water Monitoring Programme to create a more comprehensive inventory of abstractions – this data will be available in early 2004.

#### **4.4 Diffuse Source Activities within the South Eastern River Basin District**

GIS datasets were also collected as part of the initial characterisation exercise to provide information on land use activities within the South Eastern River Basin District. These datasets included Corine land cover image 1990 (CLC 2000 land cover image not digitally available at time of preparation of this report), agricultural census data 1991 (results of 2000 agricultural census not digitally available at time of preparation of this report), forestry information systems and Bord na Móna peat extraction records.

#### **4.4.1 Agriculture**

Agriculture is the main land use and industry within the catchment resulting in valuable national product and providing significant revenue and employment.

The key findings of the June 2000 Agricultural Census identify change in employment patterns and farming practice.

- The number of farms has decreased and the average farms size has increased between 1991 and 2000. There were 141,527 active farms in June 2000, compared to 170,578 in 1991 (a decrease in 17% of the number of farms). The average size of farm increased from 26.0 ha in 1991 to 31.4 ha in 2000.
- There were 1,177,452 dairy cows in June 2000 and 1,186,989 other cows. The corresponding figures in 1991 were 1,330,807 dairy cows and 817,302 other cows.
- The number of sheep was 7,555,000 in June 2000, which was some 15% below the 1991 figures of 8,888,000.
- There were 257,948 family and regular non-family workers engaged in farming in 2000 – a reduction of 17.5% on the 1991 figure of 312,729.
- In 1991, 45.1% of farmers were aged 55 or over, the age category represented 39.5% of farmers in 2000.
- In 1991, almost three quarters (73.4%) of farmers described farm-work as their sole occupation. This had fallen to 55.7% in 2000.

Changes have taken place in agricultural practices in response to agricultural policies, the reduction in the number of small farmers is an indicator of change and intensification within the sector.

The agriclimatic conditions in the south east of Ireland are highly suitable for tillage and grassland enterprises (ref Agriclimatic Atlas of Ireland). Traditionally therefore the south east has had a relatively high uptake of these enterprises in comparison to national distributions. However, according to “A survey of Fertilizer Use in 2000 for Grassland and Arable Crops” the occurrence of tillage has reduced in the south-east of the country since 1970.

According to the 1991 CSO Agricultural Census the tillage area within the South Eastern River Basin District represented 54 % of the total national tillage area. 16% of the farmed area in the South Eastern River Basin District is under tillage crops.

Analysis of the statistics from the 1991 Census of Agriculture indicates that stocking density is slightly higher than average in the south eastern area at 1.7 lu/ha farmed (national average 1.57 lu/ha farmed). Map 4.7 shows the distribution of livestock units within the South Eastern River Basin District.

The South Eastern region has significantly higher arable and pasture portions of land cover than national averages:

	<b>% Arable</b>	<b>% Pasture</b>
South Eastern Region	16.7	69.9
National	12.1	25.9

Consequently average Nitrogen and Phosphorus application rates for both animals and chemical fertilisers are higher than national average rates.

Fertilizer use on grassland for a selected sample of farms in the south east indicates higher than national average Nitrogen application rates with average Phosphorus and Potassium application rates (Table 4.2).

**Table 4.2 Grazing Fertilizer Application Rates (Nitrogen, Phosphorus and Potassium kg/ha)**

<b>Region</b>	<b>1995</b>			<b>2000</b>		
	<b>N</b>	<b>P</b>	<b>K</b>	<b>N</b>	<b>P</b>	<b>K</b>
South East	127	11	24	138	10	22
National Average	94	12	25	109	9	21

The south east region has experienced more widespread occurrences of elevated nitrate in rivers and groundwaters than is the case nationally (Maps 4.8 and 4.9). Recent water quality statistics indicate that the level of nitrate enrichment in surface waters is moderate and a downward trend may be emerging.

Overall agricultural chemical fertilizer usage has decreased in recent years within Ireland.

**Table 4.3 National Chemical Fertilizer Usage**

<b>Year</b>	<b>Phosphorus (000 Tonnes)</b>	<b>Nitrogen (000 Tonnes)</b>
1996	62	417
1997	54	379
1998	50	432
1999	51	441
2000	49*	408
2001	42	368

2002	43	363
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\*estimate (Source: Personal Communication, Sean Regan, Teagasc)

Participation in REPS is also a key agricultural indicator. The number of participants in Ireland was interrupted during the transition from REPS 1 to REPS 2 (Figure 4.2).

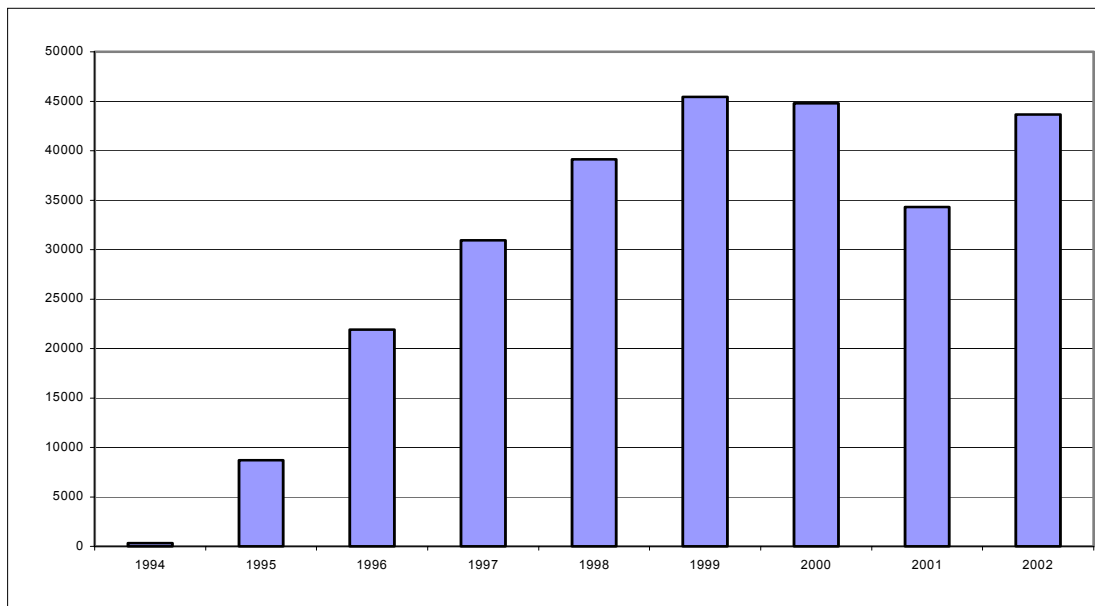
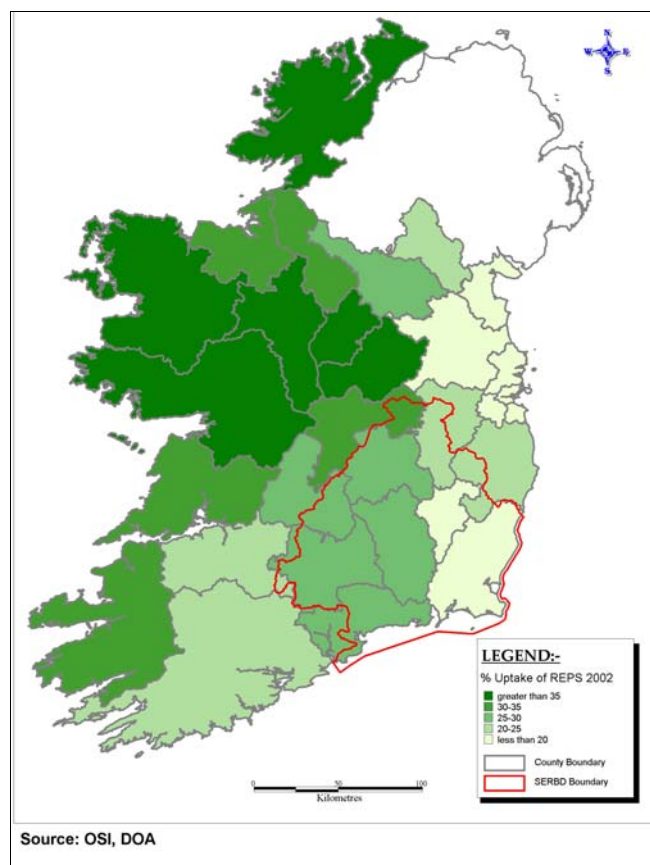


Figure 4.2 Number of Farmers Participating in REPS (Source: Dept of Agriculture and Food)



**Figure 4.3 Percentage of Farmers Participating in REPS (Source: Dept of Agriculture and Food/OSI)**

Figure 4.3 shows in the uptake of REPS (ie the percentage of farmers participating) throughout the country on a county basis. The south eastern sector has a slightly lower uptake of REPS with less than 25% of farmers participating against a National average of over 30%.

**Agricultural Statistics**

The preliminary agricultural census data (June 2000) are being processed on behalf of the Project by Teagasc to update livestock density maps and nutrient loading maps. Teagasc have also been commissioned by the Project to review runoff risk and nitrate vulnerability mapping. Soil Phosphorus Maps are to be generated by Teagasc.

Soil Nitrogen levels are not generally available in Ireland.

Access to data from the LPIS (Land Parcel Information System)/ IMA database held by DoA&F would enable Local Authorities to involve the agricultural community with environmental programmes. The Project will meet with the Department of Agriculture and Food to discuss obtaining useful datasets.

Whilst nitrate levels are of particular concern in the south-east, agricultural run-off/seepage may also result in other pollutants entering water bodies including phosphorus, pesticides and BOD and bacterial loadings. Suspended solid release could result from overgrazing, ploughing and harvestry leading to siltation of watercourses. Accidental releases of oils and chemicals can also occur.

Farmyard effluents include slurries, dirty water, dairy washings and silage effluent and poor storage or management of these arisings could result in release to watercourse. Artificial drainage of agricultural land can also alter yield and baseflow patterns.

Many of the Local Authorities have embarked on a programme of farm surveys and are creating databases in the fams module of Labinfo/Catchment Envisage regarding farmyard status and facilities. Nutrient Management Plans are being promoted in many counties and several Local Authorities have introduced Byelaws to require improved management of agricultural facilities.

South Tipperary has commenced an extensive piggery survey to determine risk of each individual enterprise.

**Agricultural Datasets**

Generally within the South Eastern River Basin District digital data on piggeries and spreadlands below county level does not exist or is not readily available. The Project will seek information held by EPA and Local Authorities to develop a database.

#### **4.4.2 Forestry**

Forestry uptake in the south east is presented in Map 4.10. Generally the south east has low uptake of forestry (less than 5%) possibly due to the competition for the land for agriculture usage. Forestry has been identified as a potential cause of diffuse pollution in the Aherlow Catchment.

If developed in a sensitive manner forestry can have environmental benefits including reducing soil erosion/landslip, creation of tourist potential and also wildlife value and by contributing to Ireland's target to limiting greenhouse gases since carbon dioxide is stored in the biomass of timber until release during burning or decay.

However, certain forestry activities can also potentially impact water quality. These potential impacts include nutrient loss during plantation and aerial fertilization, acidification in sensitive areas, siltation due to harvesting and drainage/construction works, mineral release from disturbed areas, release of oils and pesticides and alteration of yield and flow due to plantation demand or artificial drainage. Monoculture plantations can also limit biodiversity.

The Forestry Services has produced a Code of Best Forest Practice and guidelines on Water Quality, Biodiversity, Harvesting, Landscape and Archaeology. Coillte has included these environmental protective measures in the Sustainable Forest Management (SFM) initiative of its forestry estate.

#### **4.4.3 Peat Extraction**

In the period 2000-2001 commercial peat extraction by Bord na Móna totalled 5.24 million tonnes nationally. The peat is used for fuel and horticultural purposes. Private peat extraction also takes place for domestic heating.

Within the South Eastern River Basin District commercial peat extraction is limited. Bord na Móna have provided records for their peat beds in counties Offaly, Laois, North Tipperary and Kildare (Map 4.11). A three year programme is under way to upgrade the silt entrapment facilities at the production centres in the headwaters of the Barrow and Nore Basins.

Peat extraction can potentially alter recharge and flow regimes and release pollutants to receiving waters. Poorly managed peat silt can cause siltation and transport phosphate to watercourses. There are four IPC licensed Industries in the South Eastern River Basin District for the extraction and agglomeration of peat.

#### 4.4.4 Agricultural, Industrial, Water Treatment and Wastewater Treatment Sludges

Sludge management plans have been developed for Carlow, Kilkenny, Laois, South Tipperary, Waterford, Wexford, Kildare, Offaly, North Tipperary and Wicklow. The plans recommend reduction where surpluses exist and improved management of inorganic Phosphorus throughout the district.

Agriculture produces the vast majority of non-hazardous sludges, these can be disposed of by landspreading. The increased number of wastewater treatment plants providing nutrient removal nationally has increased the quantities of municipal sludge. Municipal sludges from wastewater treatment plants within the South Eastern River Basin District are generally stabilized and landspread but in some counties are disposed of to landfill, (landspreading will be required in future where soil conditions are suitable). Water treatment and industrial sludges are also disposed of to landfill or by landspreading.

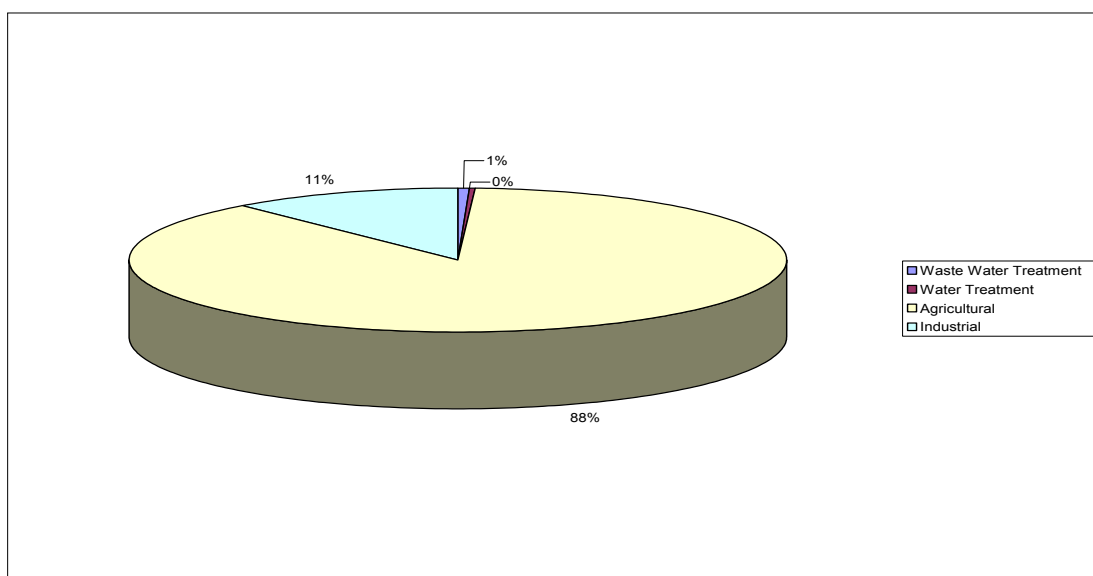


Figure 4.4 Breakdown of the Sludge Production in the South East Area

The Proposed Joint Waste Management Plan for the South East Region covers an area which is approximately 74% of the total South Eastern River Basin District. The plan states that there is approximately 796,966t DS/yr non-hazardous sludge produced in this region from agriculture, industry, water treatment and wastewater treatment. Figure 4.4 provides a breakdown of sludge production in the area.

The plan states that agriculture is the biggest producer of non-hazardous sludge in the South East Region generating approximately 88% of total sludge. Industry produces approximately 11% of all non-hazardous sludge in this area. The biggest industrial producer of non-hazardous sludge is food processing which accounts for 66% of the overall industrial sludge.

Wastewater treatment plants account for 1% of non-hazardous sludge production. 78% of this sludge is disposed of through agriculture; with sludge stabilised before landspreading. The other 22% is disposed of through landfills.

Water Treatment only accounts for approximately 0.16% of the total non-hazardous sludge. All of this sludge is disposed of through landfills.

**Sludges**

There is no GIS register at present of where sludges are disposed of within the South Eastern River Basin District the Project will seek datasets to generate a register.

**4.4.5 Septic Tank Effluents**

There is a large portion of the rural population dependent on septic tanks. A proportion of this effluent may enter watercourses through direct discharge, infiltration or run-off to contribute to diffuse pollution.

**Septic Tanks**

There is currently no register of septic tanks. It is expected that data on the population dependent on septic tanks could be extracted from the 2002 population census on a DED basis. This Census data should be available in March 2004.

**4.4.6 Urban Storm Water Outlets and Combined Storm Overflow Discharges**

Outfalls carrying urban surface water run-off and combined storm water overflows can contribute a significant amount of nutrients to surface water courses. After a dry period, the initial run-off, or “first flush”, can be highly polluting with contamination levels similar to or even exceeding domestic sewage. In particular, elevated levels of metals, organic pollutants and nutrients have been recorded in storm water run-off (MC O’Sullivan Baseline Report 1999).

**Urban Storm Water Outlets and Combined Storm Overflow Discharges**

There is no register of outfalls or overflows from urban areas. These data may become available for individual urban centres as sewer studies are undertaken.