



Missing Millions and Measuring
Progress towards the Millennium
Development Goals with a focus
on Central Asia States

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Abstract

Background: In developing countries, population estimates and assessments of progress towards the Millennium Development Goals are based increasingly on household surveys. It is not recognised that they are inappropriate for obtaining information about the poorest of the poor. This is because they, typically, omit *by design*: those not in households because they are homeless; those who are in institutions; and mobile, nomadic or pastoralist populations. In addition, *in practice*, because they are difficult to reach, household surveys will typically under-represent: those in fragile, disjointed or multiple occupancy households; those in urban slums; and may omit certain areas of a country deemed to pose a security risk. Those six sub-groups constitute a pretty comprehensive ostensive definition of the ‘poorest of the poor’.

Methods: This paper documents these omissions in general, drawing on worldwide literature about the theory and practice of implementing censuses and household surveys; and shows how substantial proportions are missing from both censuses and the sample frames of surveys.

Results: This paper suggests that between 300 and 350 million will effectively be missed worldwide from the sampling frames of such surveys and from most censuses. The impact on the health MDGs is illustrated for the five republics of the former [Soviet Union](#) making up Central Asia: [Kazakhstan](#), [Kyrgyzstan](#), [Tajikistan](#), [Turkmenistan](#), and [Uzbekistan](#).

Conclusions: It is impossible to assess progress towards or away from the MDGS in both the Central Asian Republics and worldwide. It is urgent to find solutions to the problem of the ‘missing’ poor population sub-groups.

Keywords: *population estimates; surveys; missing populations*

Missing Millions and Measuring Progress towards the Millennium Development Goals with a focus on Central Asia States

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Research

Introduction

For several decades, and in some countries for centuries, populations have been counted through national, usually decennial, censuses in which enumerators go to households. Intercensal population estimates have usually depended on reliable birth and death registration systems. In most middle and low

income countries, however, vital registration systems have never been fully functioning,¹ and there has been a similar decline in donor interest in censuses and vital registration systems.² But there is an increasing reliance on large scale standardized household surveys for the basic data.

Many countries run national economic and social surveys to provide detailed information on consumer prices, income and employment, and other relevant data for planning. This move away from censuses to relying on surveys raises the obvious problem that drawing a sample for a survey depends on having a sampling frame in the first place which is frequently based on the census. Clearly any problem with the census, if used as the sampling frame for a national survey, will lead to that sampling frame being biased. But there is – rather strangely – little recognition of these problems.

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Central Asian Journal of Global Health

Censuses

Population censuses have always faced problems of complete enumeration. Groups of adults have been excluded from censuses in some countries for political and/or practical reasons. Non-citizens, cultural minorities or marginalised groups, and specific categories of prisoners or rebels who object to government oversight have often been excluded for political reasons³ and although less frequent and certainly more transparent, this still continues.^{4,5}

Therefore, the general problem that censuses are not themselves necessarily complete is well understood.⁶ At the same time, there is an emerging consensus as to what constitutes good census practice,⁷ and censuses that follow these UN guidelines will usually overcome many of the problems that have occurred with earlier Censuses.

The guidelines are clear but there can still be problems in practice:

Housekeeping concept: whilst Cinderella is a fairy tale, the exclusion of poor servants from the census count in rich households (even though they will usually be sharing some of the household food), especially in Asia, is not, and their personal poverty is therefore missed for different reasons.

Mobile populations: in developed countries, the young highly mobile – usually male population – are also difficult to count, especially when they live in collective households, but they are relatively well-off. In developing countries, they may well be among the poorest.

Homelessness and counting De Facto rather than De Jure populations: these are difficult to count, especially where there are disputes over nationality.⁸ Equally there are several millions internally displaced in many countries either as a result of civil war or because environmental change (e.g. floods, nuclear accidents)

makes their homes uninhabitable. Although there are periodic counts, there is no regular database anywhere.

Institutional populations: there are several different types of institutions (care homes, (some) factory barracks, hospitals, the military, prisons, refugee camps, religious orders, and school dormitories) and there is still considerable variation over whether or how they should be included in the population count. Their characteristics are often not fully reported and they are simply counted as special census blocks.

Careful census reporting documents how well these groups have been enumerated and most categories are included in estimated census population counts of developed countries but not in those of many developing countries.

Moreover, in many developing countries, the census enumerators are often police or other government officials who tend to use security based national identity cards or family registration cards to validate the citizenship status of those they are enumerating.^{9,10}

These problems are illustrated in this paper for the Central Asian states.

Assessing Poverty

In assessing the absolute level of poverty or the absolute levels of illness household surveys are an inappropriate instrument for obtaining information about the poorest of the poor, especially in developing countries. This is because household surveys, with rare exceptions, typically omit by design:

1. those not in households because they are homeless;
2. those who are in institutions, including refugee camps;
3. mobile, nomadic, or pastoralist populations.

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In addition, in practice, because they are difficult to reach, household surveys will typically under-represent:

4. those in fragile, disjointed, or multiple occupancy households (because of the difficulty of identifying them);
5. those in urban slums (because of the difficulty of interviewing);
6. or may omit certain areas of a country deemed to pose a security risk.

If one wanted a practical - distinct from a theoretical - definition of the 'poorest of the poor', the above collection of six population sub-groups could hardly be bettered.

Census officials, because of the difficulty of enumeration, even in developed countries, often only make estimates of their size and location so that the members of those groups are not included in the available sampling frames for household surveys. In developing countries, these marginalised groups may not be included at all, even in the estimated population counts. The lack of recognition of these problems with the design and implementation of household sample surveys, particularly in developing countries, has meant that there has been no systematic attempt to estimate the size and distribution of the population groups 'missing' from the sampling frames of national household surveys.

Central Asia: Creation of States and MDG Indicators for Health Outcomes

The five republics were created by Soviet demographers, roughly based on ethnic identity.¹¹ Prior to Soviet rule, substantial majorities of the population lived as nomads, without 'states' in the modern sense.¹² Under Soviet rule, nomads were 'sedentarised',

although transhumance continued subject to bureaucratic regulation.¹²

The current populations, poverty rates (MDG 1), and mortality rates for infants, children (MDG 4), and mothers (MDG 5) are given in Table 1. There have been only small increases in population, with substantial decreases in the poverty rates in Kazakhstan, Kyrgyzstan, and Tajikistan, but a large increase in Uzbekistan. In contrast, there have been substantial improvements in respect of infant and child mortality and maternal mortality.

[Table 1: Population, Poverty and Mortality Rates for Infants, Children and Mothers](#)

How Many are Potentially 'Missing' from Population Counts and from Sampling Frames of Household Surveys

The focus here is on groups for which there are credible sources, and that are normally among the poorest. Other groups, not considered below because they are not necessarily the poorest include those caught up in civil wars and economic and environmental migrants,¹³ which may include the more ambitious and therefore not the poorest, etc.

Homeless

Rather obviously, household surveys omit the homeless and street children. Estimating numbers is very difficult. Over 20 years ago, UNICEF estimated that there were about 100 million street children.¹⁴ The figure is still commonly cited, but has no basis in fact.^{15,16} But, however many there are, they will not be covered by household surveys.

Institutionalised Populations

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Household surveys, by definition, omit from their sampling frame those in institutions: care homes, (some) factory barracks, hospitals, the military, prisons, refugee camps, religious orders, and school dormitories.

Care Homes and Hospitals: Those in hospitals and care homes will on average be poorer because morbidity is associated with poverty¹⁷ although that is less true for older people. There are estimated to be about 20 million hospital beds worldwide,¹⁸ with the number of hospital beds in the Central Asian countries varying between 40 and 76 per 10,000 (column 1, Table 2), with a total of 330,500.

Military: The CIA World Factbook¹⁹ documents 92 million worldwide (including reservists) and 226,200 in the Central Asian states (column 2, Table 2).

Prison: Those in prisons will usually be poorer and estimates of the total prison population of the world are around 9.8 million.²⁰ None of these 9.8 million will be included in the sampling frame of household survey. The numbers in Central Asia is 130,800 in Central Asia (column 3, Table 2).

Refugees: Refugees are not considered as part of any nation's population so they cannot, of course, be included in survey sampling frames nor make any contribution to survey-based estimates. However, the United Nations High Commissioner for Refugees²¹ publishes figures annually on numbers of officially registered refugees, internally displaced persons, and stateless persons. The total for Central Asia total is 344,400, and the worldwide total is 36.5 million; these figures do not include the large number of illegal immigrants (and in particular those returning from China into the Central Asian states), most of whom will not be counted in a national population and, of course, not in the sampling frames of household surveys.

[Table 2: Populations Vulnerable to Undercounting in Censuses or Surveys, Central Asian Republics \('000s\) around 2010](#)

Nomadic and Pastoralist Groups by World Region

The permanently mobile are usually excluded from household surveys. In particular, censuses and surveys in developing countries have difficulty enumerating nomadic/pastoralist populations who have much less access to services. Whilst it is difficult to assess their income and wealth, and there clearly are some who are rich-in-kind (or asset rich), the majority are usually poor in all senses.

There is no reliable information available on the number of nomadic pastoralists, including sea-faring mobile communities, worldwide. Over twenty-five years ago, Sandford estimated a total of 22.7 million.²² More recent estimates for most countries are much larger, and when added up the overall total is about triple the earlier estimate at about 66 million. The only internationally comparable source is that compiled by the International Livestock Research Institute,²³ based partly on livestock numbers, and these are much larger again. These estimates have been used (column 4, Table 2) and although there are some substantial discrepancies, overall, the more recent country-specific estimates are in line with the Thornton-based estimates. The worldwide estimate is 217.5 million and the estimate for the Central Asian countries is 8.823 million; there appears to have been a substantial resurgence in the nomadic lifestyle partly through repatriation.

Difficult to Reach

Fragile and Disjointed Households

The task of the census enumerator or survey interviewer is made much more difficult when the household structure is ambiguous or undefined so that either identifying the household head and/or counting the numbers in the household is almost impossible.

Urban Slums

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UN Habitat²⁴ bases its definition of slums on households lacking one or more of the following four amenities: (1) durable housing, (2) sufficient living area, (3) access to improved water, and (4) access to improved sanitation facilities.

The most recent estimates from UN Habitat²⁴ are that there are more than a billion people living in urban slums in developing countries, but information is rarely disaggregated according to intra-urban location and the poorest urban populations are often simply not included in data gathering.

The few surveys that have been conducted in those slums show sharp gradients according to income quintiles within urban populations.²⁵ But given the very high levels of mobility, it would seem reasonable to assume that a substantial minority of those households in the slum areas of developing country cities are uncounted in any census. Moreover, even where they are counted in censuses, many would (because of interviewer reluctance) in practice be excluded from sampling frames.

For Central Asia, one might suppose that because most of the cities were built relatively recently during the Soviet era, there would have been only a few slums (although see OSCE report¹¹), but calculations from the UNHabitat tables on the percentages in informal employment suggest that large proportions of urban areas are slums. Given that some of these calculated figures seem high (93% in Tajikistan, 78% in Kyrgyzstan, 63% in Kazakhstan, 50%+ in Uzbekistan), we have used values of 75% for Kyrgyzstan and Tajikistan and 55% for the other three republics for the proportion of slum populations among urban populations.

Insecure or Isolated Areas

This will obviously vary according to context and so will be a much larger problem in specific countries. Given the security situation – or simply

difficulty of transport - in many countries, it can often be difficult for the implementing institutions to carry out a fully representative survey or census.

Overall Estimates, Discussion and Conclusions

Overall Estimates

Not all those missing populations are poor; in Table 3, we give an estimate of the numbers of the poor who are missing. All those hospitalized or in prison are missing. We assume that two-thirds of military are poor and unofficial refugees are assumed to double the official refugees (and that is probably a substantial underestimate). Based on informal conversations with census officials in several countries and on the difficulties of using satellite imagery in slum areas²⁶ (because of the need to rely on key informants and the visual obscurity of some structures), the numbers of missing among nomadic and slum populations are estimated as between 10% and 20%.

[Table 3: Estimates of Poor Populations that are Missing in Central Asia 2010](#)

Worldwide, the totals in the sub-sections above add up to between 171 and 322 million; in Central Asia it is between 3.31 and 6.01 million (Table 4). Moreover, the estimates do not include the homeless, those in fragile or disjointed households, or those in areas where there are security risks. Most of the homeless are probably from urban slums so there would be double counting, but the other three categories (large, but of unknown size) are definitely additional. Estimates of between 300-350 million worldwide and about 7 million for Central Asia is not unrealistic.

[Table 4: Estimates of Population Groups Missing from Sampling Frames of Household Surveys WorldWide and for Central Asia](#)

As a 4.5-5.0% undercount of the world's population of c.7 billion, this might be judged

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acceptable; as a 22.5-25.0% undercount of the poorest wealth quintile, scandalous; and the situation is worse for Central Asia where the missing constitute about 11.5% of the total population. The undercount in the poorest quintile in Central Asia means that estimates of the absolute levels of poverty and of the mortality rates are biased upwards; both are probably 10%-15% higher than currently estimated.

Censuses and Sampling Frames

Counting Displaced and Illegal Groups

Census organisations in developed countries use several procedures for estimating the numbers of illegal immigrants. But those procedures would not work for South-South illegal migration; moreover, there are other omitted sub-groups, often quite large: for example, scheduled castes and tribes in India²⁷ and illegal servants in rich households.

Counting and Sampling Nomads and Pastoralists

These are difficult to count simply because they are moving. Reasonable samples have been obtained through combining local level surveys with remote sensing of livestock,²⁸ but documenting change in their human population remains, on the whole, elusive.

Counting Urban Slum Populations

Any face-to-face interviewing approach will be very unreliable both because of the lack of a sampling frame and because the respondent will be suspicious of the reason for the questions because they are illegally resident. But even if the census organisation were to make available a listing of 'houseless' people, given the high levels of intra-slum mobility, this would be an unreliable sampling frame for surveys.

Solutions

Carrying Out Accurate Censuses

International organizations should support national census organizations in developing and testing procedures for counting pastoralists and other nomads (gypsies, highly mobile workers, long-distance truck drivers, travelers, etc.) and those in urban slums^{26, 29} and in adopting best practice from UN guidelines.

Sampling Frame Problems for Surveys

The fundamental problem of a household survey is precisely that it will not cover those who are not in households. Although there are technical solutions (see above) to the problem of enumerating or at least counting population sub-groups missing from many censuses, the same procedures do not solve the sampling frame problem of household surveys because of the delays between census and survey. Special surveys could be and have been carried out of those who are in fixed institutions, however: they tend to be expensive, they often involve proxy respondents,³⁰ and the results are difficult to integrate with those from the main household survey.

Conclusions

Population undercounting means that any social programme risks ignoring the poorest of the poor. This blindness is a public scandal affecting at least 300 million of the poorest in developing countries (between 4.5% and 5% of total world population) and 7 million in central Asian republics (about 12% of their total population) and should be addressed immediately by international and national organizations, in terms of developing and testing appropriate procedures for counting. This is urgent because these data are used frequently for assessing progress towards the Millennium Development Goals in developing countries. In the absence of any simple solution, this author has shown that, it is possible to make estimates

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of the missing populations. It is crucial to develop similar methods more systematically, with an agreed theoretical basis.

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Table 1: Population, Poverty and Mortality Rates for Infants, Children and Mothers

	Population (millions)		Poverty (%)		Infant Mortality		Under 5 Mortality		Maternal Mortality	
	2000	2010	1998	2004	2000	2009	2000	2009	2000	2010
Kazakhstan	15.0	16.0	5.0	3.1	38	26	44	29	70	51
Kyrgyzstan	5.0	5.3	31.8	21.8	44	32	51	37	82	71
Tajikistan	6.2	6.9	44.5	36.3	75	52	94	61	120	65
Turkmenistan	4.5	5.0	25.8		59	41	71	45	91	67
Uzbekistan	24.8	27.4	32.1	46.3	53	32	62	36	33	28

Sources: Population, Poverty Rate - CIA World Factbook; Infant Mortality Rate, Child Mortality Rate – World Health Statistics

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Table 2: Populations Vulnerable to Undercounting in Censuses or Surveys, Central Asian Republics ('000s) around 2010

					Nomads		Urban Pop.		Slum (E)	
	Hospital	Prisoners	Military	Refugees	2000	2010(E)	%	N	%	N
Kazakhstan	121.6	56.0	80.5	12.7	4,724	4,874	59	9.44	55	5.19
Kyrgyzstan	27.0	8.4	20.4	304.2	256	284	35	1.86	75	1.39
Tajikistan	35.9	7.4	16.3	7.1	205	240	26	1.79	75	1.35
Turkmenistan	20.0	11.0	22.0	20.1	1,532	1,755	50	2.50	55	1.38
Uzbekistan	126.0	48.0	87.0	0.3	1,478	1,670	36	9.86	55	5.43

Source: Hospital Beds, Prisoners, Military, Refugees – UNHCR; Nomads – Thornton et al (2002); Urban Population Proportions - CIA World FactBook; Slum Proportions in Urban Areas – Estimated by Author from UN Habitat

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Table 3: Estimates of Poor Populations that are Missing in Central Asia 2010

					Nomads		Slum	
	Hospital	Prisoners	Military	Refugees	1 in 5	1 in 10	1 in 5	1 in 10
Kazakhstan	121.6	56.0	53.6	25.4	974.0	487.0	1,038	519
Kyrgyzstan	27.0	8.4	13.8	608.4	56.8	28.4	278	139
Tajikistan	35.9	7.4	10.8	14.2	48.0	24.0	270	135
Turkmenistan	20.0	11.0	14.6	40.2	351.0	175.5	276	138
Uzbekistan	126.0	48.0	58.9	0.6	334.0	167.0	1,086	543

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Table 4: Estimates of Population Groups Missing from Sampling Frames of Household Surveys WorldWide and for Central Asia

		Worldwide (millions)		Central Asia (thousands)	
		Minimum	Maximum	Minimum	Maximum
Pastoralists		21.8	43.5	881.9	1,763.8
Institutionalised	Refugees	36.5	73.0	344.4	688.8
	Hospitals	20.0	20.0	330.5	330.5
	Military			150.8	150.8
	Prisons	10.0	10.0	130.8	130.8
Slum Populations		82.8	175.6	1,474.0	2,948.0
Total		171.1	322.1	3,312.4	6,012.7

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