Northern Ireland Multiple Deprivation Measure 2001 – A user's guide

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Applying the Measures of Multiple Deprivation in Northern Ireland

Contents

1. Introduction

1.1 The New Targeting Social Need (New TSN) policy commits Northern Ireland Departments to ensure that policies are targeted on areas, groups and people in greatest need.

1.2 In July 2001 the Northern Ireland Statistics and Research Agency (NISRA) published research[1] on the geographical distribution of relative deprivation in Northern Ireland. The research was conducted by the Social Disadvantage Research Centre at the University of Oxford by a team led by Mike Noble with support from Queen's University Belfast. The resulting measures of deprivation for geographical areas throughout Northern Ireland continue to be the basis for spatial targeting of programmes, within Government and beyond.

1.3 This paper describes the measures of deprivation developed by the Noble team and gives guidance on their application for targeting and resource allocation. This document should be read in conjunction with the original research report, and tries not to repeat unnecessarily the content of the report. Accordingly, there are many occasions when the reader is referred to the original report.

[1] The Northern Ireland Multiple Deprivation Measure (2001), NISRA Occasional Paper number 18

2. The role of spatial targeting

2.1 New TSN involves the targeting of resources within programmes towards those in greatest social need, where the poorest should be identified objectively using measures of deprivation, fairly and consistently applied within programmes. The method of targeting will depend on a number of factors - notably the level at which the programme is delivered. Where programmes are delivered to individuals, measures such as income, benefit dependency, entitlement to free school meals and so forth can be used. However, where programmes are area based (e.g. rural development or urban regeneration) then targeting on an area basis may be appropriate. The role of the measures of deprivation is to assist with spatial targeting.

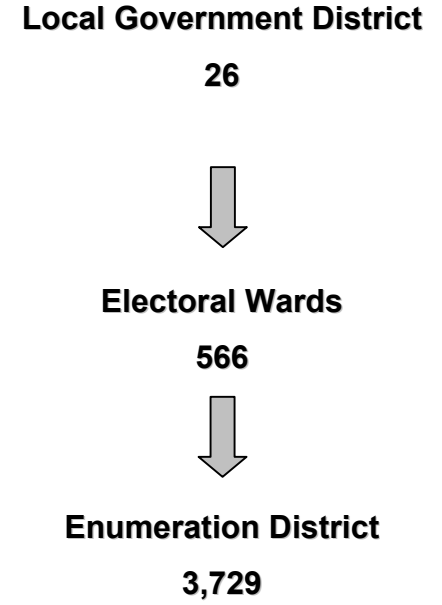
2.2 It is clear from above that the measures of multiple deprivation will inform New TSN targeting on areas, but this does not make spatial targeting a panacea for New TSN targeting. Not every person living in a disadvantaged area is deprived (the ecological fallacy) and conversely there are many disadvantaged people living outside deprived areas. Indeed, the research has demonstrated that there are households in receipt of income and employment related benefits in every electoral ward in Northern Ireland. It follows that any spatial targeting must complement, and not substitute for, targeting on groups and people. This subject is discussed in more detail in section 10. While acknowledging the need for spatial targeting to be complementary to other targeting, this report takes it as given that some form of spatial targeting is required, and addresses the issue of how best to apply the measures of deprivation.

3. Geographical issues

Local Government boundaries

7.3 Prior to this research, most Government targeting on deprived areas used the Robson measures[2] that were based mostly on information from the 1991 Census of Population. The results of the 1991 Census were reported for the Local Government boundaries as described by the 1984 Boundary Commission review, which divided Northern Ireland into 26 Local Government Districts (LGDs), in turn composed of 566 electoral wards. The Robson research introduced deprivation analysis at the level of Enumeration District (ED), the smallest geographical unit for which 1991 Census results were provided; there are 3,729 Enumeration Districts with an average size of about 150 households. The ED / ward / LGD geography is hierarchical, with EDs fitting exactly within wards, and wards fitting exactly within LGDs. This is displayed in Figure 1 below.

Figure 1: NI Administrative Geography (1984 Boundary Commision / 1991 Census)



[2] Relative Deprivation in Northern Ireland (1994), PPRU Occasional Paper number 28

3.2 Robson's ED level analysis enabled 'pockets' of deprivation in otherwise relatively affluent areas to be identified and targeted. A good example is the Taughmonagh estate in Malone ward in Belfast. Malone ward is one of the more affluent parts of Northern Ireland, being ranked in the least deprived decile of wards by Robson's degree of deprivation measure, but some of the Enumeration Districts that make up Taughmonagh (EDs 7346 and 7347) are within the most deprived third of Northern Ireland's EDs. This ability to identify and target pockets of deprivation was one of the most welcome innovations introduced by the Robson research.

3.3 Since the 1991 Census of Population, a new set of Local Government boundaries was introduced following the 1992 Boundary Commission review, these are known as the 1992 wards and LGDs. Enumeration Districts are features of the Census of Population, and the 1992 Local Government boundaries do not define a sub-ward geography. The current research could have been conducted based on the 1984 Local Government boundaries or the 1992 boundaries. The latter boundaries would have been preferable from an administrative view, since the deprivation analysis would have matched the boundaries represented by local councils and their councillors. Use of the 1992 boundaries would however have required the derivation of a complete new sub-ward geography, and this would probably have been as large an exercise as the deprivation analysis itself. It was decided that the inconvenience caused by the use of the 1984 Local Government boundaries was slight in comparison to the utility of the sub-ward geography and the ability to identify pockets of deprivation.

3.4 Users of the research thus need to be aware that the deprivation scores are reported for the 1984 ward and LGD boundaries. At ward level, most 1984 wards and 1992 wards do not cover similar geographical areas despite many ward names being similar. There are some exceptions; many, but not all, of the 1984 and 1992 ward boundaries in Cookstown LGD are identical. Other differences are substantial; the building of the

Poleglass estate in Lisburn LGD means that the 1984 Collin Glen ward is much larger (in physical area) than the 1992 Collin Glen ward.

3.5 Fortunately, at LGD level, the 1984 and 1992 boundaries are very similar. There are only two differences, both affecting Banbridge LGD. Firstly, a minor alteration to the Lisburn / Banbridge border which for the purposes of these analyses can be ignored. Secondly, but more importantly, the 1992 revisions transferred Rathfriland ward from Newry and Mourne LGD into Banbridge LGD. Thus, Rathfriland ward is reported in the deprivation analysis within Newry and Mourne LGD. If the deprivation research is being used to allocate funding to the current councils, the contribution of Rathfriland ward must be transferred to Banbridge council.

Accessing paper and digital copies of boundaries

3.6 As described above, the deprivation research uses the 1984 Local Government boundaries for wards and LGDs, along with the Enumeration Districts from the 1991 Census. Hard copy and electronic versions of the Local Government boundaries can be obtained from Ordnance Survey for Northern Ireland (OSNI). Electronic versions of the ED boundaries can be obtained from both OSNI and Census Office, NISRA. Hard copy versions of the ED boundaries on background maps can be viewed at Census Office.

Choice of geographic level for targeting

3.7 The research report gives deprivation scores for Northern Ireland's 26 LGDs, 566 wards (typical population of about 3,000 people) and 3,729 Enumeration Districts (typical population about 450 people). Which level of geography should be used for targeting?

3.8 The choice of level of geography should follow from the nature of the policy, and the size of the likely policy actions and interventions. For example, the International Fund for Ireland has a Disadvantaged Areas

Initiative which explicitly targets its funding. The Fund contributes to many community-based projects and the nature of Fund projects means that ward level targeting is considered most appropriate. By comparison, the former Industrial Development Board (IDB) funded more major projects, and LGD level targeting is more appropriate. For both these examples, the idea of targeting pockets of deprivation is appropriate on occasions; for the International Fund this means augmenting its list of target wards with deprived EDs within affluent wards, while for the IDB the large size of Belfast LGD meant augmenting LGD targeting with ward-based targeting within Belfast.

3.9 While it may be appropriate to augment, for example, a designated set of target wards with a number of designated pockets of deprivation in Enumeration Districts, comparative analyses must be restricted to a single level of geography. Indeed, comparative analyses properly require that each geographic unit has the same population. This is because larger units generally become more homogeneous, and tend to exhibit fewer extreme values. This is discussed further in, for example, Cook et al[3] who quote an example based on unemployment rates; the highest unemployment rate among Northern Ireland LGDs was 31 per cent, but among electoral wards it went as high as 59 per cent, and at ED level it went as high as 81 per cent. It follows that directly comparing unemployment rates at ED and LGD levels is not meaningful. Similar arguments apply to deprivation scores.

[3] Comparative Spatial Deprivation in Ireland (2000), Sally Cook, Michael Poole, Dennis Pringle and Adrian Moore, Oak Tree Press

4. Methodological issues

Allocating cases to administrative units

4.1 The source data for the majority of the research came from administrative sources, for example, the Department for Social Development database of all current recipients of benefits such as income support. The individual records are geo-referenced by a postcode. There are about 40,000 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 electoral wards and EDs.

4.2 While the use of postcodes provides an accurate allocation of cases to wards and EDs, it is not perfect. Electoral boundaries do not follow postcode boundaries, and there will be instances when, for a single postcode, some houses are in one electoral ward and other houses are in a different electoral ward. This research used a lookup table called the Central Postcode Directory that allocates postcodes to wards (and EDs) on the basis of the location of the centroid of all addresses within the postcode. Thus, all addresses with a given postcode are allocated to the same ward (or ED). This will result in most cases being allocated properly but it is acknowledged that the use of postcodes introduces some noise[4] to the analysis.

4.3 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 are not perfect, 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 the noise around the estimates will necessarily be proportionately greater for ED level estimates; the prime purpose of the ED

[4] Noise: Any extraneous or unwanted signal which contaminates the measurement.

level estimates is to give a picture of the distribution of deprivation within an electoral ward.

The use of administrative spatial units to measure deprivation

4.4 The potential problems with using administrative units for deprivation analyses have long been recognised. An easy introduction to the subject is given in Robson's Relative Deprivation in Northern Ireland report. Put simply, 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.

4.5 This problem has been described more formally as the Modifiable Areal Unit Problem (for example, Oppenshaw[5], 1984). Consider a single Northern Ireland LGD with a population of 50,000 people living in 20,000 households. The Local Government boundary commission is charged with grouping the 20,000 households into about 20 electoral wards. It is clear that there are literally thousands of ways in which the households could be grouped into wards, and these groupings may have consequences for deprivation analyses and targeting. This is discussed later in the section on equity issues (section 10).

4.6 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 Enumeration Districts will reduce the risk of deprived areas being missed by analyses such as that conducted by Noble, but users should be aware that mis-matches between administrative and deprivation geographies are possible.

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

The use of administrative statistics

4.7 Most of the data sources used in the measures of deprivation came from administrative sources. Administrative data have a number of positive qualities; the information is relatively easy to access, relatively cheap to obtain, free from sampling error, potentially up-to-date and updateable. However, there are a number of less desirable qualities inherent with such data sources.

4.8 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.

4.9 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 eligibility rules ammendments, is again a good example. The current research is 'single point in time' and thus unaffected, but a future repeat analysis, using exactly the same indicators, simply may not be possible. The Disability Working Allowance, used in the Income Domain, no longer exists and is now distributed through a tax credit.

4.10 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 available. As the research report acknowledges (page 15), 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 (see Section 13 for further comment).

The use of population denominators

4.11 The deprivation measures are mostly based 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 just over 320 people in Belmont ward (Belfast) fall into the categories by which the report defines 'employment deprived' compared to fewer than 110 people in Glentaisie ward (Moyle). 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 in each ward. The resulting employment deprivation rate shows that 21 per cent of the working age population of Glentaisie are employment deprived compared to 10 per cent in Belmont.

4.12 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 section 5.

Population estimates

4.13 Population estimates are produced annually (the Mid-Year Estimates) by NISRA at Local Government District (LGD) level. This level of geographic dis-aggregation is common to the other countries of the UK. Estimates at lower levels of geography would require detailed statistics on population movement at electoral ward since the 1991 Census of Population and these data have not been available historically.

4.14 As part of the deprivation research, the project team produced small-area population estimates for Northern Ireland's 566 electoral wards and 3,729 Enumeration Districts. The method took NISRA's population estimates for LGDs, and distributed the LGD populations to wards and EDs using a number of administrative sources including the Central Health Index (CHI), Child Benefit records, School Census data and Social Security Agency information of pensioners in receipt of benefits. The method is detailed in the research report. The ward and ED population estimates are available from the NISRA website (www.nisra.gov.uk).

4.15 The LGD population estimates given in the deprivation report match the 1999 mid-year population estimates[6] in other NISRA publications, but use different sets of Local Government boundaries; the deprivation report uses the 1984 boundaries, the mid-year population estimates use the 1992 boundaries. The reasons for this difference are described in Section 3. The sole difference between the deprivation population estimates and the mid-year population estimates is the allocation of Rathfriland ward to Newry & Mourne LGD (deprivation 1984 boundaries) and to Banbridge LGD (mid-year estimates, 1992 boundaries).

[6] The research used the mid-year estimates at that time (for an example refer to the Annual Report of the Registrar General 1999). These population estimates have subsequently been revised in light of the 2001 Census of Population, but this revision is not believed to have had a material effect on the deprivation rankings.

5. Interpretation and application of the domain measures

5.1 This section describes the construction of the measures of multiple deprivation and attempts to give a relatively straightforward interpretation of the measures. The original research report gives more detail. The Noble team has also completed similar research for the (former) Department for the Environment, Transport and the Regions (DETR) in England[7], the National Assembly for Wales[8] and the Scottish Executive[9]. The research reports for these projects provide further detail.

The seven domains

There are seven domains within the Measures of Deprivation, these are described in more detail below. It should be noted that the individual domains are not mutually exclusive i.e. a person can be both income deprived and employment deprived etc.

The income domain

Indicators used in the Income Domain
The number of recipients of –
Income Support
Income Based Job Seeker's Allowance
Family Credit
Disability Working Allowance.

5.2 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

[7] http://www.odpm.gov.uk/stellent/groups/odpm_urbanpolicy/documents/page/odpm_urbpol_608140.hcsp
[8] http://www.lgdu-wales.gov.uk/html/eng/our_projects/deprivation/eng_wimd.htm
[9] http://www.scotland.gov.uk/library5/social/siod-00.asp

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 electoral ward is thus the percentage of the ward's population living in a household in receipt of any of these benefits.

5.3 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 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 (293,000), Income Based Job Seeker's Allowance (62,000), Family Credit (108,000) and Disability Working Allowance (3,000). 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.

5.4 The ward income domain scores range from 69.15 (Brandywell ward in Derry) to 3.03 (Wallace Park in Lisburn). Thus, just over 69 per cent of the population of Brandywell live in households in receipt of an income benefit as described above, compared to just 3 per cent of the Wallace Park population. The Wallace Park figure demonstrates that there are disadvantaged people living in even the most affluent parts of Northern Ireland.

5.5 The income domain scores can be placed in rank order, from the most deprived (Brandywell) to the least deprived (Wallace Park) to inform spatial targeting. Recalling section 4.2 above on the deficiencies of administrative data sources and the use of postcodes to allocate cases to wards, differences between successively ranked wards, unlikely to be numerically large, are thus unlikely to be in any sense real. In the income domain, Falls Park in Belfast is ranked number 100, while Dunclug (Ballymena) is ranked 101. Their income scores are 40.60 and 40.54 respectively. The population estimate of Dunclug is 2920, of whom 1184 live in households in receipt of income

benefits; it would take only one further household of 3 people to take Dunclug's income score above that of Falls Park.

5.6 If spatial targeting is used, decisions must be taken about designating some wards and not designating other wards. It is inevitable that there will be only marginal differences between some designated wards and some non-designated wards. 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.

5.7 Because the income domain scores are straightforward percentages, based on counts, they can be used to inform the distribution of resources across a number of wards. In Belfast, Ardoyne's income domain score is 62.78, compared to Bloomfield's income domain score of 31.55. Thus, on average, the residents of Ardoyne are twice as likely to live in a household in receipt of income benefits as the population of Bloomfield; Ardoyne's population might be considered to be, on average, twice as income deprived as Bloomfield's population. If however, funding is to be allocated to Ardoyne and Bloomfield, a more appropriate comparative statistic might be that there are 4,730 income deprived people in Ardoyne (62.8% of the ward population of 7,534) compared to 1,470 income deprived people in Bloomfield (31.6% of the ward population of 4,659). One appropriate way to distribute funding to Ardoyne and Bloomfield for a project aimed at income deprivation might be in proportion to the numbers of income deprived people in each ward, and the two wards would receive funds in the ratio 4,730 to 1,470 or roughly 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.

5.8 For the income domain, and indeed any domain or composite score, the ward rankings should not be used for the proportional allocation of resources. The ward ranked as the 10th most deprived should not be considered as twice as deprived as the 20th most deprived ward, and these

rankings would not, in themselves, justify allocating twice as much resource to the former ward.

The Child Poverty Measure

5.9 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 domain score incorporates information about children living in households in receipt of the income benefits. The Child Poverty Measure is the percentage of the children in a ward who also live in households in receipt of income benefits. The comments above about the application of the income domain score apply equally to the Child Poverty Measure.

The employment domain

Indicators used in the employment domain
The claimant count
The number of recipients of -
Incapacity benefit
Severe disablement allowance
New Deal participants (outside of the claimant count).

5.10 The employment domain is mathematically very similar to the income domain. It is based on four employment related counts as listed above. Again these benefits are non-overlapping and the ward employment 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 ward employment domain scores range from 2.66 (Wallace Park ward in Lisburn) to 29.91 (The Diamond ward in Derry).

5.11 As a simple percentage of the population, the comments about the

interpretation and application of the income domain scores apply equally to the employment domain.

5.12 Historically, the employment components of deprivation measures have usually focused primarily on the unemployed. As discussed in the deprivation report, this research takes a wider view of employment deprivation and includes, in particular, incapacity benefit recipients. At the time of the research, the numbers of recipients of the four employment benefits defined above were: claimant count (49,500), incapacity benefit (56,500), severe disablement allowance (12,200) and New Deal (2,300). It is immediately clear that claimant count and incapacity benefit are the main drivers of the employment domain score, and, perhaps surprisingly, there are more recipients of incapacity benefit in Northern Ireland than the claimant count of unemployed. Not surprisingly, the four indicators of employment deprivation display differing geographic patterns. In Banbridge, Incapacity Benefits recipients outnumber the claimant count by 2 to 1, in North Down the numbers for the two benefits are similar, while in Fermanagh the claimant count exceeds the number on Incapacity Benefit by 50 per cent.

The health deprivation and disability domain

Indicators used in the health deprivation and disability domain	Weight of the indicator in the composite score (see paragraph 5.15)
Standardised mortality ratios	0.33
Recipients of health related benefits	0.32
Cancer registrations	0.14
Dental health of teenagers	0.12
Drugs prescribed for anxiety or depression.	0.09

5.13 The health domain score is based on the five 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 domains could not be applied. A statistical technique called factor analysis has been used to combine the five indictors into a single score for each ward. Further details on the indicators and the statistical methodology can be obtained in the research report.

5.14 The resulting domain score for each ward 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 domain indicates a ward with a health deprivation score around the Northern Ireland average. Higher positive scores indicate increasing health deprivation, culminating in Crumlin ward (Belfast) with a score of 2.42, while larger negative scores imply decreasing health deprivation culminating in Cultra (North Down) with a score of negative 2.20. The health domain scores for the 566 wards thus range from -2.20 to +2.42 and have a mean of zero and standard deviation of 0.74.

5.15 The health domain score for each ward is determined as a factor score, which can be considered to be a weighted average of the five indicators. The weights of each indicator in the factor score are given in the table of indicators above, where it is seen that the standardised mortality ratios and the numbers of recipients of health related benefits are the main drivers of the domain score.

5.16 As with the income and employment domains, the health deprivation scores can be placed in rank order to inform the designation of a target set of wards. Again, successively ranked wards are unlikely to exhibit any 'real' difference.

5.17 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 domain scores of two Coleraine wards, Central (0.26) and Ballysally (0.13), mean that Central has higher levels of health

deprivation than Ballysally, but we cannot infer that Central is in any way twice as 'health deprived' as Ballysally. 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.

5.18 The health domain score could, if required, be used to allocate funding across LGDs. It would first be necessary to identify a subset of wards and designate these wards as 'health deprived'. This set of wards might be the 20 percent most deprived wards in Northern Ireland, those ranked 1-113. The population of these 113 wards is 400,886 and we essentially treat this number as our count of the health deprived. Of the 113 health deprived wards, two are in Antrim LGD (Rathenraw and Springfarm) and these two wards have a population of 5,175. Accordingly, we would allocate 1.29 percent (5,175 expressed as a percentage of 400,886) of the relevant Northern Ireland budget to Antrim. Repeating this for the 26 LGDs will give 26 percentages that add to 100 percent. Note that it is not necessary that Antrim's money should be spent in Rathenraw and Springfarm, the population of these wards has merely been used as a way of determining Antrim's share of health deprivation across Northern Ireland.

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

7 The method is critically dependent on the choice of the percentage or proportion of wards that are designated as health deprived. If, instead of the worst 20 percent of wards, the worst 100 wards had been designated, Antrim share would have fallen to 0.4 percent of the Northern Ireland budget since Rathenraw is in the only Antrim ward in the 100 most health deprived wards. If the method is employed, a sensitivity analysis should be performed, examining the possible effects of different designation criteria.

8 It is possible that some LGDs may receive no funding at all. In the example above designating 113 wards, no wards in North Down were designated as health deprived. This may be appropriate or, if required, may be overcome by designating quite a high percentage of wards.

5.20 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 wards; 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 wards, 25 percent of the budget on the basis of the next most deprived quartile of wards, 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 wards. 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.

5.21 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.

The education, skills, and training domain

Indicators used in the education, skills and training domain	Weight of the indicator in the composite score (see paragraph 5.23)
GSCE / GNVQ points score	0.57
School-leavers not entering Further Education	0.12
17-20 year olds not applying for Higher Education	0.12
Years 11 and 12 not in a grammar school	0.07
No qualifications on leaving school	0.04
Absenteeism at secondary level	0.04
Working-age adults with no qualifications	0.04

5.22 Like the health domain measure, the education, skills and training deprivation domain measure is based on a number of indicators that may overlap in the population. The mathematical technique used for health, factor analysis, has been used to create a single composite score of educational deprivation for each ward. Further details on the indicators and statistical methods are available in the research report.

5.23 Again, as for the health domain, the education domain score is a factor score that can be considered as a weighed average of the indicator scores. The weights for each indicator in the composite domain score are given in the table above, and the GCSE points score is the main driving variable in the domain score.

5.24 The properties of the education measure, and the considerations about its use, are similar to those described above for the health measure. The education scores for wards range from 2.57 (St Annes, Belfast) to –2.63 (Princetown, North Down) and across the 566 wards have an average of zero and a standard deviation of 0.92. Larger positive scores are associated with increasing educational deprivation and thus Ballysaggart,

Dungannon (score 0.90) experiences worse educational deprivation than Ballygawley, Dungannon (score 0.18), but not five times as much.

5.25 The methods and caveats about targeting and the allocation of resources using the health measure apply equally to the education measure.

The geographical access to services domain

Indicators used in the access to services domain measure
Average distance to –
Post Office (1)
GP Surgery (2)
A&E Hospital (2)
Dentist (1)
Optician (1)
Pharmacist (2)
Library (1)
Museum (1)
Social Security Office or Training & Employment Agency Office (1)

5.26 The access to services measure is based on the distance by road that residents of a ward must travel to access a number of key service providers. More detail is contained in the research report. The measure for each ward is a weighted average across the service providers with a double weighting given to some key providers, indicated by the numbers above.

5.27 Although the individual indicators are all measured in the same distance units, the composite measure cannot be interpreted in simple distance terms. The distances to each service provider are standardised within the analysis to prevent the larger distances to those services with small numbers of providers dominating the analysis. The necessary transformations mean that the final score has no units of measurement. The scores do not

come from factor analysis, as for health and education, but similar principles of interpretation apply.

5.28 The ward scores range from 2.48 (Belcoo and Garrison, Fermanagh) to –2.03 (The Mount, Belfast), while across the 566 wards the access score has an average score of zero and a standard deviation of 0.83. Although it might seem logical given the underlying indicators, the higher score for Spelga, Newry and Mourne (1.24) than Rostrevor, Newry and Mourne (0.58) indicates greater access 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 and education measures apply equally to the access measure.

5.29 The outcome from the access to services measure is essentially a proxy for rurality and mapping of the ward scores highlights the concentration of service providers in urban areas.

5.30 The research report acknowledges some ways in which the access 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, chill factors (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.

The Housing Stress domain

Indicators used in the housing stress domain measure
The number of houses –
In disrepair
Without central heating
Lacking insulation

5.31 As discussed in the research report, this measure focuses on the physical condition of the housing stock, and no inference should be drawn about the socio-economic conditions of the residents of the houses.

5.32 Scoring houses on each of the three indicators determined the measure, with higher scores being associated with worse house conditions. Houses with disrepair were scored up to a value of four, while the other two indictors each had a maximum score of two. These scores were added across the ward, and then expressed as a proportion of a theoretical maximum. The disrepair indicator can be considered to have a weighting of two relative to the other two indicators. The resulting score ranges in theory from zero to one, and does have a physical meaning, although it is not as straightforward as the percentage of the housing stock lacking facilities or in disrepair.

5.33 The ward scores range from 0.47 (Fivemiletown, Dungannon) to 0.12 (Clady, Antrim), with an overall average of 0.26 and standard deviation 0.05. A ward with a score of 0.36 (Ballinamallard, Fermanagh) suffers housing stress which is in some sense twice that of a ward such as Gilnahirk, Castlereagh with a score of 0.18. However, this can come about in a number of different ways; a ward with widespread low levels of disrepair can have the same housing score as a ward with small concentrations of very bad housing.

5.34 If the housing score were to be used to allocate resources to LGDs, the method described in detail for the health measure could be

applied; designate a proportion of wards as disadvantaged and allocate resources on the basis of LGD's shares of the population of the designated wards.

The social environment domain

Indicators in the social environment domain measure	Weight of the indicator in the composite score (see paragraph 5.35)
Criminal damage	0.22
Common assault	0.22
Serious assault	0.20
Violent offences (other than above)	0.12
Theft of car	0.05
Local environment	0.05
Drug offences	0.04
Burglary from a dwelling	0.04
Other burglary	0.03
Theft from a car	0.03

5.35 The Social Environment domain measure is based on two distinct data sources: on recorded crimes and a survey-based Local Area Problem Score. Details on the indicators and a discussion of some of the problems with such data are given in the research report. With regard to interpretation and use of the measure, the key point is that the score is the result of applying factor analysis with the weights shown in the table above. The criminal damage and assault categories of offence are the most influential indicators in the domain score. The discussion about the use and interpretation of the health and education measures, as a factor analysis score, apply also to the social environment measure.

5.36 Ward scores for the Social Environment domain measure range from 1.96 (The Mount, Belfast) to –2.39 (Derrylin, Fermanagh), with

an overall mean of zero and standard deviation of 0.78. As described above for most of the domains, the score of 1.51 for Harbour (North Down) suggests a worse social environment than for Clandeboye (North Down, score 0.53) but it cannot be implied that Harbour is in any way three times as deprived.

Use of the individual indicators within each domain

5.37 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 wards which have similar domain scores. The contributions of the unemployment claimant count and Incapacity Benefit to the employment domain score have already been mentioned. It is possible for two wards to have similar employment domain scores, but for the employment deprived in one ward to be predominantly claimant count, while for the employment deprived in the second ward to be predominantly recipients of Incapacity Benefit. The policy response to these two wards, with similar employment deprivation scores, would be very different.

5.38 More generally, wards 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.

6. The Multiple Deprivation Measure

6.1 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.

6.2 The multiple deprivation score brings together the seven domain scores into a single score. The method employed, described in detail in chapter 11 of the research report, transforms the ward rank on each domain (through an exponential transformation) and then combines the seven domains through a weighted mean.

6.3 The use of the exponential transformation was a deliberate choice, to reduce the potential cancelling-out effect when a ward 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.

6.4 The exponential distribution emphasises differences between more deprived wards, and by extension makes less distinction between the remaining wards. A practical outcome of this is that small differences in ward rankings are more likely to represent real differences among deprived wards, while small differences in ward rankings among less deprived wards are less likely to represent real differences.

6.5 The contribution of each domain to the multiple deprivation measure is explicitly described by the weight given to each domain as shown below.

Table 1 Domain weights

Domain	Weight (%)
Income	25
Employment	25
Health	15
Education	15
Access	10
Housing	5
Social Environment	5

6.6 It is noted that the Steering Group that oversaw the research, and the Northern Ireland Executive, agreed these weights. This formal acceptance of the measures is discussed further in section 12.

6.7 The resulting multiple deprivation scores range from 78.07 (Crumlin, Belfast) to 1.01 (Wallace Park, Lisburn) 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 domain scores and other domains which are factor scores, applies equally to the multiple deprivation score.

6.8 As with the indicators that make up individual domains, wards with similar multiple deprivation scores may have very different domain scores, and require different policy responses. The ward ranks for Ladybrook (Belfast) and Brookeborough (Fermanagh) are compared in the table below.

Table 2 Comparison of domain ranks for two 'similar' wards

Domain	Ladybrook	Brookeborough
Multiple	171	172
Income	144	167
Employment	158	255
Health	119	181
Education	233	390
Access	516	27
Housing	424	46
Social Environment	63	478

6.9 Ladybrook and Brookeborough have similar multiple deprivation scores (26.11 and 26.01 respectively) and have rank numbers of 171 and 172 of most deprived wards in Northern Ireland. However, while Ladybrook's main problems are in the areas of the social environment and health, Brookeborough's main problems relate to access to services and housing.

6.10 The differences between needs in different domains can be very stark. The Mount (Belfast) has good access to services, being located close to central Belfast, and is the least access-deprived ward in Northern Ireland, but has the most deprived social environment. Conversely, the most access-deprived ward Belcoo and Garrison, (Fermanagh) is among the 20 least deprived wards in the social environment domain.

7. Correlations between the domain measures and the Multiple Deprivation Measure

7.1 It is perhaps unsurprising that areas experiencing one form of deprivation frequently also experience other forms of deprivation. Table 3 below quantifies the correlations between the seven domain scores and the multiple deprivation score across the 566 electoral wards.

Table 3 Ward-level correlations between domain ranks

	Income	Employ.	Health	Education	Access	Social Environ.	Housing	Multiple Deprivation
Income	1.00							
Employ.	0.88	1.00						
Health	0.79	0.81	1.00					
Education	0.76	0.69	0.68	1.00				
Access	-0.13	-0.24	-0.34	-0.24	1.00			
Social Environ.	0.49	0.53	0.57	0.50	-0.58	1.00		
Housing	0.11	0.15	0.03	-0.07	0.21	-0.03	1.00	
Multiple Deprivation	0.96	0.94	0.85	0.80	-0.13	0.52	0.17	1.00

7.2 A strong positive correlation is observed between each of the first four domain scores, with each correlation being at least +0.68 and statistically significant at the 1% level of significance. The high contributions that these four domains make to the multiple deprivation score leads to the high positive correlation between each of these domains and the multiple deprivation score.

7.3 In contrast, the first four deprivation domains and the multiple deprivation measure display negative correlations with the Access domain score. The housing stress score and social environment scores have an intermediate position with lower, but mostly positive, correlations with the first four domain scores and the multiple deprivation score.

8. Pockets of deprivation

8.1 It was noted earlier that the inclusion of Enumeration District level analyses facilitates the identification of pockets of deprivation located in otherwise relatively affluent areas. How can the statistics be used in practice to identify pockets of deprivation?

8.2 The statistics for EDs can be used directly, but these will not in themselves identify pockets. For example, ED 13071 in Creggan Central, Derry is the 70th most deprived ED across Northern Ireland but it is hardly a pocket of deprivation; each of the 4 EDs in Creggan Central are within the 10% worst EDs in Northern Ireland.

8.3 Comparisons of the multiple deprivation rankings with the extent and concentration measures can be used to identify pockets of deprivation[10]. A ward containing a pocket of deprivation is likely to have a low ranking (that is, its rank is a large number) on the multiple deprivation score, but higher ranking on extent or concentration. For example, Malone ward in Belfast has a multiple deprivation ranking of 500 but a concentration ranking of 166. Examination of the ED rankings shows two relatively deprived EDs (7346 and 7347) among more affluent EDs; these two EDs are Taughmonagh Estate.

8.4 A similar approach can be taken to identifying ward-level pockets within LGDs. For example, Lisburn LGD is placed 18th when LGDs are ranked by their average ward scores or ranks, but is placed 4th on extent and 5th on local concentration. This suggests that, on average, levels of deprivation experienced in Lisburn are below the Northern Ireland average but that ward-level pockets of deprivation exist. Examination of the ward level rankings show that the most deprived wards in Lisburn, Twinbrook and Collin Glen, are among the 10% most deprived wards in Northern Ireland.

[10] The extent and concentration measures are conceptually similar to Robson's extent and intensity measures. The extent measure for a ward is the percentage of the ward's population living in EDs that rank within the most deprived 10 per cent of all EDs in Northern Ireland. The concentration measure for a ward is the population weighted rank of the most deprived EDs within the ward containing 10 per cent of the ward population.

8.5 Deprived wards and EDs on the fringe of deprived areas can be concealed in a similar fashion to the pockets of deprivation described above. Thus, a ward level analysis would suggest that Ballynafeigh ward is relatively affluent (rank 256 out of 566 on multiple deprivation) but closer analysis shows that the ward contains deprived EDs such as ED 7046, ranked 180 out of 3,729 on employment deprivation. However, this is not really a pocket of deprivation, rather it is that part of Ballynafeigh ward that is adjacent to Botanic ward (rank 81 on multiple deprivation).

The two measures are described in more detail in the research report.

9. Application of the six LGD measures

9.1 Table 13.2 in the Multiple Deprivation 2001 research report gives six deprivation scores for each LGD; definitions of the six scores are given in the research report. How should the six measures be used?

9.2 The six scores can be placed in three groups, each composed of two measures. The three groups are the two 'average' measures, the two 'scale measures' and finally the extent and local concentration score.

The average of ward ranks and the average of ward scores.

9.3 These two measures are very similar, and produce very similar LGD rankings. These LGD rankings are the best way of comparing the average level of deprivation experienced in each LGD. The average of ward scores uses slightly more information than the average of ward ranks, and is mathematically preferable. Against this, the average of the ward ranks is possibly more easily interpreted.

9.4 These two 'ward average' measures are based on the measure of multiple deprivation. Although not given in the research report, similar LGD summaries could be determined for each of the 7 domain measures. For example the average ward rank for the Access Domain in Fermanagh would be calculated by averaging the ranks given in Data Annex A (page 99 of the research report) for the 23 Fermanagh wards. This would be repeated for the 26 LGDs. Similar analyses could be conducted on the ward Access scores, and similarly for all seven domains, resulting in a further 14 LGD level summaries. These analyses would be appropriate if LGD comparisons were required for a particular domain.

9.5 If these LGD summary measures were produced for a number of domains, the ward score averages are marginally optimal when considering a domain in isolation, but if comparisons are to be made across

domains, then the ward rank averages are more appropriate for comparing the deprivation within an LGD across domains.

The income and employment scale measures

9.6 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 'ward average' LGD measures above are the best way to compare the level of deprivation in LGDs; the role of the scale measures is to inform the distribution of resources between LGDs. This is similar to the distinction made between rates and counts at ward level in paragraph 5.7.

9.7 Consider a programme aimed at alleviating employment deprivation. An analysis of the employment deprivation data (based on the statistics in the research report) shows that 17.1 percent of the working-age population in Strabane are employment deprived compared to 9.2 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 13.2 of the research report shows that there are 3,785 employment deprived people in Strabane and 6,057 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 (£102 per employment deprived person) and Lisburn would receive £615k (also £102 per employment deprived person). This allocates more money per working-age person to Strabane (£17.4) than Lisburn (£9.3), reflecting Strabane's higher employment deprivation rate.

9.8 The scale measures can be determined for the income and employment domains only.

The extent and local concentration scores

9.9 These two measures are driven by ward-level areas of deprivation and thus can be used to identify ward-level pockets of deprivation in otherwise affluent LGDs, as described above in section 8 about identifying pockets of deprivation.

9.10 The LGD-level extent and local concentration scores are based on the measure of multiple deprivation. As with the 'ward average' measures, these two measures can be determined for each of the 7 domains.

The ward level summaries of the ED level measures

9.11 Extent and local concentration scores have been determined for each ward, and reported in Data Annex E. Because ED level analysis was possible only for the income and employment domains, ward-level extent and local concentration measures are possible for these two domains only. As for the LGD-level extent and local concentration measures, the ward-level ED summary measures can be used to identify wards containing pockets of deprivation.

10. Equality and equity issues

10.1 The ecological fallacy[11] shows that spatial targeting will inevitably introduce equality and equity issues. Spatial targeting must address the issue of whether deprived people living outside of deprived areas are in any way disadvantaged by spatial targeting.

10.2 The first defence of spatial targeting is that it should be only 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 unemployment as an example, Job Seekers Allowance targets the relevant people, while an appropriate use of spatial targeting might be to inform the location of a new training centre.

10.3 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 ward, but it is likely that the catchment area for the training centre goes well beyond the ward boundary.

10.4 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 42,000 people living in 12 wards, where each ward has a population of 3,500. 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 income level of income deprivation and, in particular, has the same scale of income deprivation score of 4,200 income deprived people.

[11] See Para 2.2

10.5 Suppose that in one of the LGDs (LGD A), the income deprived households are spatially clustered in three electoral wards, in each of which about 40 percent of the population are income deprived. The remaining 9 wards in LGD A contain only a few income-deprived people, and have very low income domain scores. By contrast, the income-deprived households in the second LGD (LGD B) are spread fairly evenly across the 12 wards and each ward in LGD B has an income domain score of about 10 percent.

10.6 What will occur if spatial targeting at ward level is used to designate a set of target wards across the two hypothetical LGDs? There are 24 wards in the two LGDs and the clustered area of deprivation in LGD A contains the three most deprived wards across the two LGDs. If resources are targeted at the most deprived 12.5 percent of wards, the designated wards (three) will all lie within one LGD (LGD A).

10.7 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.

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

10.9 However, returning to the two hypothetical LGDs, consider the outcome if targeting designates not 12.5 percent of wards but one-third of wards. A total of 8 wards are designated; the 3 wards from LGD A remain, but are joined by 5 wards 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.

Urban / rural comparisons

10.10 Early comments on the spatial outcome of the current measures of deprivation have suggested that the method appears to identify fewer rural deprived wards than the Robson measures, and consequently identifies more urban deprived wards. Without an agreed definition of an urban or rural ward, no hard statistics can be given, but it is broadly true that the current measures are identifying more urban deprived wards than similar Robson analyses. There are many possible reasons for this.

10.11 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 Enumeration District level, where Robson used indicators solely from the Census. The housing domain within the current measures suggests that housing deprivation is relatively more prevalent in rural areas. The high number of housing indicators within the Robson measures – driven by the lack of more direct indicators - may explain the Robson measures' greater propensity to identify rural deprived wards. 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 the Northern Ireland Executive (see section 12). Accordingly, while the current methodology may have changed the proportions of deprived urban and rural wards, the current methodology has a stronger theoretical basis and was the result of explicit agreement.

10.12 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.

10.13 In addition to being applicable in both urban and rural areas, the indicators that make up the current measures are all believed to be more direct measures than the Census variables used by Robson; Census variables do not address deprivation directly but mostly use proxies such as access to a car. Thus, the current measures are believed to be more timely and more direct measures of deprivation than the Robson measures.

10.14 The NI Statistics Co-ordinating Group (SCG), an inter-departmental group with representation from all Government Departments, has through a working group examined the definition of the terms 'urban' and 'rural', given the frequency of their use in official work. The working group has produced an interim report "Classification and delineation of settlements". The group is now considering comments received from public consultation and the final report is due to be published later this year.

10.15 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.

11. Examples of applications of the measures

The International Fund for Ireland

11.1 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, 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 NI Multiple Deprivation Measure report in 2001.

11.2 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 Measure of Multiple Deprivation and the Employment 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 Domain. The Fund designated a ward as disadvantaged if it was included on either list. The high positive correlation between the multiple deprivation score and the employment 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.

11.3 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.

11.4 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.

PEACE II

11.5 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".

11.6 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.

11.7 The 'most deprived parts of Northern Ireland' were identified by the most deprived 10 percent of Enumeration Districts, 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.

11.8 The choice of the economic deprivation score at ED level allowed pockets of deprivation to contribute to each LGDs share. The multiple deprivation measure 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.

11.9 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 per cent 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% 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% of the resources, equivalent to its population share. Conversely, Derry has many deprived EDs, and receives 21% 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 per cent, as shown in Table 4 below.

Table 4 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

11.10 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.

11.11 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.

11.12 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.

Stamp Duty Relief

11.13 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% of wards throughout the UK. Analysis suggested that to be equitable, 42% of wards in deprived parts of the UK such as Northern Ireland would be eligible. The scheme has been applied using the measure of multiple deprivation; the 237 (42% of 566) most multiply deprived wards have been identified as those with a multiple deprivation rank between 1 and 237.

12. Status of the measures

12.1 When they were published, the measures were 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.

12.2 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 while the indicators, domain measures and measure of multiple deprivation were accepted by the Executive.

12.3 A few examples of alternative approaches are given.

i) The Department of Education use 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 which select the most appropriate needs indicators for specific programmes such as Elderly Care or Mental Health. 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.

13. Updating the measures

13.1 The data underlying the measures of deprivation relate mostly to mid-1999. This is much more up-to-date than the Robson measures, but the current measures themselves will become dated. The use of administrative data sources ensures that the 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. Changing the target areas for programmes every three months would not be of practical benefit to anyone. The data gathered through the Family Resources Survey, which was introduced to NI for the first time in 2002/03 will be analysed to provide estimates of the take-up of income related benefits. These estimates will however be at the NI geographical level and will relate where appropriate to those persons of working age and those of pensionable age.

13.2 NISRA are aware that some users have been putting forward arguments that targeting using the current measures of deprivation is inappropriate for some LGDs because, for example, there was a recent factory closure leading to the loss of many jobs. It is argued that since the closure was after mid 1999 (the reference date for most data sources within the measures) the current deprivation measures don't take account of these job losses.

13.3 While not dismissing the importance of these job losses to local economies, the multiple deprivation measures need to be considered in a much wider context. The employment domain contributes to 25% of the overall multiple deprivation measure. Updating of the measures would require updating of all the indicators, and any change in targeting should take into account not just one indicator but all the relevant indicators.

13.4 The detailed small-area results from the 2001 Census of population became available in mid 2003 and NISRA has initiated a review of the measures of Multiple Deprivation. Information on the new research will be made available on the NISRA website (www.nisra.gov.uk).