The Republic of the Union of Myanmar

The 2014 Myanmar Population and Housing Census

MULTIDIMENSIONAL WELFARE IN MYANMAR

DECEMBER 2018

Department of Population
Ministry of Labour, Immigration and Population

WORLD BANK GROUP

Map of Myanmar by State/Region and District

FOREWORD

This report presents a multidimensional welfare analysis, drawing on the 2014 Myanmar Population and Housing Census (2014 Census). The 2014 Census was Myanmar's first since 1983. It generated thirteen thematic reports and an Atlas. The results have been widely used to promote evidence-based policy making by Ministries and a variety of other stakeholders in Myanmar.

This report, a joint work between the Department of Population under the Ministry of Labour, Immigration and Population and the World Bank, builds on the unprecedented volume of information generated by the 2014 Census to learn more about Myanmar's welfare today. It focuses on non-monetary dimensions of people's well-being. Since the Sustainable Development Goals (SDGs) make a commitment on ending "poverty in all forms and dimensions" by 2030, the importance of a multidimensional approach to identify people's well-being and needs has been recognized worldwide.

The 2014 Census covers key household and individual variables from diverse areas including education, employment, health, housing, energy use, and assets, which enabled the development of a Multidimensional Disadvantage Index (MDI). The MDI consists of six domains and 14 indicators that were selected through a two-stage consultative process with key stakeholders in Myanmar, including government officials, development partners and academics.

Unlike other sources of data, the 2014 Census results can be geographically disaggregated at lower subnational levels, such as districts and townships, since it reached all households and individuals in Myanmar. This level of granularity can significantly help policy makers and practitioners identify and reach those facing the greatest disadvantages. Indeed, the MDI presented in this report is already sparking interest among policy makers and practitioners, who can target policies and interventions based on the specific needs of different areas.

We are pleased that this report will provide a better understanding of geographical diversity of multidimensional welfare of people in Myanmar. This is essential in pursuing durable peace across diverse Regions and States in Myanmar, and in achieving the national development vision as elaborated in the Myanmar Sustainable Development Plan (MSDP).

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Other significant contributions to this report were made by two-stage consultation process conducted in September 2017 and January 2018, which were attended by many policymakers and experts including the Planning Department, Ministry of Planning and Finance; the Central Statistical Organization, Ministry of Planning and Finance; and Department of Social Welfare, Ministry of Social Welfare, Relief and Resettlement.

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EXECUTIVE SUMMARY

This report analyzes welfare in Myanmar using a multidimensional approach, and focuses on examining whether people are unable to fulfil their basic needs in a variety of non-monetary dimensions. Multidimensional approaches typically use a range of indicators to assess whether people are unable to fulfil their basic needs—i.e. whether they face disadvantages in single or multiple dimensions or are free of any disadvantage. The concept of multidimensional welfare measurement has gained widespread support and recognition; for example, the Sustainable Development Goals (SDGs) emphasize the importance of ending "poverty in all its dimensions" (SDG 1) and other SDGs point to a shared concern with disadvantage in multiple non-monetary dimensions, including hunger (SDG 2), health (SDG 3), education (SDG 4), gender (SDG 5), water and sanitation (SDG 6), growth and decent work (SDG 8), inequality (SDG 10), and peace and justice (SDG 16).

The main objective of this assessment is to derive indicators of welfare at the township level that can support an improved understanding of the spatial distribution of welfare in Myanmar. The report uses the 2014 Population and Housing Census data to do so, which contain information on education, health, housing, energy use and assets for all households and individuals in Myanmar. As the Census covers the whole population of Myanmar, a major advantage of using these data is that it is possible to construct a highly disaggregated profile of multidimensional welfare.

The national measure of multidimensional welfare for Myanmar is referred to as the *"Multidimensional Disadvantage Index"* (MDI). A household is considered to have a "disadvantage" if its members are unable to meet their basic minimum needs in a specific dimension, for example if they live in a temporary shelter, or if they use candles or kerosene to meet their lighting needs. Myanmar's MDI has been developed to measure the state of disadvantage at a national and sub-national level. Myanmar's MDI is therefore not aimed to be comparable with international measures of multidimensional disadvantage, such as the global Multidimensional Poverty Index.

The domains and indicators for Myanmar's MDI were chosen through a two-stage consultative process. The first stage of consultations was conducted in September 2017 to select an initial set of domains and indicators in collaboration with a team of government officials with the requisite technical expertise. The second stage of consultation was conducted in January 2018 and involved a wider range of stakeholders to discuss the domains and indicators selected at the first stage. Based on this two-stage consultative process, six domains and fourteen indicators were selected to assess whether a person lives in a household experiencing at least one disadvantage (ES Table 1).

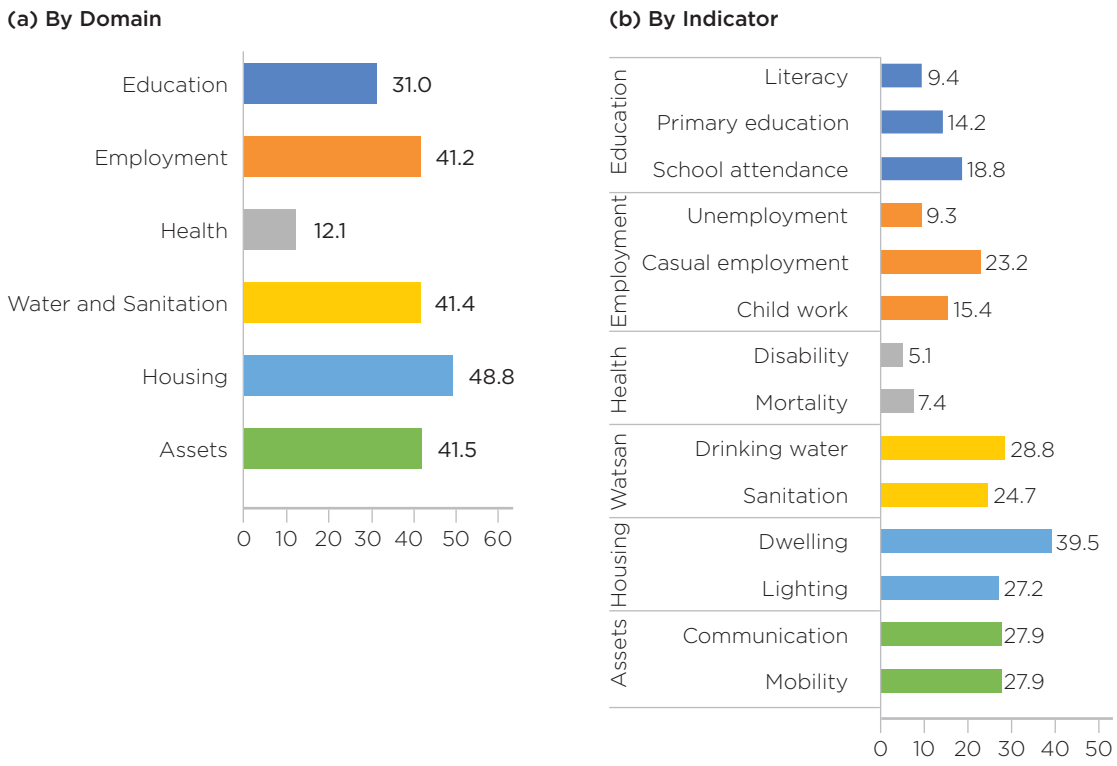
ES Table 1 | Six domains and fourteen indicators selected for the Multidimensional Disadvantage Index[1]

Domain:	Education	Employment	Health	Water and Sanitation	Housing	Assets
Indicators	Literacy	Unemployment	Disability	Drinking water	Dwelling	Communication assets
	Primary education	Casual employment	Child and youth mortality	Sanitation	Lighting	Mobility assets
	School attendance	Child work				

1 See Section 3.2 for the detailed definition and cut-off for each indicator

The most common disadvantage is housing: nearly half of the country's population experienced a disadvantage in this domain. The least common disadvantage is health, with only 12 percent of population experiencing a disadvantage in this domain (ES Figure 1). At the indicator level, in addition to the 40 percent of the population having disadvantage in their dwelling, people in Myanmar are more likely to experience disadvantage in access to basic infrastructure (water and sanitation, lighting) and household asset ownership. While disadvantage in health is the least common disadvantage experienced, it is important to bear in mind that this reflects in part the relative severity of the health indicators captured in the census - disability and mortality.

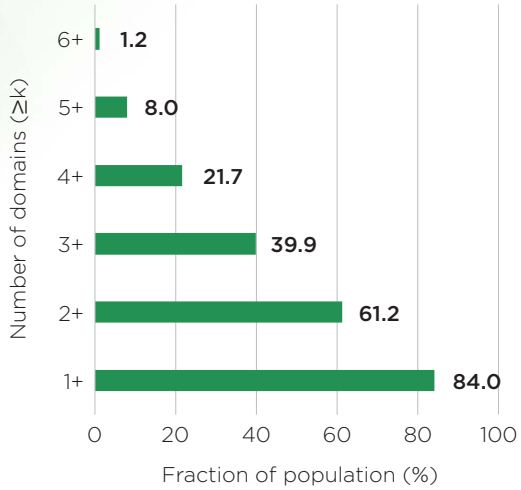
ES Figure 1 | **Percentage of Myanmar's population living in households experiencing at least one disadvantage**



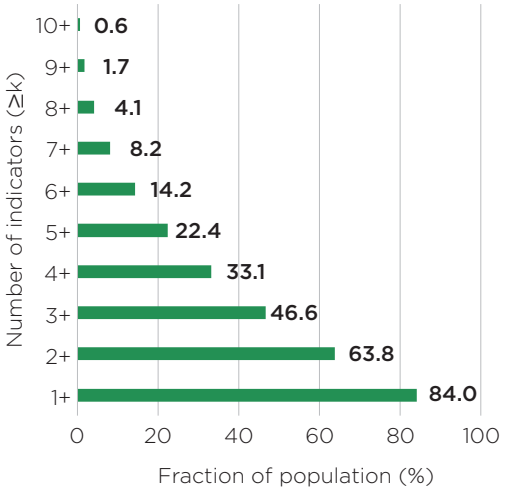
An important feature of the multidimensional profile is the simultaneous occurrence of multiple disadvantages for many individuals. As shown in ES Figure 2, 16 percent of the people in Myanmar are not disadvantaged in any indicator, while the remaining 84 percent of population experience a disadvantage in at least one indicator. Of the 84 percent of the population who have at least one disadvantage, only a small fraction – 1.2 percent of the population – are disadvantaged in all six domains. Multiplicity of disadvantages is nevertheless widespread, with 61 percent of the country's population suffering a disadvantage in two or more domains, and 40 percent in three or more domains.

ES Figure 2 | **Multiple disadvantage by number of domains and indicators - Union**

(a) Fraction of population having a disadvantage in at least k number of domains



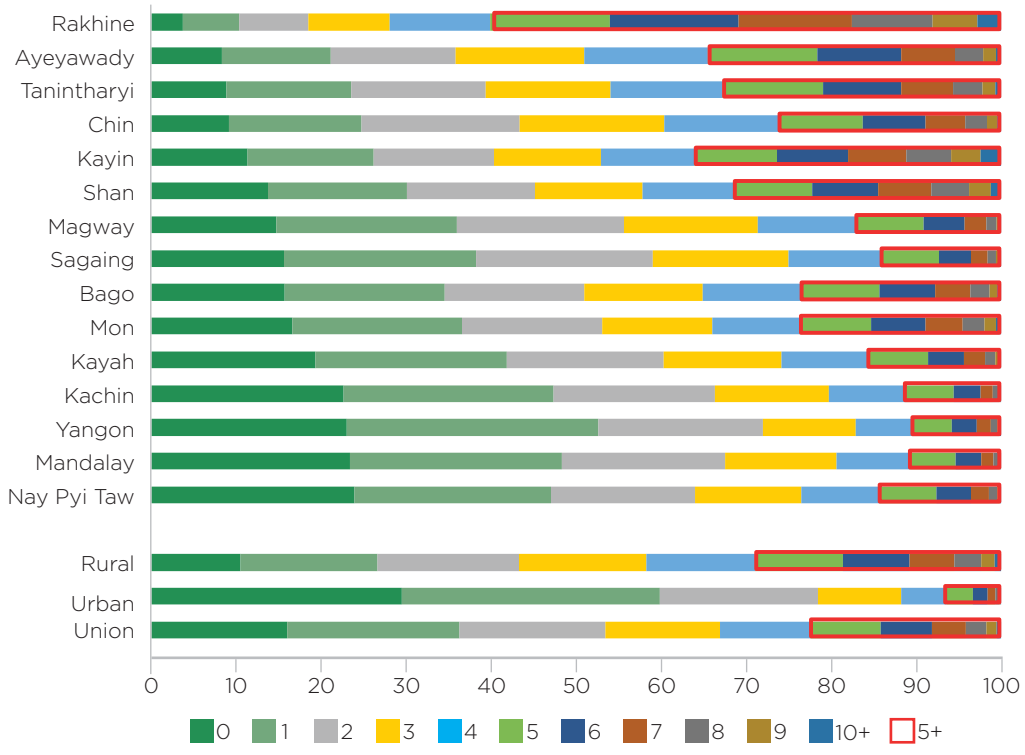
(b) Fraction of population having a disadvantage in at least k number of indicators



The rural-urban divide in the magnitude of multiple disadvantages is substantial, with the rural population distinctly more likely to experience multiple disadvantages relative to the urban population (ES Figure 3). For instance, 57 percent of the rural population has a disadvantage in 3 or more indicators compared to 22 percent of the urban population (2.6 times higher).

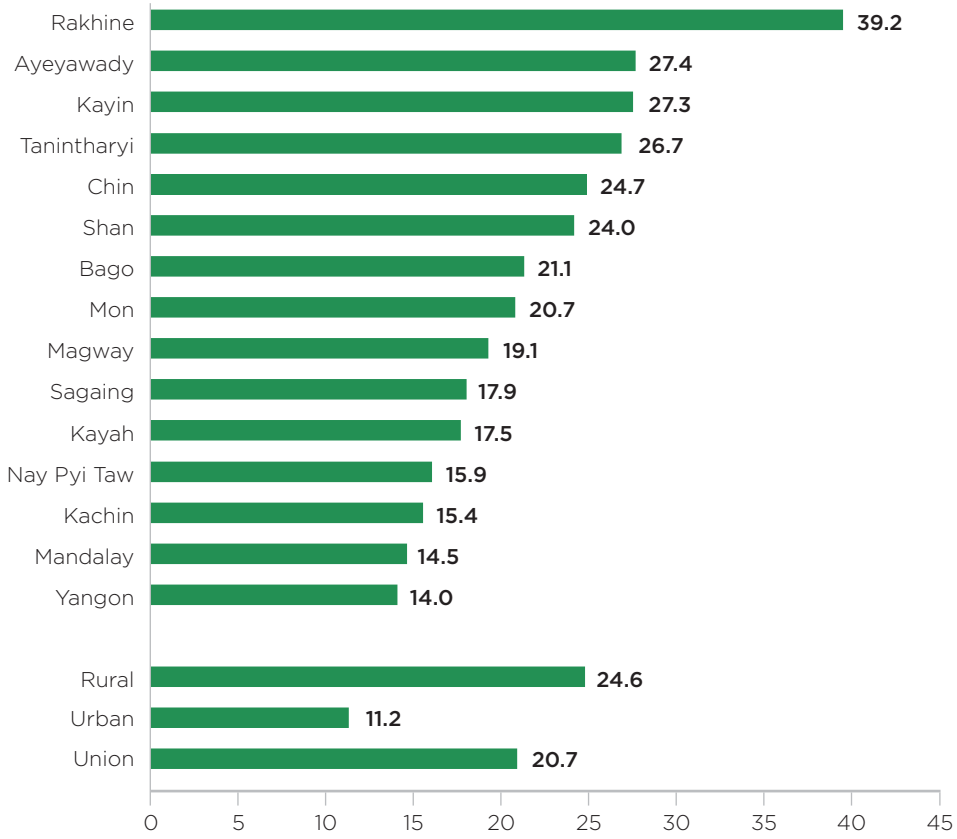
In addition to the rural-urban divide, differences across states and regions are also quite stark. In Rakhine 60 percent of the population experienced a disadvantage in 5 or more indicators. Kayin is a distant second with 36 percent of the population with a disadvantage in 5 or more indicators, while in Yangon only 10 percent fall into this category.

ES Figure 3 | **Percentage of individuals experiencing multiple disadvantages (number of indicators)**



Myanmar's Multidimensional Disadvantage Index (MDI-1) is estimated at 20.7.[2] This can be interpreted as the average person in Myanmar being disadvantaged in 20.7 percent of weighted indicators. There are however large variations in MDI-1 across urban and rural areas, and across states and regions. The rural MDI-1 (at 24.6) is more than twice as high as the urban MDI-1 (at 11.2). Across states and regions, multidimensional disadvantage is the highest in Rakhine (39.2) and the lowest in Yangon (14). Other high-MDI states and regions are Ayeyawady, Kayin, Tanintharyi, Chin and Shan, while Mandalay, Kachin and Nay Pyi Taw are some of the low-MDI states and regions. However, there is no pattern of which domain or indicator mostly contributes to the total MDI across states and regions. For instance, housing is the biggest domain contributor in Rakhine but this is not the case in Chin where asset ownership plays the biggest role in explaining the total MDI. In Shan, on the other hand, education and water and sanitation domains contributed to a half of the total MDI.

ES Figure 4 | Multidimensional Disadvantage Index – MDI-1



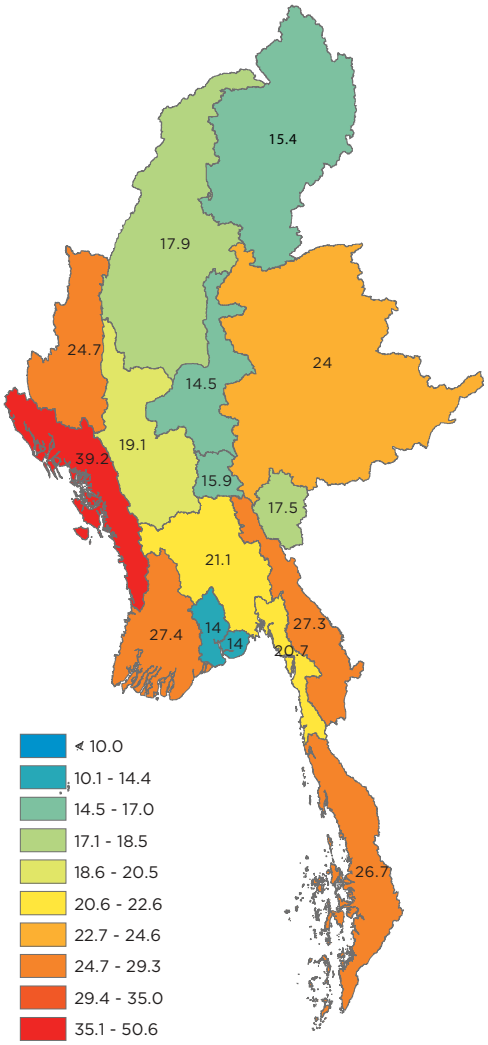
Spatial diversity of disadvantage occurs not just at the state and region level but also at the township level within each region. For example, there are townships who are amongst the worst off in the MDI even within the best-off states and regions. ES Figure 5 shows this regional difference across townships within the same state or region. For instance, Kachin and Sagaing are relatively better-off states, but northern townships in both states have some of the most disadvantaged populations in the country. Similar observation can be seen in Chin State whose southern townships facing Rakhine

2 The Report offers two types of Multidimensional Disadvantage Index: MDI-1 and MDI-2. MDI-1 is given by taking an average of the weighted sum of all indicators using the assigned weights. MDI-2 is calculated by averaging the square of the MDI-1. While MDI-1 is not sensitive to the distribution of disadvantages across the population, MDI-2 puts more weight on an indicator with higher incidence of disadvantage. The results presented in the executive summary and in the main body of the report use nested uniform weights.

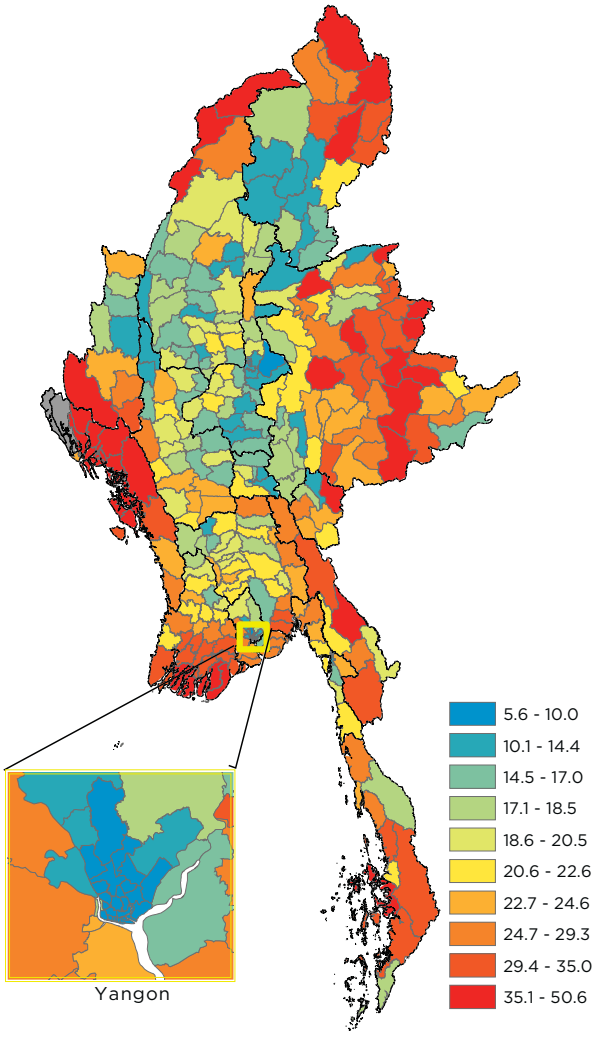
are much more disadvantaged than its northern townships. By contrast, while Yangon has the lowest MDI in Myanmar, there is a clear difference in the level of the MDI between urban Yangon and the rural townships located in the delta, close to Ayeyawady. Myanmar's MDI results can be further spatially disaggregated into lower geospatial administrative level (i.e. Wards and Village Tracts); these are not mapped in this report, but can be used to support responsive policies and actions at this administrative level to improve people's well-being in Myanmar.

ES Figure 5 | MDI-1 at State/Region and Township-level

(a) MDI-1 at the State/Region level



(b) MDI-1 at the Township-level



Note: Mapping colors are based on township-level MDI decile thresholds. Due to the limited number of enumerated population, three townships in Northern Rakhine (Maungtaw, Buthidaung, Yethedaung) are highlighted in gray.

CHAPTER 1

INTRODUCTION

1.1. What does it mean to measure welfare in a multidimensional sense, and how does this differ from traditional welfare measurement?

This report examines welfare or well-being in Myanmar using a multidimensional approach. A primary objective of this assessment is to put forward indicators of welfare at the township level that can support an improved understanding of the spatial distribution of welfare in Myanmar. The assessment put forward in this report focuses on non-monetary indicators of well-being.

A multidimensional analysis of welfare looks at whether people are unable to fulfil their basic needs in a variety of ways. For example, rather than *individually* examining whether people have been able to send their children to school, have access to improved water or have access to a reliable means of lighting, multidimensional analysis looks at all these areas *simultaneously* for a household. In doing so, this report examines whether people in Myanmar are unable to meet their needs in *one or more* areas – for example, do they have difficulty meeting their education and water needs, facing two challenges rather than one?

The traditional approach to measuring welfare captures welfare in a single dimension, notably using a monetary approach that captures welfare in terms of income or the value of consumption. This is based on the idea that income or consumption can serve as a single comprehensive measure of welfare for a household or an individual. This has justification in economic theory in that the value of total consumption can represent a money-metric of utility derived from all goods and services consumed at reference prices (Deaton and Muellbauer, 1980). Total income or consumption can also be thought of as capturing an individual's or household's general command over economic resources. The monetary approach is very widely used in both national and international welfare and poverty assessments, including the well-known global poverty estimates based on the international poverty line of $1.90 per person per day in purchasing power parity terms. The widespread use of the monetary approach raises the question of whether or why do we need anything else.

The multidimensional nature of welfare and poverty has long been recognized. Indeed, conceptual antecedents to a multidimensional view of welfare can be traced all the way back to Adam Smith's *The Wealth of Nations and The Theory of Moral Sentiments*. Advances in welfare measurement in the last decade mean that approaches to capture multiple and overlapping disadvantages of welfare are now becoming widespread.

A conceptual foundation to multidimensional welfare measurement can be found in the approaches for measuring welfare and poverty found in the recent Report of the Commission on Global Poverty (World Bank, 2017). The report identified four broad approaches to measuring welfare and poverty: (i) Asking People, (ii) Basic Needs, (iii) Capabilities, and (iv) Minimum Rights. There is considerable overlap in these approaches, but they can all provide the conceptual foundation for a multidimensional perspective on welfare and poverty measurement. For example, the Basic Needs approach which has a longstanding history in poverty and welfare measurement is rooted in the notion of a set of basic food and non-food needs that ought to be met for everyone in society. The idea of basic needs is also closely related to the notion of Minimum Rights (such as those enshrined in the United Nation's Universal Declaration of Human Rights, 1948) whereby poverty can be seen as the violation or non-fulfilment of a set of social rights, for instance, "the right to a standard of living adequate for the health and welfare … including food, clothing, housing and medical care and necessary social services" and "the right to education" with a specific reference to elementary education (United Nations, 1948). Finally, the Capabilities approach, pioneered by Amartya Sen, emphasizes that welfare should be judged in terms of the capabilities of a person to function in society (see for instance, Sen 1980, 1985, 1999). Poverty is thus viewed as a capability failure when someone does not have the ability to achieve the goals that they, and society more generally, has reason to value.

There are several important implications for welfare measurement that follow from these approaches. First, they all involve lists – a list of basic needs, a list of minimum rights, a list of people's fundamental concerns or a list of capabilities. These approaches are thus intrinsically multidimensional in nature. Second, the items in the lists are important as ends in themselves, not just as means to achieve other ends. From this perspective, income is seen to be a means to achieve such ends and thus only has instrumental value. Third, insofar as the lists represent the final ends, these approaches provide justification for direct attention to the extent to which these ends are being met for people in society.

That still leaves the question of whether income or consumption could reasonably capture achievements in multiple dimensions, even from an instrumental perspective. If it did, there would not be much of a case for a separate focus on multidimensional welfare. However, for a variety of both theoretical and practical reasons, income (or consumption) is an imperfect proxy for achievements in different dimensions. For instance, as Dreze and Sen (2002) argue, the expansion of human capabilities can certainly be enhanced by income growth, but there are many other influences on the expansion of capabilities, such as the supply of basic public services. The impact of income growth on capabilities can be highly variable depending upon the nature of income growth and other accompanying factors. Thus, a focus on income or consumption cannot substitute for direct attention to assessing progress in terms of basic capabilities.

A further motivation for going beyond the traditional monetary approach is offered by the Sustainable Development Goals (SDGs) endorsed by 193-member states of the United Nations in September 2015. The first Goal (SDG 1) deals with poverty. While one part of SDG 1 relates to ending extreme poverty in terms of an international monetary poverty line, another part calls for addressing "poverty in all its dimensions". In addition, several other SDGs directly focus on a number of dimensions; for instance, SDG 2 on hunger, SDG 3 on health, SDG 4 on education, SDG 5 on gender and empowerment, SDG 6 on water and sanitation, SDG 7 on energy, SDG 8 on growth and decent work, SDG 10 on inequality, and SDG 16 on peace and justice.

Multidimensional analysis of welfare can combine both non-monetary and monetary indicators into a unified assessment. This assessment focuses only on non-monetary indicators, a decision that is predominantly motivated by data availability. The Myanmar Population and Housing Census includes multiple indicators related to non-monetary well-being, and can support highly geographically disaggregated estimates of wellbeing. The Census does not however include the estimates of expenditure or income needed for a monetary indicator of well-being.[3]

1.2. Relevance of multidimensional welfare concepts to Myanmar

If development is viewed as the process of expanding people's capabilities, an assessment of the current development challenges facing a country requires a broad-ranging review of how people are doing in various aspects of their daily lives – in particular, how far their lives are measuring up to minimum standards with respect to important domains such as health, nutrition, education, housing, employment, assets and basic amenities. This provides useful information for development policy on:

(i) the contribution of different domains or indicators to overall disadvantage and hence indications for which domains need the most attention,

3 Small area imputations could be used to impute estimated expenditure into the Census if combined with a recently fielded living standards survey. However, since these estimates are formed on the basis of many of the non-monetary indicators included in the multidimensional welfare measure, there is a risk of double-counting and overlapping indicators using this approach.

(ii) the spatial distribution of multidimensional welfare and hence indications for geographical prioritization of government spending and policy initiatives, and

(iii) the distribution of multidimensional welfare across socio-economic groups and hence indications for who needs the most attention.

The main objective of this exercise is not to put forward a benchmark against which future progress in multidimensional welfare can be assessed. The purpose is rather to use the snapshot of data from the Population and Housing Census in 2014 to put forward a spatial profile of multidimensional welfare at one point in time in Myanmar, to further advance knowledge of the spatial variation of wellbeing in Myanmar.

1.3. The 2014 Myanmar Population and Housing Census

Multidimensional welfare measurement requires rich information from the same set of households or individuals on several indicators associated with welfare. We would like to know not only whether people are able to achieve minimum standards in, say, health or in education considered individually, but also whether they attain minimum standards in *both* health and education. In other words, we are interested in not just the marginal distributions of individual indicators, but also in their joint distribution. Indeed, an examination of the joint distribution of indicators across the population is a key distinguishing feature of a multidimensional welfare assessment. But this also implies that to conduct such an assessment we need information on the chosen set of indicators for the *same* set of households or individuals.

The assessment presented in this Report uses the 2014 Myanmar Population and Housing Census (MPHC). This is made possible by the detailed data in the MPHC, since it covers a wider range of topics than most censuses including demographic characteristics; disability and mortality; literacy and education; employment and occupation; housing conditions; and household assets and amenities. Thus, rather uniquely, the Myanmar census contains enough information to make it a viable data source for multidimensional welfare measurement and analysis. The census has also been used to conduct multidimensional welfare analysis in other countries where similar rich data has been available for either the full census or a subsample, including but not limited to South Africa, Colombia and Ghana.

As the census covers the whole population of the country, a major advantage of using these data is that it is possible to construct a highly disaggregated profile of multidimensional welfare. While the typical sample sizes for household surveys allow estimates to be disaggregated only for a handful of regions or groups, the ability to use the census data for this purpose allows us to construct a high-resolution map of multidimensional disadvantage in Myanmar. Spatially, this can be disaggregated down to the township and ward or village-tract levels.

The possibility of using the census data for this exercise represented a unique opportunity for Myanmar to construct highly disaggregated maps of multidimensional disadvantage in the country, in contrast to most exercises for other countries that are based on household surveys with limited samples.

The census enumeration aimed to count all persons who were within the borders of Myanmar on the night of 29th March 2014 (Census Night). The enumeration of the population was completed in almost all states and regions within the planned 12 days. The census household questionnaire included a total of 41 questions. A subset of 11 questions were included in the questionnaire for the institutional population (in hotels, hospitals, prisons, monasteries, boarding schools as well as the floating population of the homeless and those at sea-ports). Since the institutional questionnaire only included a limited

set of questions, this Report is based only on the data for population in conventional households and does not include the institutional population (about 4.7 percent of the total population).

The total population count for Myanmar established by the 2014 MPHC was 51,486,253 persons, while the total enumerated population was 50,279,900 persons. An estimated 1,206,353 persons in three States were not enumerated. This included 46,600 persons in Kachin, 69,753 persons in Kayin, and 1,090,000 persons in Rakhine. This Report is thus based on data pertaining to the 47,929,999 enumerated individuals, not including the institutional population of 2,349,901 persons.[4]

1.4. Overview of the report

Chapter 2 discusses the conceptual framework for the measurement of multidimensional welfare. Chapters 3 to 5 apply the conceptual framework to Myanmar, tailoring it to the 2014 MPHC as the main data source for conducting this assessment. Chapter 3 introduces the six main domains considered for this analysis and the specific indicators within each domain. It also presents broad findings in relation to each domain and indicator considered individually. Chapter 4 considers the overlap of disadvantages and the phenomenon of multiple disadvantages faced by sections of the population. The main findings relating to multiple disadvantages are presented. Chapter 5 takes on the issue of aggregation of disadvantages across domains and indicators and individuals to construct a Multidimensional Disadvantage Index (MDI) for Myanmar. The Chapter presents estimates of MDI and aggregation methodologies at the national as well as subnational levels. It also presents result on the relative contributions of different domains and indicators to overall disadvantage.

4 For further details on the 2014 MPHC, see Ministry of Immigration and Population (2015).

CHAPTER 2

CONCEPTUAL OVERVIEW FOR MULTIDIMENSIONAL WELFARE MEASUREMENT

There is a large literature on the measurement of multidimensional welfare offering a variety of measurement approaches.[5] A benchmark is the global Multidimensional Poverty Index (MPI) adopted by the United Nations Development Programme (UNDP) and now estimated for over 100 countries (UNDP, 2016). However, several countries have developed their own national measures of multidimensional welfare. While the global MPI remains a significant benchmark, national initiatives have used a range of variations in methodology to reflect country-specific data, needs and policy concerns. This chapter outlines the conceptual background for considering alternative measurement options. This framework will then be applied in Chapters 3 to 5, which will also present the main findings of the report. Annex 1 contains greater detail on multidimensional welfare measurement for interested readers.

2.1. Terminology used in the report

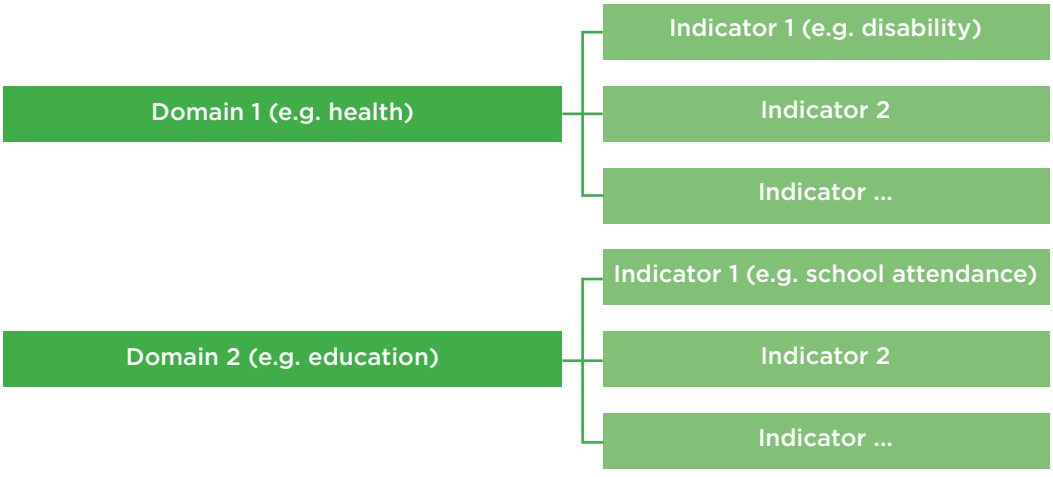
It's useful to first examine the terminology that will be used through the report. Chapter 1 discussed a building block of multidimensional welfare measurement: lists of basic needs, minimum rights, fundamental concerns or capabilities that are central to measuring multidimensional welfare. It is useful to think in terms of *hierarchical* or *structured* lists. A natural way to organize the welfare indicators to include in the analysis is to think of categories of indicators first.

This conceptualization leads to a two-level list, depicted in Figure 2.1 below:

- *Domains:* the first level captures categories of indicators or domains,
- *Indicators for each domain:* the second level captures individual indicators for each domain.

Throughout this report, a multidimensional list will include *domains* and *indicators* within domains.

Figure 2.1 | **The structure of domains and indicators**



5 The development of a measurement framework for multidimensional welfare has matured only over the decade or so to a point that monitoring of multidimensional welfare has gained some currency in the context of development. Aaberge and Brondolini (2015) and Alkire et al. (2015) offer two recent surveys of the literature.

To adapt to the needs of Myanmar, the terminology used in this report differs slightly from the international literature. The report uses the term "disadvantage" to refer to deprivations in a particular domain or indicator—i.e. a household is considered to have a disadvantage if its members fail to meet a cut-off in an indicator.

As such, the national measure of multidimensional welfare for Myanmar is referred to as the *"Multidimensional Disadvantage Index"* and the selected domains and indicators are referred to as *disadvantage domain and disadvantage indicator,* respectively.

2.2 Key elements in multidimensional disadvantage measurement

Cutting across the different approaches, there are broadly three sets of issues that need to be addressed in any assessment of multidimensional welfare:

1) *Step One: Domains and Indicators:*

Which domains and indicators should be included? What sort of indicator cut-offs should be used to define disadvantage within different domains?

2) *Step Two: Weights:*

How should the different domains and indicators within those domains be weighted?

3) *Step Three: Identification and aggregation:*

How should the indicator-level and domain-level disadvantages be aggregated into an overall measure of multidimensional disadvantage? This includes the issue of how the multidimensionally-disadvantaged should be identified as well as the issue of how the multiple disadvantages of those identified as multidimensionally-disadvantaged should be aggregated over the population (or a sub-population).

2.3 Methodological framework applied for Myanmar's multidimensional welfare measurement

This section provides an overview of methodological options considered for multidimensional welfare measurement in Myanmar. A more comprehensive conceptual framework and guidance are discussed in Annex 1.

Step One: Choice of domains and indicators

The first task in constructing the multidimensional disadvantage measure is to select domains and indicators. There are both normative and pragmatic considerations in the choice of domains and indicators that should be included in the measurement of multidimensional disadvantage. Ideally, the list of relevant domains and indicators should be generated through public discussion, deliberation and reasoning. This does not imply a "fixed-and-forever" list, nor does it imply a complete fluidity of the list, but it means that we need to consider: (i) the specificity to social context, current state of disadvantage, policy concerns and priorities, and (ii) the issue of the legitimacy of the list. However, even though there need not be a "fixed-and-forever" list, it should have some stability over time and space to assess progress in addressing disadvantage consistently.

There are a few guiding principles and considerations in developing lists of indicators:

i) The coverage of the indicator should be national.
ii) The indicator should be transparent and identify the essence of the problem.
iii) The definition of the indicator should be generally accepted as valid and have a clear normative interpretation.
iv) As far as possible, indicators should represent outcomes, not inputs – ends, not means.
v) The list should be comprehensive but limited to the most important indicators (parsimonious).
vi) The choice of indicators should avoid "double-counting" or duplication, and indicators should capture distinct aspects of disadvantage.
vii) The portfolio of indicators should be balanced across different domains.

Over and above this, there is the practical consideration that the selected indicators should be feasible in terms of available or collectable data. There are several feasibility considerations to consider. First, the data on indicators should have national coverage. There are also considerations in relation to how spatially-disaggregated we want the assessment to be and how frequently we want to monitor multidimensional welfare and disadvantage. There may be trade-offs between different data sources. For instance, census data allows for rich spatial disaggregation, but a living standards survey may allow for more frequent monitoring. Another consideration is that for constructing multidimensional welfare measures, we need information on the chosen set of indicators *for the same set of households or individuals*. Only with such data can we evaluate the extent of overlap of disadvantages and the multiplicity of disadvantages faced by individuals.

The task of developing a list of domains and indicators may seem very ambitious. However, proceeding hierarchically and developing first a list of domains first and then considering feasible indicators within each domain can make the exercise more manageable. For instance, there are some relatively obvious categories at the domain level which come up repeatedly in discussions on multidimensional disadvantage. A typical domain list may include: education, housing conditions, water and sanitation, access to work, assets and nutrition or health status. Indeed, the room for agreement at the domain level should not be underestimated.

Once the broad domains are determined, indicators within the domains can be established taking into consideration practical issues, such as feasibility and data considerations. Proceeding hierarchically in a two-step process can also reduce the risk of double-counting in the selection of indicators. For each selected indicator, we also need to specify the cut-off that determines whether a person has a disadvantage in terms of an indicator. Hence, indicators are expressed in a binary term – 1 for individuals with disadvantage in an indicator and 0 for individuals without disadvantage in an indicator.

Step Two: Selecting weights for aggregating domains and indicators

Once domains, indicators and their cut-offs are determined, the next task it to bring together or aggregate these domains and indicators into a composite index by allocating weights to each indicator.[6]

There are two commonly used weighting approaches: (1) Nested uniform (NU) weights and (2) Nested inverse incidence (NII) weights.[7]

6 There are three well-known approaches for aggregations; "Dashboard", "Venn diagrams" and "Composite index". Myanmar's Multidimensional Disadvantage Index uses the "Composite index" approach. See more detailed discussions about alternative approaches in Annex A1.
7 There is another weighing approach is referred to as "stated preference weights". See Annex A1.

- **Nested uniform weights**: this is the most commonly used, and is also referred to as "equal weighting". The approach allocates the same weights across all domains; within a domain, equal weights are assigned across indicators. The indicator level weight is calculated as the domain-level weight divided by the number of indicators in a given domain.

- **Nested inverse weights**: this approach uses data-based weights and is based on the idea that a less commonly-observed disadvantage is typically more severe and deserves a higher weight. The estimated weights are thus inversely related to the incidence or prevalence rates for different disadvantages—i.e. they put higher weight on indicators with a lower incidence of disadvantage but less weight on indicators with a higher incidence of disadvantage.

The sum of weights over all indicators under the both weighting schemes becomes 1.

The Multidimensional Disadvantage Index presented in this report uses nested uniform weights. The decision to use these weights was based partly because they are transparent and easy to explain. The decision was made easier by the observation that using instead the alternative weighting scheme - nested inverse incidence weights – has very little impact on the spatial profile of the results. For completeness, results using the nested inverse incidence weights are presented in Annex 6.

Step Three: Identifying those who are disadvantaged and aggregating this into a population statistic

The third step is to first identify an individual or household who are disadvantaged, and then to bring together those identified as disadvantaged within the population (or sub-population) to assess the extent of their multiple deprivations.

There are three ways of identifying those who are disadvantaged:

- *Union approach, fall below cut-off in any indicator:* The "union" approach characterizes someone as multidimensionally disadvantaged if they experience a disadvantage in *any* of the indicators considered.

- *Cut-off approach, falls below cut-off in some of the indicators:* This approach characterizes someone as multidimensionally disadvantaged if they experience a disadvantage in more than a given percentage of indicators. For example, in the global MPI framework (following Alkire and Foster, 2011), the poor are identified by a cross-dimensional cut-off which is specified in terms of the minimum percentage of weighted domains and indicators a person must be deprived in for him or her to be considered poor. The global MPI sets this figure at one-third.

- *Intersection approach, falls below cut-off in all indicators:* The "intersection" approach characterizes someone as multidimensionally disadvantaged if they experience a disadvantage in *all* the indicators considered.

Once the population or households who are considered to be multidimensionally disadvantaged are identified, the next step is to aggregate this into a population statistic. There are again multiple options, described in greater depth in annex 1:

- *Headcount:* This simply gives the fraction of the population who are identified as multidimensionally disadvantaged, without taking into consideration the extent of disadvantage – such as whether they fall below the cut-off in 1, 5 or all indicators.

- *Headcount adjusted:* This takes the headcount (i.e. all those who were identified as multidimensionally disadvantaged), taking into consideration their average disadvantaged share (i.e. in a two-person case where one person is deprived in half of the indicators and the second is deprived in all indicators, the average disadvantaged share is three-quarters).

- *Distribution sensitive measures:* These measures consider the distribution of the set of disadvantages, by considering the cross-dimensional convexity of disadvantages. This effectively means that disadvantages are compounding. For example, let's assume there are two households who were identified as multidimensionally disadvantaged and that between them they are disadvantaged in 12 indicators. The multidimensionally disadvantaged index would be higher if one household were disadvantaged in 11 indicators and the other household in 1, than if one household were deprived in 10 indicators and the other in 2.

This report presents the evidence in multiple ways, to allow readers to examine the full extent of disadvantages that can be seen in Myanmar.

Rather than following a cut-off approach that doesn't take into consideration those who face disadvantages in insufficient number to meet the cut-off, we prefer to follow a union approach and present evidence in a manner that shows the number of disadvantages experienced by the population. By taking a union approach, all the disadvantages are counted towards the aggregate measure and the report allows readers to examine the share of the population experiencing no, one, two, three disadvantages, etc.

We then move to producing an index that can summarize the disadvantages experience, the report presents the headcount adjusted measure (MDI-1) and a distribution sensitive measure (MDI-2). MDI-1 is given by taking an average of the weighted sum of all indicators using the assigned weights. MDI-2 is calculated by averaging the square of the MDI-1.

To summarize, both measures are defined by:

$$\text{MDI1} = \frac{1}{n}\sum_{i=1}^{n}\left(w_j I_{i1} + w_j I_{i1} + \cdots + w_j I_{ij}\right)$$

$$\text{MDI2} = \frac{1}{n}\sum_{i=1}^{n}(\text{MDI1})^2$$

where I_{ij} is a disadvantage indicator variable for individual i and indicator j, w_j is the weight assigned to indicator j and n is the size of the population. The main difference between the two measures is that MDI-1 is not sensitive to the distribution of disadvantages across the population, but MDI-2 puts more weight on an indicator with higher incidence of disadvantage. In the specific sense greater or lesser concentration of a *given set of disadvantages* has no effect on MDI-1, but greater concentration of disadvantages increases MDI-2. Another way to understand the difference between MDI-1 and MDI-2 is that MDI-2 recognizes the compounding effect of multiple disadvantages faced by an individual, allowing the combined effect of multiple disadvantages to be larger than the sum of their individual effects.

CHAPTER 3

DOMAINS AND INDICATORS FOR MYANMAR MULTIDIMENSIONAL DISADVANTAGE INDEX

3.1. Consultative process for the selection of domains and indicators

The domains and indicators for Myanmar's Multidimensional Disadvantage Index (MDI) were chosen through a two-stage consultative process.

The first stage of consultations was conducted in September 2017, which included an assessment and screening of indicators conducted by a technical team of Myanmar government officials including the Department of Population, Ministry of Labour, Immigration and Population, Planning Department, Ministry of Planning and Finance; the Central Statistical Organization, Ministry of Planning and Finance; and Department of Social Welfare, Ministry of Social Welfare, Relief and Resettlement.

At the first stage of consultations, the technical team split into groups to discuss which domains and which indicators within those domains ought to be included in the construction of an MDI for Myanmar. The groups based their discussion on (i) the general guiding principles for the selection of domains and indicators (such as those noted in Chapter 2), (ii) the concept of disadvantages relevant for Myanmar, and (iii) the Census questionnaire which was used to determine which indicators could be feasibly constructed from the Census data that were consistent with (i) and (ii). Detailed discussions were then carried out to build a consensus list of domains and indicators.

The second stage consultation was conducted in January 2018 by involving a wide range of stakeholders into the discussion of selected list of domains and indicators from the first stage. The second stage expanded the consultation to also include international development partners and independent researchers.

Six domains and fourteen indicators were selected using this two-stage process. The six domains selected are: (i) education, (ii) health, (iii) water and sanitation, (iv) employment, (v) housing and (vi) assets. There are two indicators each for health, water and sanitation, housing and assets, and three indicators each for education and employment. These domains and indicators are described in greater detail in the next section.

Three common features of all disadvantage indicators should however be noted:

- First, all disadvantage indicators are defined in binary (0/1) terms such that each indicator measures the presence or absence of a particular disadvantage for the members of a household. This mainly reflects the nature of data available from the 2014 MPHC; with the exception of a question on education (on the highest grade completed), all relevant information gathered in the Census is through categorical questions.

- Second, all disadvantage indicators are defined at the level of the household, i.e., all indicators are defined in terms of whether a particular disadvantage condition is true or not for a household, even though the condition itself in many cases is specified in terms of the attributes of individual members. For instance, the condition that no household member has completed grade 5 or above defines the indicator for primary education disadvantage for the household.

- Third, the unit of counting used in the analysis is the individual. Thus, in the example of primary education, all members of the household are considered disadvantaged in this indicator if no one has completed at least grade 5. An implication is that while the report will present findings on the percentage of population disadvantaged in one or multiple indicators, for a given indicator all members of a household share the same value of the indicator. In other words, the analysis does not allow for intra-household variation. This reflects in part the nature of data available from the 2014 MPHC, and in part the judgement that an individual disadvantage affects all household members.

3.2. Selected domains and indicators

Domain 1: Education

The three indicators selected to represent the education domain relate to literacy, completion of primary education, and school attendance for children age 6-14 years (Table 3.1). The latter two indicators are also used by the global MPI to signal the household education disadvantage. In addition, even though Myanmar has achieved a relatively high adult literacy rate of 89.5 percent (at national level), a household is deemed to have a disadvantage in education if more than half of household members age 10 and above are illiterate.[8]

Table 3.1 | Education Indicators

Domain	Indicator	Description
Education	Literacy	If more than half of household members aged 10 and above can't read or write in any language
	Primary education	If no household member has completed grade 5 or above
	School attendance	If there is a school-age child (age 6-14) in the household who is not currently attending school.

Table 3.2 shows the prevalence rates for the three education indicators. Nationally, about 9 percent of the population is disadvantaged in terms of the literacy indicator, 14 percent in terms of the primary education indicator and 19 percent in terms of the school attendance indicator. The prevalence of disadvantage at the domain level, i.e. the fraction of population with *any* disadvantage in the education indicators, is 31 percent nationally. Prevalence rates are higher in rural than in urban areas, especially for literacy and primary education where the rural disadvantage rates are more than three times higher than the urban rates.

Table 3.2 | Prevalence of a disadvantage in Education

		Population with a disadvantage (%)		
Domain	**Indicator**	**Union**	**Urban**	**Rural**
Education	***A disadvantage in any indicator***	**31.0**	**21.4**	**34.8**
	Literacy	9.4	3.4	11.8
	Primary education	14.2	4.8	18.1
	School attendance	18.8	16.6	19.7

8 2014 Myanmar Population and Housing Census. Adult literacy rate is the fraction of those aged 15 years or above who can read and write in any language.

Domain 2: Employment

Unstable and low-income generating employment conditions often characterize household disadvantage. Employment-related indicators, though not included in the global MPI, have figured in several national assessments of multidimensional welfare, for instance, for Colombia, Ecuador, Costa Rica, El Salvador, Chile and South Africa. Employment generates income, so it certainly has instrumental value in promoting welfare. But, employment represents more than just the means to earn a living. It is also linked in important ways with life satisfaction, social status, self-esteem, and mental and physical health. It is thus no surprise that the consultative process for the Myanmar MDI determined that employment should be an independent domain in its own right.

Three employment-related indicators were identified (Table 3.3). The first indicator relates to unemployment; a household is defined as having a disadvantage if any working-age member declared "sought work" or "ill/disabled" as their main activity status in the 12 months preceding the MPHC.[9] The second indicator relates to casual employment and considers a household as having a disadvantage if at least half of the household's working members are employed in an elementary occupation (see the list of elementary occupations in Table 3.3). These were identified as typically low-paid, informal jobs with insecure employment conditions. The third indicator for this domain relates to child work, and considers a household to have a disadvantage in terms of this indicator if any child aged 10-17 years in the household is reported to be working as their main activity during the past 12 months.

Table 3.3 | Employment Indicators

Domain	Indicator	Description
Employment	Unemployment	If one or more working-age members (age 15-64 years) have an activity status during the last 12 months of "sought work" or "ill, disabled"
	Casual employment	If half or more of working members (age 15-64 years) are working in "Elementary Occupations" during the last 12 months
	Child work	If any children (age 10-17 years) in the household are working during the last 12 months

Note: The list of elementary occupations includes the following occupation codes in the 2014 MPHC:
911 - Domestic, hotel and office cleaner or helper, Newsvendor, hawker, peddler, salesperson door-to-door, Vendor, fresh-water, newspaper, refreshments/cinema, street/food, non-food products
912 - Billposter, shoe-polisher, Caretaker cleaner, building/cleaning, Cleaner, (aircraft, factory, restaurant, train), Washer, hand/street (car windows), Washer, hand/vehicle
915 - Attendant (social places and events), like weddings, promotion of items, entertainment places, Caddie, golf
921 - Cutter, sugar cane, gatherer seaweed, shellfish, Labourer, farm and livestock, Labourer, fishery and aqua-culture
931 - Labourer, construction, digging, mining
932 - Hand packers, Labourer, assembling, manufacturing, wine production, Striker, blacksmith's, Washer, hand/manufacturing process/yarn
933 - Berther, dock, docker, Driver, farm equipment, animal machines, hand truck, pedal vehicle, Freight handler, Loader, aircraft, boat, furniture, vehicles, ship, porter all items, Hand and peddle vehicle driver
941 - Fast food preparers, kitchen helpers
951 - Street and related sales and service workers, street vendor
961 - Refuse workers, garbage and recycling collectors, sweepers
962 - Collector, garbage, refuse, Elementary workers not classified anywhere, Guard, gatekeeper, Labourer, odd-jobbing, Messenger, package deliverers, luggage porters, meter readers, water and firewood collector

9 The activity status of "ill/ disabled" could be subsumed as part of the disability indicator mentioned above, but is included here because of its direct link with employment.

Table 3.4 shows that 41 percent of Myanmar's population has a disadvantage in at least one of the three employment indicators. The most common form of employment disadvantage is casual employment, with 23 percent of the population living in households where half or more of its working members are engaged in "elementary occupations". Fifteen percent of the population live in households where at least one child in the age-group 10-17 years is working, and 9 percent are in households where at least one working-age member is experiencing unemployment. With the exception of unemployment, disadvantage prevalence rates are higher in rural areas.

Table 3.4 | Prevalence of a disadvantage in Employment

		Population with a disadvantage (%)		
Domain	**Indicator**	**Union**	**Urban**	**Rural**
Employment	***A disadvantage in any indicator***	**41.2**	**35.5**	**43.5**
	Unemployment	9.3	11.9	8.3
	Casual employment	23.2	17.9	25.3
	Child work	15.4	10.7	17.3

Domain 3: Health

Censuses typically do not include questions related to health status. Thus, it is often not possible to identify health indicators from the census data. The 2014 MPHC however allows for the identification of two health indicators based on information on disability and mortality. These two indicators are described in Table 3.5. The disability indicator captures disability from a functional perspective, as the complete inability or substantial difficulty seeing, hearing, walking or remembering. The mortality indicator relates to child and youth mortality and captures whether the household had an ever-married woman aged 15-40 the household who lost a child. This offers a reasonable measure of child and youth mortality. Table 3.6 shows the prevalence rates for these indicators: 5 percent for disability and 7 percent for child and youth mortality at the national level, while 12 percent of the population lives in households that experienced either of these. Rural prevalence rates are higher than urban rates.

Table 3.5 | Health Indicators

Domain	Indicator	Description
Health	Disability	A household member has "a lot of difficulty" or "cannot do it at all": seeing, hearing, walking or remembering.
	Child and youth mortality	If any of the children born alive to an ever-married woman aged 15-40 are no longer alive

Table 3.6 | **Prevalence of a disadvantage in Health**

		Population with a disadvantage (%)		
Domain	**Indicator**	**Union**	**Urban**	**Rural**
Health	***A disadvantage in any indicator***	**12.1**	**8.2**	**13.8**
	Disability	5.1	4.4	5.4
	Child and youth mortality	7.4	4.0	8.8

Domain 4: Water and Sanitation

Safe drinking water and sanitation are widely regarded as basic necessities, and indicators relating to these are common in most multidimensional welfare assessments, including the global MPI.

The report includes two indicators relating to water and sanitation, described in Table 3.7. A household is considered to have a disadvantage if their main source of drinking water is an unprotected well, or a surface water source such as pool, pond, lake, river, waterfall, tanker or truck. Disadvantage with respect to sanitation occurs when the household either has no toilet or has to depend on a bucket (surface latrine) or traditional pit latrine. Access to an unimproved sanitation facility is captured by not having a toilet or using a bucket or traditional pit latrine as a toilet (Table 3.7). Since safe drinking water and hygienic sanitation are critical to disease control and the healthy lives of all individuals, these indicators could also belong to the health domain. However, it was recognized during the consultative process that they are important enough to be considered as an independent domain.

Table 3.7 | **Water and Sanitation Indicators**

Domain	Indicator Name	Description
Water and Sanitation	Drinking water	If the main source of drinking water is any of the following: Unprotected well/Spring, Pool/Pond/Lake, River/Stream/Canal, Waterfall/Rainwater, Tanker/Truck
	Sanitation	If the type of toilet used in the household is "Bucket (Surface latrine)", "No toilet" or "Traditional pit latrine"

Table 3.8 shows that a quarter of the Myanmar population lacks adequate sanitation, 29 percent do not have access to safe drinking water, and 41 percent of the population is with disadvantage in either drinking water or sanitation. Disadvantage rates are 3-4 times higher in rural areas. For instance, more than half of the rural population has a disadvantage in either drinking water or sanitation relative to 16.5 percent of the urban population. Rural sanitation disadvantage rates are more than fourfold higher the urban rates.

Table 3.8 | Prevalence of disadvantage in Water and Sanitation

		Population with a disadvantage (%)		
Domain	**Indicator**	**Union**	**Urban**	**Rural**
Water and Sanitation	***A disadvantage in any indicator***	**41.4**	**16.5**	**51.5**
	Drinking water	28.8	11.4	35.8
	Sanitation	24.7	7.2	31.8

Domain 5: Housing

The Report assesses people's housing disadvantage using two indicators. The first indicator measures the structural quality of the house using a four-fold criteria based on the type of dwelling and the construction materials of the wall, floor, and roof. Myanmar has significant geographical variations in housing materials from the coastal to the mountainous areas, reflecting different topographical conditions. There was considerable discussion about this indicator during the consultative process, including a consideration of whether region-specific definitions of limited housing should be used. However, developing region-specific criteria also seemed fraught with difficulties, and hence this option was not pursued. The disadvantage cut-offs for this indicator emerging from the consultative process as described in Table 3.9 reflect a broadly shared view of what is considered to be minimum quality of decent housing.[10] The second indicator relates to the source of lighting, with disadvantage defined as the main source of lighting being candle or kerosene. The lighting indicator is thus mainly an indicator of access to electricity and the reach of Myanmar's electricity grid.

Table 3.9 | Housing Indicators

Domain	Indicator Name	Description
Housing	Dwelling	If the household has any of the following: (i) the type of housing unit occupied by the household is a hut (2-3 years or 1 year) (ii) the main construction material of wall is "Dhani/Theke/In Leaf" or "Earth" (iii) the main construction material of floor is "Earth" (iv) the main construction material of roof is "Dhani/Theke/In Leaf"
	Lighting	If the main source of lighting is "Candle" or "Kerosene"

Table 3.10 shows a high degree of disadvantage by type of dwelling, with nearly 40 percent of the national population (and nearly half of the rural population) living in relatively poor quality dwellings. More than a quarter of the population also uses non-electricity based sources of lighting. Rural prevalence rates for this disadvantage are five times higher than urban rates, indicative of a heavy concentration of the country's electricity grid in urban areas and significant under-provision in rural areas.

10 For further discussion of geographical variations in dwelling materials in Myanmar, see Annex 4.

Table 3.10 | Prevalence of disadvantage in Housing

		Population with a disadvantage (%)		
Domain	Indicator	Union	Urban	Rural
Housing	*A disadvantage in any indicator*	**48.8**	**21.6**	**59.9**
	Dwelling	39.5	18.5	48.0
	Lighting	27.2	7.0	35.4

Domain 6: Assets

Indicators for asset ownership are identified corresponding to two main categories of assets: communication assets (such as radio, television, landline phone, mobile phone, computer and internet) and mobility assets (of car, truck, van, motorcycle, bicycle, four-wheel tractor, canoe, boat and cart). A household is considered with disadvantage in a particular asset category if it does not have any asset in that category (see Table 3.11).

Table 3.11 | Asset Indicators

Domain	Indicator Name	Description
Assets	Communication assets	If the household does not have any of the following: radio, television, land line phone, mobile phone, computer, internet at home
	Mobility assets	If the household does not have any of the following: car/pick-up/truck/van, motorcycle/moped/tuk tuk, bicycle, 4-wheel tractor, canoe/boat, cart (bullock).

The prevalence rates for asset disadvantage are shown in Table 3.12. Nationwide, 42 percent of the population are lacking either a communication asset, a mobility asset or both. Mobility asset disadvantage rates are similar across urban and rural areas, but rural disadvantage rates for communication assets are more than two and a half times higher than those in urban areas.

Table 3.12 | Prevalence of disadvantage in Assets

		Population with a disadvantage (%)		
Domain	Indicator	Union	Urban	Rural
Assets	*A disadvantage in any indicator*	**41.5**	**31.0**	**45.8**
	Communication assets	27.9	12.8	34.1
	Mobility assets	27.9	25.7	28.8

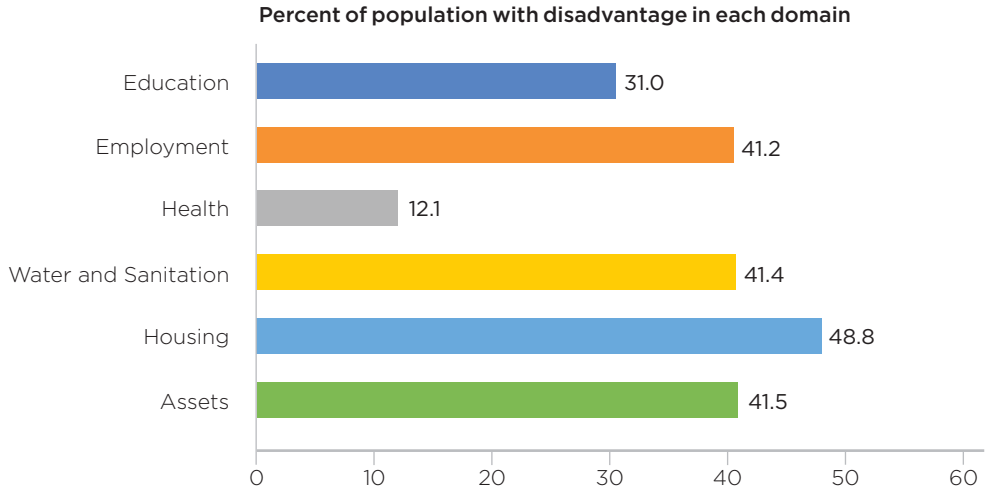
3.3. Comparative summary of disadvantage prevalence by domain and indicator

The national picture

Figure 3.1 and Figure 3.2 offer a comparative summary of national level prevalence rates of disadvantages by domain and indicator respectively.

As seen in Figure 3.1, the most common domain of disadvantage is housing: nearly half of the country's population have a disadvantage in this domain. Employment, assets and water and sanitation are the next three most common domains of disadvantage, with prevalence rates of about 41 percent each. This is followed by education, with a prevalence rate of 31 percent of the population. The least common domain is health: approximately 12 percent of the population has a disadvantage in this domain.

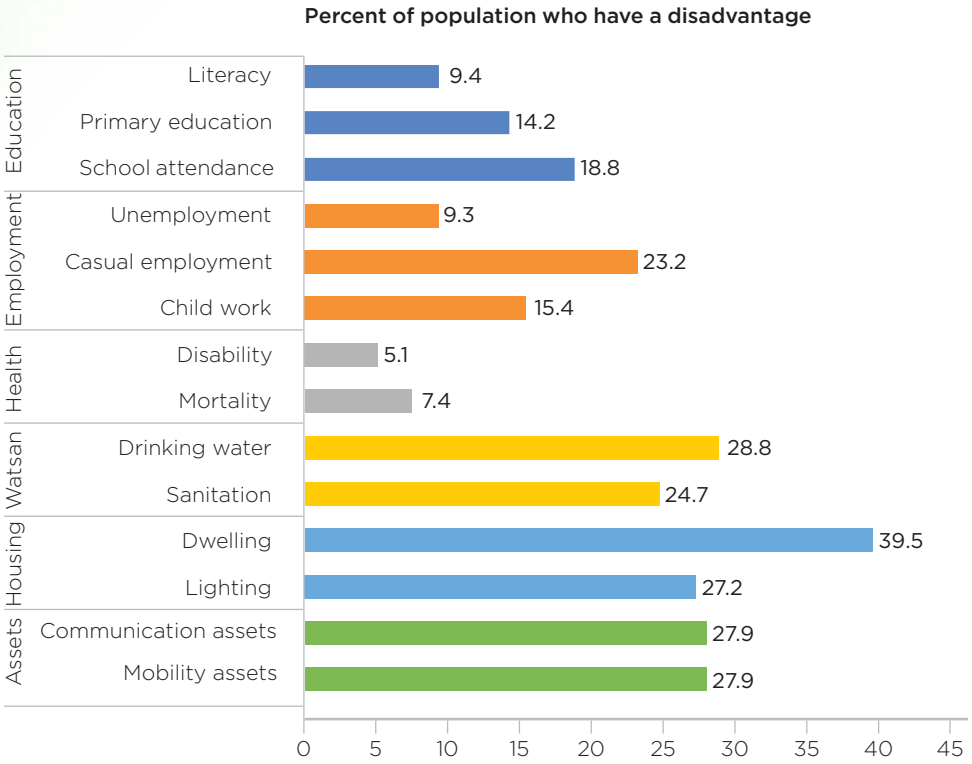
Figure 3.1 | **Comparative disadvantage prevalence rates by domain (Union)**



At the indicator level, the comparative picture of how commonly different disadvantages occur can be summarized as follows (see Figure 3.2):

- the most common disadvantage: type of dwelling (with a prevalence rate of nearly 40% of total population);
- prevalence rates of 23-29 percent: drinking water, sanitation, lighting, communication and mobility assets, and casual employment;
- prevalence rates of 14-19 percent: primary education, school attendance and child work;
- prevalence rates of 5-9 percent: literacy, unemployment, disability and mortality.

Figure 3.2 | Comparative disadvantage prevalence rates by indicator (Union)



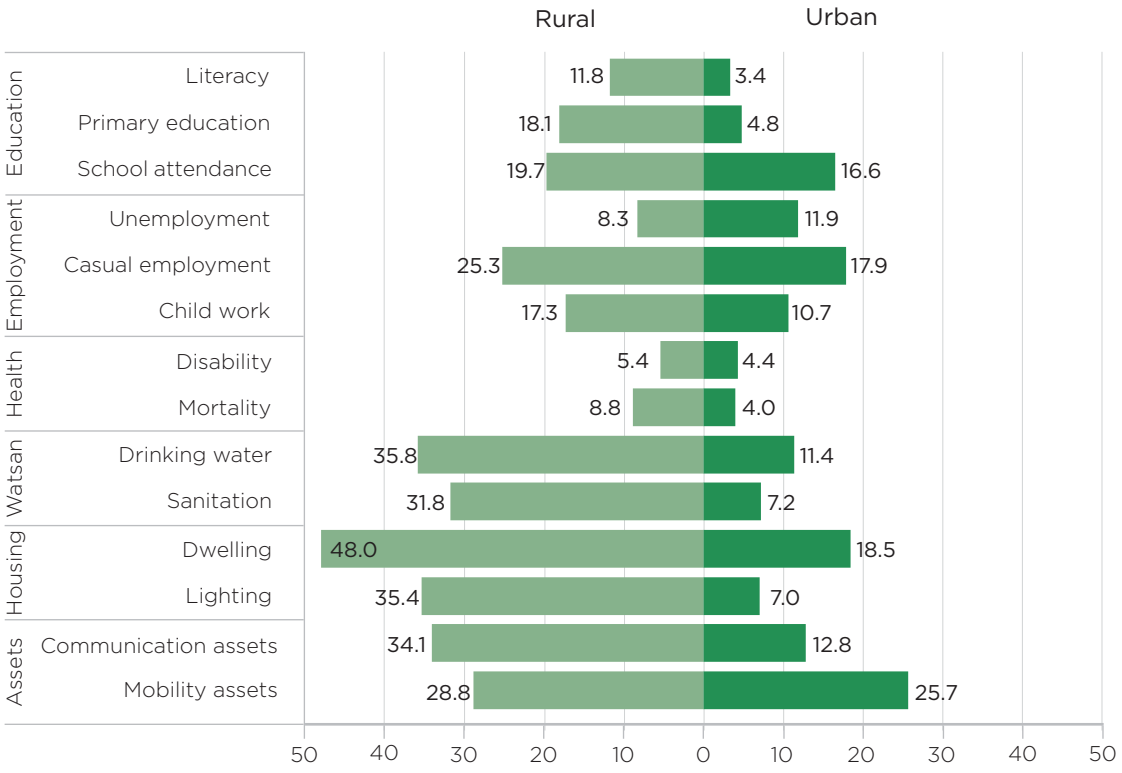
The low prevalence rates of health disadvantages partly reflect the indicators chosen – disability and mortality – which reflect relatively severe conditions that are likely to be observed with lower frequency than other commonly used health indicators, such as stunting (29 percent of children under the age of 5 are stunted in Myanmar, MOHS and ICF 2016). On the other hand, if one were to include drinking water and sanitation as part of the health domain (in view of their direct implications for health), we would observe a higher disadvantage prevalence rate in this more broadly interpreted health domain. This is not to argue for merging the health and water and sanitation domains. But, the main point is that in interpreting multidimensional welfare statistics, one should never lose sight of the specific constitutive indicators and what they represent.

Rural-urban patterns

There are notable differences between urban and rural areas in the prevalence and type of disadvantages experienced. The share of the population experiencing a given disadvantage is higher in rural areas than in urban, but the patterns of urban disadvantage differ from the national and those seen in rural areas. Just over seven in ten people in Myanmar (71 percent) live in rural areas. The rural and national patterns of disadvantage at a domain level are similar. The ranking from the most to the least common domain of disadvantage is essentially the same: housing (60 percent), water and sanitation (52 percent), assets (46 percent), employment (44 percent), education (35 percent) and health (14 percent). However, there are notable differences in the urban patterns: employment is the most common domain of disadvantage in urban areas (36 percent), followed by assets (31 percent), housing and education (21-22 percent), water and sanitation (17 percent), and health (8 percent). Thus, while every category of disadvantage is more common in rural than in urban areas, in contrast to the rural areas, employment and assets represent the most common arenas of urban disadvantage.

Figure 3.3 drills further into rural-urban differences in disadvantage rates by indicator. At the indicator level, the rural pattern largely mirrors the national pattern. But there are some interesting points of contrast in urban areas. The most common urban disadvantage indicator is mobility assets (26 percent) even though the most common domain is employment. The next most common set of indicators relate to school attendance, dwelling and casual employment (17-19 percent), followed by unemployment, child work, drinking water and communication assets (11-13 percent), and the least common group of indicators relate to literacy, primary education, disability, mortality, sanitation and lighting (3-7 percent). This contrasting pattern already points to the differing nature of key challenges in urban and rural areas. The report documents further aspects of such diversity in multidimensional disadvantages.

Figure 3.3 | Percentage of the population with a disadvantage, by indicator in rural and urban areas



Regional diversity

Table 3.13 shows the regional variation in prevalence rates of different disadvantages for the 14 indicators. The rich body of information presented in this Table could be summarized and absorbed in two different ways. First, for each indicator, one could look at states and regions with the highest and lowest prevalence rates. Second, for each state or region, one could look at the most and least common disadvantages. The former gives us a sense of regional priorities for each indicator, while the latter offers an indication of dimensional priorities for each state or region. Both perspectives are policy-relevant.

Table 3.13 | **Prevalence rates of disadvantages by region and indicator**

State/ Region	Literacy	Primary education	School attendance	Unemployment	Casual employment	Child work	Disability	Mortality	Drinking water	Sanitation	Dwelling	Lighting	Communication assets	Mobility assets
Kachin	5.1	5.2	13.4	10.4	12.8	11.9	5.7	9.5	21.9	13.5	31.4	29.2	20.5	14.0
Kayah	14.3	10.8	15.5	7.6	8.9	18.1	6.1	9.8	37.9	10.2	16.2	24.2	31.1	24.7
Kayin	24.4	25.1	25.5	13.3	24.0	14.5	6.9	8.0	35.0	30.5	36.7	55.3	38.9	32.0
Chin	14.8	9.1	15.2	12.3	10.7	10.3	11.6	13.9	28.5	23.4	20.4	33.3	56.1	60.7
Sagaing	4.3	8.0	16.4	9.2	19.6	17.5	4.7	8.1	17.6	27.3	46.8	16.1	28.9	15.1
Tanintharyi	5.8	12.1	19.9	10.6	22.2	15.0	7.3	9.5	34.1	32.7	69.7	38.5	31.9	39.2
Bago	4.6	15.0	18.0	10.0	32.0	15.0	4.2	6.9	24.9	24.2	40.5	35.7	29.6	24.6
Magway	5.5	10.4	14.6	8.1	25.1	14.4	5.4	9.2	21.3	29.9	39.5	21.5	27.4	23.1
Mandalay	4.3	9.8	16.6	8.2	22.4	15.7	3.9	5.8	12.5	18.8	32.1	13.0	20.8	16.1
Mon	11.3	15.2	21.7	13.0	29.9	13.6	5.9	5.0	27.0	19.8	39.6	33.7	22.8	24.3
Rakhine	13.0	18.7	19.8	16.8	28.5	9.2	6.4	8.9	63.1	67.6	71.7	70.1	53.7	58.3
Yangon	2.4	6.4	16.9	10.5	20.9	12.2	4.0	3.9	20.6	8.0	19.9	11.5	15.4	38.0
Shan	35.6	35.9	29.1	5.9	10.4	24.0	4.7	8.8	41.4	35.7	26.5	19.9	32.4	24.6
Ayeyawady	5.3	14.5	18.3	7.6	32.1	14.8	6.6	9.4	50.3	23.9	63.6	44.7	33.2	35.8
NayPyiTaw	4.1	9.1	13.6	7.4	28.0	12.5	3.4	7.1	10.4	12.4	26.7	30.9	23.1	27.5
Union	9.4	14.2	18.8	9.3	23.2	15.4	5.1	7.4	28.8	24.7	39.5	27.2	27.9	27.9

Table 3.14 reveals some interesting states and region level patterns of high and low prevalence rates of disadvantage for different indicators. For instance:

- While Shan State has the highest disadvantage rates for all education indicators and child work, it has amongst the lowest rates for the employment indicators.
- Similarly, Chin State has the highest prevalence rates for the health indicators and assets, while it too has amongst the lowest rates for employment indicators as well as for type of dwelling.
- Rakhine State has among the highest disadvantage rates for several indicators, including unemployment, drinking water, sanitation, dwelling, lighting, and assets, but also has the lowest disadvantage rate for child work.
- Ayeyawady Region is among the top three for prevalence rates for casual employment, water and sanitation, and type of dwelling, but it has a low disadvantage rate for unemployment.

- In addition to Shan, Chin, Rakhine and Ayeyawady Region, Kayin State and Tanintharyi Region also appear frequently amongst the top three states and regions in terms of prevalence rates.
- Nay Pyi Taw, Yangon, Mandalay, Kachin appear frequently (at least 4 times) amongst the three lowest disadvantage states and regions.
- Nay Pyi Taw, Yangon, Mandalay, Kachin never appear among the top three (highest disadvantage rate regions), while Kayin and Tanintharyi never appear among the bottom three (lowest disadvantage) states and regions.

Table 3.14 | Three highest and three lowest prevalence State/Region for each indicator

Indicator	3 highest prevalence State/Region	3 lowest prevalence State/Region
Literacy	Shan, Kayin, Chin	Mandalay, Nay Pyi Taw, Yangon
Primary education	Shan, Kayin, Rakhine	Sagaing, Yangon, Kachin
School attendance	Shan, Kayin, Mon	Magway, Nay Pyi Taw, Kachin
Unemployment	Rakhine, Kayin, Mon	Ayeyawady, Nay Pyi Taw, Shan
Casual employment	Ayeyawady, Bago, Mon	Chin, Shan, Kayah
Child work	Shan, Kayin, Sagaing	Kachin, Chin, Rakhine
Disability	Chin, Tanintharyi, Kayin	Yangon, Mandalay, Nay Pyi Taw
Mortality	Chin, Kayah, Tanintharyi	Mandalay, Mon, Yangon
Drinking water	Rakhine, Ayeyawady, Shan	Sagaing, Mandalay, Nay Pyi Taw
Sanitation	Rakhine, Shan, Tanintharyi	Nay Pyi Taw, Kayah, Yangon
Dwelling	Rakhine, Tanintharyi, Ayeyawady	Chin, Yangon, Kayah
Lighting	Rakhine, Kayin, Ayeyawady	Sagaing, Mandalay, Yangon
Communication assets	Chin, Rakhine, Kayin	Mandalay, Kachin, Yangon
Mobility assets	Chin, Rakhine, Tanintharyi	Mandalay, Sagaing, Kachin

Focusing on the top and bottom three regions in terms of prevalence rates (by indicator) is admittedly arbitrary. Nonetheless, the pattern of variation it reveals has implications for a diverse set of regional priorities when focusing on particular domains or indicators.

A different but complementary perspective is offered by Table 3.15 which shows the three most common and the three least common disadvantages for each region.

Table 3.15 | **Three most common and three least common disadvantages for each State/Region**

State/ Region	3 most common disadvantages	3 least common disadvantages
Kachin	Dwelling, Lighting, Drinking water	Literacy, Primary education, Disability
Kayah	Drinking water, Communication assets, Mobility assets	Disability, Unemployment, Casual employment
Kayin	Lighting, Communication assets, Dwelling	Disability, Mortality, Unemployment
Chin	Mobility assets, Communication assets, Lighting	Primary education, Child work, Casual employment
Sagaing	Dwelling, Communication assets, Sanitation	Literacy, Disability, Primary education
Tanintharyi	Dwelling, Mobility assets, Lighting	Literacy, Disability, Mortality
Bago	Dwelling, Lighting, Casual employment	Disability, Literacy, Mortality
Magway	Dwelling, Sanitation, Communication assets	Disability, Literacy, Unemployment
Mandalay	Dwelling, Casual employment, Communication assets	Disability, Literacy, Mortality
Mon	Dwelling, Lighting, Casual employment	Mortality, Disability, Literacy
Rakhine	Dwelling, Lighting, Sanitation	Disability, Mortality, Child work
Yangon	Mobility assets, Casual employment, Drinking water	Literacy, Mortality, Disability
Shan	Drinking water, Primary education, Sanitation	Disability, Unemployment, Mortality
Ayeyawady	Dwelling, Drinking water, Lighting	Literacy, Disability, Unemployment
Nay Pyi Taw	Lighting, Casual employment, Mobility assets	Disability, Literacy, Mortality

It is useful to recall that nationally the three or four most common disadvantages relate to: type of dwelling (disadvantage rate of 39.5 percent), drinking water (28.8 percent), and communication and mobility assets (both with disadvantage rates of 29.9 percent each), while the three/four least common disadvantages relate to: disability (disadvantage rate of 5.1 percent), mortality (7.4 percent), unemployment and literacy (disadvantage rates of 9.3 percent and 9.4 percent respectively). Relative to this national picture, the regional patterns show a great deal of variation. For instance:

- Type of dwelling does not feature among the top three disadvantages in a number of states and regions including Kayah, Chin, Yangon, Shan and Nay Pyi Taw.
- Drinking water only features among the top three disadvantages in four out of the fifteen states and regions: Kachin, Kayah, Yangon and Ayeyawady.
- Similarly, neither communication nor mobility assets feature among the top three disadvantages in Kachin, Bago, Mon, Rakhine, Shan and Ayeyawady.

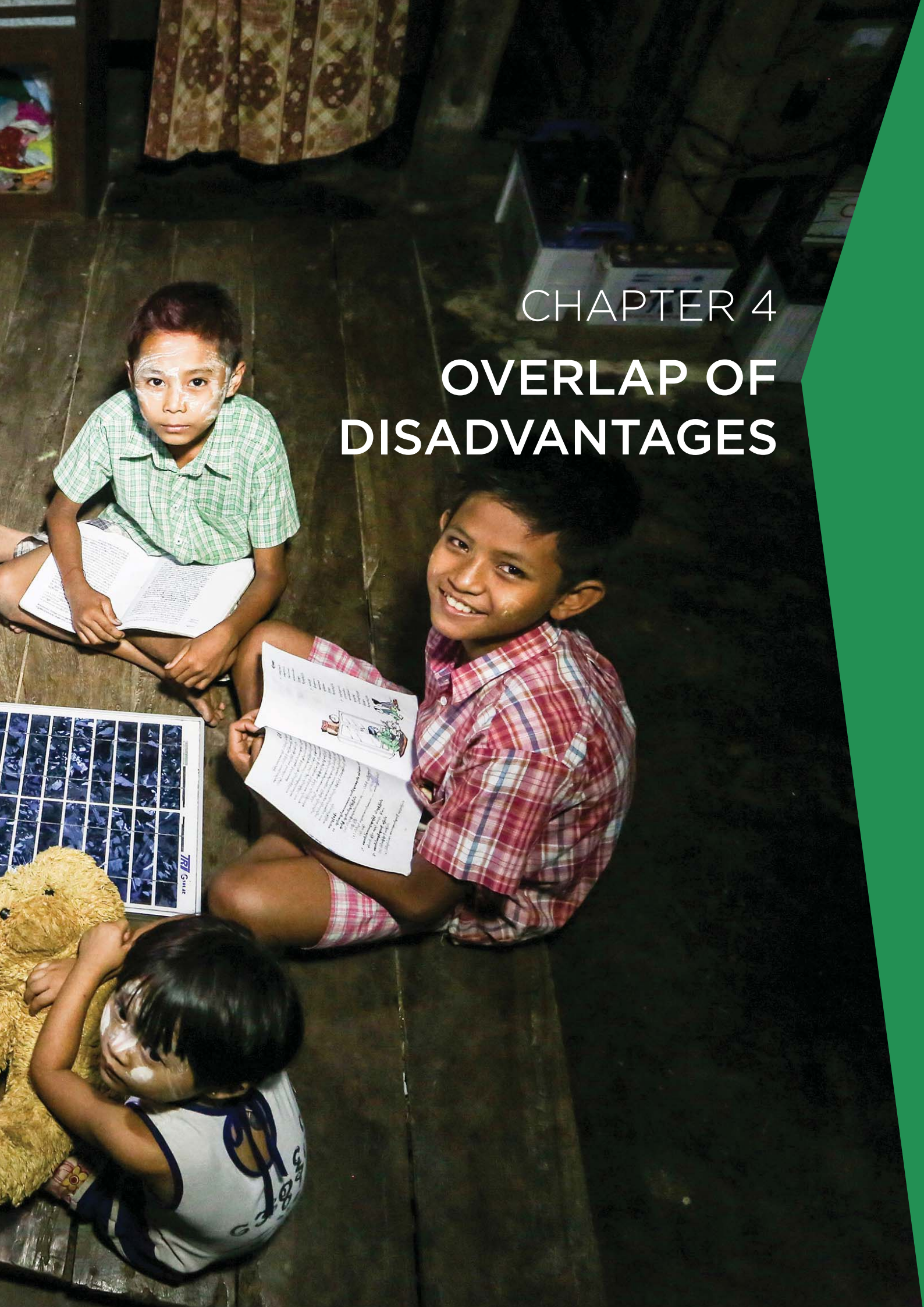
- There are also some interesting contrasts across states and regions. For instance, while completion of primary education is among the least common disadvantages in Kachin, Chin and Sagaing, it is the second most common disadvantage in Shan.

- Similarly, while casual employment is among the three most common disadvantages in a number of state and regions including Bago. Magway, Mandalay, Mon, Yangon and Nay Pyi Taw, it is among the least common in Kayah and Chin.

- It is interesting to note that school attendance is the only indicator that does not feature amongst the top or the bottom three disadvantages in any of the states or regions.

This varied picture complements the discussion in relation to Table 3.14, and in this case has implications for different dimensional priorities when focusing on particular regions.

Finally, one should note that a unique feature of the MDI analysis in Myanmar is that it is based on census data. This allows for the disaggregation of the evidence well beyond the state and region level. Annex 2 presents township-level maps of the prevalence rates for disadvantage in different domains and indicators. These maps contain a wealth of information and highlight both significant variations *within* states and regions as well as similarities between contiguous townships *across* states and regions.



CHAPTER 4
OVERLAP OF DISADVANTAGES

Chapter 3 presented findings on disadvantaged status in the country for different domains and indicators considered individually. This discussion falls very much within a dashboard approach to multidimensional assessments.[11] However, this analysis doesn't inform us about the extent to which disadvantages in different domains or indicators overlap with each other. The extent of such overlap and multiple disadvantage faced by individuals is however of fundamental interest both from a monitoring and policy perspective. This chapter thus turns to examining how far disadvantage in the selected six domains and fourteen indicators overlap with each other in Myanmar.

4.1. Size of the population with any disadvantage

A useful starting point is to look at the size of the population with at least one disadvantage in any indicator. This information is presented in Table 4.1. Note that the disadvantage prevalence rates presented in Table 4.1 represent a fraction of population with any disadvantage among the selected indicators. As the fourteen indicators included in the Myanmar MDI encompass a comprehensive array of basic capabilities, it is not surprising to find that most of the country's population has disadvantage in at least one of them.

Nationally, 40.3 million of the 47.9 million individuals in conventional households and enumerated in the 2014 Census live in households that experienced a disadvantage in at least one indicator; this is 84 percent of the total population. Seven out of every ten urban residents are disadvantaged in at least one indicator, while the proportion is significantly higher in rural areas where nine out of every ten residents are disadvantaged. Thus, while rural residents account for 71 percent of the total population, they account for 76 percent of the total population that experienced a disadvantage in at least one indicator.

There is notable variation across states and regions in the percentage experiencing a disadvantage. While at one end in Rakhine only 4 percent of the population is not disadvantaged in any indicator, at the other end in Nay Pyi Taw this proportion rises to 24 percent. But, in most states and regions, the proportion of the population with at least one disadvantage is high. This reflects the wide range of disadvantages considered given that only a small minority is able to escape them fully and completely.

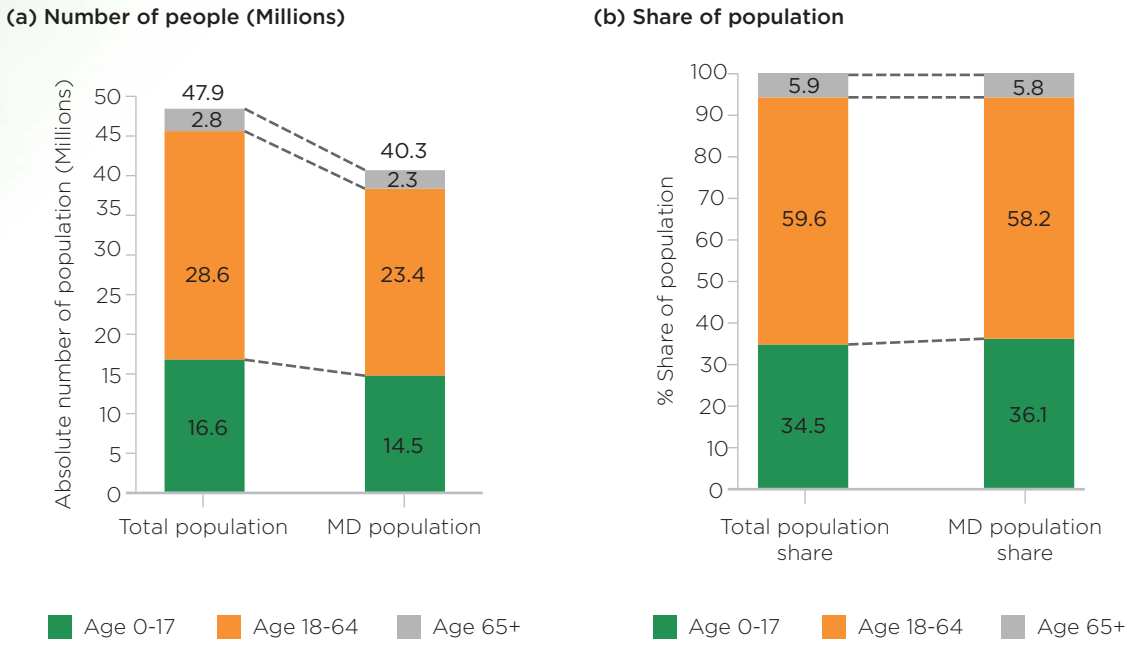
Figure 4.1 shows the age profile of those with at least one disadvantage. 36 percent of those with at least one disadvantage are children up to 17 years of age, 58 percent are adults in the age group 18-64 years, while the elderly (those 65 and above) make up 6 percent of the disadvantaged. It is notable that the age-profile of the disadvantaged population is very similar to the age profile of total population, indicating that the disadvantage prevalence rates (defined in terms of disadvantage in any indicator) are similar across the three age groups. This is not particularly surprising as it may be recalled that our disadvantage indicators are all defined at the household level such that, if the household meets the disadvantage condition for a particular indicator, all members in the household are deemed having a disadvantage in that indicator.

11 See Annex 1 for more detailed explanation about methodologies applied to measure multidimensional welfare

Table 4.1 | Share of the population and number of people with at least one disadvantage

	Total population ('000) (A)	Total population with at least one disadvantage ('000) (B)	Disadvantage prevalence rates (% of population with at least one disadvantage) (B/A)	% share in total population (A/47.9m)	% share in total population with at least one disadvantage (B/40.3m)
Union	**47,930**	**40,276**	**84.0**	**100.0**	**100.0**
Urban	13,840	9,761	70.5	28.9	24.2
Rural	34,090	30,514	89.5	71.1	75.8
Kachin	1,371	1,061	77.4	2.9	2.6
Kayah	273	220	80.7	0.6	0.5
Kayin	1,454	1,290	88.7	3.0	3.2
Chin	469	426	90.9	1.0	1.1
Sagaing	5,076	4,283	84.4	10.6	10.6
Tanintharyi	1,352	1,233	91.2	2.8	3.1
Bago	4,744	4,002	84.4	9.9	9.9
Magway	3,787	3,230	85.3	7.9	8.0
Mandalay	5,843	4,479	76.6	12.2	11.1
Mon	1,950	1,626	83.4	4.1	4.0
Rakhine	2,034	1,958	96.3	4.2	4.9
Yangon	6,949	5,351	77.0	14.5	13.3
Shan	5,501	4,747	86.3	11.5	11.8
Ayeyawady	6,054	5,552	91.7	12.6	13.8
Nay Pyi Taw	1,073	817	76.1	2.2	2.0

Figure 4.1 | **Age profile of those with at least one disadvantage (population with disadvantage in any indicators)**



4.2. Multiple disadvantage profile

An important feature of the multidimensional disadvantage profile is the simultaneous occurrence of multiple disadvantages for many individuals. Figure 4.2 and Figure 4.3 bring out this key aspect of multidimensional disadvantage. Figure 4.2 shows the distribution of the population by the number of domains in which they have a disadvantage; Figure 4.3 shows the same by the number of indicators they have a disadvantaged in.

Figure 4.2 | **Multiple disadvantage by number of domains - Union**

As noted above, 16 percent of the people in Myanmar do not have a disadvantage in any domain, and by implication, do not have a disadvantage in any indicator. Of the 84 percent who have a disadvantage in at least one domain or indicator, Figure 4.2, Panel a shows that 23 percent are disadvantaged in a single domain, 21 percent in two domains, and 18, 14 and 7 percent in three, four and five domains respectively. Only a small fraction – 1.2 percent of the population – have a disadvantage in all six domains. However, it is notable that multiplicity of disadvantage is a widespread phenomenon, with 61 percent of the population having a disadvantage in two or more of the six domains and 40 percent in three or more domains (Figure 4.2, Panel b).

A similar though more detailed picture at the levels of indicators is offered by Figure 4.3. Only a microscopic minority (12,841 individuals out of an enumerated population of nearly 48 million) is disadvantaged in all 14 indicators, and very few (0.6 percent of the population) are disadvantaged in ten or more indicators. However, multiplicity of disadvantages is a very real phenomenon: if someone has a disadvantage, they are far more likely to have a disadvantage in many indicators than in a single one. Only 20 percent of the population, or 24 percent of those with any disadvantage have disadvantage in only a single indicator. Nearly two-thirds (64 percent) of the population are disadvantaged in at least two indicators, nearly half (47 percent) in at least three indicators, one-third (33 percent) in at least four indicators, and more than one-fifth (22 percent) in five or more indicators. Such multiplicity of disadvantage is perhaps the most pernicious aspect of disadvantage status as such cumulative disadvantages can often reinforce each other with potentially serious consequences for prospects of economic and social mobility.

Figure 4.3 | Multiple disadvantage by number of indicators - Union

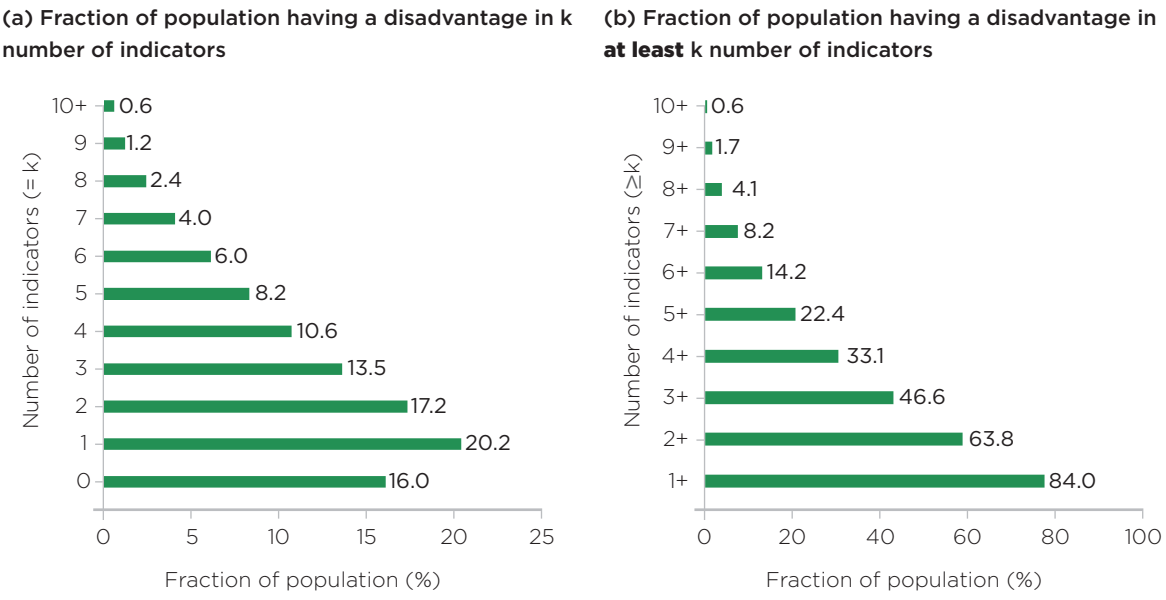
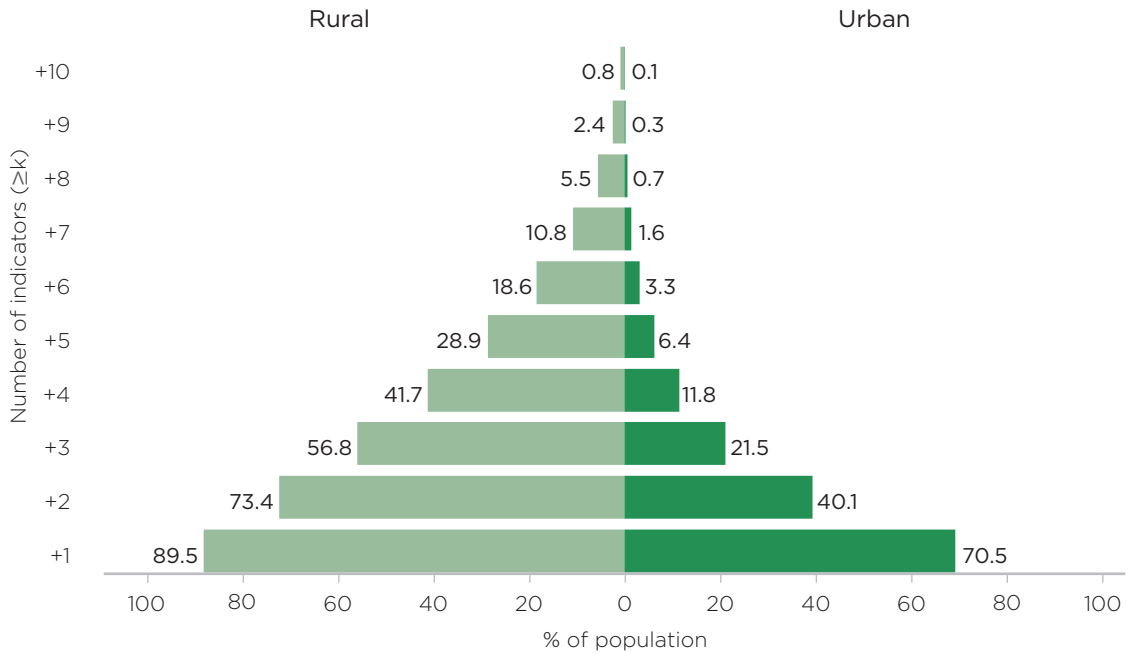


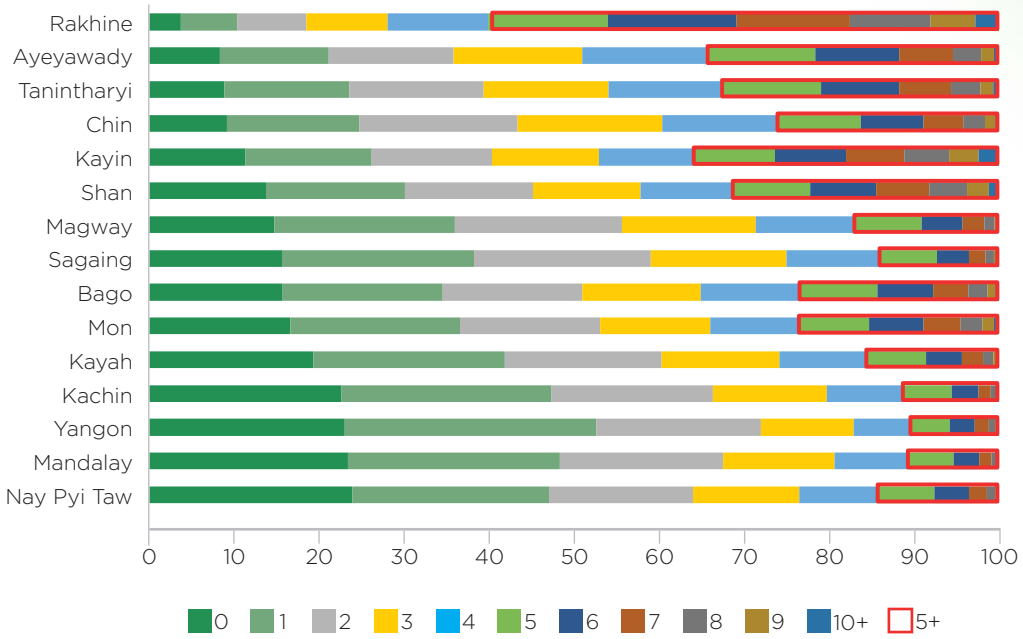
Figure 4.4 presents a disaggregated view of multiple disadvantage for rural and urban areas. The most notable feature of the Figure is that the rural distribution of cumulative disadvantages dominates the urban distribution. In other words, the rural population is distinctly more likely to experience multiple disadvantages relative to the urban population at every level of cumulative disadvantage considered. The rural-urban divide in this respect is substantial. For instance, 22 percent of the urban population is with disadvantage in 3 or more indicators, while this proportion is 2.6 times higher at 57 percent for the rural population. Similarly, the likelihood of disadvantage in 4 or more indicators for the rural population is 3.5 times higher than that for the urban population, and the likelihood of 5 or more disadvantage in rural areas (at 29 percent) is 5 times higher than that in urban areas (at 6 percent). The multiplicity of disadvantage is clearly much bigger concern in rural areas.

Figure 4.4 | Fraction of population with a disadvantage in at least *k* number of indicators, urban/rural



A further disaggregation of multiple disadvantage at the state and region level is depicted in Figure 4.5. It presents a picture of large variations and contrasts across states and regions. The striking nature of regional contrasts is well-illustrated by focusing on a single aspect of the information presented in this Figure, namely, the fraction of population with a disadvantage in five or more indicators. This proportion is the highest in Rakhine where 60 percent of the enumerated population experienced a disadvantage in 5 or more indicators. Kayin is a distant second with 36 percent of the population so disadvantaged; not far behind are Ayeyawady, Tanintharyi and Shan with a 35, 33 and 31 percent respectively. At the other end, the fraction with five or more disadvantages is the lowest in Yangon at 10 percent. This proportion is also relatively low in Kachin (11 percent), Sagaing and Nay Pyi Taw (14 percent), Kayah (16 percent) and Bago (17 percent). Having a disadvantage in five or more indicators is only one metric of multiple disadvantages. However, other more or less stringent metrics offer a similar picture of substantial regional disparities across states and regions.

Figure 4.5 | **Percentage of individuals experiencing multiple disadvantage (number of indicators), by State/Region**



4.3 The ten most common combinations of disadvantage

When people have disadvantages in multiple domains or indicators, it is of interest to know not only in how many domains and indicators they experience a disadvantage in (as discussed above), but also which combinations of disadvantage are more common than others. Table 4.2 presents this analysis at the domain level. There are six domains and, for each, an individual may be either disadvantaged or not disadvantaged., There are therefore altogether 2^6=64 possible combinations of disadvantaged status with respect to these six domains. The entire population of the country can thus be classified as belonging to one of these 64 (mutually exclusive) categories. Table 4.2 shows this national distribution where the 64 categories are arranged from the most commonly observed combination (with the largest share of the total population) to the least common combination (with the smallest population share).

Table 4.2 | The most and the least common combinations of disadvantages by domain

Rank	% of population	Disadvantaged Domain						No. of domains disadvantaged
		Education	Employment	Health	Water & Sanitation	Housing	Assets	
1	16.0							0
2	6.1		o					1
3	4.7					o		1
4	4.4	o	o		o	o	o	5
5	4.1						o	1
6	4.1				o			1
7	4.0				o	o	o	3
8	3.5		o		o	o	o	4
9	3.4				o	o		2
10	3.2	o			o	o	o	4
11	2.9					o	o	2
12	2.6	o						1
13	2.6		o			o		2
14	2.5		o			o	o	3
15	2.1		o				o	2
16	2.1		o		o	o		3
17	2.0	o	o					2
18	1.9	o	o			o	o	4
19	1.8		o		o			2
20	1.6	o	o		o	o		4
21	1.3				o		o	2
22	1.2	o			o	o		3
23	1.2	o	o			o		3
24	1.2	o	o	o	o	o	o	6
25	1.2	o				o	o	3
26	1.1	o			o			2
27	1.1			o				1
28	1.0	o				o		2
29	1.0	o	o		o			3
30	0.9	o	o				o	3
31	0.9	o					o	2
32	0.8		o		o		o	3
33	0.8	o		o	o	o	o	5

Rank	% of population	Disadvantaged Domain						No. of domains disadvantaged
		Education	Employment	Health	Water & Sanitation	Housing	Assets	
34	0.7	o	o		o		o	4
35	0.7	o			o		o	3
36	0.7		o	o	o	o	o	5
37	0.7			o	o	o	o	4
38	0.7		o	o				2
39	0.5			o		o		2
40	0.5			o	o	o		3
41	0.4			o	o			2
42	0.4	o	o	o		o	o	5
43	0.4		o	o		o	o	4
44	0.4			o		o	o	3
45	0.4	o	o	o	o	o		5
46	0.3		o	o		o		3
47	0.3		o	o	o	o		4
48	0.3			o			o	2
49	0.3	o		o				2
50	0.3	o	o	o				3
51	0.3	o		o	o	o		4
52	0.3		o	o			o	3
53	0.2		o	o	o			3
54	0.2	o	o	o		o		4
55	0.2	o		o		o	o	4
56	0.2	o	o	o	o			4
57	0.2	o		o	o			3
58	0.2			o	o		o	3
59	0.2	o	o	o	o		o	5
60	0.2	o	o	o			o	4
61	0.2	o		o		o		3
62	0.1	o		o	o		o	4
63	0.1	o		o			o	3
64	0.1		o	o	o		o	4
Total	100.0							

The first row of Table 4.2 shows what is already noted above, that 16 percent of the population is not disadvantaged in any domain. The remaining 63 rows show all possible combinations of disadvantages by domain for the 84 percent of the population who are disadvantaged in at least one domain. We focus on the top ten combinations. Several features of this top ten list are notable:

- These top ten combinations account for 43 percent of the population and 51 percent of the total disadvantaged population.
- Single domain disadvantage is frequent, with 23 percent of the population experiencing a disadvantage in a single domain. Four of the top 10 involve a single domain disadvantage – for employment (row 2), for housing (row 3), for assets (row 5) and for water and sanitation (row 6).
- However, 61 percent of the population lives in a household with disadvantage in more than one domain. Six of the top 10 combinations involve multiple disadvantage: two cases with 2-domain disadvantage, one case with 3-domain disadvantage, two cases with 4-domain disadvantage and one case with 5-domain disadvantage.
- The 5-domain case (all domains except for health) is the third most common combination with disadvantage.
- Combinations involving disadvantage in water and sanitation, housing and assets appear frequently amongst the top 10.

Two messages can be taken from this analysis. First, multiple disadvantage is not an exception but indeed the more common reality for those with a disadvantage. Second, such analysis has obvious implications for where to target efforts for addressing disadvantage. The top 10 list already accounts for more than half of all those with at least one disadvantage.

Table 4.3 | Regional population distribution of the top 10 common combinations of disadvantage by domain, by urban/rural and State/Region

	% of population	Disadvantaged Domain						# of disadvantage	% share (U/R)		% Share of population with disadvantage by State/Region (union=100)														
		Education	Employment	Health	Water & sanitation	Housing	Assets		Urban	Rural	Kachin	Kayah	Kayin	Chin	Sagaing	Tanintharyi	Bago	Magway	Mandalay	Mon	Rakhine	Yangon	Shan	Ayeyawady	Nay Pyi Taw
1	6.1		o					1	52.1	47.9	3.7	0.6	2.6	0.7	10.6	1.5	10.3	6.9	17.2	5.8	0.9	21.3	8.9	5.9	3.1
2	4.7					o		1	22.9	77.1	4.8	0.3	2.5	0.4	17.8	4.6	10.9	10.2	17.6	3.7	3.0	5.2	3.8	12.5	2.7
3	4.4	o	o		o	o	o	5	7.0	93.0	0.7	0.3	5.7	0.4	6.8	3.4	11.3	5.8	6.1	4.9	12.5	7.4	15.1	18.7	1.1
4	4.1						o	1	61.2	38.8	1.6	0.5	1.8	2.8	7.2	1.5	5.7	6.0	9.5	2.5	1.0	46.4	6.8	3.8	3.1
5	4.1				o			1	23.6	76.4	3.1	1.0	1.6	0.3	11.7	1.2	11.1	12.0	10.7	2.7	2.2	13.6	14.3	13.2	1.1
6	4.0				o	o	o	3	8.3	91.7	2.9	0.5	3.0	1.6	10.0	5.6	7.5	7.0	6.1	2.9	15.5	7.1	5.6	23.6	1.0
7	3.5		o		o	o	o	4	8.3	91.7	1.3	0.3	2.5	0.5	8.8	4.5	10.8	7.3	7.0	3.5	15.3	8.6	3.3	24.9	1.4
8	3.4				o	o		2	8.9	91.1	3.2	0.3	2.3	0.2	13.6	4.7	8.5	8.5	9.1	3.7	6.4	8.0	5.0	25.6	1.0
9	3.2	o			o	o	o	4	6.4	93.6	1.3	0.6	7.5	1.4	6.8	4.2	6.6	4.1	4.3	4.2	11.6	5.1	27.0	14.3	0.8
10	2.9					o	o	2	19.8	80.2	3.9	0.6	2.6	1.8	14.7	4.5	12.2	9.2	11.1	3.2	3.9	9.5	4.2	15.1	3.4

Note: Top 3 state/region with highest population shares in each category are highlighted in yellow.

It's possible to examine where those with the most common disadvantages are located. This distribution is shown in Table 4.3 several combinations of disadvantages are predominantly rural, there are others relating to employment (row 1) and assets (row 4) that are mostly urban. The distribution of the population in the top 10 disadvantage categories across the states and regions is further varied. These regional differences in these common disadvantages are also presented in separate urban and rural tables (Table 4.4). In addition to the 30 percent of the urban population that are free of any disadvantages (Figure 4.4), one third (33.1 percent) of urban people have a disadvantage in only a single domain. The top 10 most common combinations of disadvantage seen in urban areas are in one or two domains. By contrast, rural residents are more likely to suffer from multiple disadvantages. The most common disadvantages in rural areas come from 5 multiple disadvantages (5.8 percent of rural population). Out of the top 10 most common combinations, 5 are from more than 3 domain disadvantages. Such information on the location of those with the most common combinations of disadvantage and regional diversity in disadvantaged domains can facilitate efforts to reach them with a clearer indication of the domains in which more support is needed.

Table 4.4 | **Top 10 most common combinations of disadvantage by domain in urban and rural**

(a) Urban

Rank	% of urban population	Disadvantaged Domain						No. of disadvantaged domains
		Education	Employment	Health	Water & Sanitation	Housing	Assets	
1	11.0		o					1
2	8.8						o	1
3	4.6	o						1
4	4.3		o				o	2
5	3.7					o		1
6	3.3				o			1
7	3.2	o	o					2
8	2.0					o	o	2
9	1.9		o			o		2
10	1.6			o				1

(b) Rural

Rank	% of rural population	Disadvantaged Domain						No. of disadvantaged domains
		Education	Employment	Health	Water & Sanitation	Housing	Assets	
1	5.8	o	o		o	o	o	5
2	5.2				o	o	o	3
3	5.1					o		1
4	4.5		o		o	o	o	4
5	4.4				o			1
6	4.4				o	o		2
7	4.2	o			o	o	o	4
8	4.1		o					1
9	3.3					o	o	2
10	2.9		o			o		2

CHAPTER 5

MULTIDIMENSIONAL DISADVANTAGE INDEX IN MYANMAR

A primary and distinguishing motivation for undertaking multidimensional welfare analysis is to gain a better understanding of the multiplicity of disadvantages faced by certain sections of the population. Chapter 4 showed that *multiple rather than individual disadvantage* is the common face of disadvantage in Myanmar, not dissimilar to the experience in other countries. It is however also notable that the analysis of the most common disadvantages in Chapter 4 was presented at the level of the six domains, and not at the level of the indicators. The omission of indicator-level analysis is not inadvertent. The key issue is that when working with 14 indicators, the "curse of dimensionality" kicks in: the number of possible combinations increases exponentially with the number of indicators. With the 14 selected indicators, as many as 14,271 distinct combinations of disadvantage can be identified in the Census data! There is no meaningful way to present and comprehend information at this level of detail. Thus, it is necessary to find plausible ways of summarizing and aggregating the huge array of information on disadvantage – a task that this Chapter turns to.

In this chapter, in order to summarize and aggregate information on disadvantages across indicators and individuals, we need to introduce a set of weights for different indicators, and aggregate measures of disadvantage that satisfy a set of desirable properties. The conceptual framework in Chapter 2 already discussed the key issues in relation to weights and aggregation. This chapter now applies that framework to construct Multidimensional Disadvantage Indices (MDI) for Myanmar.

5.1. Weight applied for MDI

As discussed in Chapter 2, there are several weighting schemes to be considered for multidimensional welfare measures. This Chapter will present Myanmar MDI using the nested uniform weights.

The nested uniform (NU) weighting scheme assigns equal weights to all domains as well as equal weights to all indicators within a domain. Thus, for the six domains identified and introduced in Chapter 3, each domain carries a weight of 1/6th, while the indicators carry a weight of either 1/12th if there are two indicators in a particular domain or a weight of 1/18th when there are three indicators in a domain. The nested uniform weights for each indicator and domain are shown in column 3 of Table 5.1. Note that the NU weights are not data-based and are fully determined by the number of domains and the number of indicators within each domain.

Table 5.1 | **Weights for domains and indicators**

Domain	Indicator	Nested Uniform Weight (NU)
Education	Literacy	1/18 (0.056)
	Primary education	1/18 (0.056)
	School attendance	1/18 (0.056)
	Total Education	**1/6 (0.167)**
Employment	Unemployment	1/18 (0.056)
	Casual employment	1/18 (0.056)
	Child work	1/18 (0.056)
	Total Employment	**1/6 (0.167)**
Health	Disability	1/12 (0.083)
	Mortality	1/12 (0.083)
	Total Health	**1/6 (0.167)**
Water and Sanitation	Drinking water	1/12 (0.083)
	Sanitation	1/12 (0.083)
	Total Water and Sanitation	**1/6 (0.167)**
Housing	Dwelling	1/12 (0.083)
	Lighting	1/12 (0.083)
	Total Housing	**1/6 (0.167)**
Assets	Communication assets	1/12 (0.083)
	Mobility assets	1/12 (0.083)
	Total Assets	**1/6 (0.167)**
All indicators	**Total sum of weights**	**1.000**

The following two sections present the Multidimensional Disadvantage Indices for Myanmar. Section 5.3 presents the distribution-neutral MDI-1, while Section 5.4 presents the distribution-sensitive MDI-2. Both indices are presented using nested uniform weights at the national, rural and urban and states and regions levels.[12] The results using the nested inverse incidence weights are presented in Annex 6.

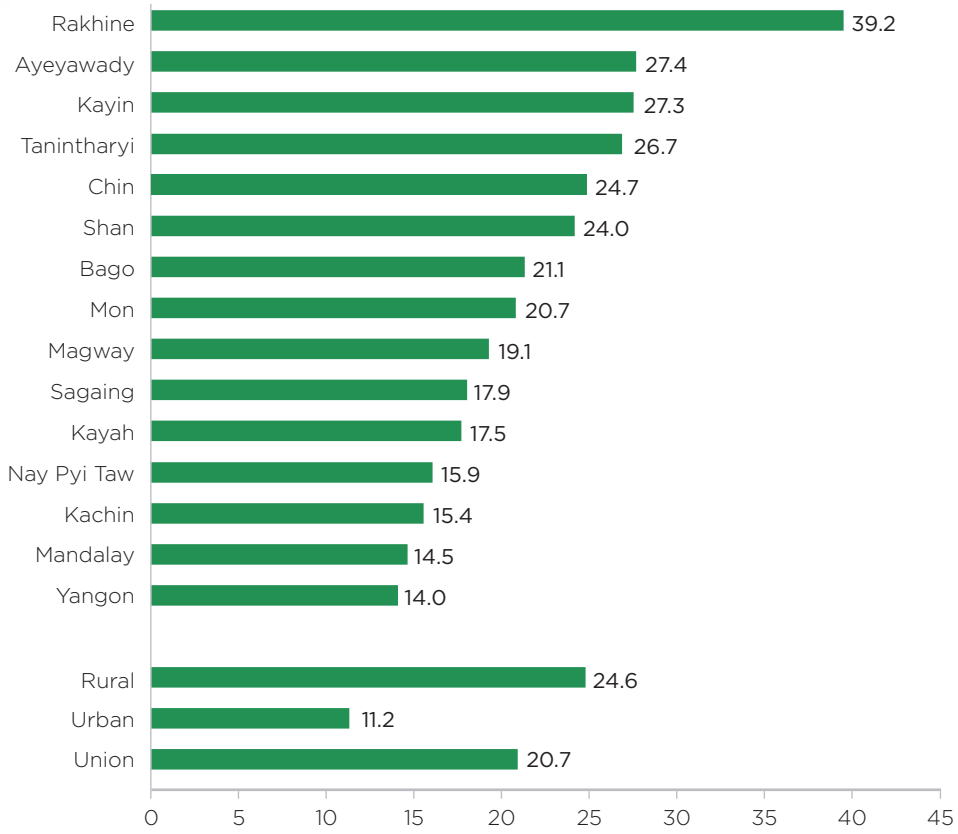
5.2. Myanmar Multidimensional Disadvantage Index: MDI-1

Myanmar's national MDI-1 is evaluated at 20.7 (Figure 5.1). This can be interpreted as an average person in Myanmar being disadvantaged in 20.7 percent of weighted indicators (where the average is formed over the whole population including both disadvantaged and non-disadvantaged individuals).[13] Relative to the union average, there are however large variations in MDI-1 across both urban and rural

12 Note that the indices are expressed in percentage form and lie within the interval (0, 100).
13 The non-disadvantaged individuals, by definition, are disadvantaged in 0% of weighted indicators.

areas, and across states and regions. The rural MDI-1 (at 24.6) is more than twice as high as the urban MDI-1 (at 11.2). Multidimensional disadvantage is highest in Rakhine with an MDI-1 of 39.2 and lowest in Yangon with an MDI-1 of 14.0. Other high-MDI states and regions are Ayeyawady, Kayin, Tanintharyi, Chin and Shan, while Mandalay, Kachin and Nay Pyi Taw are some of the low-MDI regions.

Figure 5.1 | Multidimensional Disadvantage Index – MDI-1



MDI-1 can also be written as:

$$\text{MDI-1} = H \times A \qquad (1)$$

where:

H = percentage of population living in households with a disadvantage (i.e. disadvantaged in any indicator), and

A = average intensity of disadvantage among those having a disadvantage, given by the average fraction of weighted indicators amongst the disadvantaged population.

Table 5.2 shows the breakdown of MDI-1 into these two components. While 84 percent of the national population has a disadvantage in any indicator, on average they are disadvantaged in a quarter of the indicators. Similarly, the table shows that the much higher MDI-1 for rural areas (more than twice the urban MDI-1) partly reflects the higher proportion of the rural population with a disadvantage, but also captures the higher average intensity of disadvantage in rural areas. Among those with at least one disadvantage, those in rural areas are disadvantaged 27 percent of indicators compared to those in urban areas who are, on average, disadvantaged in 16 percent of indicators. Average intensity of disadvantage amongst those with at least one disadvantage is the highest in Rakhine at 41 percent and the lowest in Yangon at 18 percent.

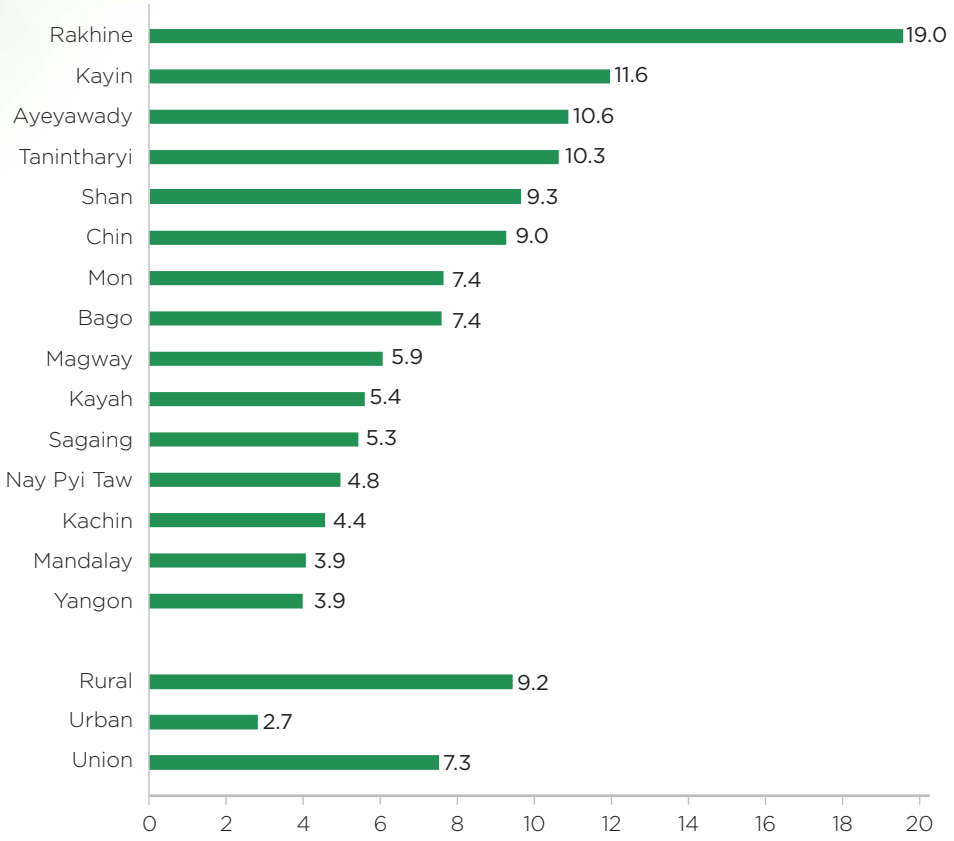
Table 5.2 **Percentage of population living in households with at least one disadvantage, average intensity of disadvantage and MDI-1**

	% of population with at least one disadvantage (H)	Average intensity of disadvantage (A)	MDI-1 [H x A]
Union	84.0	0.25	20.7
Urban	70.5	0.16	11.2
Rural	89.5	0.27	24.6
Kachin	77.4	0.20	15.4
Kayah	80.7	0.22	17.5
Kayin	88.7	0.31	27.3
Chin	90.9	0.27	24.7
Sagaing	84.4	0.21	17.9
Tanintharyi	91.2	0.29	26.7
Bago	84.4	0.25	21.1
Magway	85.3	0.22	19.1
Mandalay	76.6	0.19	14.5
Mon	83.4	0.25	20.7
Rakhine	96.3	0.41	39.2
Yangon	77.0	0.18	14.0
Shan	86.3	0.28	24.0
Ayeyawady	91.7	0.30	27.4
Nay Pyi Taw	76.1	0.21	15.9

5.3. Myanmar Multidimensional Disadvantage Index: MDI-2

The distribution-sensitive Multidimensional Disadvantage Indices, MDI-2, are shown in Figure 5.2. The overall national MDI-2 for Myanmar is evaluated at 7.3 using nested uniform weights. Like MDI-1, there is a lot of sub-national variation in MDI-2. Rural areas have a MDI-2 (9.2) that is more than three times higher than that in urban areas (2.7) (Figure 5.2). There are also large variations across states and regions, ranging from the lowest MDI-2 of 3.9 for Yangon and Mandalay to the highest MDI-2 of 19 for Rakhine.

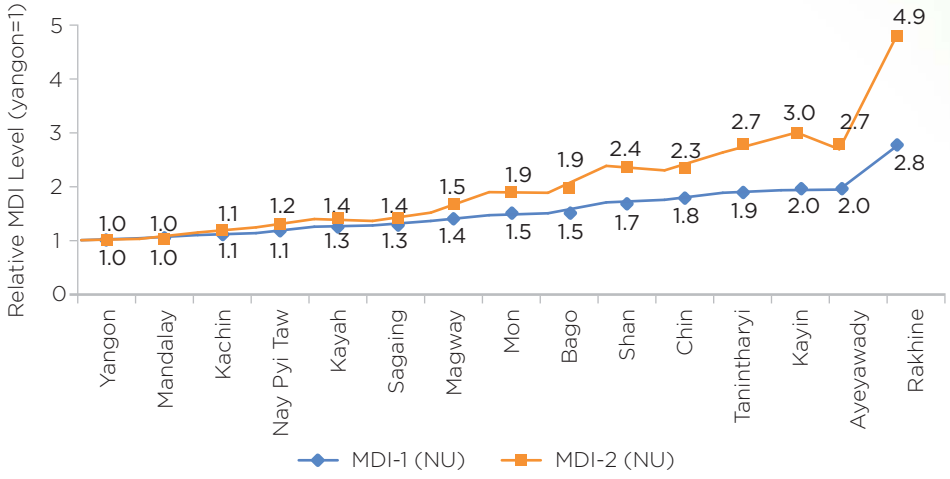
Figure 5.2 | Multidimensional Disadvantage Index – MDI-2



Comparing Figure 5.1 and Figure 5.2, it is notable that the ranking of states and regions by MDI-1 and MDI-2 is quite similar. These results thus suggest a high degree of robustness of regional rankings of multidimensional disadvantage with respect to the considered choices for aggregation.

The values of MDI-1 and MDI-2 cannot however be directly compared. The distinctive value of using MDI-2 can be appreciated and illustrated by considering the relative regional dispersions of MDI-1 and MDI-2. Figure 5.3 plots the Multidimensional Disadvantage Indices for each state and region as a ratio of the Multidimensional Disadvantage Index for Yangon which has the lowest MDI; this is done separately for MDI-1 and MDI-2. The figure shows that the spread of MDIs is much narrower with MDI-1 than with MDI-2. Thus, the state with the highest prevalence and intensity of disadvantages - Rakhine - is 2.8 times more disadvantaged than Yangon using MDI-1, but using MDI-2 it is nearly 5 times more disadvantaged. This is because MDI-2 gives greater weight to multiple disadvantages, which are significantly more frequent in Rakhine than in Yangon.

Figure 5.3 | Relative levels of Multidimensional Disadvantage Indices among State/Region



Note: The figures show relative levels of Multidimensional Disadvantage Indices (MDI-1 and MDI-2 measures) for state/region relative to Yangon. Each state/region MDI was divided by MDI of Yangon.

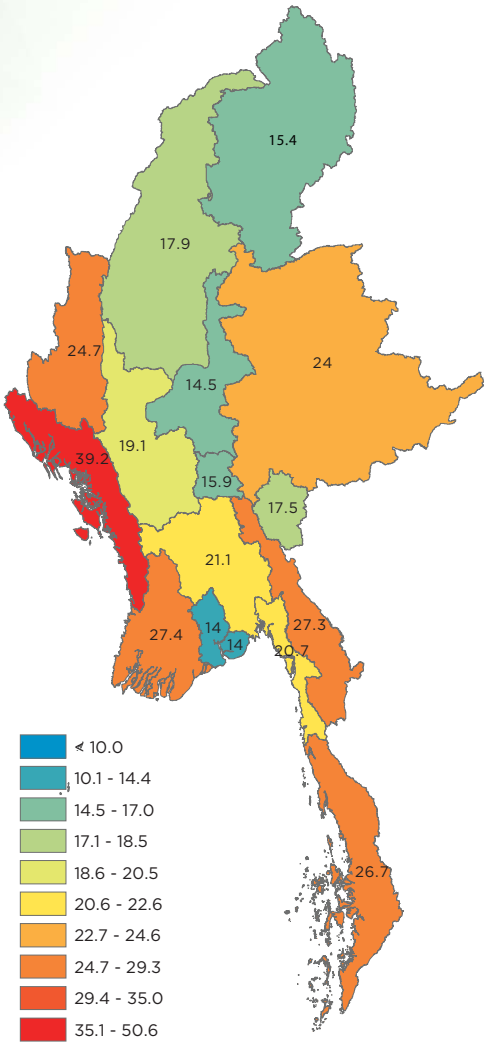
In general, distribution-neutral measures such as MDI-1 tend to compress the multidimensional disadvantage profile, while measures like MDI-2 alert us to the much greater disadvantage of areas or groups afflicted with multiple disadvantage. The MDI-2 measure thus has significant implications for the targeting of policies.

5.4. Myanmar Multidimensional Disadvantage Index: Township-level picture

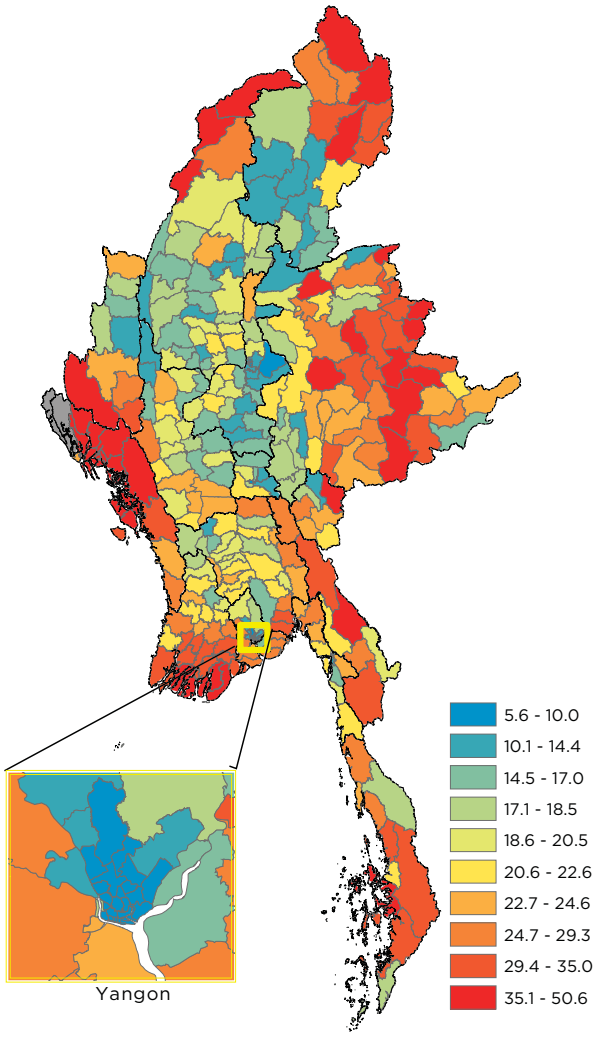
As discussed in the previous sections, spatial diversity of disadvantage is widely seen in Myanmar. This is not only a phenomenon among states and regions but also across townships. Figure 5.4 visualizes these variations in MDI-1 using maps at the state and region (panel (a)) and township level (panel (b)). From these maps, it is easy to see regional difference across townships even within the same state or region. For instance, Kachin and Sagaing are relatively better off at the state-level MDI but northern townships in both states are among the most disadvantaged areas in the nation. Similar observations can be made in Chin state whose southern townships facing Rakhine are much more disadvantaged than its northern townships. By contrast, while Yangon has the lowest MDI in Myanmar, there is a clear difference in the level of the MDI between urban Yangon and the rural townships located close to Ayeyawady. Using Census data, Myanmar's MDI results can be further spatially disaggregated into lower geospatial administrative levels (i.e. wards and village tracts).

Figure 5.4 | MDI-1 at State/Region and Township-level (Nested Uniform Weights)

(a) MDI-1 at State/Region level



(b) MDI-1 at Township-level



Note: Mapping colors are based on township-level MDI decile thresholds. Due to the limited number of enumerated population, three townships in Northern Rakhine (Maungtaw, Buthidaung, Yethedaung) are highlighted in gray.

5.5. Which domains and indicators contribute most to multidimensional disadvantage?

It is possible to evaluate in the contribution of each indicator or domain to the overall disadvantage measure.

The contribution of an indicator or domain to the aggregate MDI depends on three factors:

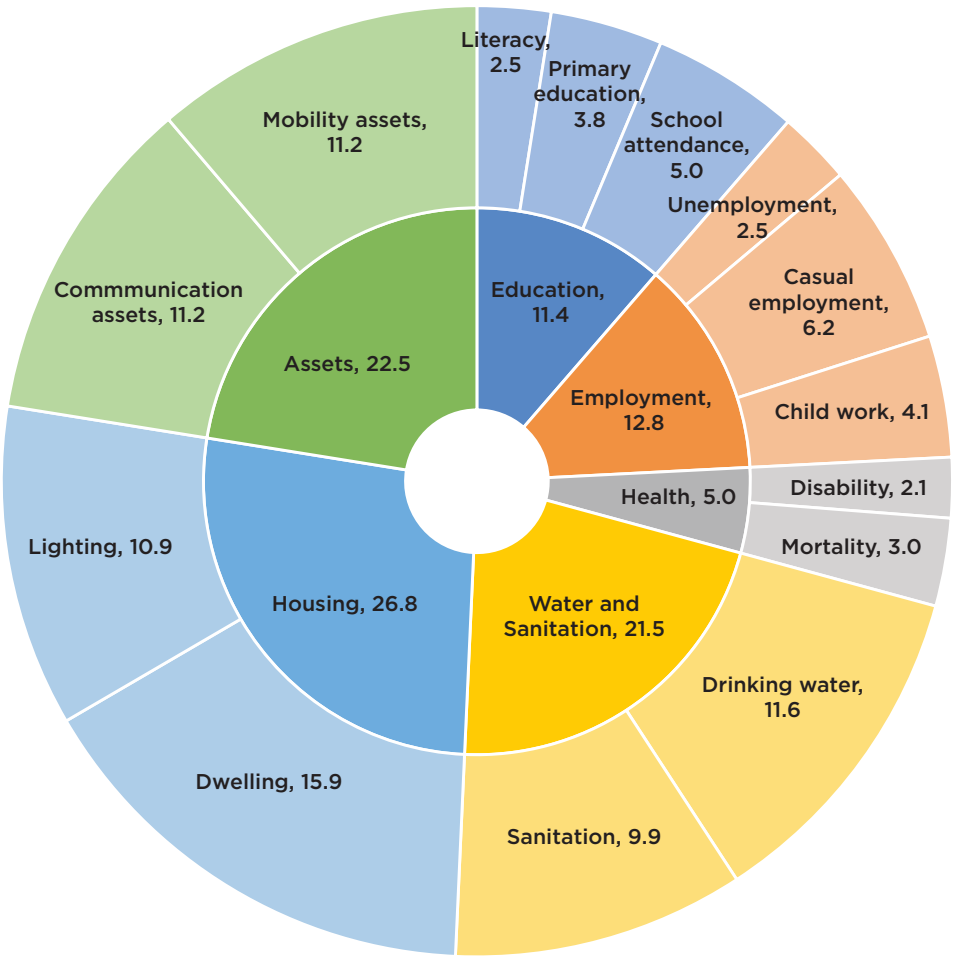
(i) the weight assigned to that indicator or domain;

(ii) the disadvantage rate or prevalence for that indicator or domain, and

(iii) how disadvantage in that indicator or domain overlaps with disadvantage in other indicators or domains across the population.

Figure 5.5 shows the contributions at the indicator or domain level to the union MDI-1.

Figure 5.5 | Contribution of each domain and indicator to MDI-1 at the union level



The national picture

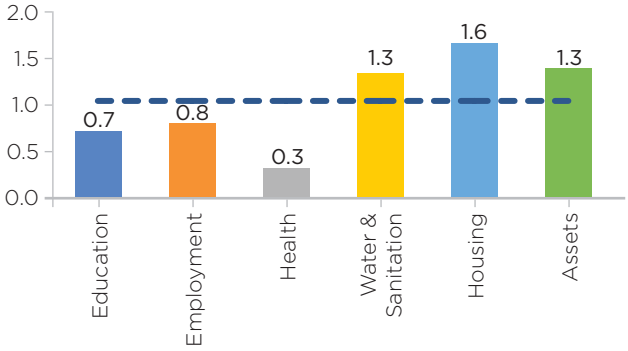
Looking first at the domain level, housing is the largest contributor to overall disadvantage: it accounts for over a quarter (27 percent) of the aggregate MDI-1. Water & sanitation and assets are the other two important contributors, each accounting for a little over one-fifth of MDI-1. These three domains together account for about 70 percent of the national MDI-1. The education and employment domains each contribute between 11-13 percent. The health domain contributes the least: 5 percent.

At the indicator level, the largest contributor is a household's dwelling, which accounts for about 16 percent of overall disadvantage. This is followed by five indicators with similar contributions of about 10-12 percent each. These five indicators are drinking water, sanitation, lighting, communication and mobility assets. These top six of the 14 indicators encompass the top three domains and thus account for 70 percent of overall disadvantage. At the other end, the indicators contributing less than 5 percent each are literacy, primary education, unemployment, child work, disability and mortality.

As noted above, indicator or domain contributions to MDI in part simply reflect their weights. For instance, with the nested uniform weighting, sanitation has a weight of 1/12th (8.3 percent) while casual employment has a weight of 1/18th (5.6 percent). So, other things being equal, on the strength of its higher weight, sanitation could be expected to contribute more to the aggregate MDI than casual employment. Thus, it is also instructive to look at contributions of each domain and indicator relative to their weights. This is shown in Figure 5.6.

Figure 5.6 | Contribution of each domain and indicator to MDI-1 relative to its weight (Union)

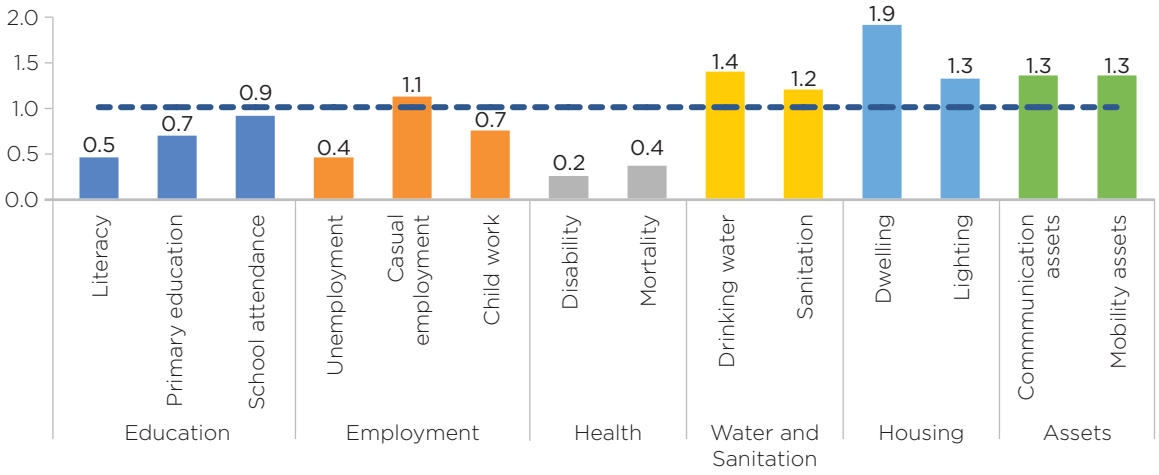
(a) By Domain



Note: Greater than 1.0 implies the domain or indicator is more contributed to MDI relative to its weight

Less than 1.0 means the domain or indicator is less contributed to MDI relative to its weight.

(b) By Indicator



Note: The figures are calculated by dividing contribution factor of each indicator or domain (in Figure 5.5) by its assigned weight (in Table 5.1).

Several interesting features of contributions of domains or indicators are notable from Figure 5.6.

- There are three domains that contribute more to national MDI-1 than their domain weights: water and sanitation; housing; and assets.
- The remaining three domains of education, employment and health contribute less than their domain weights.
- Contribution relative to weight is the highest for the housing domain (60 percent higher contribution relative to weight) and the lowest for the health domain (70 percent lower contribution relative to weight).
- Amongst indicators, the ones that contribute above their weight include: casual employment, drinking water, sanitation, communication and mobility assets. The remaining indicators – all education and health indicators, and two of the employment indicators relating to unemployment and child work - contribute below their weight.
- Contribution relative to weight is the highest for the dwelling indicator at about double its weight, and it is lowest for the disability indicator at about 20 percent of its weight.

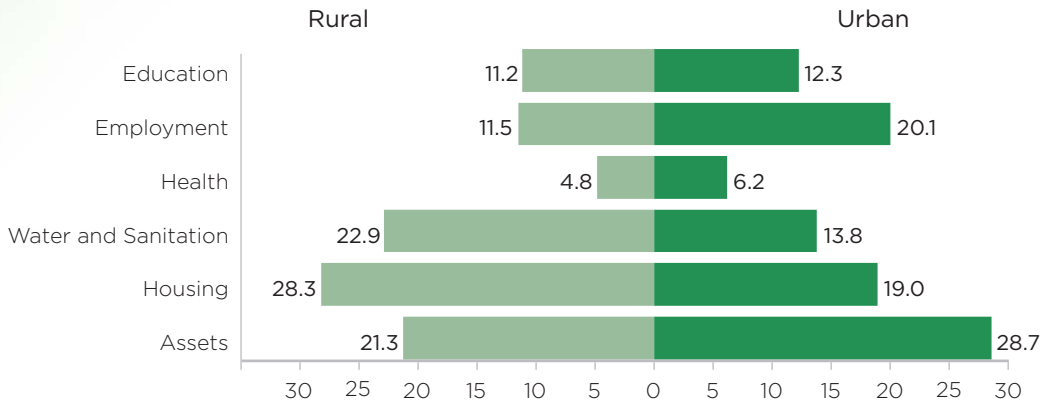
These results demonstrate that, while domain and indicator-level weights are important, one cannot simply guess their contributions to overall disadvantage from these weights.

Rural-urban contrast

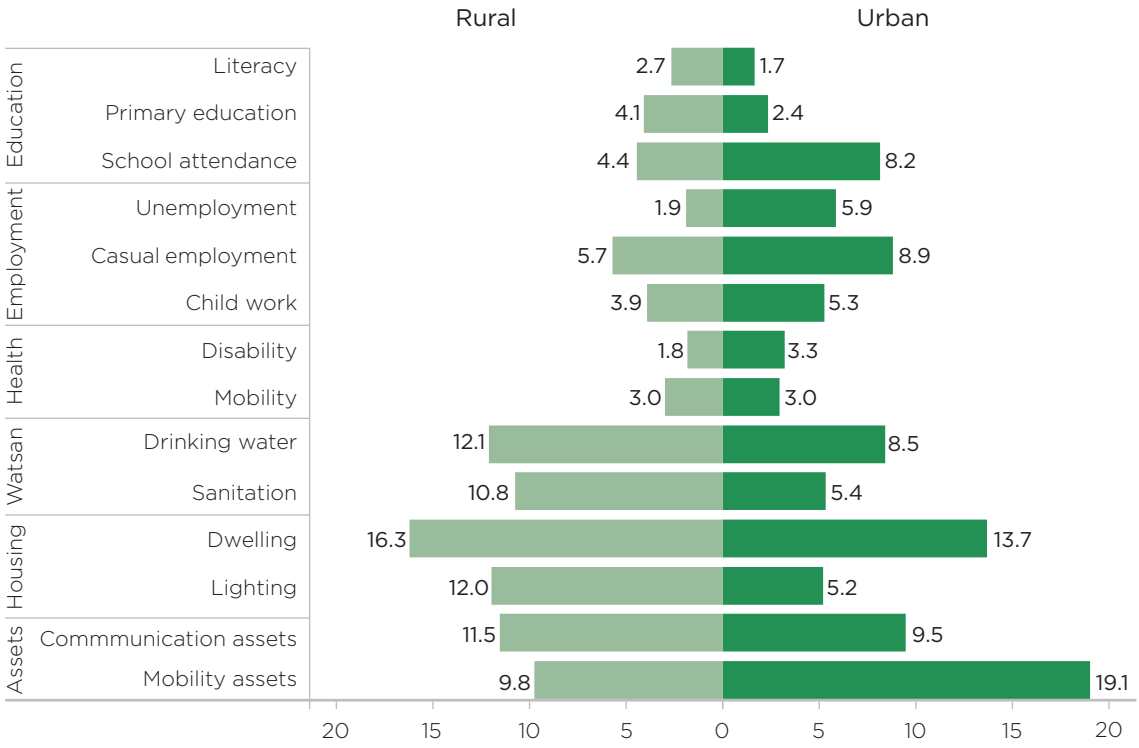
Dimensional contributions to disadvantage display a picture of significant contrasts across rural and urban areas. Figure 5.7 presents this urban to rural variation. Note that we are looking here at the percentage contributions of different domains and indicators to rural and urban MDI-1 respectively, abstracting from the difference in the levels of rural and urban MDI-1.

Figure 5.7 | Contribution of each domain and indicator to Urban and Rural MDI-1

(a) By Domain



(b) By Indicator



There are several notable points of difference across urban and rural areas.

- An important contrast is with respect to the employment domain. Its contribution to overall disadvantage in urban areas is nearly twice as high as that in rural areas. The urban contribution of unemployment and casual employment are larger than their corresponding rural contributions.

- The domain of assets also makes a larger contribution to disadvantage in urban areas than in rural areas. There is an interesting contrast between communication and mobility assets. The contribution of communication assets to MDI-1 is in fact lower in urban areas reflecting their greater urban spread. By contrast, the contribution of mobility assets in urban areas is about double of that in rural areas. This should however should be interpreted with caution. It does

not imply that the urban population is more disadvantaged in mobility assets. The prevalence rates for the lack of mobility assets are 26 and 29 percent respectively in urban and rural areas. Rather, the higher urban contribution of mobility assets reflects the fact that urban areas are even more privileged (than rural areas) in terms of their other indicators, and thus the smaller urban advantage in mobility assets constitutes a relatively larger urban disadvantage.

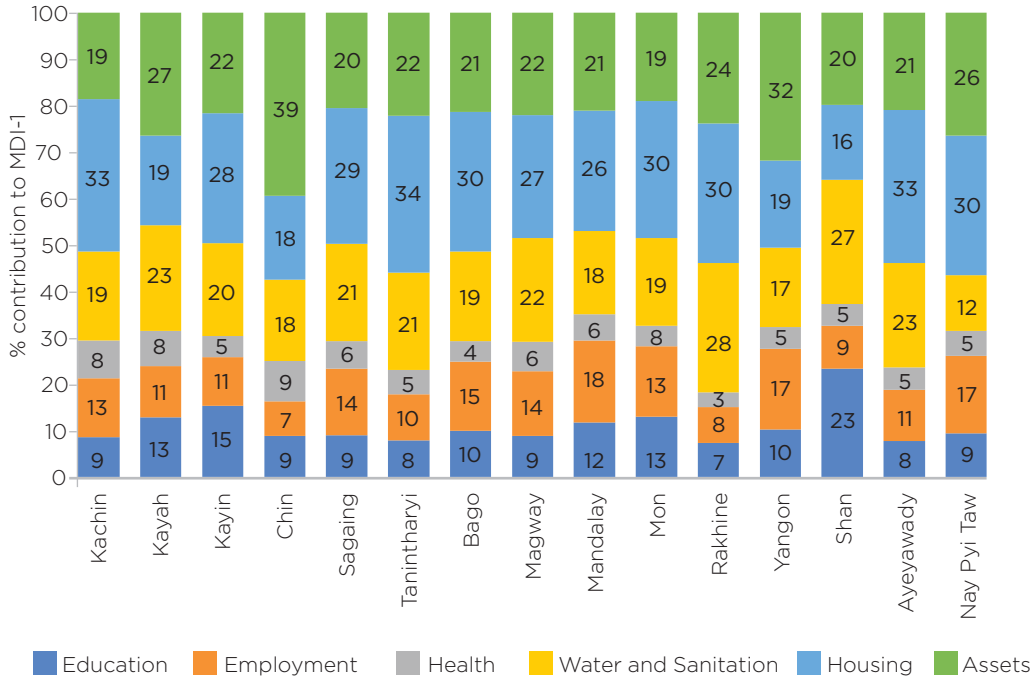
- On the other hand, the contribution of the water and sanitation domain in rural areas is almost double that in urban areas. Contributions of both drinking water and sanitation in rural areas are substantially higher.
- The housing domain too makes a larger contribution to rural disadvantages than it does to urban disadvantages. The difference is especially striking for lighting, with a 5 percent urban contribution versus a 12 percent rural contribution.
- Finally, the contribution of the education domain is comparable across the two areas. Within the domain however there is a notable contrast at the indicator level, notably while the contributions of literacy and primary education are higher for rural areas, the reverse is true for school attendance whose contribution to urban MDI-1 is much higher than its contribution to the rural MDI-1. Again, this should not be interpreted to imply an absolute urban disadvantage in school attendance but a relative one.

Overall, these results point to the diverse nature of disadvantage challenges in rural and urban areas.

Regional variations

Not surprisingly, there are significant variations in dimensional contributions at the state and region level too. The contributions of the six domains to state/region-level MDI-1 are shown in Figure 5.8, while the respective contributions of the 14 indicators are shown in Table 5.3.

Figure 5.8 | Contribution of each domain to MDI-1 at State/Region level



Without going into a detailed description of these results, we can refer to a few examples from Figure 5.8 that highlight regional diversity in contributions at the domain level:

- In contrast to its small contribution in other regions, the education domain turns out to be very important in Shan, contributing about a quarter of the region's overall disadvantage.
- The contribution of water and sanitation is large in both Rakhine and Shan relative to other regions.
- Housing makes a relatively small contribution to overall disadvantage in Kayah, Chin, Yangon and Shan, relative to its high contribution in all other regions.
- In contrast to almost every other region, assets make a huge contribution to Chin's MDI-1 (of nearly 40 percent). The contribution of assets is also large for Yangon (32 percent).

Table 5.3 | Contribution of each indicator to MDI-1 for each State/Region

State/ Region	Literacy	Primary education	School attendance	Unemployment	Casual employment	Child work	Disability	Mortality	Drinking water	Sanitation	Dwelling	Lighting	Communication assets	Mobility assets
Kachin	1.8	1.9	4.8	3.7	4.6	4.3	3.1	5.1	11.9	7.3	17.0	15.8	11.1	7.6
Kayah	4.5	3.4	4.9	2.4	2.8	5.7	2.9	4.7	18.0	4.9	7.7	11.5	14.8	11.7
Kayin	5.0	5.1	5.2	2.7	4.9	2.9	2.1	2.4	10.7	9.3	11.2	16.9	11.9	9.8
Chin	3.3	2.1	3.4	2.8	2.4	2.3	3.9	4.7	9.6	7.9	6.9	11.2	18.9	20.5
Sagaing	1.3	2.5	5.1	2.9	6.1	5.4	2.2	3.8	8.2	12.7	21.8	7.5	13.5	7.0
Tanintharyi	1.2	2.5	4.1	2.2	4.6	3.1	2.3	3.0	10.7	10.2	21.8	12.0	10.0	12.2
Bago	1.2	3.9	4.7	2.6	8.4	3.9	1.7	2.7	9.8	9.5	16.0	14.1	11.7	9.7
Magway	1.6	3.0	4.2	2.4	7.3	4.2	2.4	4.0	9.3	13.0	17.2	9.4	11.9	10.1
Mandalay	1.6	3.7	6.4	3.1	8.6	6.0	2.3	3.3	7.2	10.8	18.4	7.5	11.9	9.2
Mon	3.0	4.1	5.8	3.5	8.1	3.7	2.4	2.0	10.9	8.0	16.0	13.6	9.2	9.8
Rakhine	1.8	2.6	2.8	2.4	4.0	1.3	1.4	1.9	13.4	14.4	15.2	14.9	11.4	12.4
Yangon	0.9	2.5	6.7	4.2	8.3	4.8	2.4	2.3	12.3	4.8	11.9	6.8	9.2	22.7
Shan	8.2	8.3	6.7	1.4	2.4	5.5	1.6	3.0	14.4	12.4	9.2	6.9	11.2	8.5
Ayeyawady	1.1	2.9	3.7	1.5	6.5	3.0	2.0	2.8	15.3	7.3	19.3	13.6	10.1	10.9
Nay Pyi Taw	1.4	3.2	4.7	2.6	9.8	4.4	1.8	3.7	5.5	6.5	14.0	16.2	12.1	14.4

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ANNEXES

The Annexes provide a summary of the conceptual framework for multidimensional welfare measurement as well as greater geographically disaggregated details on the multidimensional disadvantage analysis provided in the report. Annex 1 illustrates the methodologies applied for the multidimensional welfare measurement. Annex 2 presents incidence of disadvantage at a state and region level by all 16 indicators and Annex3 shows the township-level spatial distribution of these results. Annex 4 then discusses about the geographical variations of housing materials in Myanmar. Annex 5 shows a fraction of population with any disadvantage by the township-level map and Annex 6 summarizes the results of MDI using the nested inverse incidence weights. Finally Annex 7 visualizes the township-level distribution of the MDI results.

Annex 1. Technical framework for Multidimensional Welfare Measurement

Annex 1 describes more details of methodologies applied for Myanmar Multidimensional Disadvantage Index as well as alternative approach for measuring multidimensional welfare.

Alternative approach for the aggregation

Once the domains and indicators have been determined, the next issue to consider is whether we need to aggregate disadvantage indicators across domains and individuals. Is it possible to just work with a dashboard of indicators (as for instance, suggested by Ravallion, 2011)? Under the **dashboard approach**, there is a dial for each indicator and the dials register the progress for different domains or indicators. The dashboard is very useful descriptive tool, and indeed the SDGs, and prior to them the Millennium Development Goals (MDGs), extensively used dashboards to monitor progress towards different goals. The main issue however is that each dial on the dashboard gives us a measure of disadvantage in a *single* indicator, though we are also interested in understanding the *overlap of disadvantages.* Individual dials cannot give us information on the pattern of overlap of disadvantages.

A similar problem also arises with **composite indices** such as the Human Development Index (HDI) or the Human Poverty Index (HPI). These indices are multidimensional, but they first aggregate over individuals to construct sub-indices for each indicator (often using different data sources for different indicators), and then aggregate the sub-indices across indicators. Thus, these indices also contain no information on the overlap or multiple disadvantages experienced by individuals. A greater or smaller overlap leaves the value of these indices unchanged.

It is also sometimes suggested that the dashboard approach could be supplemented with **cross-tabulations** or **Venn diagrams** to represent the joint distribution of indicators. However, this is where the *curse of dimensionality* kicks in. A 3 x 3 cross-tab is challenging enough to understand. Higher-order cross-tabs are virtually impossible to comprehend and form judgements on. The same applies to Venn diagrams too. Thus, when we are dealing with more than two or three indicators or domains, we need some way of summarizing and aggregating information on the joint distribution of disadvantages meaningfully. This is where the multidimensional welfare measurement comes in, as an approach to develop multidimensional disadvantage measures that satisfy a set of desirable properties and allow us to aggregate disadvantages across indicators and domains and across individuals systematically.

Weights

Weights are concerned with aggregation over indicators and domains. They specify the relative importance of different indicators and domains. How weights for different indicators or domains should be determined is a difficult and perhaps the most unsettled question in the measurement of multidimensional welfare.[14] The most commonly used approach is the "equal" weighting, or more precisely, the **nested uniform weights** approach. This is the method used in the global MPI as well as in most national MPIs. Under this approach, first, each of the domains is assigned an equal weight and then within each domain, all indicators are also assigned equal weights. For instance, the global MPI has three domains relating to education, health and the standard of living, and the education and health domains have two indicators each while the standard of living domain has six indicators. Thus, uniform nested weights for the global MPI accord a weight of one-third to each of the three domains, and the indicators for education and health have a weight of one-sixth each while each indicator for the standard of living has a weight of one-eighteenth.

Nested uniform weights are essentially normative and rather arbitrary in nature as they are driven only by the number of domains and the number of indicators within each domain. But they have the advantage of being very easy to implement and are very transparent and easy to understand.

There are also some data-based approaches to weighting. One of these is the **nested inverse incidence weighting** scheme, which uses the idea that the more commonly-observed disadvantages are less important than the more uncommon ones. Underlying this is the notion that most severe disadvantages are generally the first to be eliminated so that the incidence or prevalence rate for disadvantages in a particular indicator offers an indication of its relative importance; the lower (higher) the incidence, the higher (lower) its weight. Like the nested uniform weights, incidence weights could also nested, where first the weights for each domain are established as inversely proportional to the incidence of disadvantage in each domain. Then, in a second step, the weights for each indicator within a domain are determined as inversely proportional to the incidence of disadvantage in that indicator, such that the sum of the indicator weights within the domain equals the established weight for that domain.

Nested inverse incidence weights are less transparent than nested uniform weights, but have the advantage of being data-based and thus less arbitrary, and there is some intuition to the idea that the most severe disadvantages are relatively rarer. The data requirements for implementing nested inverse incidence weights are no more than what is required for a dashboard of indicators of disadvantage.[15]

Another data-based approach is that of **stated preference weights.** This approach directly relies on people's own views of the relative importance of different indicators. Thus, through a survey, the views of respondents could be elicited on their (importance) ranking of indicators or in binary terms of whether they consider a particular indicator as "a perceived necessity" or not. Weights for indicators can then be based on the proportion of population that considers an indicator to be a necessity, or the average rank of an indicator.

Stated preference weights have the merit of being based on people's preference in a transparent way, and thus also have a democratic appeal. The main issue is that we do need data on people's preferences which may not be readily available and a separate effort may have to be mounted to collect that information.[16]

14 For a review of different approaches to weighting, see Decanq and Lugo (2013).
15 For examples of the inverse incidence weights, see Desai and Shah (1988) and Cerioli and Zani (1990).
16 For examples of stated preference weights, see Guio et al. (2009); Bossert et al. (2013); Decanq et al. (2013).

Identification

Beyond the choice of indicators and their weights, the other important considerations in measuring multidimensional disadvantages have to do with the issues of identification and aggregation. The first has to do with how, given the multiplicity of indicators, should the multidimensionally-disadvantaged be identified, and the second has to do with how disadvantages across individuals and indicators and how domains are aggregated into an overall measure of multidimensional disadvantage.

Within the global MPI framework, following Alkire and Foster (2011), the multidimensionally disadvantaged (hereafter, MD-need) are identified by reference to a cross-dimensional cut-off specified in terms of the minimum number or percentage of (weighted) dimensions a person must be disadvantaged in for him/her to be considered MD-need. The cross-dimensional cut-off can range from the minimum weight of any domain or indicator to 100 percent. The former case is referred to as the "**union**" approach to identification, where a person is considered living with multidimensional disadvantage if disadvantaged in *any* domain or indicator; the latter is referred to as the "**intersection**" approach to identification, where a person is considered with multidimensional disadvantage if disadvantaged in *all* domains or indicators. There is of course a range of possible intermediate values of the cross-dimensional cut-off, and once a value is selected, the disadvantages of all those identified as MD-need are aggregated to derive an overall measure.

The global MPI sets the cross-dimensional cut-off at one-third of the weighted dimensions. However, there are some arguments for favoring the union approach. Note that the union approach effectively asserts that all disadvantages are essential, and therefore are worthy of being included into an overall measure of multidimensional disadvantage. However, the cross-dimensional cut-off forces the multidimensional disadvantage measure to neglect disadvantages of those deficient in fewer dimensions than the cut-off, no matter how large those disadvantages may be. Thus, a key advantage of the union approach is that it avoids the potentially large exclusion errors on account of not counting the disadvantages of those disadvantaged in fewer dimensions than the cross-dimensional cut-off.[17] The union approach also has the merit of ensuring that regressive transfers from a more to a less disadvantaged person increase the measure of multidimensional disadvantage.[18] In light of these arguments, this Report adopts the union approach to identification.

Aggregation

To present the aggregate measures of multidimensional disadvantage, it is useful to introduce some notation. Let Iij denote a binary (0-1) variable taking the value of 1 if individual i is disadvantaged in indicator j with weight wj among a total of d indicators and a population of size n. (The sum of weights wj over all d indicators adds up to 1.) Then, a general class of (distribution-sensitive) measures of multidimensional disadvantage, $M(\beta)$, can be defined as:

$$M(\beta) = \frac{1}{n}\sum_{i=1}^{n}\left(\sum_{j=1}^{d} w_j I_{ij}\right)^{\beta} \quad for \quad \beta \geq 1 \qquad (2)$$

where β is interpretable as a distribution-sensitivity parameter. The role of the parameter β is better explained by first considering a special case arises for $\beta=1$, when:

17 Such exclusion errors can be large indeed. Datt (2018) finds that using a cross-dimensional cut-off of one-third amounts to ignoring deprivations of 41% of the population and 22% of all deprivations in India.

18 This property is violated by measures that use non-union approaches to identification; see Datt (2018) for further discussion.

$$M(\beta = 1) = \frac{1}{n}\sum_{i=1}^{n}\sum_{j=1}^{d} w_j I_{ij} \qquad (3)$$

In this case, the multidimensional disadvantage index $M(\beta)$ is equivalent to the counting all the disadvantages of the population and expressing it as ratio of total number of possible disadvantages (when everyone is having a disadvantage in every indicator). However, this also alerts us to a potential issue with such counting measures with $\beta=1$. Since these measures aggregate disadvantages by simply summing them up, they depend only on the total number of disadvantages not their dispersion or concentration. Whether disadvantages evenly distributed or concentrated among a few, $M(\beta=1)$ returns the same value of multidimensional disadvantage. The insensitivity to the distribution of disadvantages in this case arises because the multiplicity of disadvantages for an individual is not accorded any particular significance, so that it does not matter how a given set of distributions are distributed across the population.

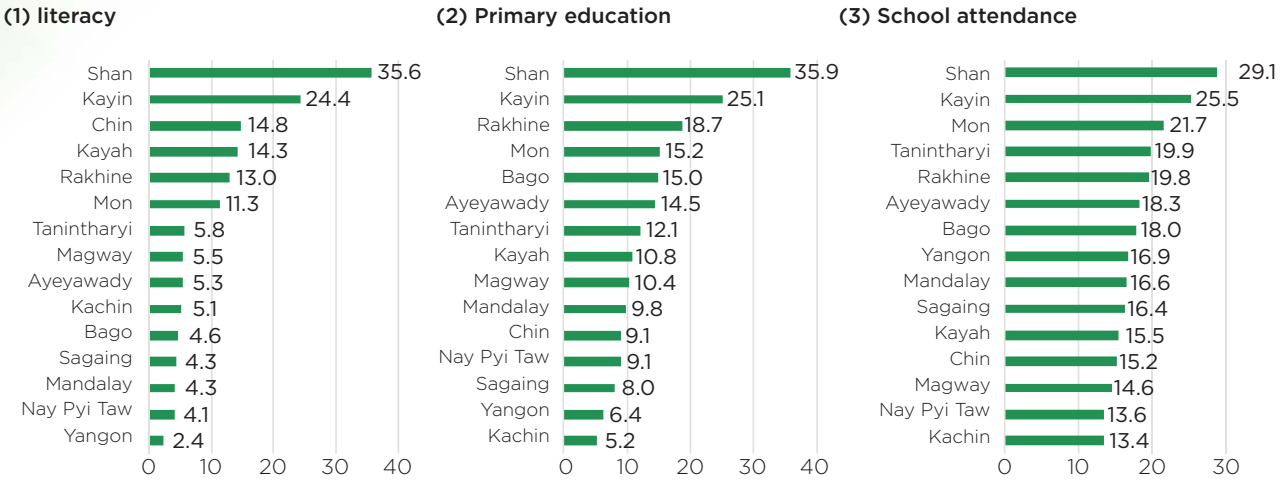
However, it is arguable that a given disadvantage is more burdensome for an individual if it is also accompanied by disadvantage in other indicators. For instance, the Commission on the Measurement of Economic Performance and Social Progress appointed by the former French President Nicholas Sarkozy noted that "...the consequences for quality of life of having multiple disadvantages far exceed the sum of their individual effects" (Stiglitz, Sen and Fitoussi, 2009). The key idea is that there can be important compounding negative effects of multiple disadvantages on individual welfare: the severity of the effects of an increase in disadvantage in any one indicator increases not only with the level of disadvantage in that indicator but also with the level of disadvantage in other indicators. While multidimensional disadvantage measures with $\beta=1$ allow for no such compounding effects of multiple disadvantages, the main rationale for measures with $\beta>1$ is that they do. The higher the value of β, the greater is the allowance for such compounding effects and the greater is the distribution-sensitivity of measures $M(\beta)$.

This Report presents multidimensional disadvantage indices (MDI) for Myanmar for $\beta=1$ and $\beta=2$. We refer to these two indices simply as MDI-1 and MDI-2.

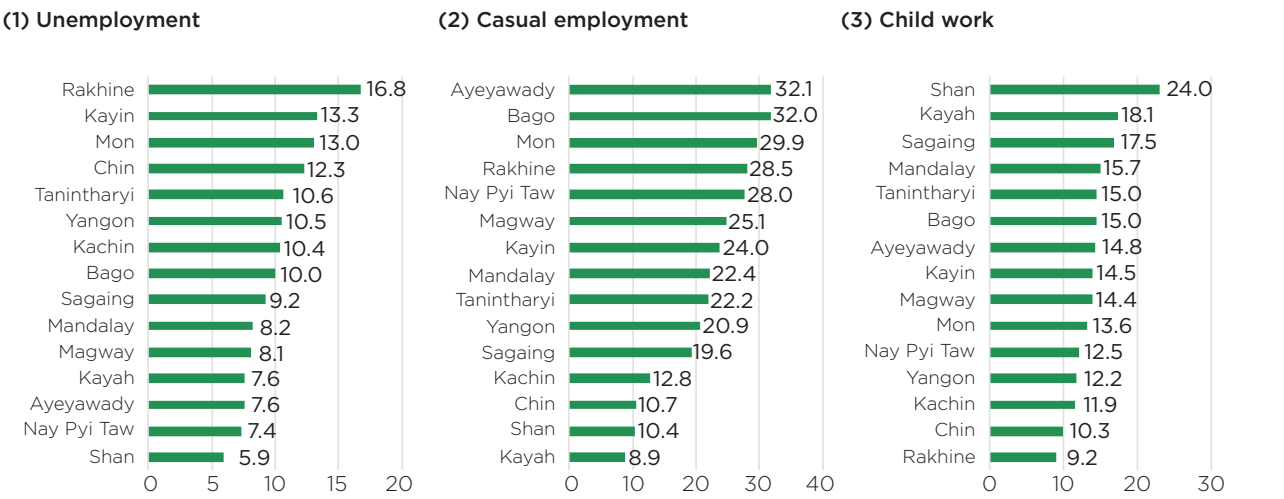
Annex 2. Incidence of Disadvantage at State/Region

Figure A 2-1 | Regional disadvantage rates by indicator

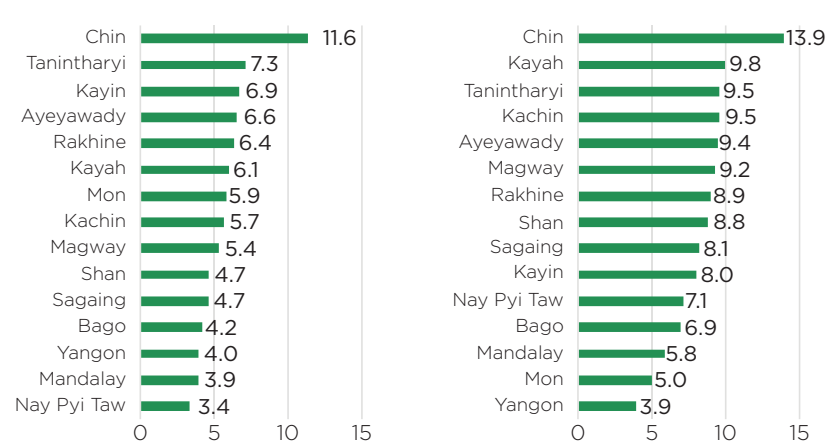
Education



Employment

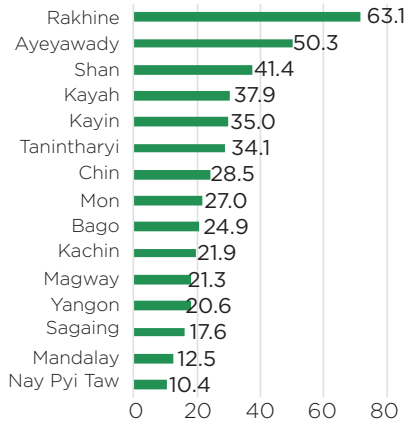


Health

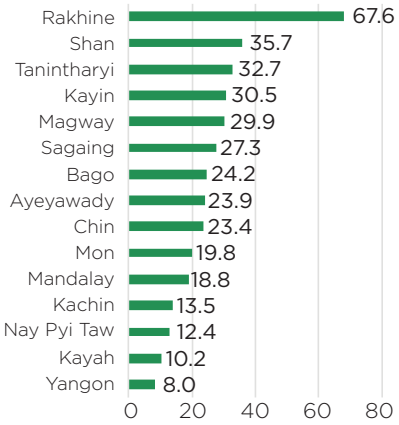


Water and Sanitation

(1) Drinking water

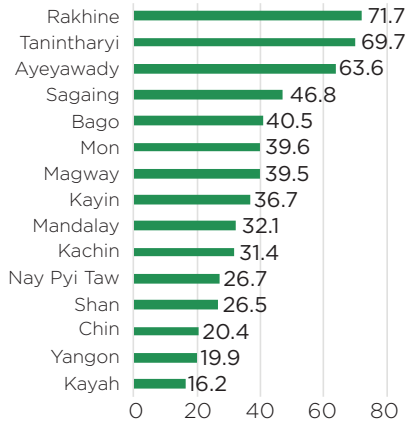


(2) Sanitation

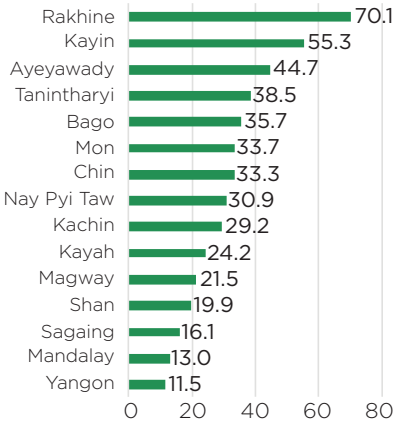


Housing

(1) Dwelling

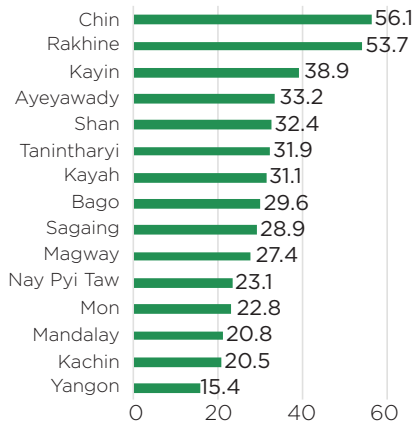


(2) Lighting

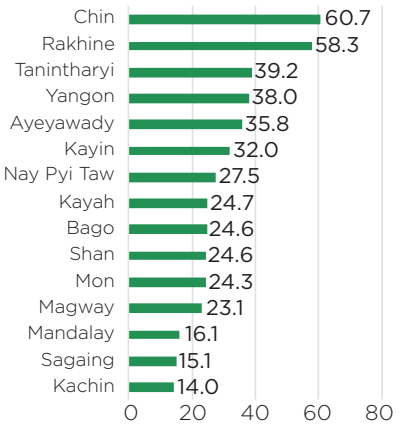


Assets

(1) Communication assets



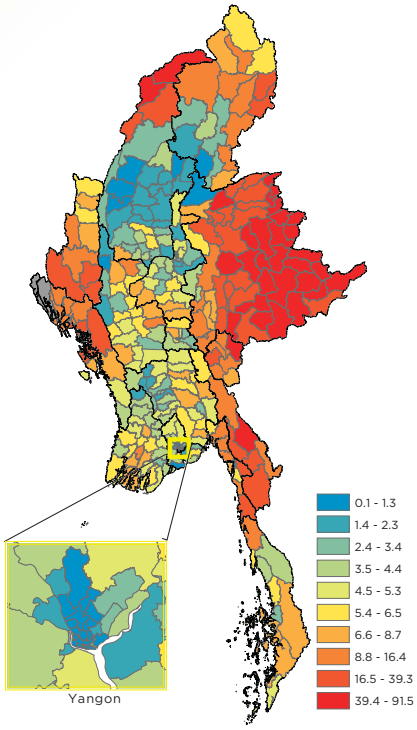
(2) Mobility assets



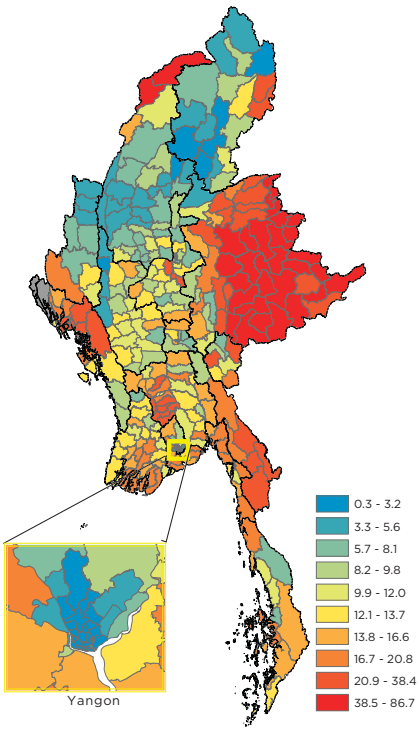
Annex 3. Incidence of Disadvantage at township-level

Figure A 3-1 | Incidence of disadvantage by indicator at township-level

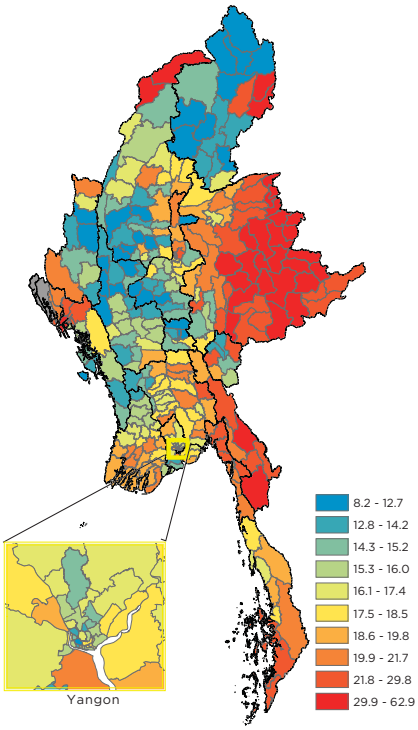
(a) Literacy



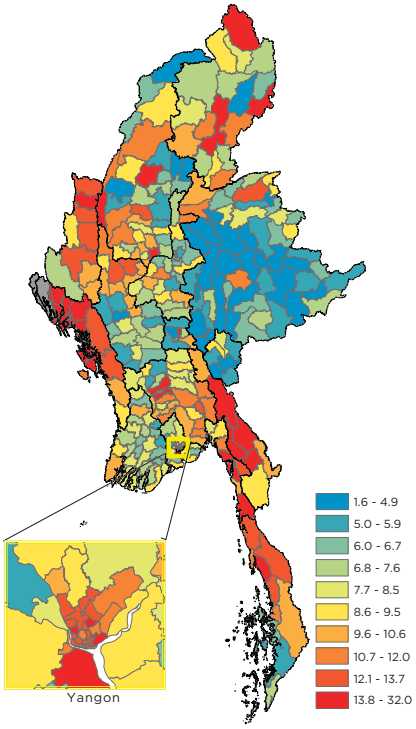
(b) Primary education



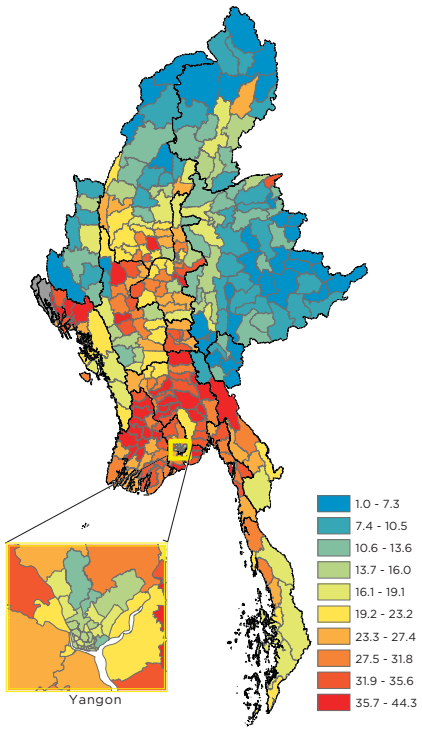
(c) School attendance



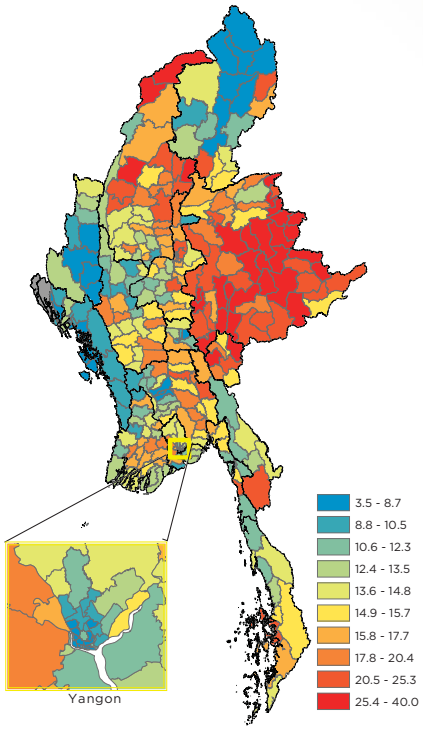
(d) Unemployment



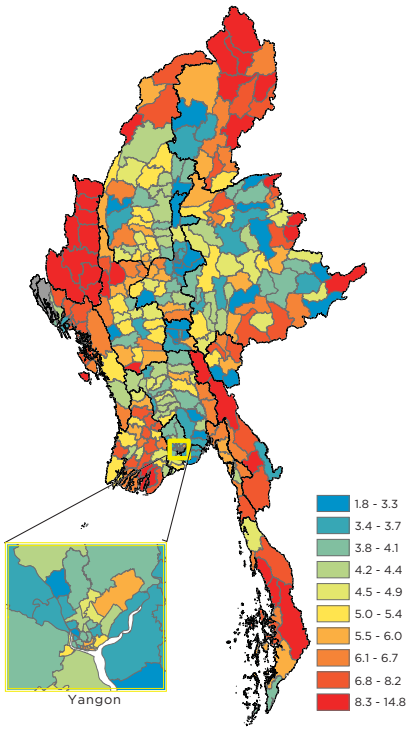
(e) Casual employment



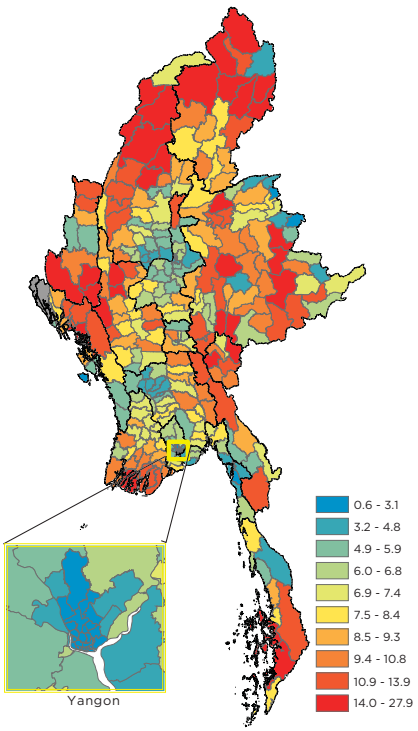
(f) Child work



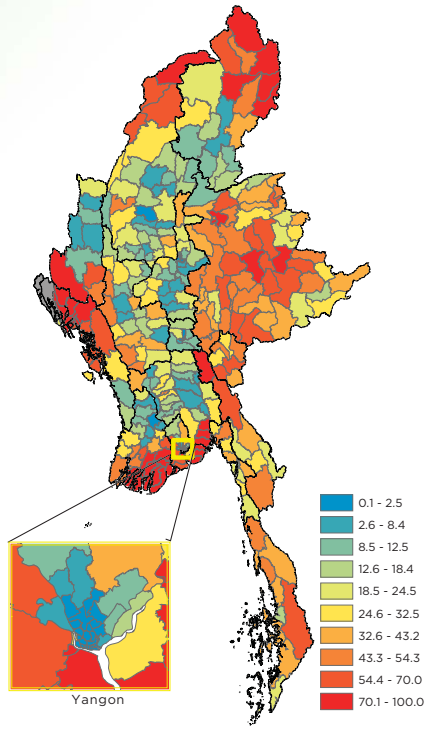
(g) Disability



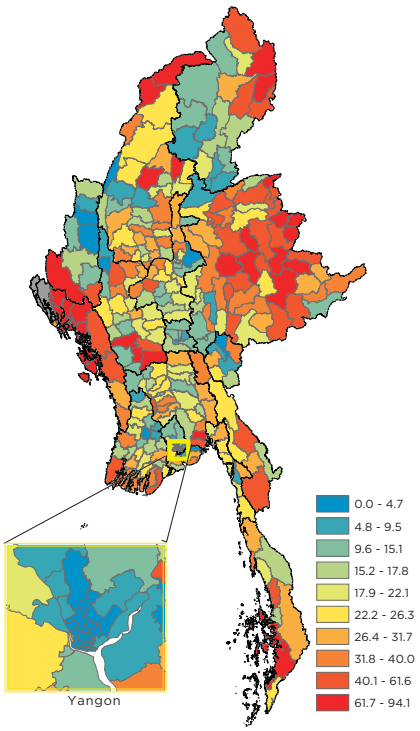
(h) Mortality



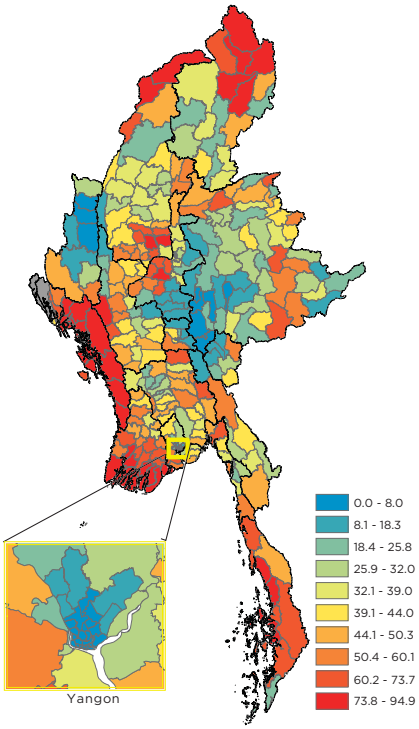
(i) Drinking water



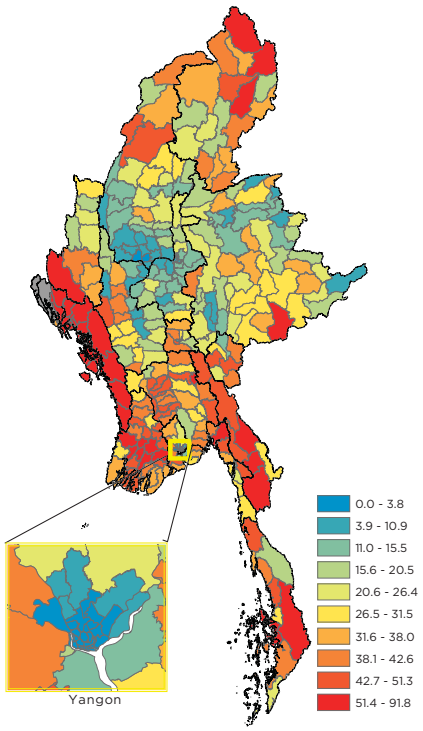
(j) Sanitation



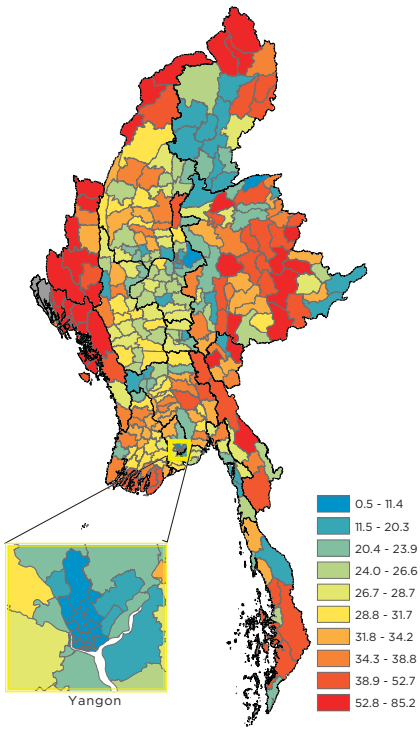
(k) Dwelling



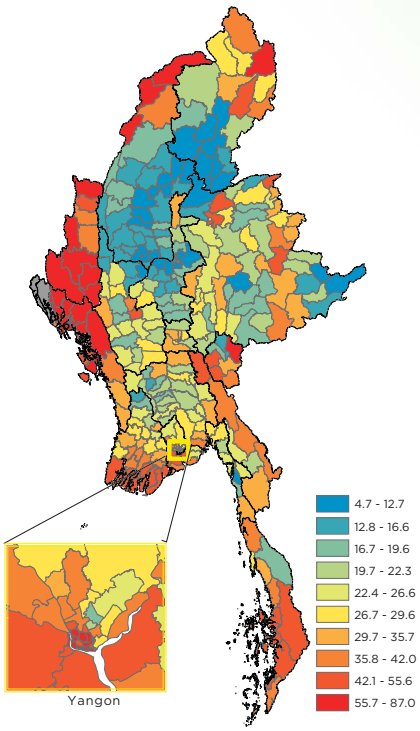
(l) Lighting



(m) Communication assets



(n) Mobility assets



Note: Maps show a fraction of population who are disadvantaged in each indicator. Mapping colors are based on decile thresholds. Due to the limited number of enumerated population in Census, three townships in Northern Rakhine (Maungtaw, Buthidaung, Yethedaung) are highlighted in gray.

Annex 4. Variation of Housing Construction Materials in Myanmar

There is substantial geographic variation in housing construction materials in Myanmar, partly related to climate and topography. This raises the question of whether the housing indicator should be geographically varied, with a more stringent definition used in colder parts of the country compared to warmer areas, for example. This annex presents some arguments for why a more stringent indicator is not necessary since the four sub-indicators of Myanmar capture different aspects of geographic variability and are not fully correlated, providing sufficient information to capture when a household has a housing disadvantage. Taking into consideration these geographical differences and sensitivity in housing materials, Myanmar's dwelling indicator identifies four sub indicators (dwelling type, construction materials of roof, wall, floor) and consider households who have a disadvantage in any sub-indicator among these four to have a disadvantage in housing.

Dhani, theke or in leaf are treated as non-durable materials for the roof and wall sub-indicators of housing. There is suggestive evidence to signal that these materials are used in hot weather to avoid heat by households in the delta and coastal areas of the country, such as Ayeyawady and Tanintharyi. In contrast, households that live in hilly and mountainous areas are less likely to use dhani and theke but are instead more likely to use wood and more durable materials to protect themselves from severely cold weather. We however see that there are households in both of these areas that use less durable housing materials, signalling that even by this conservative indicator of housing quality there are households with a housing disadvantage in these areas. Similarly, even in colder areas and among households with durable materials in some indicators, we see that they have low quality floors or dwellings. In Northern Sagaing and Kachin, for instance, households widely use bamboo and wood for their walls, floor and dwelling, but worse-off households tend to use dhani, theke or in leaf for their roof, so their housing disadvantage will be captured by the roofing indicator. Similarly, housing disadvantages in hilly and mountainous areas can be captured by having an earth floor, which is widely used in Shan and parts of Kachin and Sagaing.

Based on the current set of definitions in the four dwelling sub-indicators, the assessment conducted found that the four sub-indicators capture comprehensively a household's dwelling disadvantage, despite the strong geographic variation in climate and materials (Figure A 4-1). The decision was therefore made to use a country-wide definition of housing, rather than a subnational that is not grounded on clear evidence of a variation in housing needs.

Figure A 4-1 | Dwelling Indicator Disadvantage

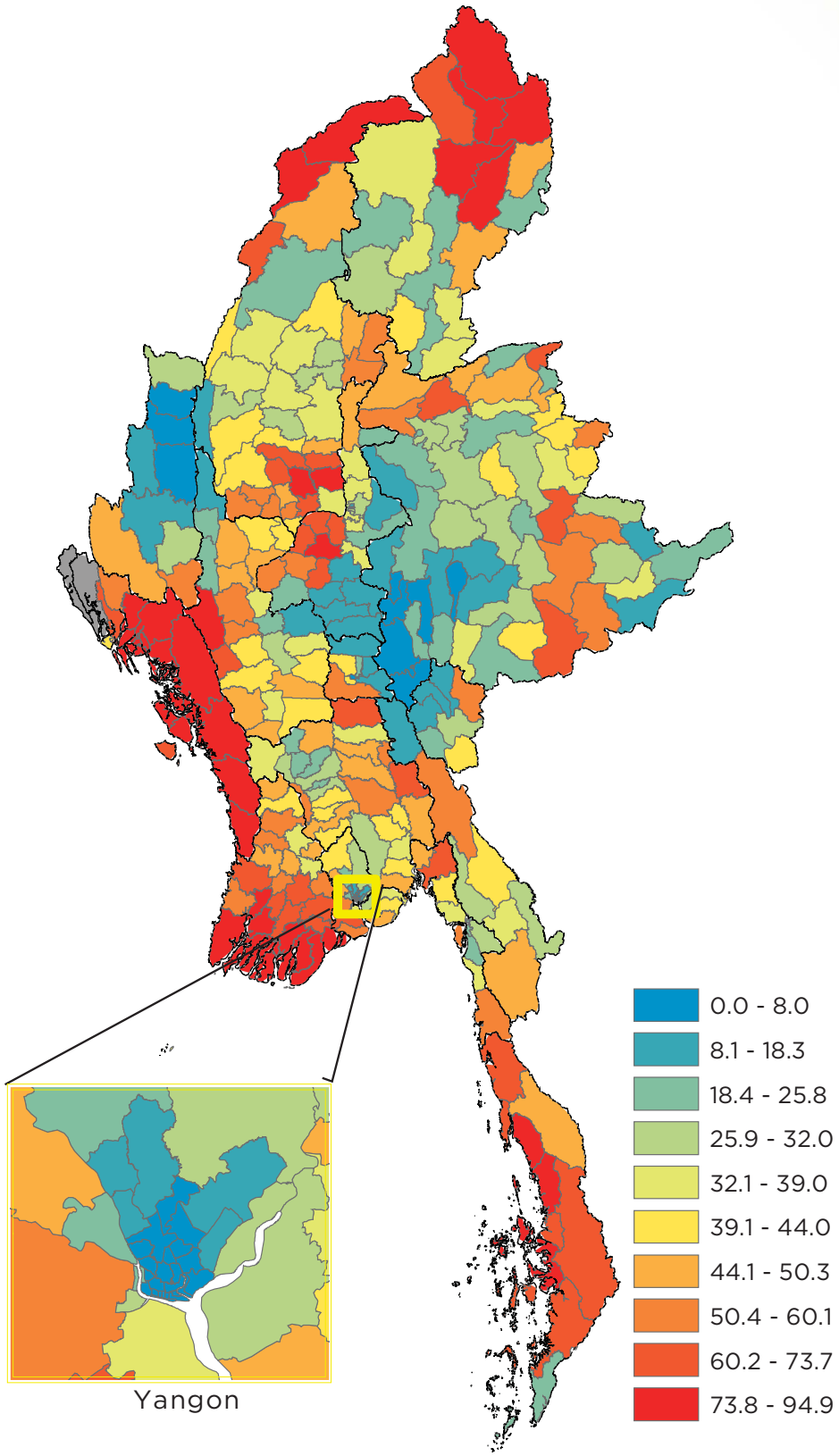
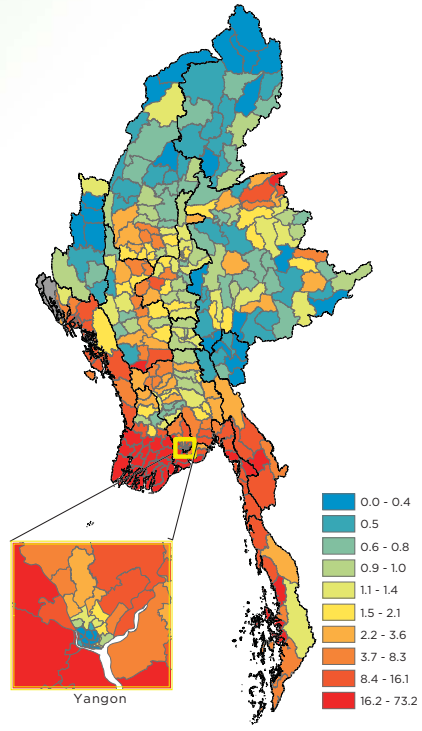
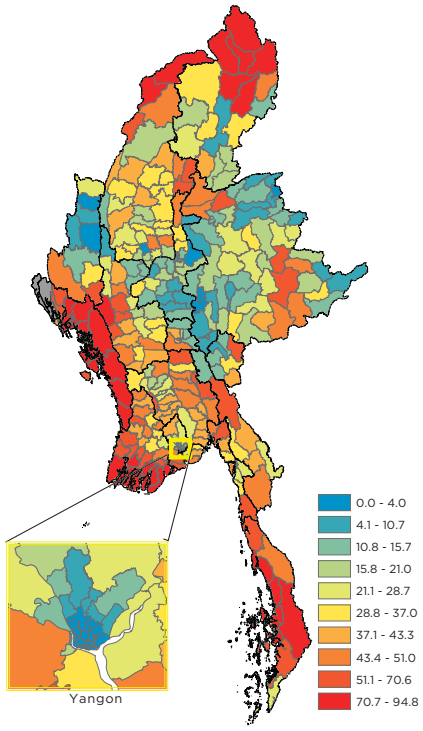


Figure A 4-2 | Sub-indicators for Dwelling indicator

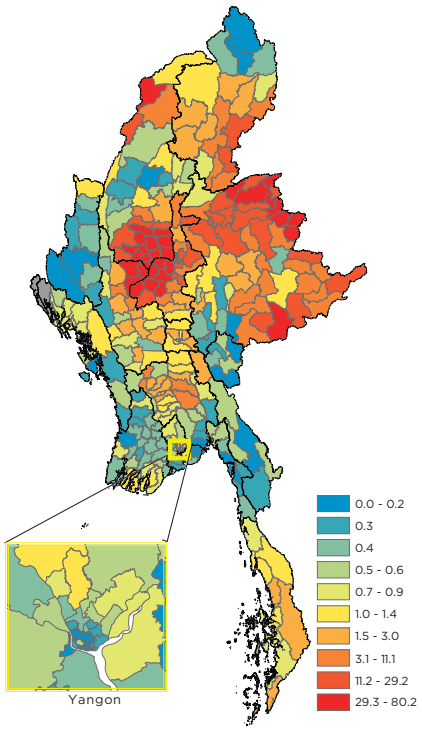
(a) Wall - Dhani/Theke/In Leaf/Earth



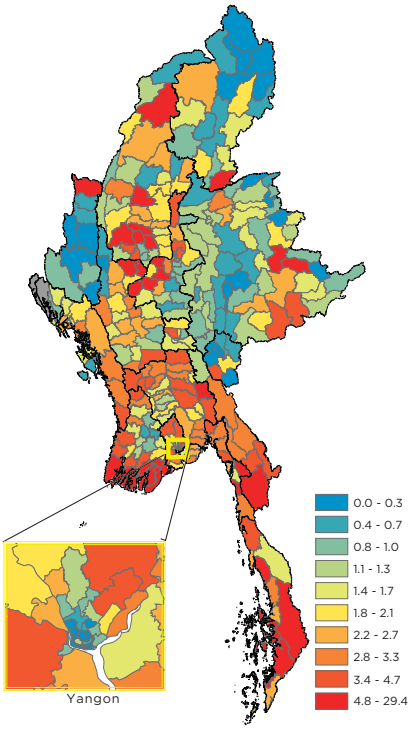
(b) Roof - Dhani/Theke/In Leaf



(c) Floor - Earth



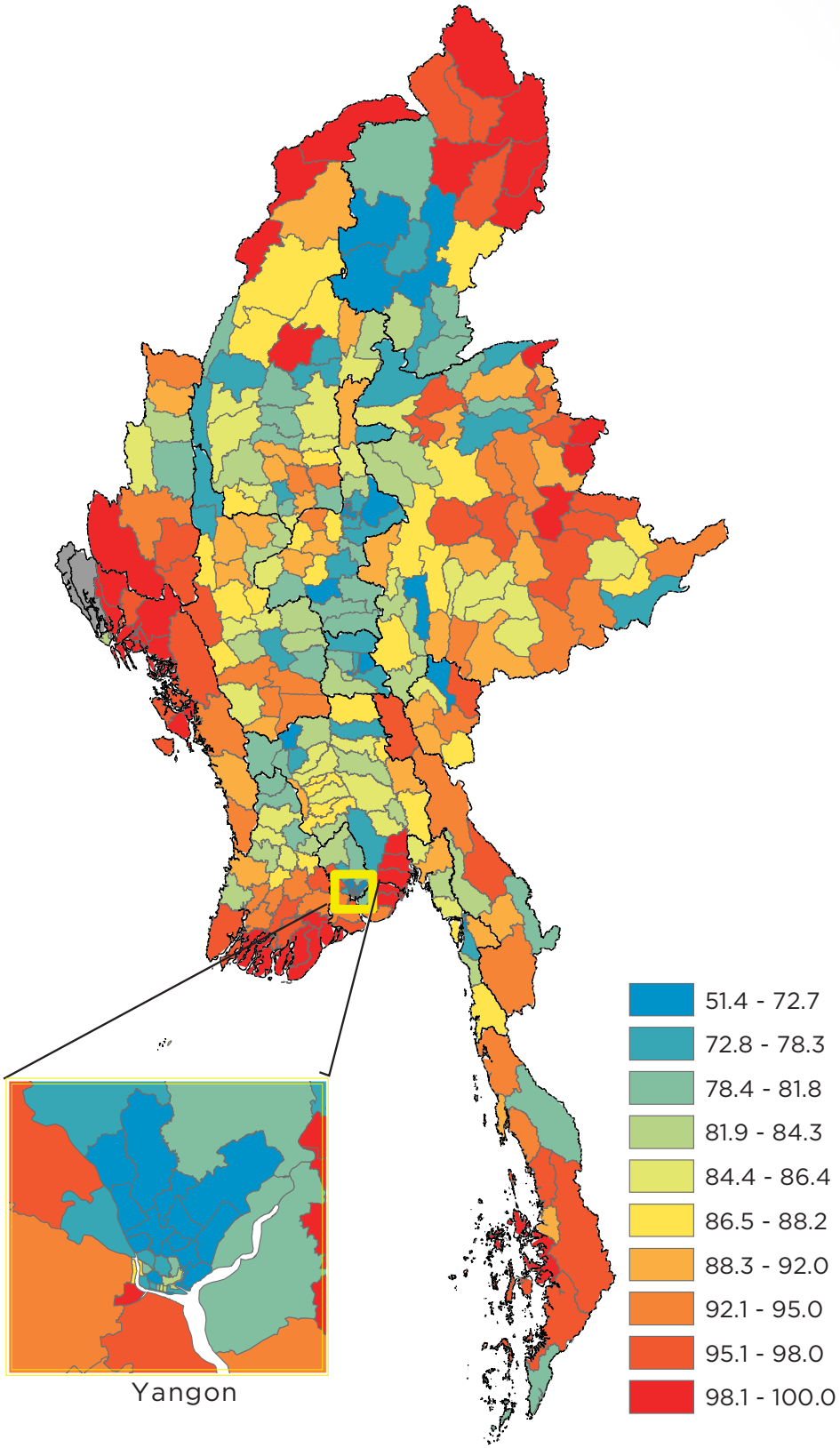
(d) Dwelling - Hut



Note: The figures are population weighted. Colors in the map are based on the decile thresholds.

Annex 5. Fraction of population with a disadvantage at the township-level

Figure A 5-1 | Fraction of population with a disadvantage in any indicator at the Township level



Note: The figures are population weighted. Colors in the map are based on the decile thresholds.

Annex 6. Multidimensional Disadvantage Index based on nested inverse incidence weights

Annex 6 presents MDI results based on the nested inverse incidence (NII) weighting scheme. The nested inverse incidence weights use data-based weights and exploits the idea that less commonly-observed disadvantages are typically more severe and deserve a higher weight. These weights are thus inversely related to the incidence or prevalence rates for different disadvantages. Thus, the primary input for NII weights are the prevalence rates for disadvantages in each domain and for each indicator within a domain that have already been presented in Chapter 3. Specifically, NII weights are constructed in two steps. First, weights for the six domains are constructed as proportional to the inverse of their respective disadvantage rates. Second, indicator-level weights within a domain are determined as proportional to the inverse of disadvantage rates for the indicators within that domain, such that the sum of indicator weights within the domain add up to that domain's overall weight as determined in the first step. Based on the 2014 MPHC data, the NII weights resulting from this procedure are also presented in Table A 6 1 with a companion of the nested uniform weights which are used in the main part of the Report.

Table A 6-1 **Assigned Weights comparison between Nested Uniform weight and Nest Inverse Incidence Weight**

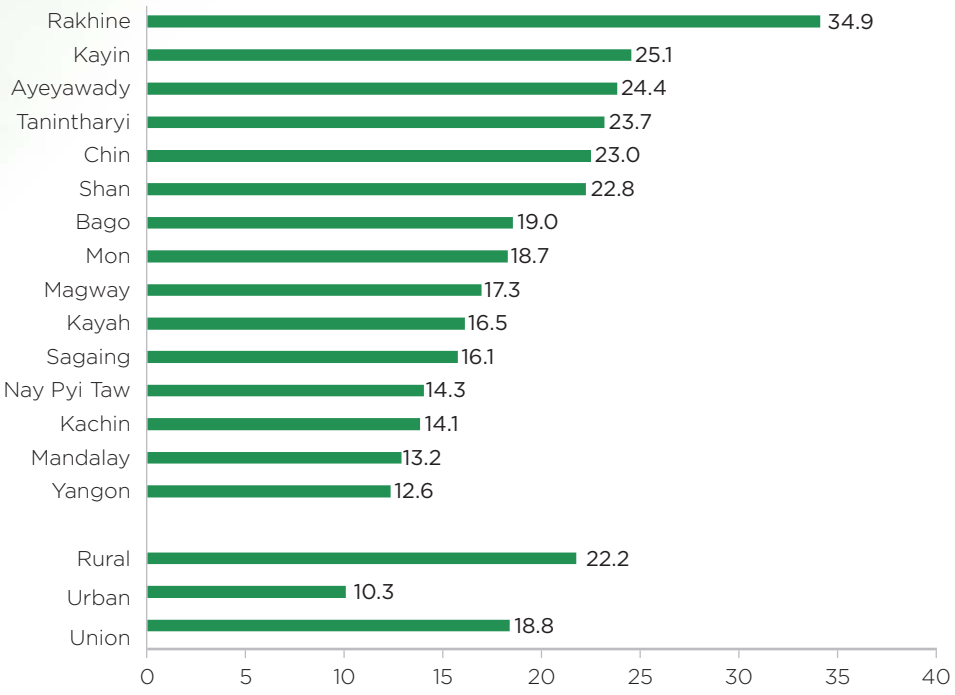
Domain	Indicator	Nested Uniform Weight	Nested Inverse Incidence Weight
Education	Literacy	1/18 (0.056)	0.063
	Primary education	1/18 (0.056)	0.058
	School attendance	1/18 (0.056)	0.061
	Total Education	**1/6 (0.167)**	**0.182**
Employment	Unemployment	1/18 (0.056)	0.057
	Casual employment	1/18 (0.056)	0.046
	Child work	1/18 (0.056)	0.055
	Total Employment	**1/6 (0.167)**	**0.157**
Health	Disability	1/12 (0.083)	0.118
	Mortality	1/12 (0.083)	0.116
	Total Health	**1/6 (0.167)**	**0.234**
Water and Sanitation	Drinking water	1/12 (0.083)	0.075
	Sanitation	1/12 (0.083)	0.079
	Total Water and Sanitation	**1/6 (0.167)**	**0.153**
Housing	Dwelling	1/12 (0.083)	0.059
	Lighting	1/12 (0.083)	0.071
	Total Housing	**1/6 (0.167)**	**0.130**
Assets	Communication assets	1/12 (0.083)	0.072
	Mobility assets	1/12 (0.083)	0.070
	Total Assets	**1/6 (0.167)**	**0.143**
All indicators	**Total sum of weights**	**1.000**	**1.000**

The main point of contrast between the two weighting schemes relates to the weights for the health domain. The NII weight for the health domain of 0.234 is substantially higher than the nested uniform weight of 1/6th. This is for a good reason, having to do with the two selected indicators for the health domain relating to disability and mortality. Both indicators have relatively low disadvantage rates (5.1 and 7.4 percent respectively; see Table 3.6). Recall however that the disability indicator refers to fairly severe forms of physical or mental disability – complete inability of a household member to see, hear, walk or remember, or to be able to do so with a lot of difficulty. Similarly, the mortality indicator refers to the death of any children born alive to an ever-married woman aged 15-40 years. For instance, for a woman who had her first child even at a relatively early age 20, this would refer to deaths of any sons or daughter who are no older than 20 years. For women with later first births, this would refer to deaths of still younger children. The mortality indicator thus captures instances of mortality at a very young age. Both disability and mortality therefore represent more severe forms of disadvantage, and it is not surprising that their prevalence rates are relatively lower. However, by the same token, in light of their severity, there is a case for according them higher weights.

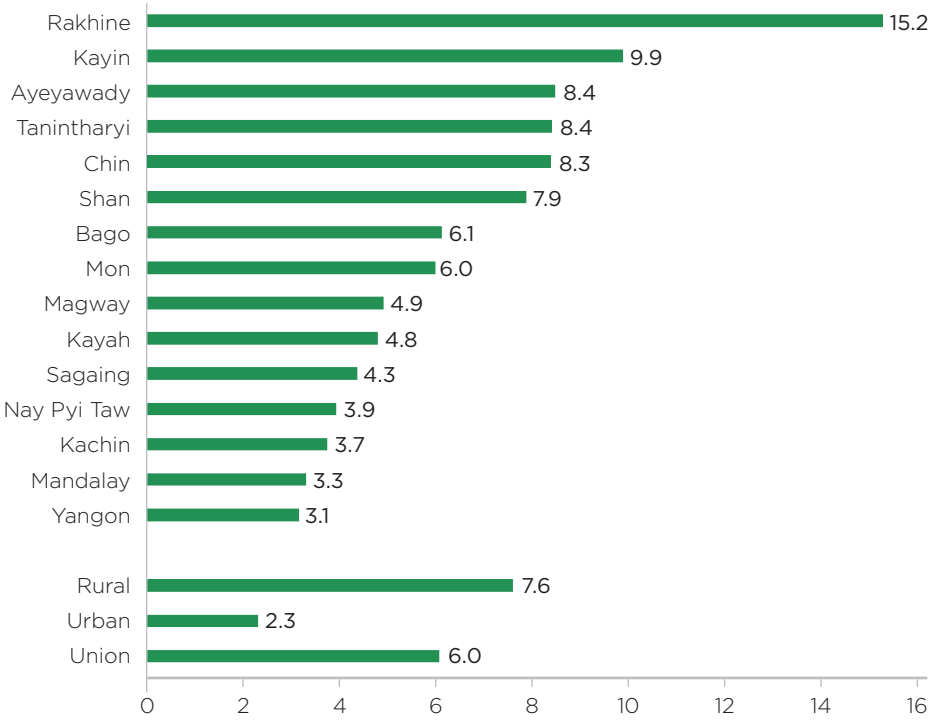
The national MDI-1 using the nested inverse incidence weights is at 18.8 (Figure A 6-1), a little bit lower than MDI-1 from the nested uniform weights. The rural and urban as well as state and regions MDI-1 is also a bit lower than the corresponding MDI-1 with nested uniform weights. However, the ranking of different regions in terms of MDI-1 is very similar for the two sets of weights. There is some re-ranking between Ayeyawady and Kayin and, and Sagaing and Kayah, but the differences are not large. Thus, relative position of urban and rural areas and states and regions with respect to multidimensional disadvantage is fairly robust to the choice of the two alternative weighting schemes.

Figure A 6-1 | **Multidimensional Disadvantage Indices: Nested inverse incidence (NII) weights**

(a) MDI-1



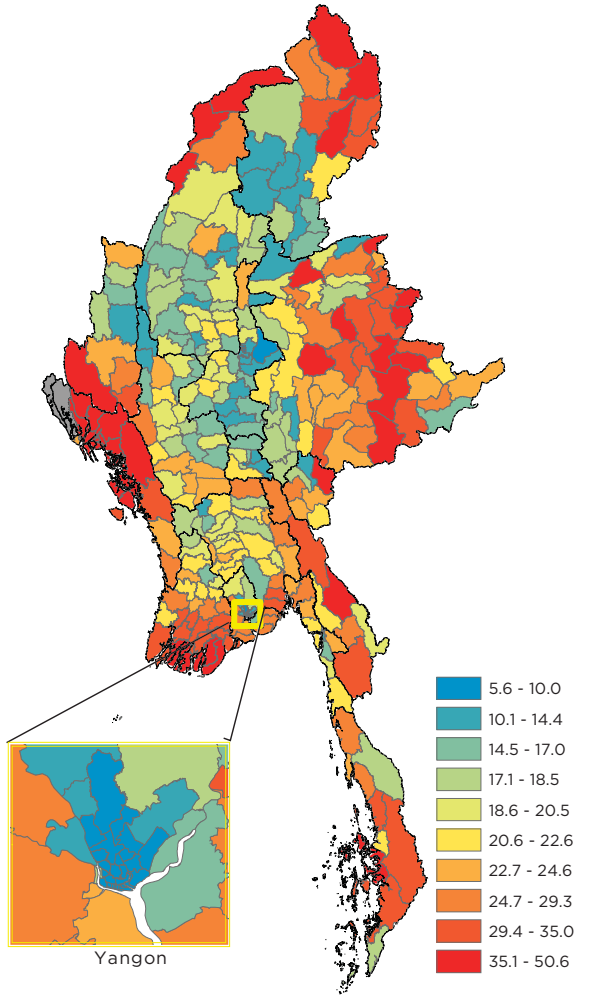
(b) MDI-2



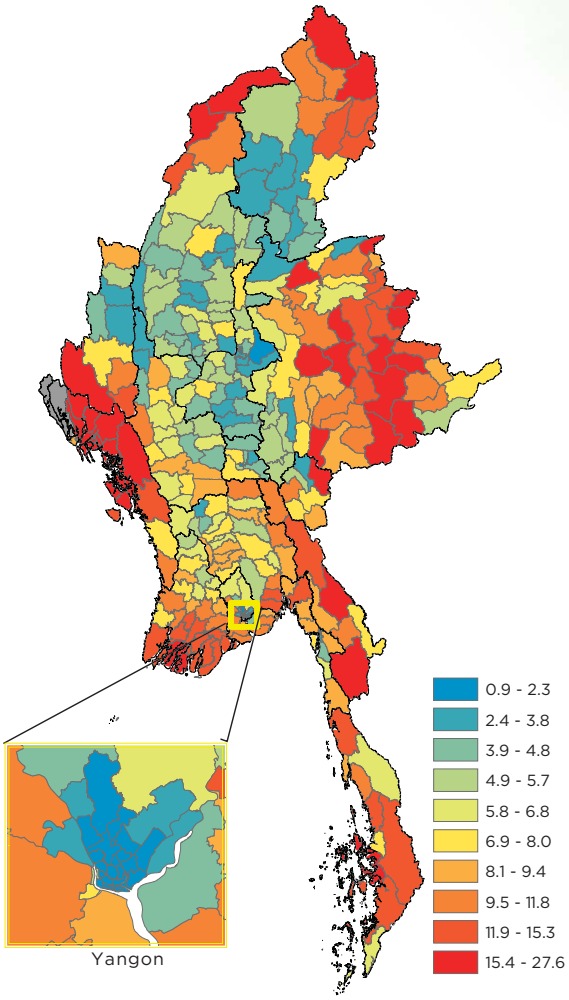
Annex 7. Multidimensional Disadvantage Index at township level

Figure A 7-1 | Township-level Multidimensional Disadvantage Index – Nested Uniform weights

(a) MDI-1



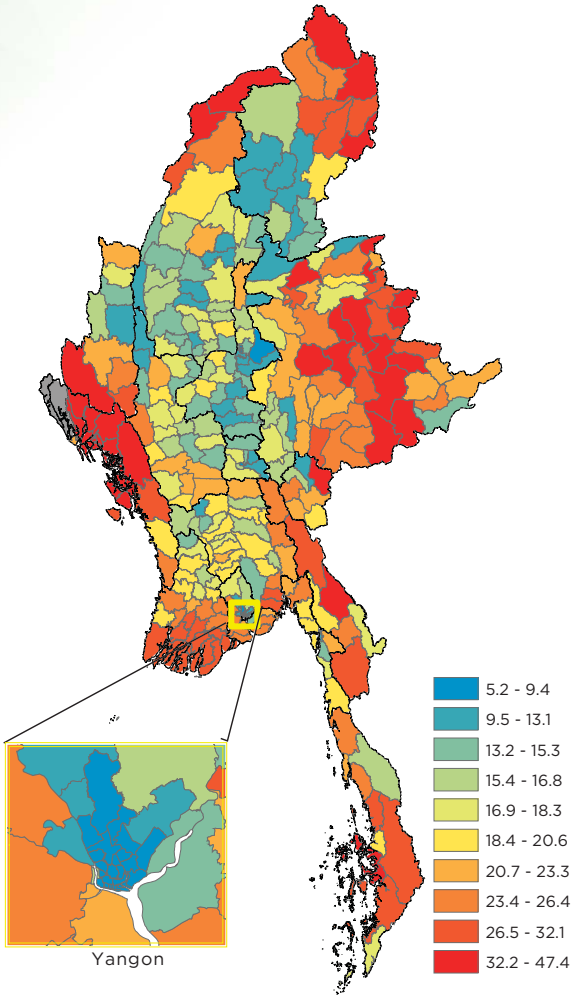
(a) MDI-2



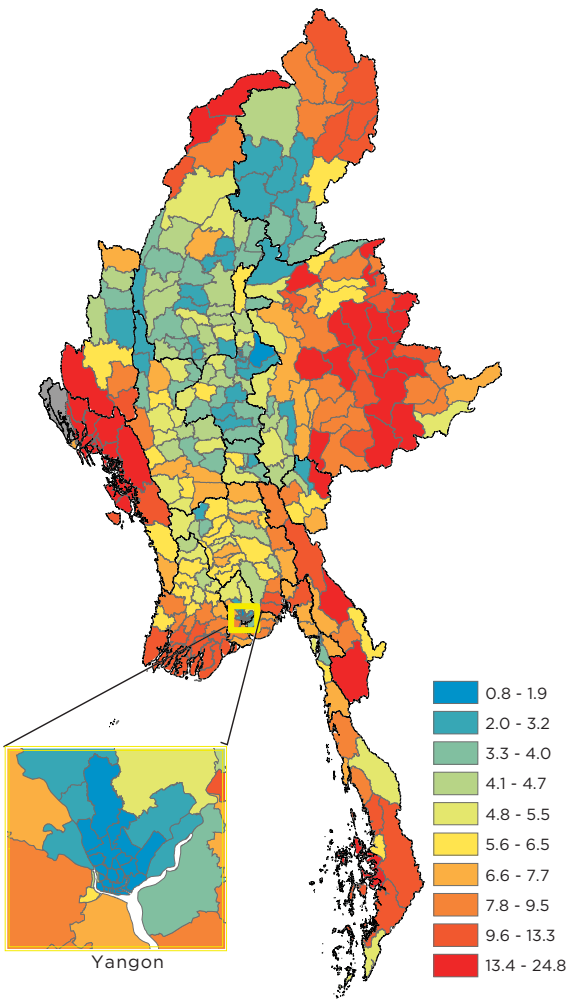
Note: The figures are population weighted. Colors in the map are based on the decile thresholds.

Figure A 7-2 | **Township-level Multidimensional Disadvantage Index – Nested Inverse Incidence weights**

(a) MDI-1



(a) MDI-2



Note: The figures are population weighted. Colors in the map are based on the decile thresholds.

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