Northern Ireland Statistics & Research Agency

Northern Ireland Multiple Deprivation Measure 2005

A User's Guide

An Agency within the Department of Finance and Personnel

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Chapter 1: Background

1.1.1. In May 2005 the Northern Ireland Statistics and Research Agency (NISRA) published the Northern Ireland Multiple Deprivation Measure (NIMDM) 2005 which identifies small area concentrations of multiple deprivation across Northern Ireland. The research was conducted by a team from the Social Disadvantage Research Centre at the University of Oxford led by Professor Michael Noble.

1.1.2. A steering group was set up to oversee the research process. This group comprised 25 members representing Central and Local government, Academia, Non-Departmental Public Bodies as well as representation from rural and community/voluntary sectors. A list of members of the Steering Group is given as Appendix 1. Full details of the meetings of the Steering Group are available on the NISRA website.

1.1.3. This research involved both the production of new measures of relative multiple deprivation in Northern Ireland and a thorough review of the NIMDM 2001, often referred to as the Noble Measures after Professor Noble who led the 2001 research, taking into account the many issues raised in the previous report and those arising from its publication. As part of the review a consultation document was produced, proposing the design of the new NIMDM 2005, which was followed by an extensive consultation process, whereby a series of public meetings took place across Northern Ireland. Almost 300 participants attended and over 5,500 consultation documents were distributed or downloaded from the NISRA website. The verbal and written responses to the consultation fed into the final proposals for the NIMDM 2005, this was presented to the Steering Group in a blueprint document which was followed by the final report published in May 2005.

1.1.4. The new NIMDM 2005 will be the official measure of spatial deprivation across Northern Ireland. The deprivation measures will be used by government and wider bodies to target resources on geographical areas of greatest need and to inform government programmes like New Targeting Social Need (New TSN). This document briefly describes the new NIMDM 2005 and gives guidance on how the deprivation measures should be applied in targeting and resource allocation. It is intended that this document should be read in conjunction with the NIMDM 2005 research report, and so repetition of the contents of that report is minimised; instead the reader is referred to the original report where appropriate.

Chapter 2: Role of Spatial Targeting and the NIMDM 2005

2.1.1. The New Targeting Social need (New TSN)[1] policy is one of the government's key socio-economic commitments aimed at tackling inequalities, poverty and social exclusion by targeting programme resources and efforts to areas, groups and individuals in the greatest objective social need. It is a cross-cutting policy that applies to all aspects of government activity. New TSN continues to be used as one of the main strategies for addressing the needs of individuals and groups most at risk in Northern Ireland. It therefore relies on reliable and consistent statistical indicators that can identify the most deprived people and areas.

2.1.2. Methods of targeting used by both government and wider community programmes will depend on whether the programme is delivered at individual or community level and a broad range of indicators are required. Where programmes are delivered to individuals, indicators measuring dependency on Income Support or entitlement to free school meals and so forth can be used. However, where programmes are community or area based (for example rural development or urban regeneration) then targeting on an area basis may be appropriate. The role of the NIMDM 2005 is to assist with spatial targeting.

2.1.3. Not every person living in a disadvantaged area is deprived and conversely there are many disadvantaged people living outside deprived areas. Indeed, the research has demonstrated that there are households in receipt of income and employment related benefits in virtually every Super Output Area (see Chapter 3) in Northern Ireland. Therefore it follows that any spatial targeting must complement, and not be a substitute for, targeting of groups and people. This subject is discussed in more detail in Chapter 5.

2.1.4. This report is based on the premise that spatial statistics are required for effective targeting of programmes and has the overall aim of addressing the issues relating to how best to apply, and make use of, the NIMDM 2005.

1 The Office of the First Minister and Deputy First Minister are consulting on an anti-poverty strategy which will develop further the tenets of New TSN but will still retain the objective targeting of areas of social need as a core principle.

Chapter 3: Geographical Issues

3.1. Output Areas/ Super Output Areas

3.1.1. The potential problems with using administrative units for deprivation analyses have long been recognised. Essentially, there is no reason why the spatial distribution of deprivation should follow administrative boundaries and consequently, measuring deprivation for administrative units may mask geographical concentrations of deprivation. This problem has been described more formally as the Modifiable Areal Unit Problem (see Oppenshaw[2], 1984). The 1994 Robson Measures of relative deprivation in Northern Ireland, based on the 1991 Census results, introduced the concept of deprivation analysis at the smallest geographical unit for which results were provided i.e. enumeration districts (EDs) within wards. This enabled 'pockets' of deprivation in otherwise relatively non-deprived places to be identified and targeted. The NIMDM 2001 also used 1991 Census EDs to identify deprived areas and similarly based the research on the 1984 local government boundaries because of the lack, at that time, of a sub-ward geography for the 1992 local government boundaries.

3.1.2. For the purposes of disseminating statistics from the 2001 Census, a statistical geography known as 2001 Census Output Areas (OAs) were created, which represent the smallest geographical units for which robust Census statistics could be produced while protecting the confidentiality of individual Census returns. There are 5022 OAs in Northern Ireland, which have an average size of just under 340 individuals. These nest within the 582 wards and 26 Local Government Districts (LGDs) currently defined in Northern Ireland. The likelihood of a spatial unit containing an area of deprivation that is concealed by the relative affluence of the surrounding area reduces as the spatial units become smaller. Thus, the small size of OAs will reduce the risk of deprived areas being missed by analyses such as that conducted by the research team. In addition, 2001 Census OAs have an advantage over 1991 Census EDs as they were designed with statistical output in mind whereas the latter were designed for Census enumerators and took no cognisance of the type of people living in an area.

3.1.3. Despite their usefulness in identifying very small pockets of deprivation, for some domains of the NIMDM 2005 (see Chapter 5), OAs would be too small to produce statistically robust information for all domains.

3.1.4. In addition to this and contributing to the geographical choices made for the NIMDM 2005, is the existence of variation in electoral ward size in Northern Ireland, with populations ranging from approximately 800 to 8,000 people - for example, 750 people live in the Bushmills ward in Moyle Local Government District in comparison with 9500 people in the Botanic Ward in Belfast Local Government District (2001 Census).

3.1.5. Therefore one of the major innovations of the NIMDM 2005 is the development of a new statistical (as opposed to administrative) geography to improve the reporting of small area statistics i.e. Super Output Areas (SOAs). SOAs are based on the 2001 Census Output Areas (OAs).

3.1.6. Ideally, for the purpose of comparative analysis, geographical areas should possess relatively even sized populations and deprivation measures should be constructed at the smallest practicable spatial scale; SOAs were proposed and accepted as an intermediate unit between OAs and wards. SOAs were created on a ward-by-ward basis by aggregating OAs and taking into account measures of population size and contiguity. Each SOA had a target population size of approximately 2000 people. The final set of 890 SOAs range in population size from 1300 (Strand_2, Coleraine LGD) to 2956 (Derrynoose, Armagh LGD) and are therefore more evenly sized than wards and overcome the difficulties in making comparisons due to variation in size and characteristics. The NIMDM 2005 has been reported for the 890 SOAs in Northern Ireland.

3.1.7. After each SOA had been created, through an iteration process, most wards became a single SOA (323), 247 wards were split into separate SOAs (ranging from 2 to 5 - for example Botanic Ward became the following SOAs: Botanic_1, Botanic_2, Botanic_3, Botanic_4, Botanic_5) and the remaining 12 wards were combined into 6 SOAs.

From 582 Wards - Created 890 SOAs

323 Wards unaltered	→	323 SOAs
188 Wards (2 SOAs)	→	376 SOAs
53 Wards (3 SOAs)	→	159 SOAs
4 Wards (4 SOAs)	→	16 SOAs
2 Wards (5 SOAs)	→	10 SOAs
*12 Wards combined	→	6 SOAs

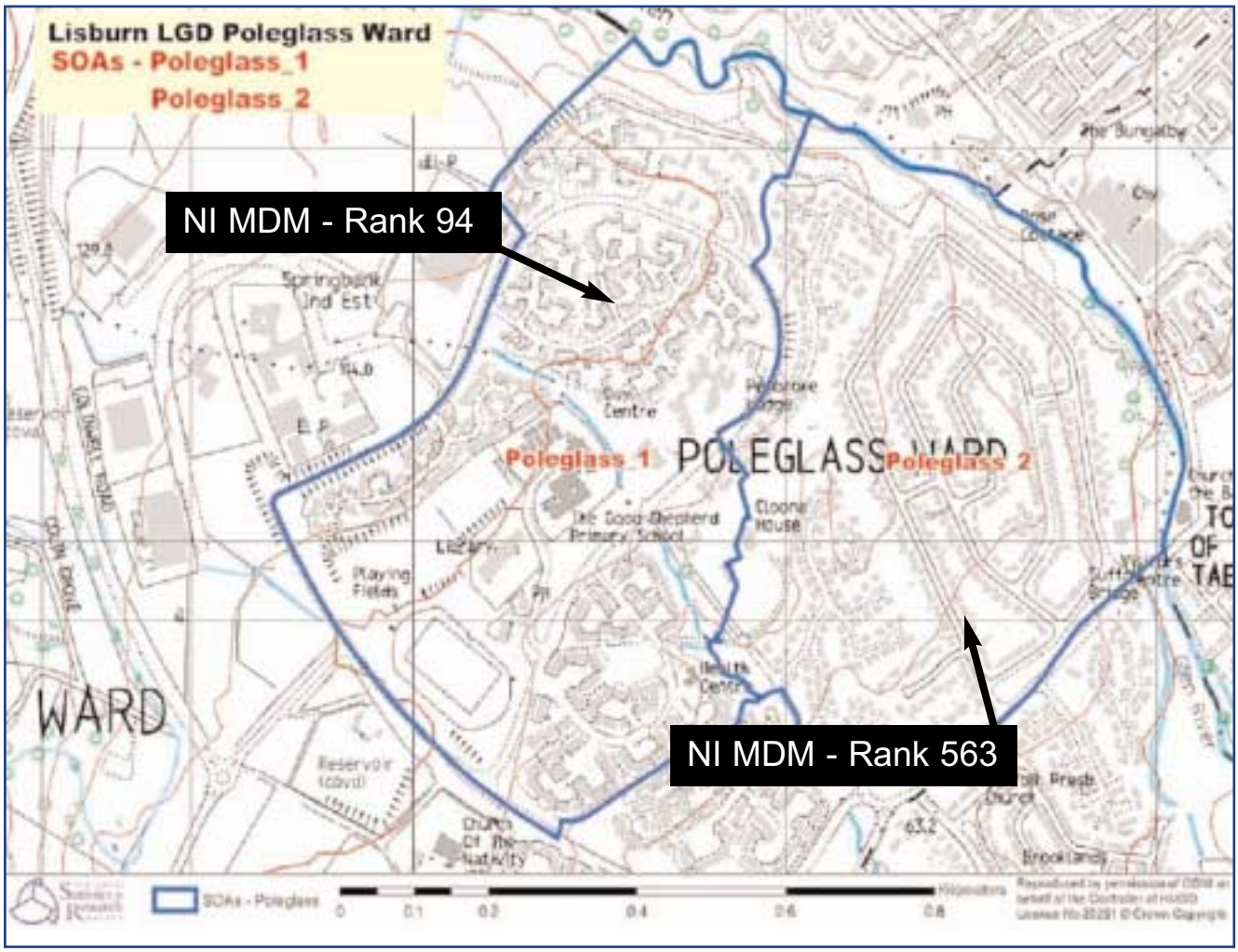
SOAs population sizes range from:
Smallest 1300 - Largest 2965
Average size = 1892

2 The Modifiable Areal Unit Problem (1984), Stan Oppenshaw, in Concepts and Techniques in Modern Geography, Geo Books

3.1.8. SOAs also take into account, as far as possible, patterns of tenure and household type and so are more suitable for identifying deprivation for areas with similar populations across Northern Ireland. However despite these efforts it is clear that there are literally thousands of ways in which the households could be grouped into OAs and SOAs, and these groupings may have consequences for deprivation analyses and targeting. This is discussed later in the section on equity issues (Chapter 8). However, overall SOAs have the advantage of allowing the identification of deprivation for small more evenly sized areas while maintaining statistical robustness.

3.1.9. To take the example of the Poleglass Ward in Lisburn LGD, the process of creating Super Output Areas based on population size, tenure and household type, separates the Poleglass Northern Ireland Housing Executive (NIHE) estate from the privately owned Glengoland housing development. This gives two homogeneous SOAs that are more useful for comparative purposes and reduce the extent to which pockets of deprivation are hidden, as would be the case in the larger heterogeneous ward. The example of how the Poleglass ward was split into SOAs is shown in the figure below.

Figure 3.1 Poleglass electoral ward showing split into two Super Output Areas.

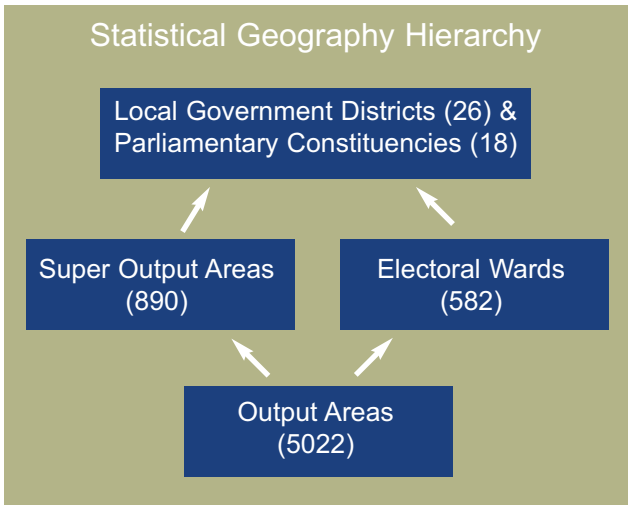


3.1.10. As can be seen from figure 3.1, the two SOAs in Poleglass are different with regard to their Multiple Deprivation Ranks in Northern Ireland. Super Output area Poleglass_1 is the Poleglass NIHE estate (ranked 94 in Northern Ireland) while Super Output Area Poleglass_2 is the privately developed Glengoland housing development (ranked 563 in Northern Ireland).

3.2. Choice of geographical level for targeting

3.2.1. The NIMDM 2005 research provides deprivation results for Northern Ireland's 890 SOAs (typical population of 2000 people), 5022 OAs (typical population of about 340 people) and also summary measures for the 582 Wards, 26 LGDs and 18 Parliamentary Constituencies (PCs). An important issue for policy delivery is therefore to decide on the level of spatial targeting that is required.

Figure 3.2 Northern Ireland Administrative and Statistical Geography (1992 Boundary Commission / 2001 Census)



3.2.2. The choice of geographic unit of analysis and deprivation measurement should be considered in the context of:

- the nature and aims of a particular policy or programme and subsequent actions and interventions;
- the potential beneficiaries and how the programme will be delivered; and
- the range of statistical indicators that are required.

Chapter 4: Methodological Issues

4.1. Allocating cases to administrative units

4.1.1. The base data for the majority of the research came from administrative sources for example, the Department for Social Development (DSD) database of all current recipients of benefits such as Income Support. The individual records are geo-referenced by a postcode. There are just under 50,000 current distinct domestic postcodes in Northern Ireland and each covers about 15 households on average. The postcode can thus identify the geographic location of each Income Support household to a high degree of accuracy, and was used to place households in SOAs.

4.1.2. While the use of postcodes provides an accurate allocation of cases to SOAs, it is not perfect. OA boundaries, on which SOAs are based, do not follow postcode boundaries, and there will be instances when, for a single postcode, some houses are in one SOA and other houses are in a different SOA. This research used a lookup table called the Central Postcode Directory[3] (April 2004 version) and allocated postcodes to SOAs (and OAs) on the basis of the location of the centroid of addresses within the postcode. Thus, all addresses with a given postcode are allocated to the same SOA (or OA). This will result in most cases being allocated properly but it is acknowledged that the use of postcodes introduces some inaccuracy to the analysis.

4.1.3. Further, it is inevitable that large administrative databases will contain incorrect, incomplete or missing postcodes although the datasets have all been put through cleaning and validation procedures. While acknowledging that the data sources and the allocation methodology can be flawed, it was the view of the research team that the data are sufficiently robust for the purposes of these analyses. However, users should be aware that the relative magnitude of inaccuracy around the estimates will necessarily be proportionately greater for OA level estimates. The prime purpose of the OA level estimates is to give a picture of the distribution of deprivation within a SOA.

4.2. The use of administrative statistics

4.2.1. Most of the data used in the NIMDM 2005 is derived from administrative sources. Administrative data have a number of positive qualities; the information is

3 The Central Postcode Directory is available, subject to terms and conditions, from NISRA.

relatively easy to access, relatively inexpensive to obtain, free from sampling error, potentially up-to-date and updateable. However, there are a number of less desirable qualities inherent in such data sources.

4.2.2. Considering social security benefits as an example, the definition of who is in receipt of the benefit is defined by the benefit rules, and this need not correspond to the population that the research wishes to identify. The debate in recent years about the use of the claimant count to measure unemployment is a good example. The administrative source counts those claiming the benefit, but there may be others who are 'unemployed' in some sense but not eligible for the benefit. With respect to the research, it is suggested that this is not a major problem, but users should be aware of the issue, and note that a slight change in the eligibility rules may change the population being quantified.

4.2.3. Linked to the example above, time trends in the statistics can be driven by changes in eligibility rules more than changes in macro-economic circumstances. The changes to claimant count statistics because of amendments to eligibility rules, is again a good example. The current research is 'point in time' and thus unaffected, but a future repeat analysis, using exactly the same indicators, simply may not be possible (just as it was not possible to use the same indicators that were used in 2001). For example the Working Families Tax Credit, used in the Income Deprivation Domain in the NIMDM 2005, has been replaced by Working Tax Credit (in May 2005).

4.2.4. Finally, when using social security benefits, the research should ideally quantify the number of people eligible for a particular benefit. This is not possible and the research uses the number of recipients of the benefit as a proxy. Note that there are two possible types of error; eligible people may not receive the benefit, while non-eligible people may receive the benefit. The only alternative to using this assumption is to conduct research that quantifies take-up rates for all groups and areas, and this detailed information is not currently available. The use of social security statistics thus involves an implicit assumption that take-up rates for the benefit are uniformly spread across the population, by group and area.

4.3. The use of population denominators

4.3.1. The NIMDM 2005 is based mostly on counts from administrative sources, for example, the number of individuals and, where appropriate, their dependents in receipt of various benefits. Thus, for example, the administrative systems provided the information that around 290 people fall into the categories defined as 'employment deprived' in both Ballyoran SOA (Craigavon LGD) and in Whiterock_1 SOA (Belfast LGD). In order to compare these counts in a meaningful way across Northern Ireland, the counts have been transformed into rates through division by appropriate population denominators, in this case the number of people of working age (the whole population aged 18-59 years plus men aged 60-64 years) in each SOA. The resulting employment deprivation rate shows that 34 percent of the working age population of Whiterock_1 are employment deprived compared to 18 percent in Ballyoran.

4.3.2. While these rates are usually considered more appropriate for comparative purposes, the counts themselves have a key role in the application of the deprivation measures. In particular, while population rates are preferred for making comparisons between areas, this does not hold for the allocation of resources. This is discussed in more detail in Chapter 5.

4.4. Population estimates

4.4.1. NISRA publish annual mid-year population estimates for Northern Ireland and its constituent LGDs. This level of geographic disaggregation is common to the other regions of the UK. Estimates of population change over time at lower levels of geography would require detailed statistics on population movement in these small areas since the 2001 Census of Population. Historically these data have not been readily available.

4.4.2. However, because the NIMDM 2005 was to be constructed at SOA level, as part of the research the project team produced small-area population estimates for Northern Ireland's 890 SOAs and 5,022 OAs. The method started from a mid 2001 base population and used a number of indicators of population change to update earlier population estimates for each small area of interest (SOAs and OAs) and create population estimates for mid 2003. The administrative sources used include mid-year estimates (MYEs), the Central Health Index, Child Benefit records, DSD information on pensioners in receipt of benefits, Armed Forces data and counts of prison populations. Further details of the methodology is given in the research report. The mid 2003 small area estimates are consistent with the 2003 MYE at Local Government District and Parliamentary Constituency level produced by NISRA.

Chapter 5: Interpretation and Application of the Deprivation Measures

5.0.1 This section describes the construction of the NIMDM 2005 by providing an overview of the domains and indicators used for the new deprivation measures and also attempts to provide a relatively straightforward interpretation of the measures. A more in-depth description is given in the NIMDM 2005 main report.

5.1. Domains and indicators of deprivation

5.1.1. There are 43 indicators (most of which relate to 2003) which combine to form seven domains within the NIMDM 2005. It should be noted that the individual domains are not mutually exclusive (i.e. a person can be both income and employment deprived and so on). The aim for each domain was to include a parsimonious collection of indicators that comprehensively captured the deprivation for each domain, within the constraints of data availability.

Income Deprivation Domain

Indicators

- Adults and children in Income Support households
- Adults and children in income-based Job Seeker's Allowance households
- Adults and children in Working Families' Tax Credit households whose equivalised income (excluding housing benefits) is below 60% of median before housing costs
- Adults and children in Disabled Person's Tax Credit households whose equivalised income (excluding housing benefits) is below 60% of median before housing costs

5.1.2. This domain measures the number of people living in households with low incomes, identified as those people living in households in receipt of the four benefits listed above. A recipient household is defined as a claimant, any partner plus any dependent children (i.e. the recipient and their dependents). The administrative system holds, or can estimate, the total number of people living in each recipient household. A household in receipt of one of these benefits is not in receipt of any of the other benefits, and accordingly the domain measure simply adds the counts of the recipient and their dependents living in such households across the four benefits. The count of people living in such households is expressed as a percentage of the total population of the area in question. The score for any SOA is thus the percentage of the SOA's population living in a household in receipt of any of these benefits.

5.1.3. Because the numbers of people living in families in receipt of each benefit are simply added, there is no explicit weighting given to the individual benefits within the Income Deprivation Domain score. At the time of the research, the numbers of recipients (and their dependents) of the four income benefits defined above were: Income Support (300,000), income-based Job Seeker's Allowance (45,000), Working Families' Tax Credit (19,900) and Disabled Person's Tax Credit (350). Thus, while there are no explicit weights involved in determining the domain scores, geographic patterns in the distribution of Income Support clearly have the greatest influence on the domain measure.

5.1.4. The SOA Income Deprivation Domain scores range from greater than 0.75 in the Falls and Whiterock areas in Belfast LGD to less than 0.03 in areas including North Down, Castlereagh and Stranmillis in Belfast LGD. Thus in areas in Falls and Whiterock, as many as 78% of the population live in households in receipt of an income benefit, while in areas such as Stranmillis, less than 1% of the population were experiencing income deprivation.

5.1.5. The Income Deprivation Domain scores can be placed in rank order, from the most to least deprived to inform spatial targeting. Due to deficiencies inherent in administrative data sources, as referred to in Chapter 4, and the use of postcodes to allocate cases to SOAs, differences between successively ranked SOAs are mostly numerically small and are thus unlikely to be in any sense real. In a number of SOAs, a very small number of households receiving benefits separate one rank from another. Nevertheless, ranks further apart are likely to reflect meaningful differences in deprivation.

5.1.6. If spatial targeting is used, decisions must be taken about designating some SOAs and not designating other SOAs. It is inevitable that there will be only marginal differences between some designated SOAs and some non-designated SOAs. The choice of cut-off will be informed by the extent to which the programme or policy aims to concentrate resources on the most deprived areas, or spread resources more widely.

5.1.7. Because the Income Deprivation Domain scores are straightforward percentages, based on counts, they can be used to inform the distribution of resources across a number of SOAs. In Antrim LGD, Toome SOA has an Income Deprivation Domain score of 0.25 compared to the Randalstown_1 score of 0.13. Thus, on average, the residents of Toome are twice as likely to live in a household in receipt of income benefits as the population of Randalstown_1; Toome's population might be considered to be, on average, twice as income deprived as Randalstown_1's population. If however, funding is to be allocated to Toome and Randalstown_1, a more appropriate comparative statistic might be that there are 639 income deprived people in Toome (25 percent of the SOA population of 2555) compared to 209 income deprived people in Randalstown_1 (13 percent of the SOA population of 1607). One appropriate way to distribute funding to Toome and Randalstown_1 for a project aimed at income deprivation might be in proportion to the numbers of income deprived people in each SOA. Accordingly the two SOAs would receive funds in the ratio 639 to 209 or 3 to 1. In summary, note the use of the domain score (rate) to compare areas, but the use of the count statistics to inform allocation of resources.

5.1.8. For the Income Deprivation Domain, and indeed any domain or composite score, the SOA rankings should not be used for the proportional allocation of resources. The SOA ranked as the 10th most deprived should not be considered twice as deprived as the 20th most deprived SOA, and these rankings would not in themselves justify allocating twice as much resource to the former SOA.

- **Income Deprivation Affecting Children Measure (IDAC)**

5.1.9. The income measure counts both adults and children in households, and there may be occasions when it is more appropriate to consider just adults or just children. The Income Deprivation Domain score incorporates information about children living in households in receipt of the income benefits. The measure is the percentage of the children in a SOA who live in households in receipt of income benefits. The comments above about the application of the Income Deprivation Domain score apply equally to the IDAC measure. The measure is not included within the NIMDM 2005 except to the extent that it is a contributory part of the overall Income Deprivation Domain score.

- **Income Deprivation Affecting Older People Measure (IDAOP)**

5.1.10. The Income Deprivation Domain score incorporates information about people aged 60 years or over living in households in receipt of Income Support or income-based Job Seeker's Allowance. The IDAOP measure is the percentage of the population in a SOA aged 60 or over who live in households in receipt of the two income benefits. The comments above about the application of the Income Deprivation Domain score apply equally to the IDAOP measure. The measure is not included within the NIMDM 2005 except to the extent that it is a contributory part of the overall Income Deprivation Domain score.

Employment Deprivation Domain

Indicators

- Unemployment claimant count (JUVOS) of women aged 18-59 and men aged 18-64 averaged over four quarters
- Incapacity Benefit claimants women aged 18-59 and men aged 18-64
- Severe Disablement Allowance claimants women aged 18-59 and men aged 18-64
- Participants in New Deal for Young People (18-24 years) who are not included in the claimant count
- Participants in New Deal for 25+ who are not included in the claimant count
- Invalid Care Allowance claimants women aged 18-59 and men aged 18-64

5.1.11. The Employment Deprivation Domain is mathematically very similar to the Income Deprivation Domain. It is based on six employment related counts as listed above. Again these benefits are non-overlapping and the SOA Employment Deprivation Domain score results from summing recipients of these benefits, and expressing the total number of recipients as a percentage of the working-age population (the whole population aged 18-59 years plus men aged 60-64 years). The SOA Employment Deprivation Domain scores range from less than 0.03 in parts of in Lisburn and Antrim LGD, to 0.43 or more in the Whiterock area of Belfast.

5.1.12. As a simple percentage of the population, the comments about the interpretation and application of the Income Deprivation Domain scores apply equally to the Employment Deprivation Domain.

5.1.13. Historically, the employment components of deprivation measures have usually focused primarily on the unemployed. As discussed in the research report, this research takes a wider view of employment deprivation and includes all those involuntarily out of the labour market, for example those who are out of work through sickness or disability. At the time of the research, the rounded numbers of recipients of the six employment benefits defined above were: Unemployment Claimant Count (33,800), Incapacity Benefit (72,000), Severe Disablement Allowance (11,200), Invalid Care Allowance (32,200) and two New Deals (1,800). It is immediately clear that the claimant count, Incapacity Benefit and Invalid Care Allowance are the main drivers of the Employment Deprivation Domain score, and, perhaps surprisingly, there are more recipients of Incapacity Benefit in Northern Ireland than the claimant count of unemployed. The six indicators of employment deprivation display differing geographic patterns. In Larne LGD for example, Incapacity Benefit recipients outnumber the Unemployment Claimant Count by two to one, whereas in Armagh LGD there are almost three times as many recipients of Incapacity Benefit as there are people in the Unemployment Claimant Count.

Health Deprivation and Disability Domain

Indicators	Factor Weights
• Years of Potential Life Lost	0.46
• Comparative Illness and Disability Ratio	0.20
• A combined measure of two indicators (i) individuals suffering from mood or anxiety disorders, based on prescribing; and (ii) suicides	0.19
• People registered as having cancer (excluding non-melanoma skin cancers)	0.15

5.1.14. The Health Deprivation and Disability Domain score is based on the four listed indicators. These indicators take different mathematical forms and individual people or households may experience more than one indicator. Thus, the simple aggregation and expression as a percentage approach used for the Income and Employment Deprivation Domains could not be applied. A statistical technique called factor analysis has been used to combine the four indictors into a single score for each SOA. Further details on the indicators and the statistical methodology can be obtained in the research report.

5.1.15. The resulting domain score for each SOA has no simple interpretation, except that higher scores are associated with increasing deprivation. Factor analysis procedures typically centre the results on zero, and a score of zero in the Health Deprivation and Disability Domain indicates a SOA with a health deprivation score around the Northern Ireland average. Higher positive scores indicate increasing health deprivation, for example Shankill_2 SOA has a score of 2.56, while larger negative scores imply decreasing health deprivation. The Health Deprivation and Disability Domain scores for the 890 SOAs range from -2.06 to +2.56 and have a mean of zero.

5.1.16. The Health Deprivation and Disability Domain score for each SOA is determined as a factor score, which can be considered to be a weighted average of the four indicators. The weights of each indicator in the factor score are given in the table of indicators above, where it is seen that the Years of Potential Life Lost indicator is the main driver of the domain score.

5.1.17. As with the Income and Employment Deprivation domains, the Health Deprivation and Disability Domain scores can be placed in rank order to inform the designation of a target set of SOAs. Again, successively ranked SOAs are unlikely to exhibit any real difference.

5.1.18. As noted, the use of factor analysis results in domain scores centred on zero, and consequently the domain scores cannot be treated as ratio variables. For example, the Health Deprivation and Disability Domain scores of two Belfast SOAs, Ballymacarrett_3 (2.16) and Botanic_5 (1.08), mean that Ballymacarrett_3 has higher levels of health deprivation than Botanic_5, but we cannot infer that Ballymacarrett_3 is in any way twice as ‘health deprived’ as Botanic_5. Further, because the indicators can apply many times to individual people, the incidences of each indicator cannot be summed to estimate the number of health deprived people.

5.1.19. The Health Deprivation and Disability Domain score could, if required, be used to allocate funding across LGDs or other geographical units. It would first be necessary to identify a subset of SOAs and designate these SOAs as ‘health deprived’. This set of SOAs might be the 20 percent most deprived SOAs in Northern Ireland (those ranked 1 to 178 on the Health Deprivation and Disability Domain). The population of these 178 SOAs is 323,050 and this number is essentially treated as the count of the health deprived. Of the 178 health deprived SOAs, two are in Omagh LGD (Lisanelly_2 and Strule) and these two SOAs have a population of 3,435. Accordingly, we would allocate 1.06 percent (3,435 expressed as a percentage

of 323,050) of the relevant Northern Ireland budget to Omagh. Repeating this for the 26 LGDs will give 26 percentage allocations. Note that it is not necessary that Omagh's money should be spent in Lisanelly_2 and Strule; the population of these SOAs has merely been used as a way of determining Omagh's share of health deprivation across Northern Ireland.

5.1.20. There are two points about this method of allocation of funds to LGDs that users should be aware of:

(i) The method is critically dependent on the choice of the percentage or proportion of SOAs that are designated as health deprived. If, instead of the worst 20 percent of SOAs, the worst 100 SOAs had been designated, Omagh's share would have fallen to 0.49 percent of the Northern Ireland budget since Lisanelly_2 is the only Omagh SOA in the 100 most health deprived SOAs. If the method is employed, a sensitivity analysis should be performed, examining the possible effects of different designation criteria.

(ii) It is possible that some LGDs may receive no funding at all. In the example above designating 178 SOAs, no SOAs in Coleraine were designated as health deprived. This may be appropriate or, if required, could be overcome by designating a higher percentage of SOAs.

5.1.21. The method described above can be applied with various modifications. It is not necessary to restrict the method to a dichotomous classification, and some money might be distributed to LGDs on the basis of the population of the least deprived group of SOAs. The argument for this might be to acknowledge that there are deprived people in non-deprived areas. For example, a formula might be applied that allocated 40 percent of the Northern Ireland budget to LGDs on the basis of population shares among the upper quartile of most deprived SOAs, 25 percent of the budget on the basis of the next most deprived quartile of SOAs, 20 percent of the budget on the basis of the next most deprived quartile and the remaining 15 percent of the budget on the last (least deprived) quartile of SOAs. As with the simple dichotomous model, the choices of the percentages allocated to each quartile, and the choice of quartiles, quintiles, deciles and so forth are critical and would require justification.

5.1.22. The allocation model detailed in the previous paragraph can be restated in a different way, with perhaps surprising results. Because the model distributes some money to each quartile, with 15 percent of the budget allocated to the least deprived quartile, the allocation model is equivalent to distributing 60 percent (4 times 15) of the budget on a simple population basis across the LGDs (independently of deprivation), with 25 percent of the budget being distributed additionally in the top quartile, 10 percent in the next quartile and 5 percent in the third quartile.

Education, Skills and Training Deprivation Domain

Sub-domains/Indicators	Factor Weights
Sub-Domain: Children/Young people (50%)	
• GCSE/GNVQ points score	0.48
• Key Stage 3 data	0.09
• Proportions of those leaving school aged 16 and not entering Further Education	0.12
• Absenteeism at secondary level	0.06
• Proportions of 17-20 year olds who have not successfully applied for Higher Education	0.15
• Proportions of Years 11 and 12 pupils not in a grammar school	0.09
• Proportions of post primary pupils with Special Educational Needs in mainstream schools	0.02
Sub-Domain: Working age adults (50%)	
• Proportions of working age adults (aged 25-59) in the area with no or low levels of qualification	

5.1.23. Like the Health Deprivation and Disability Domain measure, the Children/Young People sub-domain of the Education, Skills and Training Deprivation Domain is based on a number of indicators that may overlap in the population. The mathematical technique used for the health deprivation and disability domain, factor analysis, has been used in this sub-domain to create a single composite score of educational deprivation for children and young people for each SOA. Further details on the indicators and statistical methods are available in the research report.

5.1.24. Again, as for the Health Deprivation and Disability Domain, the Children/Young People sub-domain score is

a factor score that can be considered as a weighted average of the indicator scores. The weights for each indicator in the composite sub-domain score are given in the table above: the GCSE points score is the main driving variable in the sub-domain score.

5.1.25. The two sub-domain scores were subjected to the exponential transformation and combined with equal weights to produce the domain score. Although the Health deprivation and Disability meaure is a factor score and the Education, Skills and Training Deprivation measure is based on exponentially transformed variables, the methods and caveats about targeting and the allocation of resources using the Health Deprivation and Disability measure apply equally to the Education, Skills and Training measure.

Proximity to Services Deprivation Domain

Indicators

- Road distance to a GP premises
- Road distance to an Accident and Emergency hospital
- Road distance to a dentist
- Road distance to an optician
- Road distance to a pharmacist
- Road distance to a Job Centre or Jobs and Benefit office
- Road distance to a Post Office
- Road distance to a food shop
- Road distance to the centre of a settlement of 10,000 or more people

5.1.26. The Proximity to Services Deprivation measure is based on the distance by road that residents of a SOA travel to access a number of key service providers. The measure for each SOA is a weighted average across the service providers with a double weighting given to the Accident and Emergency hospital indicator. More detail is contained in the research report.

5.1.27. Although the individual indicators are all measured in the same distance units, the composite measure cannot be interpreted in simple distance terms since the overall score is a weighted combination of transformed indicators. The necessary transformations mean that the final score has no units of measurement. The scores do not come from factor analysis, as for Health, Deprivation and Disability and Education, Skills and Training, but similar principles of interpretation apply.

5.1.28. The SOA scores range from 2.25 (Belleek and Boa, Fermanagh LGD) to -0.90 (Falls_1, Belfast LGD), while across the 890 SOAs the Proximity to Services Deprivation score has an average score of zero. Higher positive scores represent areas with greater deprivation on this measure. Although it might seem logical given the underlying indicators, the higher score for Glenravel, Ballymena LGD (1.50) than Gresteel_1, Limavady LGD (0.75) does indicate greater deprivation, but not that services are on average twice as far away. The methods and caveats about targeting and the allocation of resources using the Health Deprivation and Disability and the Education, Skills and Training Deprivation measures apply equally to the Proximity to Services Deprivation Domain.

5.1.29. The outcome from the Proximity to Services Deprivation measure is essentially a proxy for rurality and mapping of the SOA scores highlights the concentration of services in urban areas.

5.1.30. The research report acknowledges some ways in which the domain scores could be improved. Users should be aware that the method uses distances by road, but takes no account of the availability of public transport, differences in the supply of services at each service delivery point, the unwillingness of members of one community to use facilities perceived to be in an area that is dominated by another community and the availability of services in the Republic of Ireland. Further, the measure implicitly assumes that the relative deprivation caused by the greater distance from service providers increases linearly with distance.

Living Environment Deprivation Domain

Indicators

Sub-Domain: Housing quality (33%)

- Ward level housing stress
- Houses without central heating

Sub-Domain: Housing access (33%)

- Household overcrowding
- LGD level rate of acceptances under the homelessness provisions of the Housing (Northern Ireland) Order 1988 and the Housing (Northern Ireland) Order 2003, assigned to the constituent SOAs

Sub-Domain: Outdoor physical environment (33%)

- Ward level local area problem score

5.1.31. As discussed in the research report, this measure comprises three sub-domains, one focusing on the condition of the housing stock, one on access to housing and one on the local physical environment. No inference should be drawn about the socio-economic conditions of the residents of the houses or areas.

5.1.32. Within the Housing Quality sub-domain, the housing stress indicator was derived from large scale survey data through a statistical process known as 'modelling'. The model makes use of the most recent data available and incorporates disrepair, lack of insulation, and failure to meet the Decent Home Standard. A ward level score was assigned to constituent SOAs. A measure of the percentage of houses without central heating at SOA level was also included in this sub-domain, using data from the 2001 Census.

5.1.33. The Housing Access sub-domain has two indicators which are symptoms of the difficulty in some areas of accessing appropriate and affordable housing. The indicators selected were household overcrowding and homelessness. The overcrowding indicator is derived at SOA level from the 2001 Census and measures overcrowding by reference to the number of people in the household. The homelessness indicator is the proportion of households accepted as homeless under the provisions of the 1988 and 2003 Housing Orders. This indicator is at LGD level and allocated to each SOA in the LGD.

5.1.34. The outdoor physical environment is a single indicator - the local area problem score. The problems included are: litter and rubbish dumping, general graffiti, sectarian graffiti (including painted kerbs), vandalism, dog mess or other excrement, scruffy or neglected gardens, scruffy or neglected buildings, vacant or boarded up buildings, and an overall measure of the visual quality of the area.

5.1.35. As for the Education Skills and Training Deprivation measure, the composite measure has come about through combining exponentially transformed variables and thus has a theoretical minimum of zero and a theoretical maximum of 100. The SOA scores range from 77.59 (Ardoyne_2, Belfast LGD) to 0.59 (Cultra, North Down LGD). Higher scores represent areas with greater deprivation on this measure. While the higher score for Culmore_5, Derry LGD, (16.01) than Ballywalter_2, Ards LGD (8.00) does indicate greater deprivation, it cannot be said that Culmore_5 is twice as deprived as Ballywalter_2. The methods and caveats about targeting and the allocation of resources using the Health Deprivation and disability Measure apply equally to the Living Environment Domain.

Crime and Disorder Domain

Indicators

Sub-Domain: Crime (60%)

- Violence, robbery and public order
- Burglary
- Vehicle theft
- Criminal damage

Sub-Domain: Disorder (40%)

- Malicious and deliberate primary fires
- Disturbances

5.1.36. The Crime and Disorder Domain measure is based on three distinct yet complementary data sources: police recorded crime data, police incident data on disturbances, and fire brigade data on malicious and deliberate primary fires. The domain is presented as two sub-domains: a Crime sub-domain that reflects four major crime types and a Disorder sub-domain that reflects wider social disorder through fire brigade and police incident data. Further details on the indicators and data are given in the research report.

5.1.37. Within the Crime sub-domain, the four composite indicators of violence, burglary, theft, and criminal damage were combined using equal weights as, at present, there is no robust empirical method of deriving weights based on severity. The Disorder sub-domain combines indicators from the fire service and the police, with police incident data allocated a greater weight than fire brigade data due to the higher frequency of incidence of disturbance than malicious and deliberate primary fires. The final overall Crime and Disorder Domain score was constructed by combining the two sub-domains. The Crime and Disorder Domain score represents the relative likelihood of experiencing a criminal or disorderly act at small area level and may be an appropriate measure for targeting crime reduction or wider community safety initiatives. Disaggregation of the domain into the two constituent sub-domain scores may provide further evidence for targeting particular initiatives. For example, the Crime sub domain score will act as a better measure of risk of criminal victimisation than the Disorder sub-domain and would therefore be a better choice for identifying neighbourhoods with high crime levels. Conversely, the Disorder sub-domain is likely to provide a better measure of key forms of anti-social behaviour than the Crime sub-domain and

would therefore be a better choice for identifying neighbourhoods with high levels of social disorder. The underlying indicators enable even greater specificity in the targeting of areas for community safety interventions.

5.1.38. As for the Education Skills and Training Deprivation measure, the composite measure has come about through combining exponentially transformed variables and thus has a theoretical minimum of zero and a theoretical maximum of 100. SOA scores for the Crime and Disorder domain measure range from 93.01 (Botanic_3, Belfast LGD) to 0.04 (Florence Court and Kinawley, Fermanagh LGD). Higher scores represent areas with greater deprivation on this measure. Although it might seem logical given the underlying indicators, the higher score for Craigywarren, Ballymena LGD (10.02) , than Wallace Park_1, Lisburn LGD (1.01) does indicate greater deprivation, but it cannot be said that Craigywarren is ten times as deprived as Wallace Park_1.

5.2. Use of the individual indicators within each domain

5.2.1. Each domain score is made up, in some mathematical way, from observed values of a number of indicators. While the domain score brings together the individual indicators into a single composite measure for the domain, the indicators may show different patterns for different SOAs which have similar domain scores. The contributions of the unemployment claimant count and Incapacity Benefit to the Employment Deprivation Domain score have already been mentioned. It is possible for two SOAs to have similar Employment Deprivation Domain scores, but for the employment deprived in one SOA to be predominantly claimant count, while for the employment deprived in the second SOA to be predominantly recipients of Incapacity Benefit. The policy response to these two SOAs, with similar employment deprivation scores, would be very different.

5.2.2. More generally, SOAs that have similar scores on any domain measure may require different policy responses because of their different circumstances, which are articulated by the indicator scores that contributed to the similar domain scores.

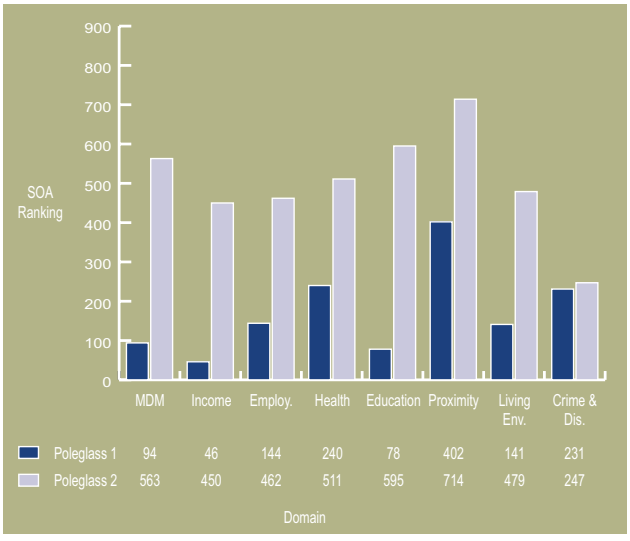
5.3. Identifying pockets of deprivation

5.3.1. It was noted earlier that the inclusion of OA level analyses facilitates the identification of pockets of deprivation located in otherwise relatively affluent areas. The statistics for OAs can be used directly, but these will not in themselves identify pockets. For example, OA 95GG210010 in Falls_2 SOA, Belfast LGD is the 34th most deprived OA across Northern Ireland but it is hardly a pocket of deprivation; each of the five OAs in Falls_2 are within the 10 percent most deprived OAs in Northern Ireland.

5.3.2. SOAs can be used to identify pockets of deprivation within LGDs, by comparing the MDM rankings with the Extent and Local Concentration measures. These two measures are described in the research report. For example, Lisburn LGD is placed 17th and 19th respectively when LGDs are ranked by their SOA scores on Average Score or Average Rank, but is placed 7th on Extent and 4th on Local Concentration (see Table 5.30 in the main report). This suggests that, on average, levels of deprivation experienced in Lisburn are below the Northern Ireland average but that SOA level pockets of deprivation exist. Examination of the SOA level MDM rankings show that the most deprived SOAs in Lisburn, Collin Glen_1, Collin Glen_2, Collin Glen_3, Twinbrook_1 and Twinbrook_2 are among the 10 percent most deprived SOAs in Northern Ireland.

5.3.3. With regard to deprivation the bar charts in figure 5.1 show the level of deprivation in each of the two SOAs within the Poleglass electoral ward. Poleglass_1 SOA is markedly more deprived than Poleglass_2 SOA.

Figure 5.1 Poleglass ward results - MDM and Domain rankings for each SOA



5.3.4. At a lower level of geography ward level analysis can also conceal pockets of deprivation. Evidence would suggest that the Upper Malone Ward is relatively non-deprived and contains SOAs Upper Malone_1 and Upper Malone_3 ranked at 776 and 668 out of 890 respectively. However, closer analysis shows that this ward also contains

a more deprived SOA namely Upper Malone_2 which is ranked 134 out of 890 on multiple deprivation. This SOA contains the Taughmonagh estate - which is a large social housing area amongst the predominately private, owner-occupied dwellings in the Upper Malone area and illustrates how disadvantaged areas can be concealed through the presence of less deprived areas at ward level.

5.3.5. By analyzing the Economic Deprivation measure at OA level, smaller pockets of deprivation can be highlighted within a relatively less deprived SOA. For example, the Cregagh SOA in Castlereagh LGD is ranked 231 in Northern Ireland (i.e. outside the top 25% most deprived SOAs). Within this SOA, OA 95II070009 (an area within the Cregagh NIHE estate) is ranked 100 (out of 5022) in Northern Ireland in terms of economic deprivation (i.e in the top 5% most deprived OAs in Northern Ireland).

5.4. Application of the LGD and PC measures

5.4.1. There are six deprivation scores for each LGD and PC, definitions of the six scores can be found in the main report. The six scores can be placed in three groups, each composed of two measures. The three groups are the two population weighted 'Average' measures, the two 'Scale measures' and finally the Extent and Local Concentration score. Although this section is written with reference to LGDs it applies equally to the PC summaries.

(i) The population weighted average of SOA ranks and the average of SOA scores

5.4.2. These two measures are very similar, and produce comparable LGD rankings. These LGD rankings are the best way of comparing the 'average' level of multiple deprivation experienced in each LGD. The MDM score is the weighted average of exponentially transformed variables and, unsurprisingly, displays a frequency distribution whose shape is similar to that of the exponential distribution. It is noted later in this report (section 6.1.4) that the SOA-level MDM score emphasises differences between more deprived SOAs and, consequently, makes less distinction between other SOAs. Thus, if MDM scores are added across SOAs, the shape of the observed distribution of SOA MDM scores limits the extent to which less-deprived SOAs cancel out the deprivation in deprived SOAs. Thus, although the 'average score' LGD summary is calculated through a population weighted average process, mathematically it is more appropriate to consider it as the aggregation of the deprivations in the SOAs within the LGD. The use of the population-weighted average merely ensures that the summary measure can be compared between LGDs irrespective of their differing population sizes. The average of SOA scores uses more information than the average of the SOA rank and is thus probably preferable. Against this, the average of the SOA ranks is possibly more easily interpreted.

5.4.3. These two SOA average measures are based on the MDM. Although not given in the research report, similar LGD summaries could be determined for each of the seven domain measures. For example the Average SOA Rank for the Proximity to Services Deprivation Domain in Fermanagh LGD would be calculated by averaging the ranks given in Table 5.18 in the research report for the 25 Fermanagh SOAs. This would be repeated for the 26 LGDs. Similar analyses could be conducted on the SOA Proximity to Services Deprivation scores, and similarly for all seven domains, resulting in a further fourteen LGD level summaries. These analyses would be appropriate if LGD comparisons were required for a particular domain.

5.4.4. If these LGD summary measures were produced for a number of domains, the SOA score population weighted averages are marginally optimal when considering a domain in isolation, but if comparisons are to be made across domains, then the SOA population weighted rank averages are more appropriate.

(ii) The Income and Employment scale measures

5.4.5. These two measures use the 'count' nature of the income and employment indicators and represent, respectively, the number of income and employment deprived people in each LGD. The SOA average LGD measures, above, are the best way to compare the level of deprivation in LGDs, while the role of the Scale measures is to inform the distribution of resources between LGDs.

5.4.6. Consider a programme aimed at alleviating employment deprivation. An analysis of the Employment Deprivation Domain data shows that 22.5 percent of the working-age population in Strabane are employment deprived compared to 12.5 percent in Lisburn. Clearly Strabane is proportionately more employment deprived than Lisburn, but these rates, in themselves, would not justify allocating more resources to Strabane than Lisburn. Table 5.30 of the research report shows that there are 4,986 employment deprived people in Strabane and 7,954 employment deprived people in Lisburn. It is suggested that funding might be allocated between Strabane and Lisburn in proportion to these numbers of employment deprived people. Thus, from a budget of £1m Strabane would received £385k (£77 per employment deprived person) and Lisburn would receive £615k (also £77 per employment deprived person). This allocates more money per working-age person to Strabane (£17.39) than Lisburn (£9.65),

reflecting Strabane's higher employment deprivation rate.

5.4.7. The Scale measures can be determined for the Income Deprivation and Employment Deprivation Domains only.

(iii) The Extent and Local Concentration scores

5.4.8. These two measures are driven by SOA level areas of deprivation and thus can be used to identify SOA level pockets of deprivation in otherwise affluent LGDs, as described above in Section 5.4 about identifying pockets of deprivation.

5.4.9. The LGD level Extent and Local Concentration scores are based on the MDM. As with the SOA average measures, these two measures can be determined for each of the seven domains.

Chapter 6: The Multiple Deprivation Measure

6.1. Overview of the Multiple Deprivation Measure (MDM)

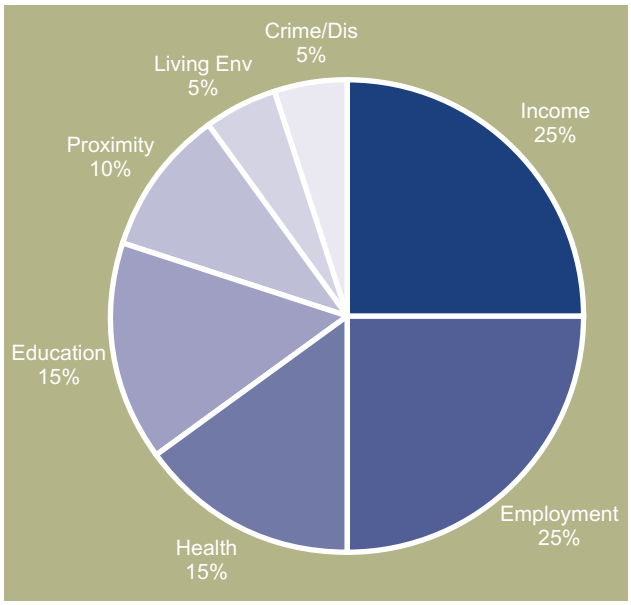
6.1.1. The seven domain scores are the key outputs of the research, and one of NISRA's recommendations is that the domain scores should be used when they are appropriate targeting tools for a specific project or programme. However many programmes will target deprivation in a wider or more general sense, and for this reason a multiple deprivation score has been determined.

6.1.2. The MDM brings together the seven domain scores into a single score. The method employed, described in detail in the research report, transforms the SOA rank on each domain (through an exponential transformation) and then combines the seven domains through a weighted mean.

6.1.3. The use of the exponential transformation was a deliberate choice, to reduce the potential cancelling-out effect when a SOA is deprived in one domain, but less deprived on another domain. The exponential transformation means that deprivation in each domain is aggregated, and relative non-deprivation in any domain essentially does not cancel out the deprivation observed in another domain.

6.1.4. The exponential distribution emphasises differences between more deprived SOAs, and by extension makes less distinction between the remaining SOAs. A practical outcome of this is that small differences in SOA rankings are more likely to represent real differences among deprived SOAs, while small differences in SOA rankings among less deprived SOAs are less likely to represent real differences. The contribution of each domain to the Multiple Deprivation Measure is explicitly described by the weight given to each domain as shown in figure 6.1.

Figure 6.1



6.1.5. Two weighting options were put out to public consultation and the above weights were favoured. This decision was subject to agreement by the Steering Group.

6.1.6. The resulting MDM scores range from 83.06 (Whiterock_2, Belfast LGD) to 2.20 (Jordanstown_3, Newtownabbey LGD) and have little or no physical interpretation except that higher scores are associated with greater levels of deprivation. The use of the exponential distribution means that the measure of multiple deprivation has a theoretical minimum score of 0 and theoretical maximum score of 100, but the measure should not be interpreted as a percentage. The guidance on application of the Health Deprivation and Disability Domain scores and other domains which are factor scores, applies equally to the MDM score.

6.1.7. As with the indicators that make up individual domains, SOAs with similar MDM scores may have very different domain scores, and require different policy responses. The SOA ranks for Ballysally_1 (Coleraine LGD) and Glenderg (Strabane LGD) are compared in the table below.

Table 6.1:
Comparison of domain ranks for two 'similar' SOAs

Domain	Ballysally_1	Glenderg
Multiple	81	79
Income	64	123
Employment	161	96
Health	196	229
Education	60	166
Proximity to Services	528	7
Living Environment	61	75
Crime and Disorder	38	643

6.1.8. Ballysally_1 and Glenderg have similar multiple deprivation scores (45.18 and 45.57 respectively) and have rank numbers of 81 and 79 of most deprived SOAs in Northern Ireland. However, while Ballysally_1's main problems are in the areas of crime and disorder, education, living environment and income, Glenderg's main problems relate to Proximity to Services, Employment and Living Environment.

6.1.9. The differences between needs in different domains can be very stark. Falls_1 (Belfast LGD) is proximate to services, being located close to central Belfast, and is the least deprived SOA in Northern Ireland on the Proximity to Services Deprivation Domain, yet ranks as the tenth most deprived on the Health Deprivation and Disability Domain. Conversely, the most deprived SOA on the Proximity to Services Deprivation Domain, Belleek and Boa (Fermanagh), is just outside the 100 least deprived SOAs on the Crime and Disorder Domain.

6.2. Correlations between the domain measures and the MDM

6.2.1. It is perhaps unsurprising that areas experiencing one form of deprivation frequently also experience other forms of deprivation. Table 6.2 below quantifies the correlations between the seven domain ranks and the MDM rank across the 890 SOAs.

Table 6.2: SOA level rank correlations[4] between domain ranks

	Inc	Emp	Health	Educ	Prox	LivEn	CriDis	MDM
Inc	1.000							
Emp	0.941	1.000						
Health	0.693	0.692	1.000					
Educ	0.828	0.807	0.579	1.000				
Prox	-0.249	-0.262	-0.506	-0.168	1.000			
LivEn	0.743	0.691	0.621	0.681	-0.211	1.000		
CriDis	0.378	0.355	0.577	0.240	-0.712	0.297	1.000	
MDM	**0.965**	**0.948**	**0.767**	**0.866**	**-0.219**	**0.798**	**0.384**	**1.000**

6.2.2. A strong positive correlation is observed between the Income Deprivation, Employment Deprivation, Health Deprivation and Disability, Education, Skills and Training Deprivation and Living Environment Deprivation Domain ranks, with each correlation being at least +0.579 and statistically significant at the 1 percent level of significance. The high contributions that the first four of these domains make to the multiple deprivation rank leads to the high positive correlation between each of these domains and the MDM rank.

6.2.3. The Crime and Disorder domain ranks and the Living Environment Domain ranks show lower but positive correlations with each other, the MDM and the four correlated domains listed above. The proximity to Services Deprivation rank is negatively correlated with all other domain ranks and with the MDM

Chapter 7: Comparison between the new measures and other deprivation measures

7.1.1 The publication of new measures of spatial deprivation invariably raises the issue of comparing area deprivation scores over time. While measuring change over time is clearly important, the prime objective of the research was to produce the best current measures of spatial deprivation; the Steering Group agreed that this was more important than tracking change over time. Thus, for example, considering the set of indicators used within the measures, the exclusion of a newly available data source simply because it was not included previously was not considered appropriate. Further, maintaining full consistency in the set of indicators is often simply not possible; the Family Credit source used in the Income domain in the previous measures (NIMDM 2001) no longer exists. It has largely been replaced by the Working Families' Tax Credit, however policy differences in for example eligibility rules mean that a straightforward replication of the previous Income Domain was not possible.

7.1.2 It is suggested that the NIMDM 2005 and the domain measures are best considered as tools for identifying target areas that experience the highest levels of relative deprivation. However, such composite measures have limited utility in tracking change over time. The methodologies used to create the NIMDM 2001 and NIMDM 2005 and most of the domain scores (excluding income and employment), namely factor analysis and exponential transformations, mean that even if exactly the same indicators are available at two time points, interpretation of the change in composite scores over time is not

4 Spearman's rho rank correlation was used

straightforward. It is recommended that change over time be addressed through tracking trends in individual indicators. This fits with the principle that indicators to measure the success of projects should be identified prior to the implementation of the projects. In summary, composite measures can be used to identify target areas, but indicators are preferable to monitor change over time.

7.1.3. A similar argument can be applied to attempts to compare relative deprivation scores between areas in Northern Ireland and areas in, say, the Republic of Ireland or Great Britain. The adoption of similar methodologies for measuring spatial deprivation in Northern Ireland, England, Scotland and Wales has led to queries about the possibility of comparing 'Noble-type' deprivation scores in, for example, Newry and Norwich. There are a number of difficulties with such comparisons. The main difficulty is the inclusion of different indicators. For example, Northern Ireland does not have Council Tax whereas Council Tax sources are used in deprivation measures in Great Britain.

7.1.4. Even if the measures are based on similar sets of indicators, the factor analysis and exponential transformation methodologies mean that results are specific to, and relative to, the base geographical area. The example below is hypothetical but demonstrates a potential outcome.

7.1.5. It would be possible for a small area in England to have indicator scores that are individually all worse than those of a small area in Wales, but the domain score (produced through factor analysis) of the Welsh small area could be worse than that of the English small area. This can occur because the average level of deprivation is higher in Wales and domain scores measure small area position relative to the country average.

7.1.6. Comparisons within Northern Ireland between the NIMDM 2001 and NIMDM 2005 are complicated both by the change in the indicator set, change in levels of deprivation and the change in geography. It is thus not possible to make direct comparisons between the measures from the NIMDM 2001 with the measures from the NIMDM 2005.

7.1.7. In summary, the composite measures within NIMDM 2005 were designed to identify areas of spatial deprivation in Northern Ireland in 2005. Comparative analyses, whether across time or with areas outside Northern Ireland are best approached through the use of single indicators.

Chapter 8: Equality and Future Development Issues

8.1. Equality and equity

8.1.1. Spatial targeting must address the issue of whether deprived people living outside of deprived areas are in any way disadvantaged by spatial targeting.

8.1.2. The first defence of spatial targeting is that it should only be part of an overall targeting strategy that involves the complementary targeting of people, groups and places. Targeting of people and groups should occur when appropriate, and likewise spatial targeting. Considering the employment domain as an example, the claimant count targets the relevant people, while an appropriate use of spatial targeting might be to inform the location of a new training centre.

8.1.3. Consideration should also be given to the geographical extent of the beneficiaries of a spatially targeted project. For example, spatial targeting may suggest locating a new training centre in or near a deprived area, but it is likely that the catchment area for the training centre goes well beyond the deprived area.

8.1.4. There are other less obvious equity issues involved with spatial targeting. The Modifiable Areal Unit Problem, discussed earlier, describes how a different choice of geographical boundary can affect deprivation scores. Consider two hypothetical LGDs (A and B) each with total populations of 52,000 people living in 26 SOAs, where each SOA has a population of 2,000. Suppose that within each LGD, 10 percent of the population are income deprived, and live in households in receipt of income benefits. Each LGD thus experiences a similar level of income deprivation and, in particular, has the same scale of income deprivation score of 5,200 income deprived people.

8.1.5. Suppose that in one of the LGDs (LGD A), the income deprived households are spatially clustered in 6 SOAs, in each of which about 40 percent of the population are income deprived. The remaining twenty Wards in LGD A contain only a few income-deprived people, and have very low Income Deprivation Domain scores (less than 5 percent). By contrast, the income-deprived households in the second LGD (LGD B) are spread fairly evenly across the 26 SOAs and each SOA in LGD B has an Income Deprivation Domain score of about 10 percent.

8.1.6. What will occur if spatial targeting at SOA level is used to designate a set of target SOAs across the two hypothetical LGDs? There are 52 SOAs in the two LGDs and the clustered area of deprivation in LGD A contains the 6 most deprived SOAs across the two LGDs. If resources are targeted at the most deprived 12 percent of SOAs, the designated SOAs (6) will all lie within one LGD (LGD A).

8.1.7. This illustrates how different residential patterns could affect spatial targeting. While the example above is extreme, it has been argued that the clustered residential patterns of LGD A are more typical of urban areas, while deprived households in rural areas are most widely dispersed, and rural areas are more like LGD B. Consequently, the argument runs that spatial targeting is more likely to designate urban areas than rural areas.

8.1.8. The existence of arguments such as that above reinforces the need for spatial targeting to be just one component of a policy that simultaneously targets areas, groups and people.

8.1.9. However, returning to the two hypothetical LGDs, consider the outcome if targeting designates not 12 percent of SOAs but one-third of SOAs. A total of 17 SOAs are designated; the 6 SOAs from LGD A remain, but are joined by 11 SOAs from LGD B. Thus, spatial targeting has swung from over-representation of LGD A to under-representation of LGD A. In general, concentrated targeting of the very worst areas may lead to over-representation of population groups with strong socio-economic clustering, but this same clustering may lead to their under-representation if the targeting is less concentrated.

8.2. Urban / rural comparisons

8.2.1. Comments on the spatial outcome of the NIMDM 2001 have suggested that the method identifies more urban deprived Wards. It is broadly true that the 2001 and 2005 Measures of Deprivation do identify more urban deprived Wards or SOAs than the deprivation analysis after the 1991 Census run by Professor Brian Robson from the University of Manchester[5]. There are many possible reasons for this.

8.2.2. It is noted that the Robson measures were based primarily on 1991 Census of Population and Housing data. Because of its nature, the Census contains many indicators relating to housing infrastructure. In the absence of more direct indicators of deprivation, such as measures of income, Robson's dependence on the Census led to a relatively large number of housing-related indicators being included in his measures. This is particularly true at ED level, where Robson used indicators solely from the 1991 Census. In contrast, the spread of the indicators in the current research and the weights given to each domain were decided explicitly by the research team, the Steering Group and NISRA.

8.2.3. The specification for the deprivation research noted that different forms of deprivation may occur throughout Northern Ireland and that, in particular, urban and rural areas may experience different types of deprivation. The deprivation indicators employed in the measures all had to satisfy a number of statistical criteria. To enable the measures to be applicable in both urban and rural areas, the research project ensured that all indicators selected would be applicable in both urban and rural areas. Consequently, it is believed that the deprivation measures are applicable in both urban and rural areas, and there are sections discussing these issues under each domain in the research report.

8.2.4. In light of responses from the public consultation exercise, an urban rural look-up table has been provided as an output from this research. This look up table uses the default definition of urban and rural areas recommended for use in Government. The look up table exists for both SOAs and OAs. A combination of this classification work along with the deprivation measures could be used to list and rank urban and rural deprived SOAs.

8.2.5. Finally, it has been emphasised on many occasions in this report that spatial targeting is only one part of NewTSN targeting. There are many programmes and projects that are specifically aimed at rural communities and the agricultural sector specifically. Figure 8.1 shows the most deprived Super Output Areas for urban and rural areas.

5 Relative Deprivation in Northern Ireland (1994), PPRU Occasional Paper number 28

Figure 8.1 Top ten most deprived urban and rural SOAs

Top 10 Urban most deprived	Top 10 Rural most deprived
Whiterock_1	Crossmaglen
Shankill_2	Glenderg
Falls_2	Castlederg
Crumlin_2_Belfast	Newtownstewart
Whiterock_3	Creggan
Falls_3	Clare
Shankill_1	Silver Bridge_1
New Lodge_2	Finn
New Lodge_1	Rosslea
Ballymacarrett_3	Ardboe

8.3. Status of the measures

8.3.1. When they were published, the NIMDM 2005 was commended to all Northern Ireland Departments as an agreed way of defining multiple deprivation. The domain measures are the recommended spatial targeting tools when the domain scores are considered relevant to the particular programmes and projects. While NISRA commend the measures, their application is the responsibility of individual Departments.

8.3.2. If, for a given programme or project, a Department feels that another spatial targeting tool is more appropriate, that Department may use the other tool. However all Departments were represented on the Steering Group that accepted the research report, indicators, domain measures and MDM.

A few examples of alternative approaches are given.

i) The Department of Education has used the eligibility of pupils to free school meals as a way of identifying schools with deprived pupil bases. This is theoretically close to the Income Deprivation measure as receipt of Income Support or Job Seekers Allowance (income based) is the usual passport to free school meals.

ii) Moving outside of the concept of deprivation, a programme to target teenage pregnancies would clearly be optimally spatially targeted at geographic areas where teenage pregnancy rates are highest, and these may not coincide with deprived areas.

iii) The DHSSPS use their own evidence based methods for allocating resources in their main expenditure programmes. Formulae are developed through empirical research at small area level and the most appropriate needs indicators for specific programmes such as Elderly Care or Mental Health are selected. A major benefit of the resulting tailored need indices is that they quantify how much more or less needy one area is compared to another and consequently what their share of available resources should be.

8.4. Future developments - updating the measures

8.4.1. The data underlying the NIMDM 2005 relate mostly to 2003. This is of course more up-to-date than the NIMDM 2001 which was based on data for 1999, but the current measures themselves will become dated. The use of administrative data sources ensures that deprivation measures can be updated more frequently than previous Census based measures. However, there is a natural tension between the ability to produce regular updates of the Multiple Deprivation Measures and the practical constraint of giving projects on the ground time to produce benefits.

8.4.2. NISRA plans to publish a short consultation paper on this subject in the near future.

Chapter 9: Dissemination of NIMDM 2005

9.1.1. As described previously, the deprivation research uses the 1992 Local Government boundaries for LGDs, along with the newly created SOAs. Because the data in the Income Deprivation, Employment Deprivation and Proximity to Services Domains are more robust than in other domains, it was possible to use OAs for the Economic Deprivation measure. With regard to accessing the measures themselves the following options are available:

(a) Hard copy reports can be obtained from The Stationery Office, 16 Arthur Street, Belfast, (Tel: 028 9023 8451) priced £25. The hard copy report includes a CD which incorporates the following:

- Electronic copy of the report
- Spreadsheets of the measures
- OA and SOA digital boundary files
- Map images of SOAs
- Interactive map for Deprivation in Northern Ireland (SOA level)
- Guidance on the measures and creation of SOAs

(b) The NISRA website www.nisra.gov.uk incorporates a Deprivation section which gives the background to the new research as well as access to an electronic version of the report, spreadsheets of the measures etc

(c) The Northern Ireland Neighbourhood Information Service (NINIS) website www.ninis.nisra.gov.uk has been updated to include a Deprivation 2005 link. Users may obtain deprivation area profiles by entering a postcode or create thematic maps of the measures for their chosen area. The site also incorporates a data catalogue which allows direct access to spreadsheets of the measures for all geographies and a map catalogue which incorporates map images for OAs, SOAs, Wards and Parliamentary Constituencies as well as interactive maps for each LGD with relevance to deprivation measures.

Appendix 1
Steering Group members

Name	Organisation
Dr Michael Anyadike-Danes	Economic Research Institute of Northern Ireland
Mr Robert Beatty (Chair)	NISRA
Dr Stephen Donnelly	OFMDFM
Mr Joe Frey	NIHE
Dr James Gillan	DETI
Dr Ivor Johnston	DE
Mr Robert Kidd	DEL
Ms Eileen Lavery	Equality Commission
Dr Nick Mack	Rural Development Council
Dr David Marshall	NISRA
Mr Tony Mathewson	PSNI
Mr Martin Mayock	DHSSPS
Mrs Siobhan Morgan	NIO
Dr Chris Morris	DSD
Mr Stanley McBurney	DARD
Ms Frances McCandless	NICVA
Mr Daniel McSorley	SOLACE
Dr Tracy Power	DRD
Ms Janis Watson	NISRA
Dr Michael Willis	DCAL

Appendix 2 - Examples of Applications of previous Deprivation Measures (2001)

Because the NIMDM 2005 has only recently been published, this annex provides some examples of applications of the NIMDM 2001.

Section 1: The International Fund for Ireland

The International Fund for Ireland actively spatially targets its resources through its Disadvantaged Areas Initiative. A high proportion of the Fund's expenditure assists relatively small community-based projects, and accordingly the Fund targets mostly at Ward level. The Fund maintains a target list of disadvantaged Wards and disproportionately targets its expenditure in, or for the benefit of, these Wards. Throughout the 1990s the Fund used a set of 222 disadvantaged Wards based on the Robson research and identified a successor set of target Wards following the publication of the NIMDM 2001 report.

The Fund aims to alleviate deprivation in a broad sense, but with a particular emphasis on economic regeneration. This suggested that the Fund should use the MDM and the Employment Deprivation Domain measure. Historically the Fund have targeted just over one-third of Northern Ireland and wished to retain this level of targeting. The Fund identified the worst 175 Wards on the Measure of Multiple Deprivation, and similarly the worst 175 Wards on the Employment Deprivation Domain. The Fund designated a Ward as disadvantaged if it was included on either list. The high positive correlation between the MDM score and the Employment Deprivation Domain score (r=0.94) meant that there was a large overlap between the two Wards lists, and combining them yielded a list of 197 Wards.

The Fund is aware that pockets of deprivation can exist within otherwise affluent Wards, and identified the most deprived 500 EDs throughout Northern Ireland. The vast majority of these EDs are contained within the 197 Wards already designated, but a small number lay within a further 34 Wards. Spatial targeting by the International Fund for Ireland is based on the resulting set of 231 Wards, with targeting within 34 of these Wards restricted to sub-Ward areas. The target area contains 36 percent of the Northern Ireland population.

The Fund does not treat spatial location as the sole criteria by which projects are judged, and has, for example, programmes aimed at cross-community capacity building, cross-border projects, tourism and so forth.

Section 2: PEACE II

Resources from Priority 3 of the PEACE II Operational Programme are distributed to 26 Local Strategy Partnerships (LSPs) who are responsible for spending the resource within their own LGD area. The Operational Programme text for Priority 3 of PEACE II states that the resources from the programme (£74m) should be allocated to LSPs on the basis of a formula based on "population weighted by deprivation".

The Special EU Programmes Body (SEUPB) are responsible for the distribution of PEACE II resources to the 26 LSPs. SEUPB decided that one third of the money (£24.7m) should be distributed on the basis of people living in the most deprived parts of Northern Ireland, a further third based on the number of deprived people in each LGD, irrespective of whether they lived in a deprived area or not, and the final third allocated on the basis of simple population share.

The 'most deprived parts of Northern Ireland' were identified by the most deprived 10 percent of EDs, using the Economic Deprivation score. The deprived 373 EDs have a population of 185,700. Each LGD's contribution to this population determined the LGDs share of the £24.7m. For example, among the 373 deprived EDs, 14 are in Lisburn with a population of 10,400. This is 5.6 percent of the population of the 373 deprived EDs, and thus £1.38m was allocated to Lisburn.

The choice of the Economic Deprivation score at ED level allowed pockets of deprivation to contribute to each LGD's share. The MDM could have been used at Ward level, or indeed any of the domain scores judged to be relevant, but these would not have allowed pockets of deprivation to contribute.

The choice of the worst 10 percent of enumeration districts to define deprived areas is also critical. The smaller the chosen percentage, so resources are targeted more tightly on small numbers of very deprived areas, and conversely a larger percentage will spread resources more evenly. The ultimate limit is when 100 percent of EDs are designated, and the targeting reduces to population share. The choice of 10 per cent of EDs to designate deprived areas by SEUPB will have been influenced by the further tranches allocated by numbers of deprived people, and population share. For this tranche of money, LGDs with small numbers of deprived EDs such as Fermanagh (0.4 percent of the Northern Ireland population-weighted total) will have received relatively small allocations. As the percentage of EDs designated as deprived increases,

so Fermanagh's share would increase until, with all EDs designated, Fermanagh would receive 3.4 percent of the resources, equivalent to its population share. Conversely, Derry has many deprived EDs, and receives 21 percent of the funding allocated using deprived EDs. Had the percentage of EDs used to define deprived areas been progressively increased, so Derry's share of the resources would have reduced until, when all EDs are designated as deprived, Derry's share falls to 6 percent, as shown in Table 2.1 below.

Table 2.1: The effect of changing the definition of deprived areas on the allocation of resources to Fermanagh and Derry LGD areas

Percentage of EDs defined as deprived	Fermanagh's percentage share of the population in deprived EDs	Derry's percentage share of the population in deprived EDs
10	0.4	20.9
20	1.8	15.1
30	2.0	12.0
40	2.8	11.1
50	3.5	10.2
100	3.4	6.3

The number of deprived people within each LGD was quantified by the Scale measures for income and employment, and each measure was used to distribute half of the £24.7m. Thus, Lisburn has 25,399 income deprived people (5.44 percent of the Northern Ireland total) and 6,057 employment deprived people (5.02 percent of the Northern Ireland total). Lisburn thus received £0.67m on the basis of the Income Scale measure and £0.62m on the basis of the Employment Scale measure.

For population share, Lisburn's population in 2000 accounted for 6.58 percent of the Northern Ireland total, and thus Lisburn was allocated a further £1.62m.

Lisburn LSP's funding under PEACE II is thus £1.38m + £0.67m + £0.62m + £1.62m giving a total of £4.3m. Note that it is possible to quantify the empirical contribution of each Ward to this £4.3m and Lisburn LSP could use this information to guide their funding within Lisburn, although there is no obligation on Lisburn LSP to do so.

Peace II Extension 2005-2006

The EU funded Peace II Programme in Northern Ireland and the Border Counties of Ireland had been due to end in December 2004. However, following representations from the Prime Minister and the Taoiseach, the European Commission approved an extension to the Peace II Programme into 2005 and 2006.

Following approval of the Peace II extension, the representative body of the LSPs, the Regional Partnership Board, undertook a consultation exercise which indicated support for allocating the additional resources to the LSPs using the equally weighted population, deprivation scale and deprivation extent formula. As the Noble deprivation indicators were then under review, it was agreed that the additional LSP allocations would be based on the revised indicators and updated population data.

Following publication of the new Noble measures of multiple deprivation in May 2005, the additional resources available to the LSPs were allocated using these measures and updated population figures. The most deprived parts of Northern Ireland were identified using the amended deprivation extent measure, while the number of deprived people in each LGD was quantified using the updated scale measures of income and employment deprivation.

Section 3: Stamp Duty Relief

In the 2001 UK budget, the Chancellor of the Exchequer announced a scheme to promote economic activity in deprived areas throughout the UK. One aspect of this was the removal of stamp duty on domestic property sales up to a value of £150,000 compared to the previous value of £60,000. This stamp duty relief applies to properties in the worst 10 percent of Wards throughout the UK. Analysis suggested that to be equitable, 42 percent of Wards in deprived parts of the UK such as Northern Ireland would be eligible. The scheme has been applied using the MDM; the 237 (42 percent of 566) most multiply deprived Wards have been identified as those with a MDM rank between 1 and 237.

Northern Ireland Statistics and Research Agency

The Northern Ireland Statistics and Research Agency (NISRA) was established as an Executive Agency within the Northern Ireland Department of Finance and Personnel on 1 April 1996. NISRA is the principal source of official information on socio-economic conditions in Northern Ireland. The Registrar General, a NISRA official, is responsible for undertaking the Northern Ireland Census of Population, and administers the civil registration of births, deaths, marriages and adoptions.

The overall corporate aims of NISRA are to:

- Provide a statistical and research service to support the decision making by Government in Northern Ireland and to inform Parliament and the wider community through the dissemination of reliable official statistics; and
- Administer the marriage laws and to provide a system for the civil registration of births, marriages, adoptions and deaths in Northern Ireland.

NISRA can be found on the internet at www.nisra.gov.uk

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