

River Basin Management Plans

# Report of the economic analysis required by Article 5

December 2009



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Northern Ireland  
**Environment**  
Agency

# **WATER FRAMEWORK DIRECTIVE**

**Report of the economic analysis  
required by Article 5**

**Northern Ireland**

**Updated November 2009**

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# **1. Introduction**

## **1.1 Article 5 Reporting Requirements**

This report provides information required under the Water Framework Directive (WFD).

These requirements cover the following areas:

- An overview of the socio-economic importance of water uses in the River Basin District together with information relating to how this analysis was carried out and how it may be improved in the future.
- An assessment of the current level of cost recovery for water services for household, agriculture and industry, with some indication of a first picture related to subsidies, and information relating to how this analysis was carried out and how it may be improved in the future.
- A summary of work completed to date to establish a baseline scenario including details of work required in the future, particularly covering more complex sectors.

## **1.2 Structure of the report**

This report contains the following sections:

- **Driving Forces:** This section sets out the socio-economic characteristics of Northern Ireland in terms of employment, growth, investment etc.
- **Pressures:** This section attempts to link economic information with the most important activities for the characterisation/risk assessment.
- **Water Services and Cost Recovery:** This section presents information received from Northern Ireland Water (NI Water) (a Government Owned Company which is responsible for the provision of water and sewerage services in Northern Ireland) in regard to cost recovery.
- **Cost Effectiveness:** The progress made and the uncertainty that exist in ensuring cost effectiveness in implementing the programme of measures are detailed in this section.

## **1.3 Data Sources**

This supporting document should be read in association with the Northern Ireland Article 5 Characterisation Summary Report. This has been prepared by the Department of the Environment (Northern Ireland)

A number of data sources have been used in compiling this document. These are detailed as they are encountered in the text, but in summary include data from government, local authorities, environment agencies, university research departments, pressures and impacts outputs and consultancy reports. This assessment is based on pragmatism and the use of existing data sources. The acquisition of new data and integrated data management will form part of the process of improving the knowledge and the information base.

## **1.4 Public Participation**

The need for public involvement is an important feature of the WFD and, in certain areas, such as the development of the River Basin Management Plans (RBMPs), is statutory. The Department has consulted throughout each stage of the compliance process and public participation will continue to be encouraged throughout the first planning cycle implementation phase after the publication of the first River Basin Management Plans. The Northern Ireland Water Framework Directive Stakeholder Forum and the nine Catchment Stakeholder Groups will continue to meet regularly with the input and support provided by the Department of Environment and its partners in other Government Departments.

## 2. Driving Forces

This section provides an overview of the socio-economic characteristics of the Northern Ireland Economy and includes the following information:

- Economic History
- General Profile: presents an introduction to Northern Ireland's River Basin Districts and IRBDs (RBDs and IRBDs) and details key limitations faced when gathering information.
- Employment: presents an overview of employment and unemployment in manufacturing and services.
- Output and Growth Forecasts.
- Construction and Investment.

### 2.1 Economic History

Northern Ireland was the only part of the island of Ireland to participate to a significant degree in the birth of the industrial revolution. Development was initially concentrated in the Lagan Valley but subsequently extended to the Bann and Foyle basins. A mix of immigrant expertise and good local raw materials led to the development of a major linen industry in the region, which used water both for motive power and as part of the wet spinning process. Servicing this industry led in turn to the development of a major engineering sector.

The growth of Belfast, in particular, was dramatic. The town with a population of well under 50,000 in 1821 had grown to a city with a population of over 250,000 by 1900. In Belfast early development of linen mills was dictated by the availability of water for motive power and this led to the clustering of mills in north and east Belfast. While the linen industry quickly converted to coal powered steam equipment, these early locational choices by the linen industry are still reflected in Belfast's human and industrial geography today.

Belfast had for long been a port engaged in the Atlantic trade, but port improvements in the 19<sup>th</sup> century, coupled with the emergence of the linen industry, led to a rapid expansion of trade and the development of a local shipbuilding industry, in both Belfast and Londonderry. Related industries such as boiler-making and rope-making also developed; making Northern Ireland a major centre of import and export trade. Exports of textile-related machinery also contributed to this trade.

The early part of the 20<sup>th</sup> century was marked by the decline of traditional industries as they struggled to face competition. This was a period of heavy unemployment and low productivity. In the 1960s however, inward investment in a range of new industries brought new jobs and new techniques. The man-made fibres industry was very prominent in these new industries and placed particular demands on Northern Ireland's water infrastructure. By the start of the 1980s, however, both the man-made fibre industries and the traditional Northern Ireland sectors were in decline and unemployment rose to over 120,000 on a claimant count basis. While clusters of textile manufacturing and the traditional Northern Ireland heavy engineering still remain, they are small in scale and increasingly specialist in nature.

A reflection of these trends is the relatively low level of industrial demand for water, which today accounts for just 13% of Northern Ireland water demand compared to a proportion around half as high again in Scotland (Entec 2004).

## 2.2 General Profile

Belfast (with a population of 268,300 in 2008<sup>1</sup>) is the capital and major centre of population of Northern Ireland which has a total population of almost 1.8 million. One river basin district (North Eastern) and three international river basin districts (IRBDs) (North Western, Shannon and Neagh Bann) have been identified within Northern Ireland.

**For the purposes of this report the scale analysis is at the ‘All Northern Ireland’ level and not RBD level.** River Basin Districts in Northern Ireland are relatively small in terms of land area, but are very small in terms of socio-economic scale. For example, the North West IRBD in Ireland/Northern Ireland contains approximately one fortieth of the population that resides in the North West RBD in England. This gives rise to a number of unique factors applying in Northern Ireland that have shaped the analysis, namely: fairness regarding the appropriateness of connecting a single user to a pressure unless there is positive evidence to connect them; and confidentiality because Northern Ireland often has a single company in a particular sector where larger economies have a number of companies in an industry. It is therefore not always possible to extract data from official sources for much of the sectoral analyses that would ideally be sought.

Originally, Northern Ireland did not participate in the restructuring of the water sector as undertaken in the rest of the United Kingdom (UK) but is now undergoing strategic change which is discussed in detail later in this document. This change ranges from ongoing debate on whether to raise additional contributions from domestic users, demand management, leakage management, interconnectivity of supply, to the structure of the industry itself.

## 2.3 Employment<sup>2</sup>

The latest employee jobs figure of 709,040 is a seasonally adjusted decrease of 0.8% on the previous quarter. The current unemployment rate of 7.2% is 1.9 percentage points below the EU 27 rate of 9.1%.. The unadjusted total employee jobs figure for June 2009 was 707,750 which represents a decrease of 6,140 jobs since March 2008..

Sector	Numbers (NI)	Percentage (NI)	Percentage (UK)
Manufacturing	-7,160	-8.6%	-8.1%
Services	-11,010	-1.9%	-1.2%
<b>Total</b>	<b>-25,340</b>	<b>-3.5%</b>	<b>-2.1%</b>

Note: Employee jobs figure at June 2009 (seasonally adjusted), Labour Market Statistics also seasonally adjusted

Sector	Numbers (NI)	Percentage (NI)	Percentage (UK)
Manufacturing	-10,090	-8.6%	-18.7%
Services	+38230	+7.1%	+3.3%

<sup>1</sup> mid year estimate from ‘NISRA’

<sup>2</sup> Figures supplied by DETI

<b>Total</b>	<b>+27,410</b>	<b>+4.0%</b>	<b>+1.1%</b>
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In the period July – September 2009, unemployment in NI stood at 58,000 or 7.2% (seasonally adjusted) of the economically active population; an increase of 3.0 percentage points on the previous year. In NI the unemployment rate for young people (aged 18–24, unadjusted) for the period July – September 2009 was 20.4%.

The agricultural sector accounted for 1.2% of Gross Value Added (GVA) in 2008, with agricultural enterprises employing 48,964 employees, 2.9% of total civil employment (DARD, 2008). However, employment in agriculture continues to fall, and the number of farmers employed in the sector had fallen to 31,097 in 2008. Over the last 25 years, the number of people employed on farms has fallen by 27.8%, and the decline is even more significant when the move to part-time and casual labour is taken into account.

## 2.4 Output and Growth Forecasts<sup>3</sup>

It is estimated that the UK economy contracted by 0.3% in 2009Q3 giving an annual decline of 5.1%. The turmoil in financial markets triggered by the US sub-prime mortgage crisis has not yet abated and growth estimates have been affected as a result with UK growth projected to be negative in 2010 - GDP growth is expected to be -0.5% in 2010. The highest growth levels in total GVA between the period 2006-2007 were found in London (7.1%), Northern Ireland (6.2%) and the South East of England (6.1%), ([www.statistics.gov.uk](http://www.statistics.gov.uk)). Despite GVA per head having increased in all regions, only London, the South East and the East of England had a GVA per head above the UK average. All other regions were below the UK average, with Wales being the lowest, followed by the North East of England and Northern Ireland. This can be attributed to the fact that the economy continues to attract lower value added jobs with lower level of productivity hence the GVA gap that remains between the province and other areas outlined above.

Following a period of consultation the NI Budget 2008/09 – 2011/12 was published in its final form in January 2008. In addition the Investment Strategy for Northern Ireland is now underway and it represents a huge injection of capital investment into the physical and social infrastructures. Whilst this is positive the forecasted signs are that the NI economy is also set of testing times. Manufacturing output declined by 3.0% in Q2 2009, and output was 12.5% lower than the same period in 2008. Output growth in the service sector remained constant over the quarter to Q2 2009, this compares favourably to the UK decline of 0.6%. Northern Ireland had experienced a prolonged period of rapidly rising house prices but data showed that this came to an end in Q4 2007. The most recent house price data shows a decline of 5.0% over the month to September 2009 and over the year house prices have fallen by 18.3%.

Manufacturing exports (sales outside the UK) from Northern Ireland were worth £5.5bn in 2007/08, and external sales (outside of Northern Ireland) were worth £11.7bn. Exports have increased by 42.3% (£1,624m) since 2002/03 and by 8.5% from 2006/07.

Business Expenditure on R&D (BERD) increased by 7.7% in real terms to £185.1m in 2007. SMEs continue to be the main driver of BERD growth, increasing expenditure by 43.6% over the year and by 170.0% since 2001. Despite this growth, intramural BERD as a proportion of GVA in Northern Ireland was only 0.6% in 2007 – only slightly higher than four other UK regions.

<sup>3</sup> Latest figures sourced from Ernst and Young Economic Outlook for Business Winter 2009



Recent growth estimates and forecasts for Northern Ireland are shown in table 2.3 below.

	<b>2009</b>	<b>2010</b>
PricewaterhouseCoopers (July 2009)	-3.0% to -3.9%	0% to +1%
First Trust Bank December 2009))	-2.5%	+0.5%
Note: All First Trust Economic Outlook & Business Review growth forecasts are in % real change		

## **2.5 Construction and Investment**

The key findings from the Quarterly Construction Enquiry covering the period 1 April – June 2009 were as follows:

The seasonally adjusted Index of Construction was 96.2, down 2.5 points on the previous quarter (98.7) and down 6.2 points on the corresponding quarter in 2008 (102.4) (Table 1.1)

The estimated seasonally adjusted value of construction output (at 2005 prices) was £706 million, a decrease of 2.5% (£18 million) on the previous quarter (£724 million) and a decrease of 6.0% on the corresponding quarter in 2008 (£751 million). This is in line with slowing economic growth and the corresponding decline in GDP.

Invest NI is the main economic development organisation in Northern Ireland. During the past seven years Invest NI offered assistance totalling almost £897m, contributing towards projects which planned to invest almost £4.5bn. £192m was offered to support both local and externally-owned companies establish business in Northern Ireland, with an associated planned investment of £1,450m. 115 first-time internationally-mobile investments were offered assistance of £143m, contributing towards £1,225m of planned investment. Almost £360m of assistance was offered through a range of schemes to help businesses expand their operations within Northern Ireland. These projects plan to invest over £2.1bn. £439.4m of assistance was offered to clients engaged in manufacturing activities, compared to £290m in the services sector. This included business and financial services, which accounted for £137.1m of assistance offered, representing 19% of sector-related support.

Northern Ireland remains a prime investment location, having attracted many investments from firms around the world. The region offers very good international connectivity, accessible to key EU and US markets, a competitive cost environment, and a highly educated, English-speaking workforce which provides a stream of talent, especially for knowledge-based companies. This highlights the extent to which the Northern Ireland economy is undergoing a structural shift. From a WFD standpoint therefore the nature of this investment is at least as important as the present state and distribution of industry. This investment is concentrated in the knowledge economy - rather than traditional sectors such as textiles. The impact of this investment focus will be to reduce the water requirement per unit of Gross Domestic Product (GDP).

## **3 Pressures**

### **3.1 Sectors Impacting on Water Status**

This section provides information on the sectors that significantly impact on water status. The sectors with a particularly important relationship are:

- Water and Sewerage services;
- Agriculture; and
- Industry.

Information detailing the ‘Characteristics of water use’ (including abstractions, flow regulations, discharges and morphology) is detailed in the Sections 6.2 to 6.6 of the Article 5 Characterisation Summary Report, which this document supports. The River Basin Management Plans contain updated information on the impacts associated with these pressures.

Article 5.1 of the Directive requires that each Member State carries out an economic analysis of water use for each RBD or portion of an international RBD falling in its territory. In practice it has not been possible to work at the scale of the RBD for this reporting requirement and reporting is detailed here on an “All Northern Ireland” scale.

#### **Water Services**

Responsibility for delivering water and sewerage services in Northern Ireland rests with NI Water - an independently regulated company owned by government. NI Water took over responsibility for water and sewerage services from central government on 1 April 2007. NI Water abstracts, treats and distributes over 600 million litres of drinking water every day through a network of over 26,500 km of water mains. It also collects and treats around 130 million cubic metres of waste water every year. This involves operating and maintaining around 1,100 waste water treatment works and more than 14,500 km of sewers.

Significant resources are needed to maintain this infrastructure. Under the Northern Ireland Executive’s Investment Strategy, over half a billion pounds has been invested in water and sewerage networks since April 2007. This ongoing investment has allowed NI Water to bring forward plans for more than 300 improvement programmes here. Two programmes that stand out in delivering real improvements are the Belfast Sewers Project and the company’s ongoing Water Mains Rehabilitation Programme.

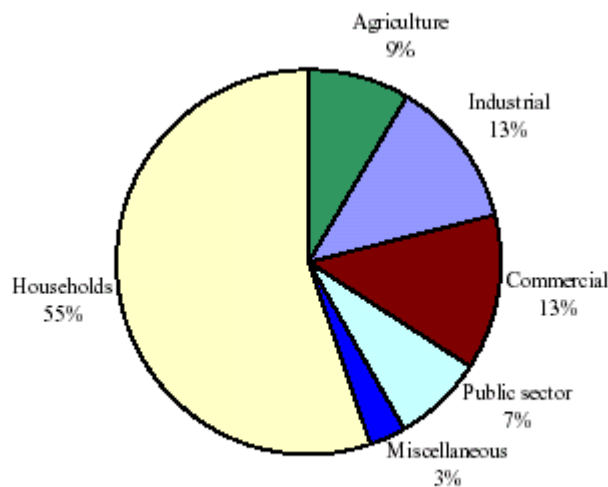
The Belfast Sewers Project represents a total investment of over £140 million in upgrading the city’s sewer network and constructing a large diameter tunnel. These measures will not only reduce the pollutant loading on the river Lagan by 85% but will also reduce instances of flooding. This will provide an efficient infrastructure for the future economic development of the Belfast area.

The current Water Mains Rehabilitation Programme (2007-10) represents an investment of £80 million in upgrading and improving our water mains. To date, NI Water has laid more than 1000km of mains as part of this programme. The upgrades have helped to improve the quality, reliability and flexibility of water supply while also reducing leakage and enhancing development and investment prospects across Northern Ireland (reference

<http://www.niwater.com/watermainsproject.asp>). It is expected that the Water Mains Rehabilitation Programme will continue through the first river basin management planning cycle.

In addition, a further £230m investment through two large Public Private Partnership Projects will provide further improvements to drinking water quality and waste water treatment. The Omega Waste Water PPP Project will deliver improved treatment standards for 20% of the total waste water received by Northern Ireland Water. The Alpha Water PPP Project will deliver new treatment facilities for over 50% of drinking water supplied. In order to assess water supply, the domestic and non-domestic activities for which water is supplied are detailed in Chart 3.1 below. This chart does not include information on private abstractions.

Chart 3.1 Water supply in Northern Ireland (Source: Entec 2004)



The majority of water is supplied for domestic use, with non-domestic (including agricultural, industrial and commercial) users supplied with approximately 153,000m<sup>3</sup> per day. Over 99% of households in Northern Ireland are connected to the mains for the supply of clean water<sup>4</sup>. It is estimated that at least 1,200 households have no access to mains water (approximately 3,000 people) and are reliant on private sources. There may be additional use of private abstractions by those supplied with mains water. In Northern Ireland, the Department of the Environment's Drinking Water Inspectorate is responsible for regulating and assessing the quality of the public water supply and working with Local Councils in monitoring private water supplies. Over one hundred thousand tests are made each year by NI Water and the Drinking Water Inspectorate to ensure that drinking water quality is maintained.

For the disposal of sewage, 83% of households are connected to the mains sewage system<sup>5</sup>. The remaining households have private septic tanks, many of which are emptied by Northern Ireland Water. In Northern Ireland, there are housing plans based on the recommendation of Sir John Semple that at least 5,250 new homes are built over 3 years. This will place pressure on existing water and sewerage networks. A study commissioned by the Northern Ireland Environment

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<sup>4</sup> DRD, 2003

<sup>5</sup> DRD, 2003

Agency (formerly Environment and Heritage Service (Smith, et al forthcoming) calculated the diffuse agricultural phosphorous (P) contribution to inland waters by using export coefficients (see below under agriculture). This study also identified the human contribution to the overall P budget was divided into mains-sewered households (945 tonnes), households connected to septic tanks (118 tonnes) and industrial discharges (40 tonnes).

## Agriculture

The Agriculture sector has the potential to have a number of impacts on water quality. Agriculture is an abstractor of water, as well as a source of diffuse pollution (mainly nitrates, phosphorous and pesticides). Sediment run-off can also impact on morphology. Within the sector, the majority of farms are based on livestock, particularly cattle, which are found on 81% of farms, while sheep are found on 34% of farms. This is shown below in table 3.1. Going forward, output forecasts for key agricultural sectors depend on a range of factors, with economics and the EU Common Agricultural Policy (CAP) being key drivers.

<b>Table 3.1 Composition of agricultural sector in Northern Ireland</b>		
<b>% of farms with</b>	<b>2000</b>	<b>2008</b>
Diary cows	18	15
Beef cows	56	65
Cattle	84	81
Sheep	36	34
Pigs	3	2
Cereals	13	12
Source: <a href="http://www.dardni.gov.uk">www.dardni.gov.uk</a> (Statistical Review of NI Agriculture, 2008)		

The local agricultural sector plays a more significant role in the economy than is the case in other UK regions. Farm gate sales or gross output was estimated to be worth £1.4 bn in 2008. The GVA<sup>6</sup> of the agricultural industry in NI is £348m which represents 1.2% of total GVA. By comparison the UK figures are £6816m and 0.5% of total GVA. Likewise 3.1% of the population in NI are employed in agriculture against a UK average of 1.4%. When the food and drinks processing sector is included, this rises to 5.5%. Agriculture employs 24,000 full time equivalents, which translates to an estimated 49,000 people engaged in some form of agricultural activity in 2008. The processing sector employs around 18,450 full-time equivalents. There are currently around 26,000 farm businesses in Northern Ireland. Agriculture is predominantly grazing livestock based, with dairying, beef cattle and sheep accounting for approximately 59% of gross output. Agriculture land in Northern Ireland is almost all under grass, with only 6% of the areas farmed used for arable or horticultural purposes. Pigs and poultry, contribute 18% of total sales.

The Nitrates Action Programme Regulations (NAP) were introduced in January 2007. The measures under the NAP Regulations govern the storage and application of livestock manures and chemical fertilisers. The Regulations sets a limit of 170kg/N/ha/year for the application of nitrogen in livestock manure and this also indirectly limits the application of organic Phosphorus

<sup>6</sup> NI Agri-food sector Key Statistics June 2008, DARD

In addition, to complement the NAP controls, the Phosphorus (Use in Agriculture) Regulations (Northern Ireland) 2006 control the use of chemical fertiliser containing phosphorus..

DARD's Farm Nutrient Management Scheme provided capital grant support to help farmers comply with the Nitrates Action Programme. Through the Scheme over £200m has been invested in improved slurry and manure storage facilities. Some 3900 farms completed projects under the scheme at an average cost of £50k per farm.

Phosphorus (P) is recognised as the key nutrient in controlling the degree of eutrophication in inland waters in Northern Ireland. Diffuse contributions of phosphorus from agricultural land are a significant source of phosphorus inputs to rivers and lakes. Trends in applications of chemical P fertilisers in Northern Ireland show a dramatic reduction in recent years. The rate for 2008 of 2.9 kg P/ha was unprecedented for modern agriculture in Northern Ireland as it was the lowest since 1938. When the rate for 2008 is compared to the average for the period 2004 to 2006, the reduction of 59% in P applied was considerably larger than that observed for Nitrogen, indicating that the Northern Ireland P Regulations, along with economic factors, had a significant impact. Phosphorus in imported livestock feed is the other main source in NI agriculture. While feed imports have increased in recent years, a voluntary agreement with the NI Grain Trade Association has reduced the phosphorus content of feed. This combined with the sharp decline in use of chemical fertilisers has resulted in a large reduction of the overall phosphorus balance of NI agriculture.

### **Controls on the Abstraction and Impoundment of Water**

Department of the Environment (DOE) introduced the Water Abstraction and Impoundment (Licensing) Regulations (NI) in 2006. These regulations aim to provide a single and consistent environmental risk based approach to the assessment and authorisation of water abstraction and impoundment activities within Northern Ireland.

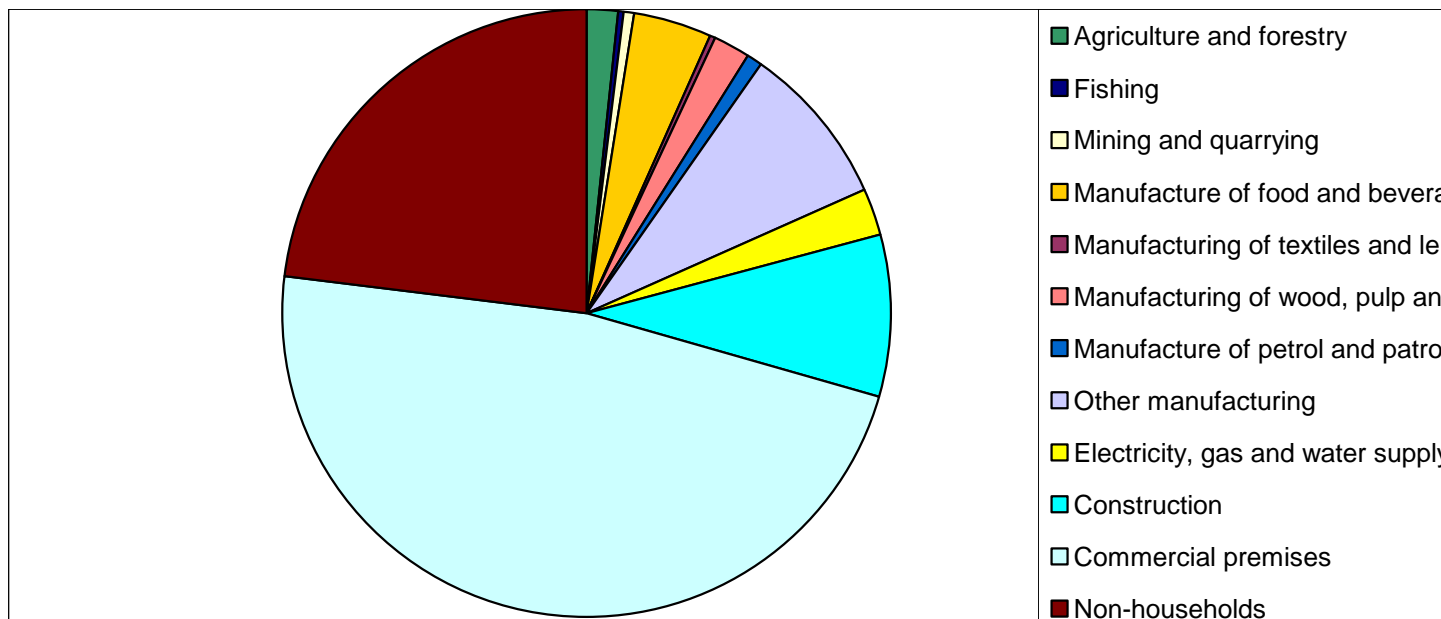
### **Industry**

At the level of an individual RBD in Northern Ireland many industrial sectors are dominated by a single firm or plant, accordingly the projection of the industry is impossible without considering that individual large firm. However, commercial confidentiality limits the extent to which individual firm data can be considered and released. An individual firm displays a much higher risk profile than the industrial sector it inhabits, and any central projection would have to be considered therefore as exhibiting such wide confidence limits around it as to render it useless for progressing the objectives of the WFD. Future analysis will generally consider single plant operations (e.g. filtration technology) than on the prospects for the general sub-sector. In addition, the knowledge and information base will be improved by detailing in as far as possible all industrial service expenses for water and wastewater disposal charges, levies, VAT, pollution reduction schemes etc. Industrial demand is expected to fall slightly, as limited increases in overall levels of output are offset by increased efficiency in use and a sectoral shift towards the knowledge economy.

### 3.2 Gross Value Added by sector in Northern Ireland in 2008

In order to assess the significance of water use, the activities for which water is used are detailed. These can be consumptive, as for production of mineral water, or non-consumptive, as for cooling of industrial facilities. The value of these processes is considered here in terms of Gross Value Added (GVA) to the economy and employment. This is detailed in Chart 3.1 below.

*Chart 3.2 Gross Value Added by sector in Northern Ireland in 2008 (Source DOE Economics Branch 2009)*



Water has a significant cooling use in power stations and along with the rest of the utilities sector together with other key water-users, agriculture and manufacturing industry, accounted for just under one fifth of all GVA in the Northern Ireland Economy. The remaining four fifths of the economy (by GVA) use water in cooking, sanitation and related uses.

## 4 Water Services and Cost Recovery

### 4.1 Introduction

Article 9 of the Directive aims to ensure that pricing policies improve the sustainability of water resources and requires pricing policies to perform the following functions by 2010:

- Take account of the principle of the recovery of the costs of water services, including environmental and resource costs,
- Embody the polluter pays principle,
- Provide adequate incentives to use water resources efficiently,
- Ensure that water use groups (separated into at least industry, households and agriculture) make an adequate contribution to the costs of water services.

### 4.2 Water services and Northern Ireland

Water Services are defined by the Directive as in Box 4.1

#### **Box 4.1 Definition of Water Services**

“All services which provide, for households, public institutions or any economic activity:

- (a) abstraction, impoundment, storage, treatment and distribution of surface water or groundwater;
- (b) waste-water collection and treatment facilities which subsequently discharge into surface water.”

Definition of Water Services, WFD Article 2 Paragraph 38

Northern Ireland Water was appointed the sole water and sewerage undertaker for Northern Ireland, under the Water and Sewerage Services (NI) Order 2006. NI Water is a company 100% owned by the government which assumed responsibility from central government on 1<sup>st</sup> April 2007.

Through NI Water’s Strategic Business Plan (2007-10), investment has increased in recent years, leading to improved quality in both drinking water and waste water discharges. Drinking water quality at customers’ taps is assessed using the index ‘Mean Zonal Compliance’ (MZC). MZC has increased from 98.65% in 2004 to 99.49% in 2008. This compares to England and Wales levels of 99.97%. The Strategic Business Plan set out the vision and strategy for the period 2007-2010, and provided supporting detail about how that strategy would be put into effect.

NI Water’s Business Plan for the next three years (2010-13) will be determined through the industry’s Price Control Process 2010 (PC10). PC10 will determine the strategic priorities, costs, plans, targets, and finally customers’ prices for water and sewerage services over the 2010/13 period. The process begins with the issuing of Social & Environmental guidance providing government direction on the strategic priorities for the water industry. The water company (NI Water) identifies the costs to customers for delivering the government’s policies through a Business Plan, submitted to the utility regulator (NIAUR) for determination. In this plan, the Company demonstrates how it will deliver to agreed targets within a revenue limit. The process finishes with the utility regulator determining service performance targets and revenue (customer bill) limits for the period. Each year, the Regulator must approve a charges scheme from the

water company before it can start to charge water and sewerage customers. More information on PC10 is available on the utility regulator's website at <http://ofreg.nics.gov.uk>.

Building on the investments and improvements made by NI Water through its strategic business plan, the key benefits to be realised in PC10 are:

- Improved services to customers as a result of over £600 million of investment during the PC10 period 2010-2013 (subject to PC settlement).
- Improved water quality and reduced environmental pollution.
- Building on operating expenditure efficiencies already achieved and delivery of further expenditure efficiencies by 2010.
- Improved organisational capability to deliver outcomes and meet stakeholder needs.
- Financial sustainability – NIW aims to become fully self financing and will have the ability to plan for the future investment and customer improvements needed.

### **4.3 Water service providers, users and polluters**

#### **Service Providers**

In addition to NI Water there are a number of *private providers of water services*. At least 3,000 people are reliant on private sources in Northern Ireland and there may be additional use of private abstractions by those supplied with mains water. NI Water currently provides a service to empty privately owned septic tanks.

#### **Water Users**

*Water users* are defined in Article 2 as: “water services together with any other activity identified under Article 5 and Annex II having a significant impact on the status of water. This concept applies for the purposes of Article 1 and of the economic analysis carried out according to Article 5 and Annex III, point (b).” Article 9 of the Directive specifies that the water uses should include at least households, agriculture and industry.

An attempt is made as far as possible to report the information on water uses into these categories, however some uses cannot be disaggregated in this way and this will need to be subject of further analysis after the Article 5 report. This further work will also consider the appropriate sub-categorisation in the context of water pricing and programmes of measures. Current sub-categorisation is on the basis of the uses identified in the Pressures and Impacts analysis.

Some water uses, such as land reclamation, drainage etc. do not fit easily within the categories of households, industry and agriculture. As recognised in the Eco1 guidance it is necessary to include these “other uses” which are identified on the basis of the river basin characterisation. For the purposes of this report, water uses that have a significant impact on the status of water are disaggregated into Water Services, Agriculture and Industry.

#### **Water Services**

NI Water supplies over 600 million litres of water each day to approximately 795,000 properties, both domestic and non-domestic. NI Water also treats around 127 million cubic meters of



wastewater from the 663,000 properties connected to the wastewater system. The best estimate of per capita household consumption in Northern Ireland is 145 litres per person per day. With a population of 1,742,000 in 2006<sup>7</sup>, this suggests a total household consumption of 250 MI/day<sup>8</sup>. Growth in households (small rise in population coupled with a fall in average household size) is expected to increase domestic demand for water.

### **Agriculture**

The Water Resource Strategy (2002-2030) estimated total agricultural water consumption (incorporating domestic agriculture; cattle troughs; out farm and intensive units) at 39.20MI/d. Furthermore, it was estimated that agriculture water use from boreholes could be as high as 11MI/d (Robins, 1996).

### **Industry**

Industry water consumption according to the Water Resource Strategy (2002-2030) is 31.79MI/d. Industry is required to adhere to Trade Effluent discharge consents, although compliance varies between activities.

In addition to the agriculture and industry figures for water consumption the measured non-household supplies figure is 105.8MI/D.

### **4.4 Identification of significant polluters**

There are different types of pollution in the context of the WFD and it is useful to identify polluters who give rise to increased costs of providing water services. This is a technically difficult area and a large number of assumptions are required to arrive at an answer. A detailed analysis of the allocation of costs to users and polluters in Northern Ireland will form part of improving knowledge and the information base. This analysis will be taken forward through the localised implementation of the River Basin Management Plans.

### **4.5 Current level of financial costs of Northern Ireland Water**

The Income and Expenditure Account for NI Water, year ended 31<sup>st</sup> March 2009 is summarised in table 4.2 below.

Turnover	331.6
Expenditure	
Staff Costs	62
Operating Costs (including PPP/PFI operating expenditure, and staff costs)	148.2
Depreciation	52
<b>Total Expenditure</b>	<b>(262.2)</b>

<sup>7</sup> [www.northernireland.gov.uk](http://www.northernireland.gov.uk) (30<sup>th</sup> June 2006)

<sup>8</sup> Please note that this figure is significantly higher than the 217MI/day suggested in the Water Resource Strategy. At least some of this difference can be accounted for by metered agricultural premises, which were excluded from the lower figure, and by direct abstractions. From a figure for average domestic consumption of 0.6m<sup>3</sup>/day in rural areas, Robins (1996) estimates that those domestic properties reliant on private sources may abstract as much as 2MI/day in Northern Ireland.

<b>Operating Profit</b>	(69.4)
Deferred tax and Interest	33.9
<b>Net deficit on operations after deferred tax and interest charges</b>	<b>35.5</b>

Source: NI Water Annual Report and Accounts 2008-2009

A dividend of £35m in relation to the 2008/09 year was declared and paid post year end.

#### 4.6 Current level of environmental and resource costs

Environmental and resource costs arise where costs are imposed on water service providers from polluting activities. Environmental and resource costs also arise where water services abstractions and discharges contribute to water bodies failing to achieve good ecological status.

Households' value for good ecological water quality (i.e. the WFD standard) was recently investigated by a 'willingness to pay' (WTP) survey carried out by Queen's University, Department of Agriculture and Food Economics: Hutchinson et al (2004). The preliminary results are shown in the table below, for two levels of provision; a 'maintenance' programme and an 'improvement' programme.

<b>Table 4.3 Willingness-to-pay per household (expressed as the additional payment consumers would pay on top of their current annual rates bill).</b>		
	Mean	Standard Deviation
Maintenance Programme	£10.04	£17.34
Improvement Programme	£15.92	£25.35

Source: QUB, Dept of Agriculture and Food Economics: Preliminary results

The preliminary results show that the Mean WTP for the Maintenance Programme was £10.04 per year (standard deviation = £17.34) and Mean WTP for the Improvement Programme was £15.92 per year (standard deviation = £25.35). Given that there are 627,000 households in Northern Ireland, the Total Economic Value per year of good ecological water quality is £6.3million for the maintenance option and £10.0m for the improvement option.

The risk assessment showed that the Water Service (superseded by Northern Ireland Water) together with industrial sector abstractions and discharges were associated with a number of instances where water bodies are at risk of failing to achieve good ecological status.

The Collaborative Research Programme on RBMP Economics has commissioned research to establish the level of environmental and resource costs to aid in the assessment of disproportionate costs under the programmes of measures. This information will also be of use in examining pricing policies and the adequacy of the recovery of costs, including environmental and resource costs.

One task in the CRP is to understand which measures identified as options for river basin management plans are potentially disproportionately costly. Part of this task will involve

identifying the main gaps in information to draw up an appropriate process for assessing and filling these gaps. This will build on work undertaken for the Cost Effectiveness Analysis and Developing a Methodology for Assessing Disproportionate Costs, which can be found at: <http://www.defra.gov.uk/environment/water/wfd/economics/index.htm>.

#### **4.7 Revenues and Cost Recovery**

Ultimately the analysis of cost recovery needs to be undertaken at a RBD scale. However, for Article 5 reporting it is acceptable to report rates of cost recovery on the basis of water service areas. Hence the following analysis of cost recovery in Northern Ireland is at the NI Water scale, i.e. all Northern Ireland.

The Water and Sewerage Services (Northern Ireland) Order 2006 sets out the framework for the funding of water and sewerage services to be met by consumers. NI Water is run on a commercial basis and is subject to independent environmental and economic regulation. Water pricing is in place for agriculture and industry through (largely) metered water charges. Trade effluent charges are also in place. It is considered that households already make a financial contribution to these services through the Regional rate.

It is acknowledged that Northern Ireland's water and sewerage infrastructure has suffered from deterioration in the past. Large parts of the water main network are cast iron and vulnerable to bursts after severe cold spells. Furthermore, large parts of the Belfast sewerage network rely on Victorian brick sewers which can be vulnerable to collapse. Northern Ireland Asset Management Plan (NIAMP2) estimated that over the next 20 years investment of £3 billion is required to improve water and sewerage services. NI Water's Water Mains rehabilitation programme and the Belfast Sewers Project will begin to address infrastructure improvement issues. Subject to agreement by the NI Executive, water and sewerage investment of the order of £600 million is anticipated over the next three years under NI Water's Price Control settlement (2010-13).

Through the Price Control process NI Water has submitted a detailed Business Plan to the Utility Regulator which sets out its total revenue and debt requirements for the period. The Business Plan will be finalised through the Utility Regulator's determination of price limits, where service performance targets and revenue (customer bill) limits are set for the period. Each year, the Regulator must approve a charges scheme from the water company before it can start to charge water and sewerage customers. Revenue limits (customers' charges) determined through the price control process take account of the true costs of water and sewerage service provision by not only including the operational and maintenance costs but also including costs associated with capital investment in the infrastructure. More information on PC10 is available on the utility regulator's website at <http://ofreg.nics.gov.uk>.

### **Charges**

#### **Agriculture & Industry**

Water pricing arrangements for the agriculture and industrial sectors have been in place for many years. The majority of these customers are metered and charged according to usage. This is in line with the Directive's requirement for users to use water resources efficiently and promotes the

polluter pays principle. The bulk of non-essential or discriminatory water use is by non-domestic water users which accounts for around 30% of the total water consumed in Northern Ireland. The continued roll out of metering in that sector will incentivise efficient use of water resources and help achieve the aims of the Directive. Water and sewerage charges were extended to all non-domestic customers on 1<sup>st</sup> April 2008 although unmeasured charges continue to be phased in.

## **Household**

Households make a contribution towards the costs of water and sewerage services through domestic Regional Rate payments. It is estimated that this contribution equated to about half of the level of funding required to provide services to domestic customers in 2008/09. The remaining funding requirement is provided through central Government revenue.

The necessary regulatory and financial structures are in place to implement any Executive decisions on future funding arrangements. This includes models which apportion the cost of providing water and sewerage services between each of the customer groups (including households) in line with Article 9. In the absence of specific additional household water and sewerage contributions, the Executive continues to pay for these services on domestic customers' behalf.

These payments reflect the anticipated profile of customer payments (if customers were making the payments themselves). The Executive has not agreed a methodology by which domestic customers will make payments. Any policy decisions will take account of the fact that there have not been any water scarcity issues within the river basin area during the last 10 years. NIW continually monitors the storage levels in all impounding reservoirs and takes all reasonable steps to maximise water storage so as to minimise the effect to customers of any prolonged dry weather spells.

## **Promotion of Efficient and Sustainable Water Use**

To help meet the sustainable water use aims as described under Article 1 of the Water Framework Directive, the Order places a duty on NIW to promote the efficient use of water by customers. The independent Utility Regulator has the power to enforce this duty.

It is also an offence to waste water from a water source through either allowing a water source to run to waste or by abstracting more than is licensed under the Abstraction and Impoundment Licensing Regulations (NI) 2006. The abstraction licenses issued to NIW during 2007 will also be reviewed in coming years to ensure compliance with the Directive in terms of both water quantity standards and ecological need. Fees and charges under the Abstraction and Impoundment (Licensing) Regulations (NI) 2006 will be introduced early 2010.

NIW currently has an extensive programme for promoting and improving water efficiency and conservation. This includes:

- continuing to invest on reducing water mains leakage to reduce the 2008/09 leakage levels by 7.6% for 2012/13;

- attending major public exhibitions, hosting events at its Silent Valley Education Centre and organising educational visits to schools and communities;
- travelling throughout the River Basin areas using its Waterbus (mobile classroom) to teach pupils about issues such as water efficiency;
- publishing education leaflets for customers on water topics such as using water wisely;
- running campaigns designed to increase awareness of the need for water conservation and more environmentally friendly lifestyle choices and behaviours;
- implementing and enforcing the requirements of the Water Supply (Water Fittings) Regulations (Northern Ireland) 2009 which include an offence for installing or failing to maintain a fitting which wastes or misuses water supplied by NIW
- by adding to the monitoring network in NI to more accurately measure the volumes abstracted from each of the surface and groundwater sources currently operated by NIW; more detailed monitoring may identify reductions in volume and or sources in the future; and
- the delivery of catchment scale projects with support from NIEA officials to monitor and identify mitigation works which may be required under the Directive to ensure compliance

## 5 Cost-Effectiveness Analysis

The Pressures and Impacts analysis reveals that a large number of activities contribute towards pressures on water bodies in Northern Ireland. Many water bodies are at risk from multiple pressures. Information on costs and benefits, including environmental and resource costs and benefits, is needed to inform the design of cost-effective Programmes of Measures (PoM) and the consideration of less stringent environmental objectives.

The classification of water bodies and the setting of environmental objectives undertaken as part of the development of the River Basin Management Plans has been used to draw up a programme of measures, which includes both basic and supplementary measures.

The supplementary measures in the PoM have been assessed for costs and benefits across all three of the NI RBMPs. The assessment<sup>9</sup> determined that if the whole package of measures were implemented as proposed in the plans this would result in estimated costs in the range £3m-£15m (with standard discounting over 15 years) but with potential benefits of £23-£25m (again discounted over 15 years).

The WFD requires Member States to “make judgements about the most cost-effective combination of measures in respect of water uses to be included in the programme of measures” [Annex II (b)]. Where there are a number of potential measures that could be implemented to achieve a WFD objective, the most cost-effective combination of measures is that which delivers the objective for the least overall cost.

Accordingly, the Collaborative Research Programme (CRP) on River Basin Management Planning Economics was set up to develop the methodologies needed to undertake the WFD economic analysis and to provide the guidance on these methodologies for use in the UK as well as a cost calculation tool, a cost database and the completion of a National Water Environment Benefits survey to provide information about the overall scale of benefits from WFD implementation. The CRP involved 14 parties and was chaired by Defra<sup>10</sup>.

The preliminary cost-effectiveness analysis (pCEA) makes a significant contribution to our understanding of the measures that are needed to meet WFD objectives and their associated costs. However, there is still uncertainty about several aspects of the cost estimations. In particular, there is uncertainty about the relationship between some water quality and quantity parameters, and the ecological status of water bodies; and the related question of how far measures will need to be rolled out in order to achieve the desired objective.

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<sup>9</sup> LINK to strategic Regulatory Impact Assessment TO INSERTED.

<sup>10</sup> Parties to the CRP were: Department of Environment, Food and Rural Affairs (Defra), Scottish Executive, the Environment Agency, Scottish and Northern Ireland Forum for Environmental Research (SNIFFER), Scottish Environment Protection Agency (SEPA), English Nature, Department of Trade and Industry (DTI), UK Water Industry Research (UKWIR), Royal Society for the Protection of Birds (RSPB), Welsh Assembly Government (WAG), Department of Environment Northern Ireland (DOENI), British Ports/UK Major Ports Group (UKMPG), Countryside Landowners and Business Association (CLBA), National Farmers Union (NFU), and Joint Environment Programme (JEP).

The pCEA information was used to develop the preferred WFD implementation option which is described in the updated Impact Assessment (reference 2). This shows clearly that costs need to be phased significantly in order to achieve a proportionate implementation of the WFD, given the likely level of benefits.

The pCEA also shows that, given the uncertainty associated with classification, source apportionment and the effectiveness of measures, and the current state of knowledge, a longer term adaptive approach to river basin planning will ultimately be more effective and cost-effective than an unphased approach.

A common theme emerging from the pCEA is the need for measures to improve information and reduce uncertainty. These measures may take a number of forms, such as research on the extent and apportionment of pressures which have not previously been monitored by the NIEA; the relationship between particular pressures and ecology, particularly for hydrology and morphological pressures; investigations of pressures in specific sites; research on the effectiveness of measures, including the implementation of pilot projects.

A second recurring theme within this work is that of site-specificity. Given the wide range of conditions affecting water bodies in Northern Ireland, it is clear that the most cost effective package of measures will vary from location to location, both between and within RBDs. The remit of the pCEA was to consider costs and effectiveness at the national level. As a result, authors made assumptions about the number of sites where implementation would be necessary and the average cost that would be incurred.

The pCEA also identifies a number of cross-cutting measures which may address several pressures at the same time. There are particular challenges in assessing the cost effectiveness of these measures because of their cross-cutting and innovative nature.

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