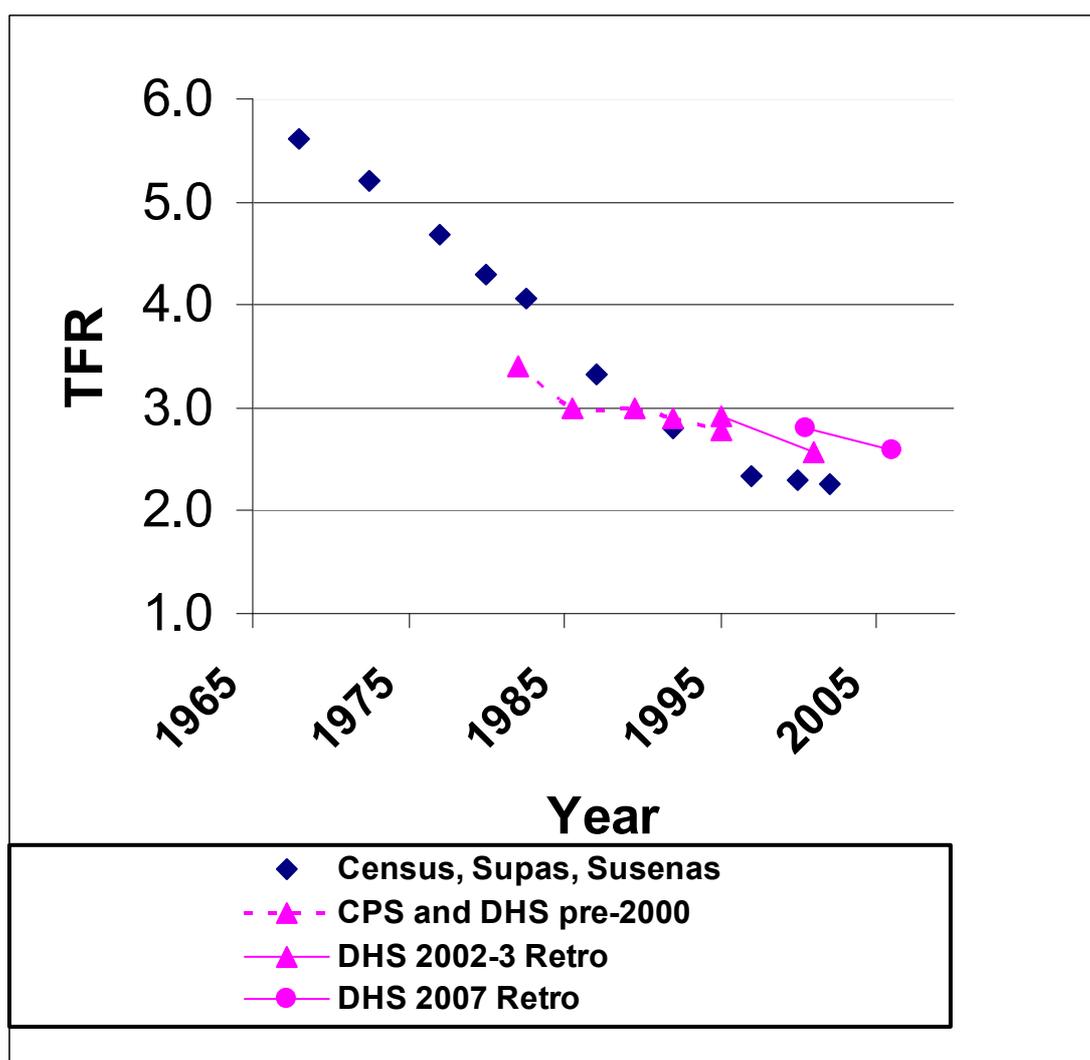


Fertility levels and trends in Indonesia

Over the last four decades Indonesia, like most countries in Asia, has undergone a major transition from high to low fertility. Where women up to the 1970s had long born an average of over five children, the pace of childbearing has slowed since then through a combination of delayed marriage and the increased use of contraception to prolong the time between births and ultimately end childbearing with fewer children. The transformation in behaviours surrounding family formation is reflected in the sequence of blue diamonds in Figure 1. This gives us a long term 'macroscopic' view of fertility trends from the beginning of the family planning program through the most recent national surveys. Each blue diamond is an estimate of fertility spanning a three to five year period centred on the point. This calculation is drawn from a comparison of the number of children between the ages of 0 to 3 or 4 enumerated in the population, and the number of women of childbearing ages (the Own Child method). The line is not linear but falls continuously through the turn of the century, at which point the decline slowed near the so-called replacement level of 2.1 children per woman.

Figure 1 Indonesian fertility trends, 1965-2007



The fertility calculations of the more detailed *Contraceptive Prevalence Survey* and the *Demographic and Health Surveys (CPS and DHS)* since the late 1980s do not follow the census trendlines. In early years they were below the own child estimates. Since 1995 the DHS estimates of total fertility have increasingly exceeded the fertility levels found in the census-type national surveys. Since the year 2000 the published DHS estimates of current fertility (three years prior to the survey) have been stagnant at 2.6 children per woman, well above replacement level and nearly half a child higher than the census estimates.

DHS enumerations focus on the experience of ever-married women between the ages of 15 and 49, from whom complete histories of pregnancies and births are obtained. The total number of births in discrete periods of time prior to the survey is obtained from these histories. Thus in Figure 1 the two most recent DHS produce estimates of fertility both for the four years prior to the survey and five to nine years retrospectively. In each case they show declining fertility, not a plateau.

Table 1. Marital status distributions for women of reproductive ages in successive national surveys in Indonesia

Age Group	SUPAS 1995	DHS 1997	Census 2000	SUSENAS 2002	DHS 2002-3	SUPAS 2005	DHS 2007
Percentage of women in the age group who are single							
15-19	85.7	82.1	89.3	89.7	85.4	90.8	86.9
20-24	40.1	36.1	43.1	47.0	41.2	51.4	38.3
25-29	15.2	14.1	16.7	16.3	13.8	19.7	15.4
30-34	5.5	5.3	6.9	6.5	5.9	8.1	7.0
35-39	2.8	2.4	3.5	2.9	3.0	4.3	3.6
40-44	2.1	2.9	2.4	2.1	2.1	2.6	2.6
45-49	1.9	1.7	2.0	1.4	2.0	2.0	1.9
All WRA	27.7	25.3	28.7	27.6	25.0	28.8	23.7
Percentage of women in the age group who are ever-married							
15-19	14.3	18.0	10.7	10.3	14.6	9.2	13.1
20-24	59.9	63.9	56.9	53.0	58.8	48.6	61.7
25-29	84.8	85.9	83.3	83.7	86.2	80.3	84.6
30-34	94.5	94.7	93.1	93.5	94.1	91.9	93.0
35-39	97.2	97.7	96.5	97.1	97.0	95.7	96.4
40-44	97.9	97.1	97.6	97.9	98.0	97.4	97.4
45-49	98.1	98.4	98.0	98.6	98.0	98.0	98.1
All WRA	72.3	74.7	71.3	72.4	75.0	71.2	76.3

*Calculated from the Measure DHS STATCompiler: <http://www.statcompiler.com/> and 2007 DHS data provided by Statistics Indonesia.

In the DHS it is assumed that single women are not sexually active and have not produced any children. However, to calculate fertility rates the survey needs to record all women in the population irrespective of their marital status. This number is obtained from the household census compiled by interviewers when they first arrive at selected sample households. The DHS census listing is the tool used to assess the number of household members who are eligible for the various interview forms collected during the survey. Table 1 reveals that the DHS household listings consistently show lower proportions single compared to Census, SUPAS or

SUSENAS enumerations taken at around the same time, particularly for the ages from 20 through 29.

What explains the apparent lack of single women in the DHS listings? In part it appears that there is a major difference in the type of household covered by DHS and census type surveys. Essentially, the DHS interviewers are on the lookout for ever married women and given the nature of the survey they are particularly attuned to households with families. Since the 1980s Indonesia has undergone a remarkable change in the roles young women perform in society. They are increasingly likely to pursue education to higher levels, to work in expanding industrial and service occupations, or join the over four million Indonesian workers who are employed overseas sending remittances home. Single women often live in institutional settings – dormitories, industrial barracks, and boarding houses. Anecdotal evidence from interviewers indicates that these places are often passed over in the DHS canvassing because fieldworkers concentrate on households that are more likely to yield eligible respondents. In contrast census type enumerations are designed to include both family and non-family households, often with particular interest in workers and students.

Assessing the coverage of DHS listing of single women

The DHS faces the challenge of working out some way of estimating the number of single women missing from the DHS household census and using that to recalculate the denominators of fertility rates. Table 2 shows total number of women actually recorded in the survey in column B. Column D shows the number who would have been listed if the DHS had obtained the same proportion of single women as found by the 2000 Population Census (column C). This calculation implies that there could have been as many as 4492 single women missing from the DHS household listings.

Table 2. Estimation of total number of women in 2002-3 DHS if reflecting 2000 Census marriage patterns					
	2002-3 DHS women by age group	2002-3 DHS percent single in age group	2000 Census Percent single in age group	Estimate of sample if DHS had Census profile of all single women	Difference -- missing single women
	A	B	C	D=A*C/B	A-D
15-19	6715	85.4	89.3	7019	-304
20-24	6738	41.2	43.1	7051	-313
25-29	6302	13.8	16.7	7611	-1309
30-34	5844	5.9	6.9	6882	-1038
35-39	5349	3.0	3.5	6226	-877
40-44	4704	2.1	2.4	5404	-700
45-49	4170	2.0	2.0	4120	50
All WRA	39822	25.0	28.7	44314	-4492

Of course there are some strong reasons to question the use a full count census carried out over two years earlier to test the coverage of the 2002-2003 DHS. While the census did not have to contend with sampling errors, it did have problems with non-

sampling issues. It was a mammoth operation with an army of interviewers, many of whom lacked experience and supervision. Thus the two years of individual aging and population mobility plus the potential lower quality of data collection in the census could undermine the confidence we have in applying the marital status of the full count census data to the 2002-03 DHS.

Importantly, though, the census enumeration served as the basis for the sampling frame for subsequent surveys. Both the 2002-03 DHS and the National Social and Economic Survey (SUSENAS) carried out a few months earlier in 2002 were constructed from identical sampling procedures, as indicated in the Final Report for the DHS:

The sample developed for the 2002 National Socioeconomic Survey (Susenas) was used as a frame for the selection of the 2002-2003 IDHS sample. Household listing was done in all CBs covered in the 2002 Susenas. This eliminates the need to conduct a separate household listing for the 2002-2003 IDHS. (IDHS Final Report, 2003: 267)

The annual SUSENAS follows a ‘census-type’ household enumeration including questions on the age, sex and marital status of each resident. There should be no difference in the proportion of women who were single in the two surveys. As Table 3 shows, there is still a very large difference – nearly 1499 women – though in three age groups, 35-39, 40-44 and 45-49 there were more single women in the DHS than would have been expected from the marital status pattern of the SUSENAS.

Table 3. Estimation of total number of women in 2002-3 DHS if reflecting 2002 SUSENAS marriage patterns

	A	B	C	D=A*C/B	A-D
	2002-3 DHS women by age group	2002-3 DHS percent single in age group	2002 SUSENAS percent single in age group	Estimate of sample if DHS had SUSENAS profile of all single women	Difference - missing single women
15-19	6715	85.4	89.7	7051	-336
20-24	6738	41.2	47.0	7684	-946
25-29	6302	13.8	16.3	7421	-1119
30-34	5844	5.9	6.5	6482	-638
35-39	5349	3.0	2.9	5101	248
40-44	4704	2.1	2.1	4656	48
45-49	4170	2.0	1.4	2926	1244
All WRA	39822	25.0	27.6	41321	-1499

Adjusting the fertility rates for missing single women

These two calculations of missing women allow the reconstruction of age specific and total fertility rates for the 2002-3 DHS. In the Main Report the method used for calculating fertility rates indicates that:

Numerators of the ASFRs are calculated by summing the number of live births that occurred in the period 1 to 36 months preceding the survey (determined by the date of interview and the date of birth of the child) and classifying them by the age (in five-year groups) of the mother at the time of birth (determined by the mother's date of birth). The denominators of the rates are the number of woman-years lived in each of the specified five-year groups during the 1 to 36 months preceding the survey. Since only women who had ever married were interviewed in the IDHS, the numbers of women in the denominators of the rates were inflated by factors calculated from information in the Household Questionnaire on populations ever married in order to produce a count of all women. Never-married women are presumed not to have given birth. (IDHS Main Report, 2003:43)

Ideally the analysis carried out by the DHS would adjust the number of women in the Household Questionnaire to take account of the missing single women and use that number to calculate the women years lived in the period from 2000-2002. That calculation requires more information than is currently available, so in this paper a number of simple assumptions are made to generate a close approximation to the adjustment needed to calculate fertility.

In Table 4 the published age specific fertility rates and the calculated numbers of women recorded in the Household Questionnaire are used to estimate the annual number of births for all women in 2002, assuming no decline in fertility over the 2000-2002 period. Then the annual fertility rates are recalculated using the adjusted numbers of women who should have been listed in the DHS Household Questionnaire if the 2002 SUSENAS or the 2000 Census marriage patterns had prevailed for the DHS.

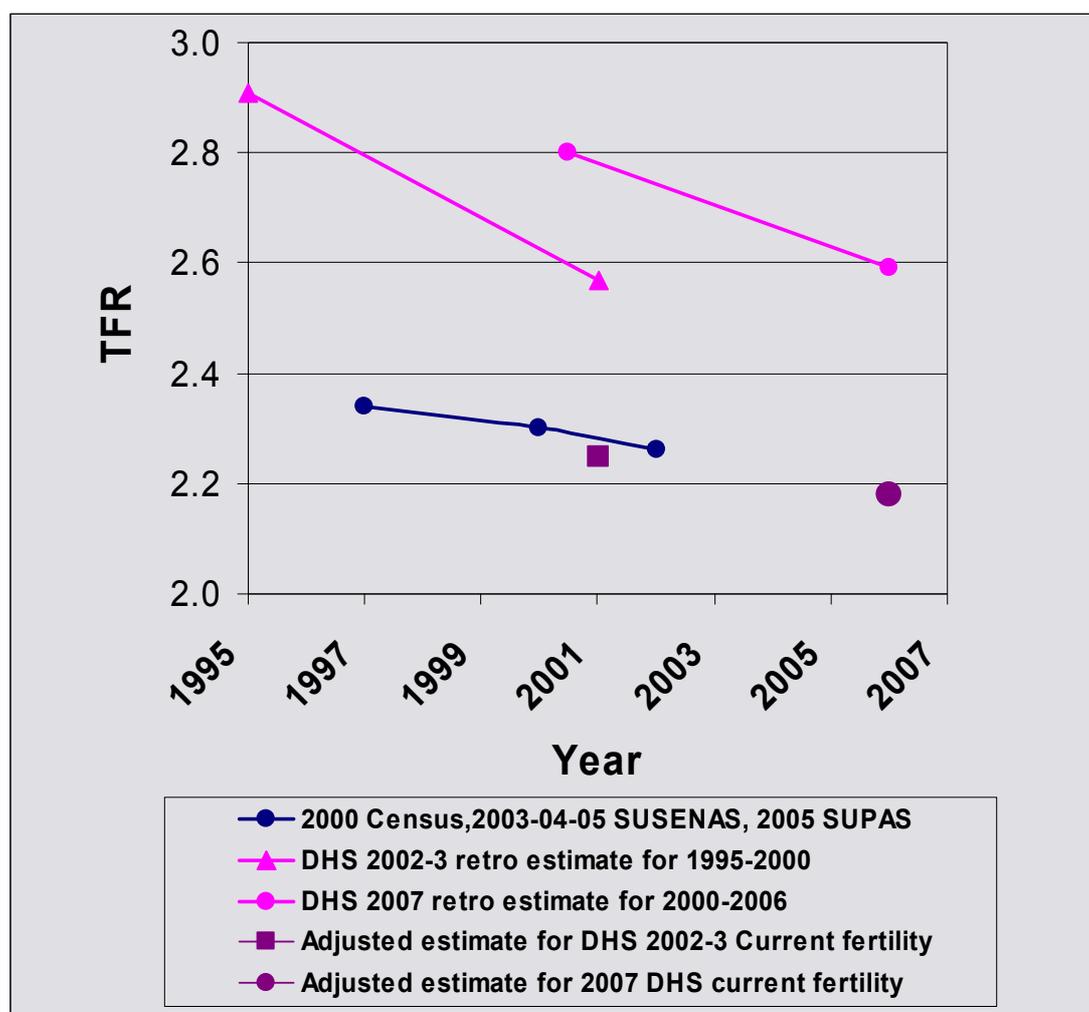
Table 4. Adjustment of ASFR and Total Fertility Rate for the 2002-3 DHS

Age of mothers	Fertility rates of 2002-3 DHS Final Report (2000-2002)	Women recorded in 2002-3 DHS	Annual births implied by fertility rates and number of women in 2002	Women adjusted for 2002 SUSENAS marital status	Fertility Rates with 2002 SUSENAS based estimate of women	Women adjusted for 2000 Census marital status	Fertility Rates with 2000 Census based estimate of women
15-19	51	6845	349	7077	49	7045	50
20-24	131	6422	841	7737	109	7100	118
25-29	143	6134	877	7593	116	7787	113
30-34	99	5484	543	6574	83	6979	78
35-39	66	5127	338	5148	66	6284	54
40-44	19	4361	83	4893	17	5679	15
45-49	4	3500	14	3169	4	4463	3
Total		37873	3046	42190		45336	
TFR	2.57				2.22		2.15

Where the DHS 2002-03 Main Report showed a TFR of 2.6 (rounding off the calculation of 2.57), the adjustment based on both the Census and the SUSENAS marriage patterns implies that the true fertility level was closer to 2.2 – only a small amount above the commonly accepted target of replacement level of 2.1. A similar procedure has been applied to the 2007 DHS in the Annex table, yielding a TFR of

2.18. Figure 2 takes a ‘microscopic’ view of the fertility estimates since the advent of decentralization in 2000. As recent estimates show, the adjusted DHS results are slightly under the census-type survey trend line and both indicate a slowing in fertility decline but substantially below the unadjusted DHS levels.

Figure 2 Unadjusted trend lines from 2002-3 and 2007 DHS and three census type surveys compared with adjusted fertility estimates for 2002-3 and 2007 DHS.



Adjusting the fertility rate for missing single women in the 2002-3 DHS produces a TFR of 2.25 for the three year period 2000-2002 (centred on 2002). This is below the trend line for census-type enumerations. A similar adjustment applied to the 2007 DHS using the marital status distribution from the 2005 SUPAS produces a TFR of 2.18 for the period from 2005-2007, or a point estimate for 2006.

The gap of nearly half a child between DHS and census-type estimates produces understandable disquiet among policymakers. Some prefer to rely on the higher number through the application of a precautionary principle – it is better to respond to the implications of the higher fertility than to assume the lower fertility is real, but then be found to have been complacent. This creates a credibility gap undermining policy and confusing planning. It represents one of the most serious problems of revitalizing the population and family planning program in Indonesia today.

Conclusions

There are serious problems with the methods used to estimate fertility in Indonesia. The own-child method of fertility calculation used in the decennial census and the annual SUSENAS produces a steady downward trend of fertility from the 1970s through to the present day. In contrast the pregnancy history techniques used by the DHS yielded lower fertility than the census prior to 2000, and higher levels since then. The discrepancy appears to be caused by the failure of the DHS sample and interview methods to capture a true profile of all women of reproductive ages, and in particular missing a substantial number of single women. Once adjusted for these missing women the fertility rates for the three years prior to the 2002-03 and 2007 surveys are around 2.2, slightly above the long term BKKBN goal of replacement level fertility.

ANNEX tables:

Estimation of total number of women in 2007 DHS if reflecting 2005 SUPAS marriage patterns

	DHS numbers recorded by age group	DHS Percent single in age group	2005 Supas Percent single in age group	Estimate of sample if DHS had recorded all single women $D=A*C/B$	Difference -- missing single women A-D
	A	B	C		
15-19	6849	86.9	90.8	7160	-311
20-24	7040	38.3	51.4	9464	-2424
25-29	7156	15.4	19.7	9202	-2045
30-34	6730	7.0	8.1	7843	-1112
35-39	6473	3.6	4.3	7667	-1194
40-44	5722	2.6	2.6	5636	86
45-49	5127	1.9	2.0	5373	-246
All WRA	45098	23.7	28.8	52344	-7246

**Estimation of total number of women in DHS if reflecting 2007
 SUSENAS marriage patterns**

	A	B	C	D=A*C/B	A-D
	DHS numbers recorded by age group	DHS Percent single in age group	2007 Susenas Percent single in age group	Estimate of sample if DHS had recorded all single women	Difference -- missing single women
15-19	6849	85.4		0	6849
20-24	7040	41.2		0	7040
25-29	7156	13.8		0	7156
30-34	6730	5.9		0	6730
35-39	6473	3.0		0	6473
40-44	5722	2.1		0	5722
45-49	5127	2.0		0	5127
All WRA	45098	25.0		0	45098

Adjustment of ASFR and Total Fertility Rates --

Age of mothers	Fertility rates of 2007 DHS Final Report (2005-2007)	Women recorded in 2007 DHS	Annual births implied by fertility rates and number of women in 2007	Women adjusted for 2005 SUPAS marital status	Fertility Rates with 2005 SUPAS based estimate of women	Women adjusted for 2007 SUSENAS marital status	Fertility Rates with 2007 SUSENAS based estimate of women
15-19	51	6849	349	7160	49		#DIV/0!
20-24	135	7040	950	9464	100		#DIV/0!
25-29	134	7156	959	9202	104		#DIV/0!
30-34	108	6730	727	7843	93		#DIV/0!
35-39	65	6473	421	7667	55		#DIV/0!
40-44	19	5722	109	5636	19		#DIV/0!
45-49	6	5127	31	5373	6		#DIV/0!
Total		45098	3046	52344			
TFR	2.59				2.13		#DIV/0!