INTER-AGENCY REGIONAL ANALYSTS NETWORK

STUNTING IN PAKISTAN

A Trends Analysis of Underlying Factors By 2030

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KEY OBSERVATIONS

1. The government of Pakistan and its partners in nutrition set the target of reducing stunting prevalence from 44 to 34% by 2017, and to end hunger by 2030 through a holistic approach.
2. Statistical analyses have established significant relationships linking stunting rates (or child height for age z-scores) to key underlying factors in Pakistan, notably: prenatal care, households' assets, maternal and paternal schooling, fertility and open defecation.
3. Contextualizing these factors within their respective socio-economic system shows that serious challenges jeopardize the objective of reducing chronic malnutrition in the country by 2030.
4. A strategic focus on reducing disparities between genders and improving institutions' accountability and resource distribution across the country would likely make the most impactful contribution to stunting reduction in Pakistan by 2030.

INTRODUCTION

Pakistan is one of the ten countries in the world where more than half of the under-five year old population suffers from either stunting or wasting, or both. Malnutrition in its different types and forms is a critical issue for the Islamic Republic, which has demonstrated in recent years increased commitment to social development. Over the past two decades, the Pakistani government has notably recorded significant achievements in combatting polio, increasing routine immunization, and decreasing the number of out-of-school children. Progress in stunting reduction, however, has presented mixed results. According to the latest available figures, the under-5 stunting rate in the country is as high as 44%, the third highest rate in the world, with stunting prevalence being slightly higher in male children (48%) than in female children (42%)[1]. While childhood stunting was estimated to drop globally from 40% (95% CI 38.1, 41.4) in 1990 to 25% (95% CI 24.8, 28.7) in 2013, Asia as a whole showed a dramatic decrease over the same period, nearly halving the number of stunted children from 190 million (49% in 1990) to 100 million (28% in 2010). This shows a heavy trend in stunting reduction over time, a global and regional feature. This trend is expected to reach 21.8%, or 142 million, in 2020, globally, and Asia to drop below the symbolic threshold of 20% by 2020. However, Pakistan has only registered a 10-point reduction in stunting prevalence during this period, from a 54.5% stunting rate measured in 1990-91 to 44% measured in 2013. In actual fact, after a decade of slow decrease (1991-2001) the country registered a +3.3% increase in stunting prevalence since 2001, a striking and worrying reverse trend (see Annex 1).

The effort to reduce stunting is driven by the wide recognition of the impact of the irreversible physical and neurocognitive damage that accompanies stunted growth on human development. There is also growing awareness of the costs to society resulting from stunting (including increased mortality, increased morbidity in childhood and later as adults, poor educational outcomes, pregnancy complication, lost earnings and losses to national economic productivity)[2]. Tackling the burden of chronic malnutrition during childhood has therefore become an imperative requiring political commitment for nutrition-specific and nutrition-sensitive action. The development of strategic frameworks, such as the National Infant and Young Child Feeding (IYCF) Practices

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[1] UNICEF 2015, *Stop Stunting*, Progress Report 2013-2015, Results for Children in Pakistan

[2] Shekar, M, Eberwein, JD and Kakietek, J 2016, 'The costs of stunting in South Asia and the benefits of public investments in nutrition', *Maternal & Child Nutrition*, Vol 12(Suppl. 1), May 2016, pp. 186–195

Strategy or the Pakistan Integrated Nutrition Strategy (PINS), is a concrete step already underway in that direction. Pakistan, with the support of international institutions, set the ambitious goal of reducing stunting to 34% by 2017 (or less 1.9 million children previously stunted) and, by signing on the Sustainable Development Goals (SDGs), is engaged to "end hunger and ensure access for all, especially for the poor and vulnerable, to nutritious and sufficient food the year round" by 2030, thereby in effect ending all forms of malnutrition by this date. To achieve this will necessitate strong, consistent and coherent action on the root causes of chronic malnutrition.

While the consequences of stunting are clear, its causes are more complex. Underlying factors for nutrition can generally be split into 'processes' and 'outcomes', which are namely: Food Environment, Social Environment, Health Environment, and Living Environment (cf. Annex 2).[3] Direct factors contributing to stunted growth and development include poor maternal health and nutrition, inadequate infant and young child feeding practices, micronutrients deficiencies and infections[4] —all together reflecting stunting's multisectoral etiology. Most of these factors are strongly related to poverty. Furthermore, multiple studies[5] provided estimates that link stunting to a range of specific underlying drivers. The present report builds on the findings of a conclusive study[6] that quantified the factors explaining long-term improvements in child height for age z-scores (HAZ[7], i.e. stunting reduction) in four South Asian countries: Bangladesh (1996/1997–2011), India (1992/1993–2005/2006), Nepal (1997–2011) and Pakistan (1991–2013). The authors of this statistical analysis[8] found that, among common explanatory variables, five had a significant impact on improving HAZ at country level (antenatal care, household assets, women's and paternal schooling, fertility and open defecation)[9]. This report contextualizes these five underlying drivers with a 15-year outlook (i.e. analyses the socio-economic system they belong to), thereby providing a comprehensive picture of stunting's evolution in the country by 2030. It is meant to support and enhance strategic decision-making in Pakistan for stunting reduction.

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[3] International Food Policy Research Institute 2016, *Global Nutrition Report 2016: From Promise to Impact: Ending Malnutrition by 2030*, Washington, DC.

[4] WHO 2014, *Global Nutrition Target for 2025*

[5] E.g., Smith and Haddad (2015) analysed variation across a number of countries over time, while Headey and Hoddinott (2014) and Headey (forthcoming) analysed variation within a given country over time. *Global Nutrition Report 2016*

[6] Headey, D, Hoddinott, J, and Park, S 2016, 'Drivers of nutritional change in four South Asian countries: a dynamic observational analysis', *Maternal & Child Nutrition*, Vol 12(Suppl. 1), May 2016, pp. 210–218

[7] HAZ, height for age z-scores, are the heights of children under 5, by age, standardized with respect to the corresponding heights for age of a global reference children growth set (WHO, 2006, *WHO children growth standards*). HAZ values range between -6 or -7 to 6 or 7, with a large majority of the values in the interval [-3,3]. An HAZ value of -1, for instance, indicates a child whose height is one standard deviation below the median height of the children of their age (from that reference set), while a positive value stands for heights above the reference median. Children with HAZ values below -2 are considered stunted, or severely stunted if the HAZ is lower than -3. Cf. Headey et al. (2016), 'Drivers of nutritional change in four South Asian countries: a dynamic observational analysis', *Maternal & Child Nutrition*, Vol 12(Suppl. 1), May 2016, pp. 210–218

[8] The article analyses data from available Demographic Health Surveys (DHS) in the four countries. For each country, the model assumes that the relation of the different factors with stunting is constant over the analyzed time period (1991-2013 for Pakistan). This assumption has been tested by fitting models separately by survey/year and comparing the estimated coefficients to look for significant differences among them, which were not found.

[9] The article focuses on assessing the importance of the effect of the different factors in the observed past changes in stunting z-scores in each of the countries. The authors thus combine the estimated coefficients from the models with the observed evolution of each of these factors in the analyzed periods (1991-2013 for Pakistan) so as to determine which of them has had a greater impact in the observed evolution of stunting in the past years. However, although the past contribution of each of them to stunting has been quantified and ranked, this observational analysis doesn't allow assessing the net (and future) relative importance of each one of these factors on stunting with respect to the rest. Nevertheless, it does establish the significant relation of all six factors with stunting; we therefore considered here the set of factors without establishing any prioritization among them.

1. ANTENATAL CARE AND PAKISTAN'S HEALTH SYSTEM

While the impact of stunting on health is rather obvious, the impact of healthcare on stunting reduction is becoming more widely acknowledged as a greater number of studies have shown it in recent years. The WHO conceptual framework for childhood stunting[10] identifies several important healthcare-related determinants for child and maternal chronic malnutrition: access to healthcare, qualified healthcare providers, availability of supplies, infrastructure, and healthcare systems and policies. Each component plays a role in the direct causes of stunting, which are poor maternal health condition (such as body mass index), inadequate feeding and care practices, and infections. The poor state of Pakistan's healthcare system is consequently a major hindrance to stunting reduction in the country. Indeed, Pakistan ranks very poorly among other countries on a wide range of health indicators, in particular when it comes to maternal, neonatal and infant mortality. Pakistan ranked 149th out of 179 countries in 2015 on the Maternal Mortality Ratio Index, slipping from 147th in 2014. The maternal mortality rate in Pakistan is 170 per 100,000 live births, in contrast to 30 in Sri Lanka. Under-five mortality rate, a proxy indicator reflecting multiple factors (level of nutrition, parents' education, and access to health services), is 85.5 per 1000 live births (2013), nearly as twice as high as India's. In this context, historical trends in healthcare improvements reveal serious strains on future perspectives.

Headey et al. (2016) used two standard indicators to assess access to health care over the last two decades (i.e. service coverage indicators): 'Four or more antenatal visits' (%), and 'Born in a medical facility' (%). Both indicators show a significant improvement when comparing 1991 and 2013 data for Pakistan (N=4,865; cf. table below)[11]. However, progress made was relatively smaller than other countries in the region on the same indicators and over a shorter period of time (noteworthy, both Bangladesh and Nepal presented comparatively worse initial situations).

Country	4 or > antenatal visits (%)	Born in a medical facility (%)
Pakistan % change (1991-2013)	134.6% (from 16.4% to 38.4%)	227.4% (from 15.2% to 49.8%)
Bangladesh % change (1997-2011)	262.6% (from 6.6% to 24%)	462.9% (from 4.4% to 24.6%)
Nepal % change (1996-2011)	417.8% (from 9% to 48%)	345.8% (from 7.9% to 35%)
India % change (1993-2006)	43.7% (from 32% to 45.9%)	51.5% (from 29.9% to 45.4%)

Source: Figures from Headey et al. (2016)

The measured achievements on these two indicators (see also Annex 3, graphs 2005-2015) mean that —if constant— by 2030 all Pakistani women will receive some medical care during pregnancy. However, the absence of reliable information on the total number of pregnancies that took place in the same period, in a context where stillbirths and miscarriages are attached to social stigma, introduce a serious constraint in analysing and projecting this dataset. In addition, progress in healthcare in Pakistan remains weighed down by severe political, economic and social challenges. It is only recently that health became a Government priority. Prime Minister Nawaz Sharif's National Health Program, which was launched in 2015, stands as a 'step

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[10] World Health Organization, The Healthy Growth Project, Conceptual Framework 'Stunted Growth And Development - Context, Causes and Consequences', retrieved February 2017

[11] Data show how the percentage of mothers having at least one antenatal visit during their pregnancy has linearly increased from 50 to 73 from 2005 to 2015, that is, an average annual increment of 2.3 points. For the location of delivery, the percentage of children being born in medical facilities has also experienced a linear increment (note: except for a possible outlier in the 2005-06 PSLM) of 26 points, that is, an average annual increment of 2.6 points.

forward towards making Pakistan a real welfare state' (the slogan of the campaign)[12]. However, concerns over the capacity of the ruling government to reform the health system in Pakistan do not only arise from a historical lack of political thrust in health issues, but also from deeply-rooted practices crippling the entire health system. Past public spending on health is a key indicator of the historical indifference Pakistan's successive governments (civilian and military) showed for the sector, as well as of the situation of health institutions' deprivation that is inherited from the last decades. Pakistan hardly ever spent more than 1% of its GDP on health (average 0.6%), with most part of the allocations to health having been consumed by the secondary and tertiary care, leaving merely 15% for the preventive and primary health care.[13] Only two countries in the world, the Democratic Republic of Congo and Bangladesh, have a lower ratio of GDP to health spending. Donor funding (ODA) has also been minimal (<2% of total national health expenditure)[14], far less than that committed in the Paris declaration on Aid Effectiveness in 2005, with little perspective of increase.

Part of the country's new health strategy, carried out by the PM National Health Programme and embedded in the National Health Vision (NHV, launched in 2016 in line with the SDGs), is to raise the allocation for the sector to 3% of GDP by 2025.[15] There is no doubt that this political commitment could bring significant change to the health system by 2030, and thereby be instrumental to stunting reduction. Adequate, responsive and efficient health financing —a 'strategic investment' as per the NHV— is, nevertheless, only part of the solution to reform a deficient national health system. Decades of weak management, lack of professional training, and huge disparities across Pakistani provinces constitute critical bottlenecks in improving health care in the country by 2030. Human resource is considered as one core building block for a functional health system. Yet, Pakistan has one of the lowest doctors, dentists, nurses and paramedics to population ratios. Other pressing issues include maldistribution of resources, retention issues, low work-place satisfaction levels (all resulting in significant brain drain); sub-optimal alignment of education curriculum with modern pedagogic techniques, international standards and local requirements; inadequate system of licensing of health practitioners; and apparent stagnancy in the coverage of community health workers, and their numbers (coverage and quality are far from the required standards)[16]. In particular, recruitment, transfer and promotion processes are based on factors such as political affiliation, ethnicity, class, religion, bribes, etc., rather than on competency and abilities. The lack of qualified health professionals is not only detrimental within health structures, but reverberates across all health institutions, including health ministries. As a result, key decision-making processes have often been driven by personal and electioneering strategies rather than on systematic needs assessments and comprehensive feasibility reports. Despite the overwhelming lack of access to health care, many hospitals in Pakistan are either vacant or underutilized, and corruption in procurement of medicines and equipment is not uncommon. This results in under-equipped installations and substandard medicines.

As another consequence of the poor quality of government-provided health services in Pakistan, the private sector plays a key role in health care, despite its sometimes questionable quality, high cost and dubious ethics of medical practice[17]. Considering the extent to which many Pakistanis already rely on the private sector, which in reality fills many gaps in health care delivery, there is also a dire need to improve state regulations and alignments not only between provinces but also between private and public services. In this context, two key uncertainties by 2030 are the implementation of the decentralization process, devolving a number of responsibilities including health to the district level governments, and how citizens might lobby for greater

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[12] Government of Pakistan, Prime Minister National Health Programme, retrieved February 2017

[13] Government of Pakistan, National Health Vision — Pakistan 2016-2025

[14] National Health Vision 2016-2025 "1. Health Financing"

[15] Junaidi, I 2016, "National health vision identifies critical issues", *Dawn*, September 02, 2016

[16] National Health Vision 2016-2025 "3. Human Resource for Health"

[17] Shaikh, BT 2015, "Private Sector in Health Care Delivery: a Reality and a Challenge in Pakistan", J Ayub Med Coll Abbottabad, 2015 Apr-Jun, 27(2)

transparency and liability from all the spectrum of health actors. At present, social activism in Pakistan to ensure that government-run health facilities and health programmes are functional and accountable is scarce and largely unsuccessful. Even though this could have a positive impact, it is more than likely that huge geographic disparities, which are also a key feature of health care in the country, in particular between urban and rural areas, will subsist in the outlook. In addition to the uneven distribution of facilities and resource, socio-cultural determinants of health contribute to this disparity, in relation with household's wealth in particular. In other words, access to healthcare, while clearly having an impact on chronic malnutrition[18], can be seen as a dependent variable of other underlying determinants. Overall, while the Pakistan National Health Vision proposes an accurate diagnostic of the key challenges the country currently faces to reform its health system, and while the government is undoubtedly taking steps in the right direction to ensure a better access to universal, affordable, and quality health care for its population, significant progress by 2030 will depend on much more than political will and increased funding, two necessary yet insufficient conditions for change.

2. HOUSEHOLD ASSETS AND PRIVATE WEALTH

Economic wealth is a second major underlying driver for sustained nutritional change. Indeed, an increase in household's wealth facilitates larger expenditures on food, health and other nutrition-relevant expenditures which have a direct impact on stunting reduction.[19] The strength of the statistical relationship between wealth and stunting may vary from one country to another[20], but always remain significant. Despite remarkable improvements over the years, big pockets of durable poverty in Pakistan constitute a critical challenge to stunting reduction in the country. Multiple standards and definitions are used to estimate poverty rates. By international standards[21], in 2013 they were 11.2 million people (or 6% of the total population) living below the US$1.90 a day poverty line, and 68.2 million people (or 37% of the population) living below the US$3.10 a day poverty line (cf. Annex 4). By national standards[22], they were 53 million poor people (or 29%) in the country in 2013, raising the national estimate of poor households from 6.8 to 7.6 million with the new methodology. Beyond the use of different methodologies, what matters for stunting reduction is the extent and slope of wealth increase.

Headey et al. (2016) used national Demographic Health Surveys (DHS)[23] to measure household assets, as a proxy indicator for wealth and a more reliable and easier to collect measure than income. Pakistan did relatively well between 1991 and 2013 when considering the asset index built by the authors (reaching 5.3 on a scale of 10), and although this indicator cannot be compared across countries (the index being country specific). This is consistent with the World Bank poverty estimates which also suggest that Pakistan achieved

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[18] See also: Bowser et al. (2016), "The impact of health care spending and income inequality on stunting prevalence"

[19] Headey et al. 2015, "The Other Asian Enigma: Explaining the Rapid Reduction of Undernutrition in Bangladesh", *World Development* 66, pp. 749–761

[20] See for example (for a comparison between India and Guatemala): Martorell, R. & Young, M.F. 2012, "Patterns of stunting and wasting: potential explanatory factors", *Advances in Nutrition*, 2012; 3: 227– 33

[21] World Bank, Pakistan, Poverty and Equity

[22] A new methodology for measuring poverty, based on national 2013-14 survey data, was adopted in 2016, notably incorporating costs of basic needs (CBN) in the formula for capturing non-food expenditures. In monetary terms, the Pakistani poverty line stands at Rs3,030 per adult equivalent per month. For an analysis on the matter, see: Zeb Khan, M. 2016, "New poverty line makes a third of Pakistanis poor", *Dawn*, Updated Apr 08, 2016, Retrieved February, 2017

[23] "[DHS] does collect information on assets and housing characteristics. These include ownership of household durables (TV, radio, motorcycle, tables and chairs and wardrobe), housing characteristics (floor, wall and roof materials and access to electricity), house ownership and farm land ownership." Headey et al. (2016)

substantial growth in household income and significant reductions in poverty over the same period, as all four countries[24].

Country	Authors' asset index (1-10)
Pakistan % change (1991-2013)	52.9% (from 3.5 to 5.3)
Bangladesh % change (1997-2011)	144.7% (from 1.4 to 3.5)
Nepal % change (1996-2011)	285.2% (from 1 to 4)
India % change (1993-2006)	41.9% (from 2.4 to 3.3)

Source: Figures from Headey et al. (2016)

Another set of national data[25] corroborate these findings, showing that from fiscal year 2002 to fiscal year 2014 the ownership of relatively more expensive assets increased even among the poorest. In the bottom quintile, the ownership of motorcycles thus increased from 2 to 18 percent, televisions from 20 to 36 percent and refrigerators from 5 to 14 percent (see Annex 5). In contrast, there was an overall decline in the ownership of cheaper assets like bicycles and radios. Housing quality in the bottom quintile also showed an improvement. The number of homes constructed with bricks or blocks increased while mud (*katcha*) homes decreased.[26]

Poverty, however, is a multifaceted phenomenon. For instance, the evolution of food expenses (as per the total consumer expenditure), and greater prioritization of commodities over other goods and necessities, need to be taken into account when targeting stunting reduction.[27] In addition, land issues and competing uses of resources have led to greater insecurity for some of the most vulnerable population (e.g. eviction of hereditary tenant households and replacement by daily wage earners in the agricultural sector), trapped in a negative cycle of indebtedness. Ultimately, important differences between rural and urban areas, as well as between provinces and districts should be noted. This is particularly tangible when considering the Multidimensional Poverty Index (MPI), which captures the severe deprivations that each person experiences with respect to education, health and standard of living[28].

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[24] World Bank 2016,

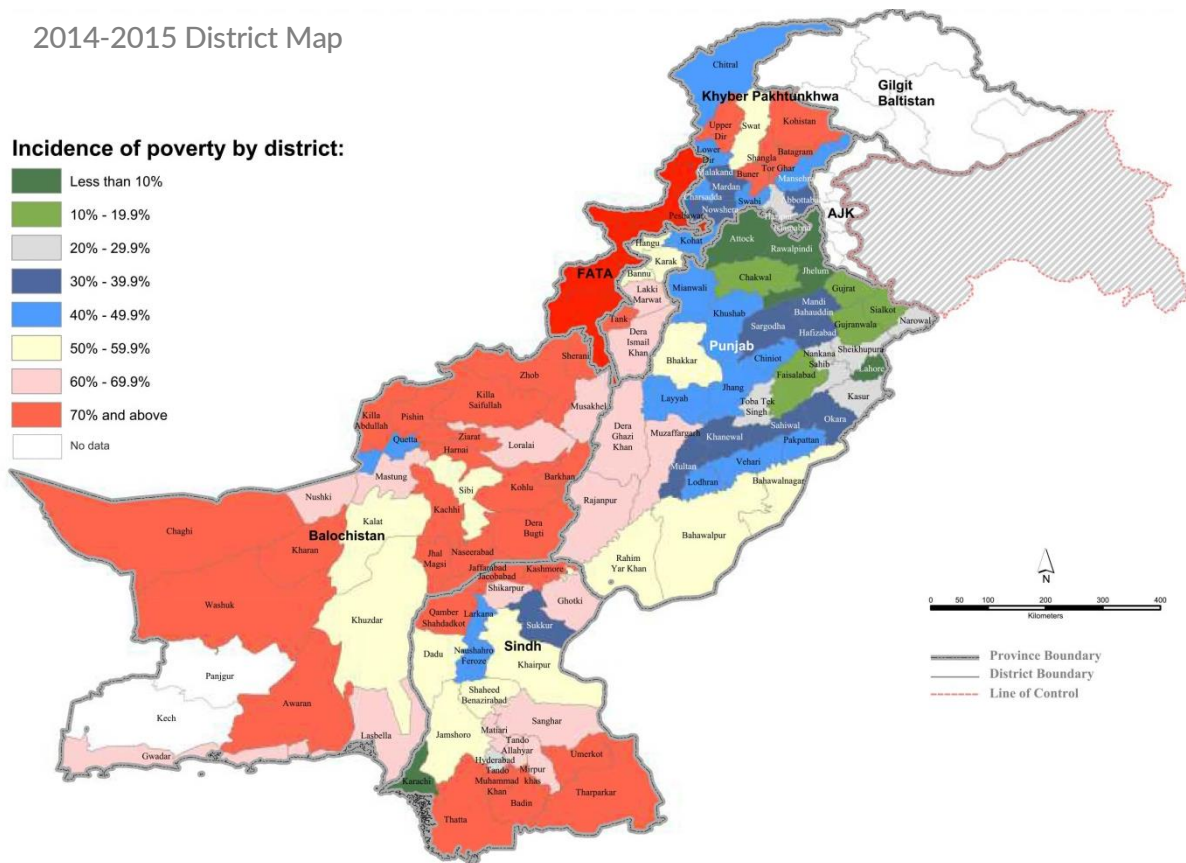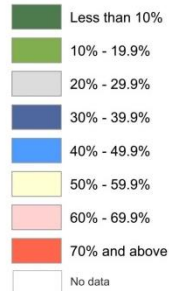[25] Pakistan Bureau of Statistics, Household Income and Expenditure Survey (HIES)

[26] World Bank 2016, *Pakistan Development Update, Making growth matter*

[27] The share of consumer expenditures on food in Pakistan is approximately 40% of the total expenditures on goods and services since the 2010's (cf. United States Department of Agriculture, Economic Research Services, Food expenditures, USDA calculations based on annual household expenditure data from Euromonitor International)

[28] UNDP 2016, *Multidimensional Poverty in Pakistan*

2014-2015 District Map

Incidence of poverty by district:

- Less than 10%
- 10% - 19.9%
- 20% - 29.9%
- 30% - 39.9%
- 40% - 49.9%
- 50% - 59.9%
- 60% - 69.9%
- 70% and above
- No data

Province Boundary
District Boundary
Line of Control

Source: UNDP (2016) Multidimensional Poverty in Pakistan

There are indeed stark regional disparities in poverty across Pakistan. The proportion of people identified as 'multidimensionally' poor in urban areas is significantly lower than in rural areas: 9.4% and 54.6%, respectively. At the provincial level, in 2014/15, MPI headcount ratios ranged from 31.4% in Punjab (with an intensity of 48.4%), to 71.2% in Balochistan (with an average intensity of 55.3%)[29]. In terms of progression, multidimensional poverty has continuously declined in Pakistan since 2004/05. The MPI (a 0 to 1 index) fell from 0.292 in 2004/05 to 0.197 in 2014/15, while the poverty headcount ratio fell from 55.2% to 38.8%. The intensity of deprivation also declined over the same period, falling from 52.9% to 50.9%. Similar trends are observed across all provinces and regions, with the exception of Azad Jammu and Kashmir, which experienced an increase between 2010/11 and 2012/13. In terms of relative change in its MPI, Punjab accounts for the highest relative reduction (40.2%), while Balochistan experienced the slowest progress in reducing multidimensional poverty, with a relative change of only 17.7%.[30] Noteworthy, education counts for the

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[29] The headcount ratio, H, is the proportion of the multidimensionally poor in the population: $H = q/n$ where q is the number of people who are multidimensionally poor and n is the total population. The intensity of poverty (or deprivation) reflects the proportion of the weighted component indicators in which, on average, poor people are deprived (for the formula, see UNDP, Technical Notes, 2015)

[30] UNDP 2016, *Multidimensional Poverty in Pakistan*. Findings at district level state that: "Larkana, Attock, Malakand, T.T. Singh and Hyderabad have made the most progress, reducing absolute poverty headcount ratio by more than 32 percentage points. In relative terms the best performers were the districts of Islamabad, Attock, Jhelum, Lahore, Karachi and Rawalpindi. On the other hand, some districts have experienced an increase in their poverty incidence. In absolute and relative terms, the districts of Umerkot, Harnai, Panjgur, Killa Abdullah and Kashmore have witnessed the highest increase in incidence of poverty." (Ibid.)

highest percentage of contribution —almost a third alone— to 2014/15 MPI (29.7%), while assets ranks fifth in importance (only representing 6.3%).[31]

Furthermore, Pakistan's economic growth (essentially driven by strong domestic demand) and staggering fall in poverty over the last decade, which both attest of the government's success in achieving macroeconomic stability, have not been accompanied yet by a structural reform to invest in health, education, and nutrition. This reform remains to be made, while changes in global demand exacerbated the effects of Pakistan's long-term decline in competitiveness, and while measures of inequalities show that these have worsened. The Gini coefficient, which measures income inequality, was 0.35 in 1987/88 and had risen to 0.41 by 2013/14.[32] Despite a burgeoning, better-educated middle class, social disparities remain daunting. The consumption of the richest 20 percent of the Pakistani population is now sevenfold that of the poorest 20 percent. Economic discrimination is still a day-to-day reality for many Pakistanis, in particular for women and religious minorities. Besides, cohorts of young graduates trying to grow outside the working class are met with few opportunities in a still atrophied labour market, stigmatized by the terrorist threat and fears of instability on the international stage.

Eventually, to sustain improvement in household's wealth by 2030 will depend on three factors: fostering an even access to primary and secondary education (as a key contributor to multidimensional poverty reduction, cascading downwards on stunting reduction), generating opportunities to harvest the demographic dividend and continue to fuel domestic demand, and seriously tackling the trend of growing inequalities. This will require addressing two of the country's biggest challenges: institutionalized corruption and its governance reform. Frequent scandals associated with the flagship Benazir Income Support Program (a social protection intervention targeting women living in chronic poverty launched in 2008), for instance, act as reminders of the difficulty to ensure systematic monitoring and control processes. The governance reform, on its end, has a crucial impact on the responsibilities and resources devoted to the different provinces in Pakistan in order to implement national policies prioritizing the poor and socially disadvantaged population.

3. MATERNAL AND PATERNAL SCHOOLING AND THE EDUCATION SYSTEM

The impact of an improved access to education, in particular among girls and women, has long been positively associated with a range of social indicators. Education deprivation notably plays a key role in poverty and child undernutrition, and, in particular, lower parental education is significantly associated with stunting prevalence in primary school children[33]. The mechanisms through which parental schooling translated into child health outcomes (improvement in HAZ score for instance) combine multiple 'pathways', such as greater household income, later marriages, exposure to media, literacy, labour market participation, health knowledge, and the extent of maternal empowerment within the home.[34] These pathways are all leverages for a reduction in children chronic malnutrition.

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[31] UNDP 2016, *Multidimensional Poverty in Pakistan*

[32] UNDP 2016, *Development Advocate Pakistan*

[33] See for instance, Mushtaq et al. 2011, "Prevalence and socio-demographic correlates of stunting and thinness among Pakistani primary school children", *BMC Public Health*, 2011, 11:790. In this study, it was notably found that "stunting among children with illiterate parents was 14% [and] significantly decreased to 4.5% among children with parents having higher education (P <0.001)".

[34] Aslam, M and Gandhi Kingdon, G 2012, "Parental Education and Child Health—Understanding the Pathways of Impact in Pakistan", *World Development*, <u>Volume 40, Issue 10</u>, October 2012, Pages 2014–2032

Headey et al. (2016) compared maternal and paternal education in the four countries under consideration by analysing the number of years of schooling (data collected in national DHS). Pakistan presents an improvement of both indicators between 1991 and 2013. However, the change registered in the country is relatively less good than in Bangladesh or in Nepal, both countries achieving higher success in similar time periods, i.e. increasing in higher proportions maternal and paternal years of school. In other words, while Nepal is fast catching up in absolute number of years, and while India presented a much better initial situation, progress in Pakistan is comparatively slower.

Country	Maternal education	Paternal education
Pakistan % change (1991-2013)	98.7% (from 1.8 years to 3.5)	31.3% (from 4.5 years to 5.9)
Bangladesh % change (1997-2011)	122.4% (from 2.4 years to 5.3)	41.2% (from 3.5 years to 4.9)
Nepal % change (1996-2011)	211.1% (from 1.1 years to 3.5)	39.3% (from 4.0 years to 5.6)
India % change (1993-2006)	46.2% (from 3.4 years to 4.9)	13.0% (from 5.9 years to 6.7)

Source: Figures from Headey et al. (2016)

While overall these indicators look encouraging[35], they need once again to be contextualized so as to anticipate more accurately their evolution by 2030. When it comes to education, Pakistan has long shown some of the worst indicators globally, be in terms of enrolment rates or public spending on education. Uneven access, gender disparities, and low quality education represent serious stumbling blocks on the road to stunting reduction, particularly when considering the negative cycle of intergenerational stunting. One main indicator of the existing challenges in the country is school drop-out, a figure that emphasizes gender inequalities. In Pakistan, 26% of primary school-aged children are out of school (national average), which is 22% among boys and 30% among girls.[36] When receiving the Nobel Prize in 2014, Malala Yousafzai became to the world the face of the struggle of Pakistani girls to exert their basic right to education. And while Malala is now studying in the UK, where she and her family had to seek refuge (Malala's advocacy for girls' educational rights put her under serious threat, where gunmen attempted to assassinate her in 2012), she remains a vibrant incarnation of the many obstacles on the way of girls to attend schools and universities. On one hand, persistent perception of low returns on girls' education is particularly evident in rural areas, as a main driver for girls' drop outs from primary education.[37] On the other hand, a structural impediment is the segregation law in place in the country, requiring girls to study separately and while a smaller number of infrastructures is available to them[38]. Altogether this can explain that although progress can be measured in terms of the greater ratio of the population having access to primary education (for both sexes), Pakistan hardly registered any significant improvement in closing the gender gap in educational attainment in the last decade:

[35] It should also be noted that international education data (as opposed to those published by the Pakistan Bureau of Statistics) show for both educational attainment and years of schooling data, both male and female, that even if important progress has been made from the 1990's, a standstill or even a regression appears in the last data available 2005-2010, in contrast with neighbouring countries which continue to improve.

[36] UNESCO Global Education Monitoring Report 2016 (based on national DHS 2012 data)

[37] Khan, GA, Azhar, M, and Shah, SA 2011, "Causes of Primary School Drop out Among Rural Girls in Pakistan", *Sustainable Development Policy Institute* (SDPI), Working Paper Series, #119, July 2011

[38] For a local example, in the Kohat district there is a total of 483 schools for boys (from primary to higher-secondary education) and 341 for girls (see the infographics as part of the Alif Ailaan campaign for education reform in Pakistan).

Educational Attainment

Source: Own elaboration with data from Pakistan Bureau of Statistics Social And Living Standards Measurement Surveys (PSLM) from 2004 to 2015. Population 10 years and older that has completed primary level (i.e. Class 5) or higher, expressed as a percentage of the corresponding total population.
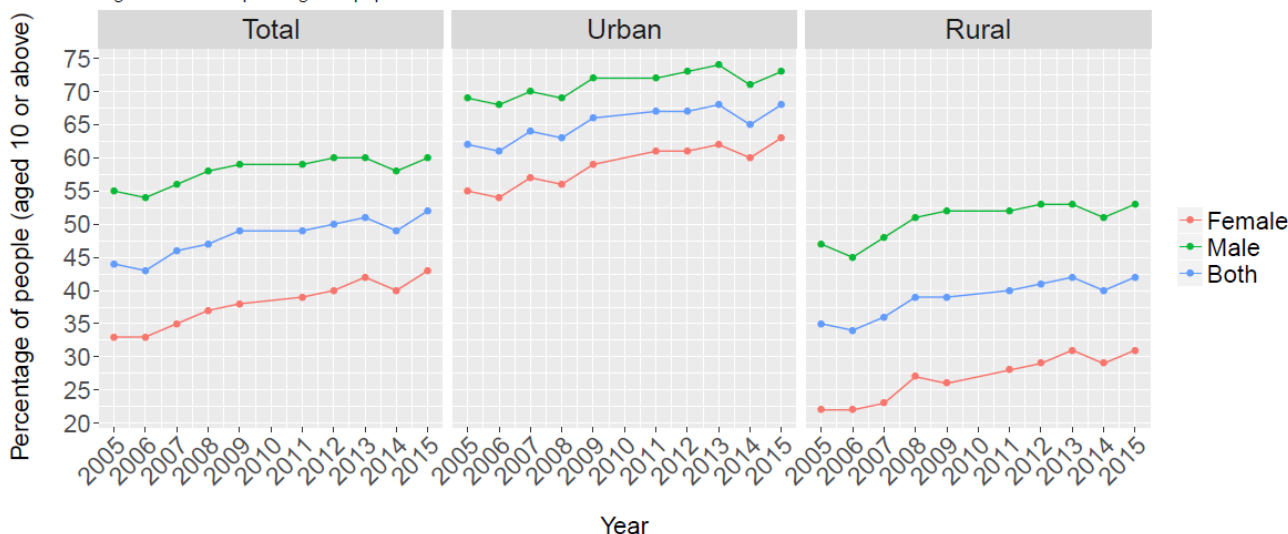
And yet, statistical analysis proves that, in Pakistan, an additional year of maternal schooling resulted comparatively in higher HAZ improvement (by 0.032, as opposed to 0.021 for one additional year of paternal schooling[39]). Improving an equitable access to education could therefore, maybe even more than elsewhere, translate in significant gains in stunting reduction. Focusing on adolescent and adult education (prospective mothers and childbearing age women), with nutrition-sensitive curricula aiming at increasing awareness level, in particular of the 1000-day window of opportunity, would have long term effects for the considered population. The necessary reform of the education system, however, will not be an easy task, for at least three reasons: minimal public spending on education expenditures, poor standards in policy implementation, and a daunting war on education under the Taliban's rule in the country.

Public financing of education was patently not a priority in Pakistan in the last decades, and the country traditionally records among the lowest levels of education spending in the region (alongside Bangladesh).

Education remains drastically under-funded. As a result, lack of basic

Education Expenditure

Source: Own elaboration with data from World Bank.

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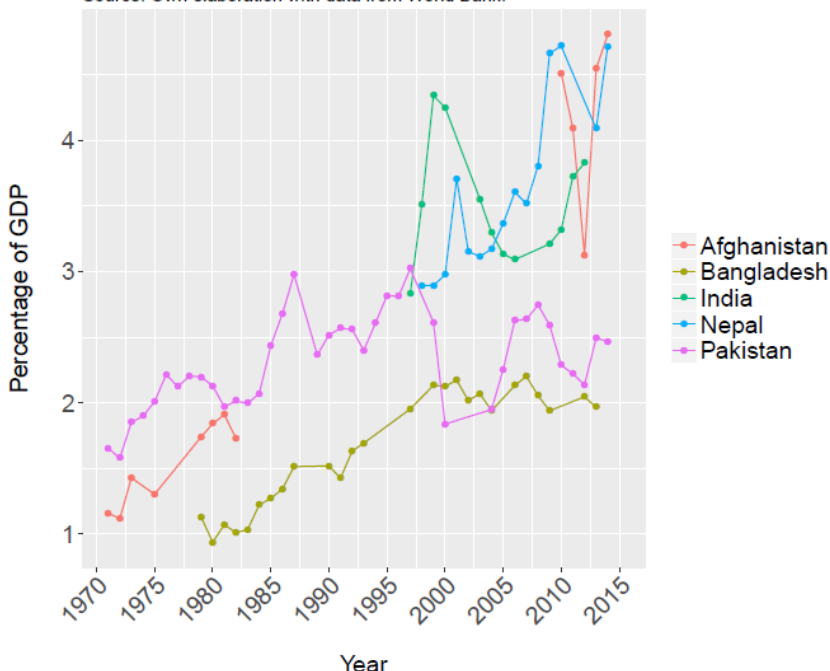
[39] Cf. Headey et al. (2016), 'Drivers of nutritional change in four South Asian countries: a dynamic observational analysis', *Maternal & Child Nutrition*, Vol 12(Suppl. 1), May 2016, pp. 210–218

facility (water, electricity, etc.) and little investment in human resource (poorly trained teachers and their often political rather than merit-based appointment) constitute the backdrop against which any substantial reform will have to be implemented. In this context, at this rate of funding and unsteady progress, it is unlikely that Pakistan can achieve its commitment to education for all.

Announcements of increased budgetary allocations to the sector since 2015 certainly constitute a game changer. These announcements, however, should be handled carefully and articulated to the existing socio-spatial framework of the existing education system in Pakistan, whereby state schools (in particular for girls) are not evenly accessible in the country and rapidly expanding *madrasas* (Islamic schools, which growth have been observed since years) are often given preference even where state schools are in reach.[40] Implementing a nutrition-sensitive educational agenda is ultimately increasingly challenged at times when repeated Taliban's attacks on schools and universities have become a more common modus operandi and adversely impact efforts to put —and keep— girls and boys at school.

4. FERTILITY AND DEMOGRAPHIC GROWTH

Fertility is also found to be a determinant underlying driver to stunting. Association between the young age of the mother, birth spacing, and maternal and paternal pregnancy intention have all a significant relationship to stunting[41]. Fertility in low and middle income countries can arguably be considered as a dependent variable of other factors, primarily education, whereby gains in female education can result in increased bargaining power of women within households, increased access to and understanding of family planning methods, smaller desired family size, higher labour force participation and increased opportunity costs, and eventually better access to health care[42]. Headey et al. (2016) considered fertility independently, through two indicators for the four countries under consideration: 'Birth intervals' (in years) and 'Number of children'.

From the perspective of these two indicators, Pakistan showed between 1991 and 2013 a unique, surprising reduction of birth intervals (from 0.1 year), as well as a significant decrease in number of children (-0.6 children per women on average)[43]. Comparatively to the other countries Pakistan presents the smallest average birth interval (and a trend that doesn't show any improvement of that indicator), and the highest average number of children (while all three other countries are below the line of three children per woman, Bangladesh even reaching 2.5 in 2011).

Country	Birth intervals	Number of children
Pakistan % change (1991-2013)	-3.8%　　　(from 2.8 years to	-13.4%　(from 4.5 children to

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[40] On this topic, see the interesting article on the Bangladesh madrasa modernization programme: Bano, M 2014, "Madrasa Reforms and Islamic Modernism in Bangladesh", *Modern Asian Studies*, 48(4), pp. 911–939

[41] See for instance: Rahman, M 2015, "Is Unwanted Birth Associated with Child Malnutrition In Bangladesh?", *International Perspectives on Sexual and Reproductive Health*, 2015, 41(2):80–88

[42] Pradhan E, 2016, "Link Between Education and Fertility In Low and Middle Income Countries", Harvard T.H. Chan School of Public Health

[43] Keeping in mind the potential bias already mentioned in terms of information gap (total number of pregnancies and data on stillbirths and miscarriages). Note also that the adult target population for the DHS surveys is all women age 15-49 and all men age 15-59. However, the statistics included in Headey et al. (2016) are given for a sub-sample of the whole DHS sample that include only those children under 5 for which anthropometric measures could be obtained and their mothers and fathers. That is, the women for which these fertility values are estimated all have children under 5, which results, for instance, in an average number of children per woman much higher than the one estimated for the whole population (the PSLM survey 2013 for Pakistan estimates it to 2.12 for the women population between 15 and 49). This bias is also present in all figures reported for parents/households in Headey et al. (2016) and used in this report, but is especially noticeable when talking about fertility.

	2.7)	3.9)
Bangladesh % change (1997-2011)	22.8% (from 3.4 years to 4.2)	-23.6% (from 3.3 children to 2.5)
Nepal % change (1996-2011)	13.9% (from 3 years to 3.4)	-18.6% (from 3.4 children to 2.8)
India % change (1993-2006)	0% (from 3 years to 3)	-6.9% (from 3.1 children to 2.9)

Source: Figures from Headey et al. (2016)

So as to be able to understand these trends and project them by 2030, it matters to once again consider fertility rates in a contextual, systemic approach. The country's slow demographic transition is no secret. It has been estimated that by 2050 the Pakistani population will reach 342 million people[44], which will make Pakistan the sixth more populated country after India, China, the USA, Indonesia and Nigeria in 2030. Pakistan has indeed the highest population growth (1.49% 2014 est.), and highest birth and fertility rates in South Asia[45], and the extent to which the government's strategy to reduce chronic malnutrition in U-5 children takes this growth into account is uncertain at that stage. This demographic challenge is the product of compound factors. At a very proximal level, the country demonstrates low rates of contraception use. The overall Contraceptive Prevalence Rate (CPR) for 2014/2015 is 25.54%, with high regional disparities.[46] The lowest CPR was found in Balochistan (6.93%), and the highest was observed in the Federal district of Islamabad (41.36%). In Bangladesh, this figure is above 60%. More importantly, the latest national CPR in Pakistan presented a slight decrease as compared to the previous one: 27.41% in the year 2013-14.[47] When breaking down fertility figures by age-specific rates, the trends are, indeed, worrying.

Age-specific Fertility Rates
Source: Own elaboration with data from Pakistan Bureau of Statistics Social And Living Standards Measurement Surveys (PSLM) from 2004 to 2015.

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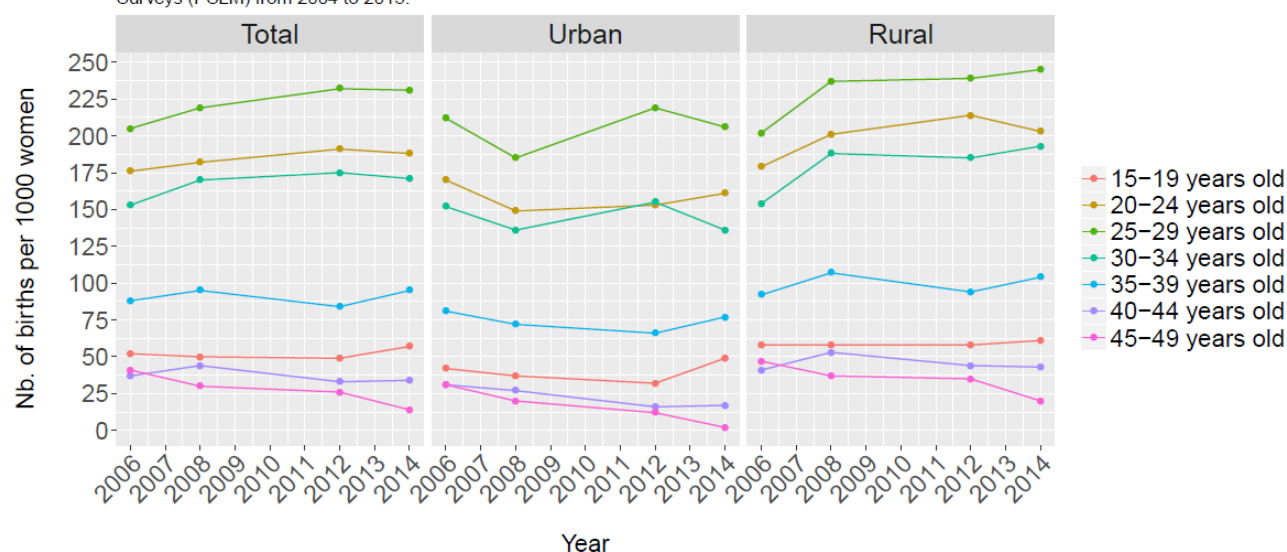
[44] Sathar, ZA, Royan, R and John Bongaarts, J 2013, *Capturing the Demographic Dividend in Pakistan*, Population Council Book Series, Special Issue, April 2013, Volume 1, Issue 1

[45] World Bank 2014, Birth rate and Fertility rate

[46] Pakistan Bureau of Statistics, *Contraceptive Performance Report 2014-2015*

[47] Ibid.

Between 2006 and 2014, the number of births per 1000 women in the younger generations (15-19, 20-24, and 25-29 years old) overall presents an increase over time, demonstrating that while mortality rates have dropped since decades, the concrete reduction in fertility rates is still pending, and will not turn into reality without a clear policy and social change.

The religious factor has sometimes been advanced to explain high fertility rates in Muslim countries, and this very indicator has a history of being particularly controversial in the country. The examples of Bangladesh, Indonesia or Iran have nevertheless all proven than the successful implementation of determined family planning policies and deployment of community outreach services (notably promoting breastfeeding, thereby impacting birth spacing) overcome other practices when it comes to birth control. Strengthening Pakistan's National program on Family planning and Primary health care (FP & PHC) could be instrumental to that end. In the public sphere, Pakistani researchers and experts are warning that the demographic explosion of Pakistan, long considered as an asset (both in economic and political terms, in particular in the context of the long-lasting rivalry with India), is no longer a sustainable approach. Having a large population of young employable people does not automatically translate into economic prosperity, and especially not when the lack of simultaneous investment in health, education, and good governance prevent the country from harnessing its demographic dividend.

The major challenge facing the country to lower its fertility rates seems to lie with enduring inequality, not so much across income levels but across genders and across urban and rural areas.[48] In 2015, Pakistan obtained the worst rank in terms of gender gap[49] right after Syria (Pakistan ranked 143 out of 144 countries), obviously behind other countries in South Asia. The gender gap in Pakistan, causing mainly female inequalities, is made of and nurtured by several factors such as gender–based violence, the lack of women's economic agency or the lack of access to education.

In this context, despite the call upon an accelerated family planning programme (which could, according to Dr Zeba Sathar, the Director of the Population Council of Pakistan, bring the 342 million figure down to 266 million)[50], and despite records that millions of women have declared that they do not want more children or want to space births, but are unable to do so, the likeliness to see fertility rates in the country substantially drop by 2030 is seriously low.

5. OPEN DEFECATION AND SANITATION ISSUES

Poor sanitation is a major public health concern linked to several health outcomes, including childhood stunting. Mounting evidence has shown that open defecation in particular is associated with the prevalence of stunting[51]. Lack of sanitation, and particularly open defecation, contributes to the incidence of diarrhoea and

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[48] See the interview with Mehtab Karim, a senior research adviser and senior fellow at the Pew Forum on Religion and World Affairs, with Eric Zuehlke, an editor at the Population Reference Bureau: "Changes in Fertility Rates Among Muslims in India, Pakistan, and Bangladesh" (April 2009)

[49] Through the *Global Gender Gap Report*, the World Economic Forum quantifies the magnitude of gender-based disparities and tracks their progress over time. While no single measure can capture the complete situation, the Global Gender Gap Index presented in this *Report* seeks to measure one important aspect of gender equality—the relative gaps between women and men across four key areas: health, education, economy and politics. The table in report is taken from the *Global Gender Gap Report 2016*.

[50] Zofeen, TE 2015, "Family planning may be our last hope", updated April 3, 2015, retrieved February 2017

[51] See for instance, Spears, D, Arabinda Ghosh, A and Cummin, O 2013, "Open Defecation and Childhood Stunting in India: An Ecological Analysis of New Data from 112 Districts", PLoS ONE 8(9): e73784

to the spread of intestinal parasites, which in turn cause malnutrition (i.e. environmental enteropathy).[52] In 2013, diarrheal diseases were estimated to cause 20% of post neonatal deaths (children aged 1-59 months) in Pakistan.[53] Overall, open defecation explains 54% of international variation in child height; in contrast, GDP only explains 29 percent.[54] Poor sanitation also has a financial cost and in 2012 the Water and Sanitation Program reported that Pakistan was losing the equivalent of 3.9% of its GDP every year because of inadequate sanitation[55] and of the consequent deaths or diseases resulting from it.

Making the assumption that "any fixed point defecation is likely to be better than open defecation and that negative community level sanitation externalities are more harmful that sanitation practices within the household', Healey et al. (2016) compared cluster-level[56] open defecation:

Country	Open defecation (cluster %)
Pakistan % change (1991-2013)	-55.9% (from 50.2 to 22.1)
Bangladesh % change (1997-2011)	-81.6% (from 26.0 to 4.8)
Nepal % change (1996-2011)	-44.1% (from 86.8 to 48.5)
India % change (1993-2006)	-28.2% (from 63.5 to 45.6)

Source: Figures from Headey et al. (2016)

This is certainly the area in which Pakistan registered the most significant improvement, both from a national and regional perspective. The situation has indeed gradually improved over the years. Until 2007 more than half of Pakistan's population did not have access to improved sanitation facilities[57]. In 2008, 51.2% Pakistanis were reported using improved sanitation and, in 2015, the country successfully reached the Millennium Development Goal (MDG) for sanitation[58], with nearly 64% of the population having access to improved sanitation. This achievement made Pakistan one of the world's 95 countries to attain the MDG for sanitation.

[52] WHO, UNICEF, USAID 2015, "Improving Nutrition Outcomes With Better Water, Sanitation And Hygiene: Practical Solutions For Policies And Programmes"

[53] WHO, Department of Maternal, Newborn, Child and Adolescent Health, 2013, "Pakistan, Neonatal and child health country profile", retrieved November 2016

[54] Spears, D, Ghosh, A and Cumming O 2013, "Open Defecation and Childhood Stunting in India: An Ecological Analysis of New Data from 112 Districts", PLoS ONE 8(9): 10.1371

[55] The World Bank, 2012, "Inadequate Sanitation Costs Pakistan up to 3.9% of GDP", retrieved November 2016

[56] Where cluster stands here for sampling unit in the DHS survey, which generally corresponds to villages; that is, reported data represent the percentage of villages engaging in open defecation.

[57] The World Bank 2016, "Improved sanitation facilities", Pakistan. Improved sanitation can include: flush toilet, piped sewer system, septic tank, flush/pour flush to pit latrine, ventilated improved pit latrine, pit latrine with slab...

[58] UNICEF 2015, "Improved Access to Sanitation, Progress Report 2013-2015"

Sanitation

Source: Own elaboration with data from Pakistan Bureau of Statistics Social And Living Standards Measurement Surveys (PSLM) from 2004 to 2015.
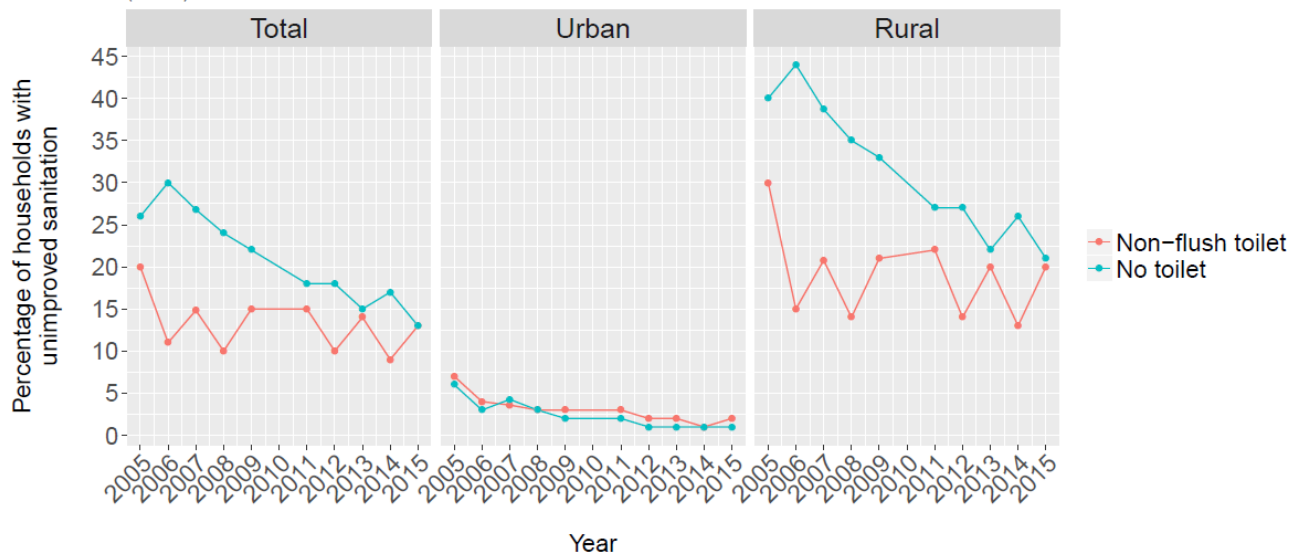
There are, however, big disparities within the country (with 83% coverage in urban areas, while rural areas barely exceed 50% coverage, despite a much more rapid evolution). The population having no access to adequate sanitation is estimated to be 68 million people.[59] Moreover, open defecation is still practiced in 21% of rural areas (and 13% of Pakistan total sanitation coverage)[60]. In 2015, 25 million people were still practicing open defecation in Pakistan.[61]

As for the health sector, the Ministry of Planning, Development and Reforms designed its Vision 2025[62], a roadmap for Pakistan, in which it recognized the importance of improved sanitation. The Vision highlights the pressing need to eliminate open defecation and advocates for the increase of improved sanitation access to 90% of the population by 2025. This national target is in line with the Sustainable Development Goals. At federal level, the Ministry of Climate Change (former Ministry of Environment) is responsible for the development of national strategies regarding sanitation and for implementing the 2006 National Sanitation Policy[63] which set up an open defecation free (ODF) environment. In 2011 a constitutional amendment shifted the policy and administrative responsibilities of sanitation (and water) to provinces. Provincial Governments are now responsible for planning, funding, regulating and monitoring the development of sanitation services and within this framework, delegate the implementation to local governments. The Pakistan Approaches to Total Sanitation (PATS)[64] have been designed to support the National Sanitation Policy. They were developed by the Ministry of Climate Change, under the guidance of UNICEF, after the devastating floods in 2010[65] and include several sets of national guidelines for sanitation programs, such as Community-led Total Sanitation[66],

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[59] WaterAid 2016, "Pakistan"

[60] Joint Monitoring Programme for Water Supply and Sanitation, 2015, Country files, Pakistan, WHO and UNICEF

[61] UNICEF Media centre, 2015, Pakistan "Without toilets, childhood is even riskier due to malnutrition"

[62] Government of Pakistan, Ministry of Planning, Development and Reform, Pakistan 2025 One Nation – One Vision

[63] Government of Pakistan, Ministry of Environment, 2006, National Sanitation Policy. The policy provides guidelines and support to the different administrative divisions of Pakistan (federal, provincial, federally administrated territories, local and development authorities) to improve sanitation coverage.

[64] Government of Pakistan, Ministry of Environment, 2011, Pakistan Approach to Total Sanitation (PATS)

[65] About 18 million people were affected. 12 million households and 10,000 schools were lost or damaged. Disasters Emergency Committee, Pakistan Floods Fact and Figures

[66] SACOSAN V, 2013, "Pakistan Sanitation Country Paper, Community-Led Total Sanitation", retrieved November 2016

School-Led Total Sanitation, Sanitation Marketing or Disaster Response. Eventually, the end goal of the approach is to encourage communities to take control of their sanitation development: for instance, involving community resource persons (functioning as catalysts for local community's practices changes) and working closely with community institutions (such as schools or village committees). It has been successfully set into motion in Pakistan and has brought together Provincial Governments, organizations from the civil society (such as WaterAid and MuslimAid) and international institutions with the support of Provincial Governments, UNICEF and civil society partners. Media also play an important role in creating awareness on sanitation related issues and alarming the public on poor sanitation health impacts.

Despite the important framework that has been deployed by the government and development partners to increase population's access to improved sanitation, important challenges remain and interfere with its full deployment. The lack of adequate drainage and sewerage systems and the missing linkages between hardware components and software health and hygiene education have seriously constrained the benefits of improvement. Gaps in monitoring (mainly coming from a lack of methodical data collection form the different administrative division authorities) and funding are also among the prominent stakes. The lack of implementing capacity from the government partly comes from the important gap in funding (estimated to be up to nearly US$2 billion in 2015)[67]. Furthermore, considering the current resources mobilization trend, and population growth, external support was judged insufficient to meet the funding gap and achieve total access to sanitation by 2030.

CONCLUSION

Globally 159 million under-five year olds were estimated to be stunted in 2015, the majority of them living in Asia. The global and regional trends in stunting prevalence are decreasing, and stunting rates are generally dropping. Pakistan, however, seems to resist these trends, and has registered a +3.3% increase in stunting prevalence since 2001. In face of this reverse move, the Pakistani government has set the ambitious goal to reduce stunting from 44% to 34% by 2017 (or less 1.9 million children previously stunted) and has endorsed the Sustainable Development Goals to "end hunger and ensure access for all, especially for the poor and vulnerable, to nutritious and sufficient food the year round" by 2030. To do so requires a concerted and consistent action engaging the broad scope of nutrition actors, with a focus on the underlying drivers of stunting.

Direct causes of chronic malnutrition that operate at the individual level include inadequate dietary intake and diseases. Underlying factors are related to unhealthy household environment, inadequate health services, household food insecurity, as well as inadequate care and feeding practices for women and children. An increasing number of studies have established statistical associations between stunting and a number of socio-economic variables in an attempt to identify the main drivers on which to focus policies and action to reduce chronic malnutrition. This analysis is based on statistical evidence relating stunting in Pakistan to five key determinants with a regional perspective (comparison with Bangladesh, India and Nepal). Each of these determinants has been considered within the system it belongs to (healthcare, households' wealth, education, demographic growth, and sanitation), so as to discuss their respective evolution by 2030 against a realistic, contextualized picture of the situation. For each of them, historical trends reveal serious strains on future perspectives. While the country registered significant improvement nation-wise on economic growth, poverty reduction, and improved access to sanitation, many challenges remain. The poor state of Pakistan's healthcare and education systems are two major hindrances to stunting reduction in the country. These two sectors

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[67] Shrestha, RL, Murali, R and Shrestha GB 2015, Sustainable and equitable Financing of sanitation services, Freshwater Action Network

inherit decades of low public spending, weak management, as well as a lack of professional training, and both present huge disparities across Pakistani provinces. The insufficient political and financial investment in human resource and structural reforms reverberate on decision-making processes and policy implementation, constituting critical bottlenecks in efficiently unfolding any chronic malnutrition strategy in the country. Overall, durable regional disparities —and between urban and rural areas— and growing socio-economic inequalities are two key features which will at best nuance, at worst jeopardize any lasting progress in social development, in particular for the poorest and most marginalized.

The five drivers discussed here present strong interrelations. Fertility, for instance, is often seen as a dependent variable of education. What results from this analysis is that focusing on closing the gender gap in Pakistan, in the framework of nutrition policies, is a transversal priority to ensure the most impactful action on stunting reduction by 2030. In a general context where the country needs to urgently generate opportunities to benefit from its demographic dividend, address the terrorist threat, and allocate scare resource among competing priorities, reducing chronic malnutrition is a milestone imperative with short and long term gains for the population.

Annex 1: Pakistan Stunting Prevalence Rates (1985-2013)

Source: Own elaboration with data from the 2016 Edition of the Joint Child Malnutrition Estimates, UNICEF/WHO/World Bank Group.
Stunted children are defined as those whose are below minus two standard deviations from median height−for−age of the WHO Child Growth Standards.
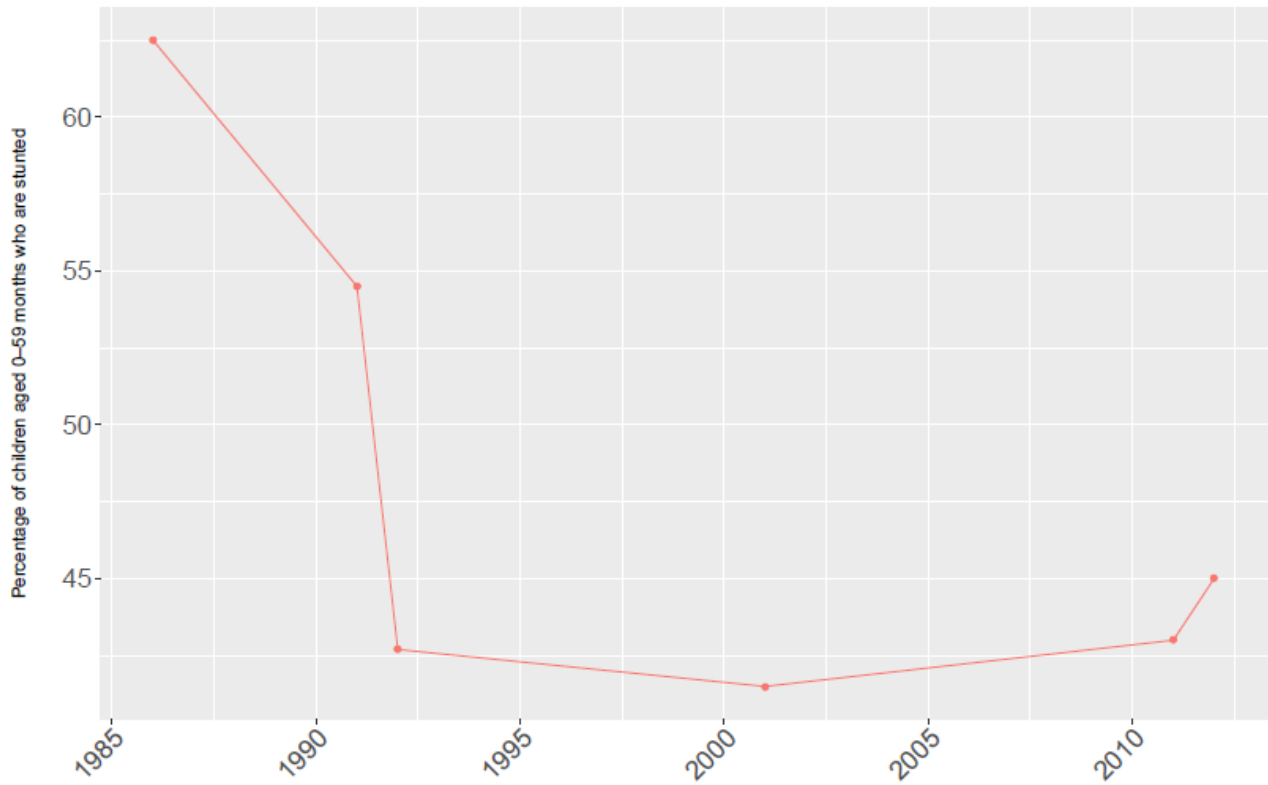
Annex 2: The underlying drivers of improved nutrition status
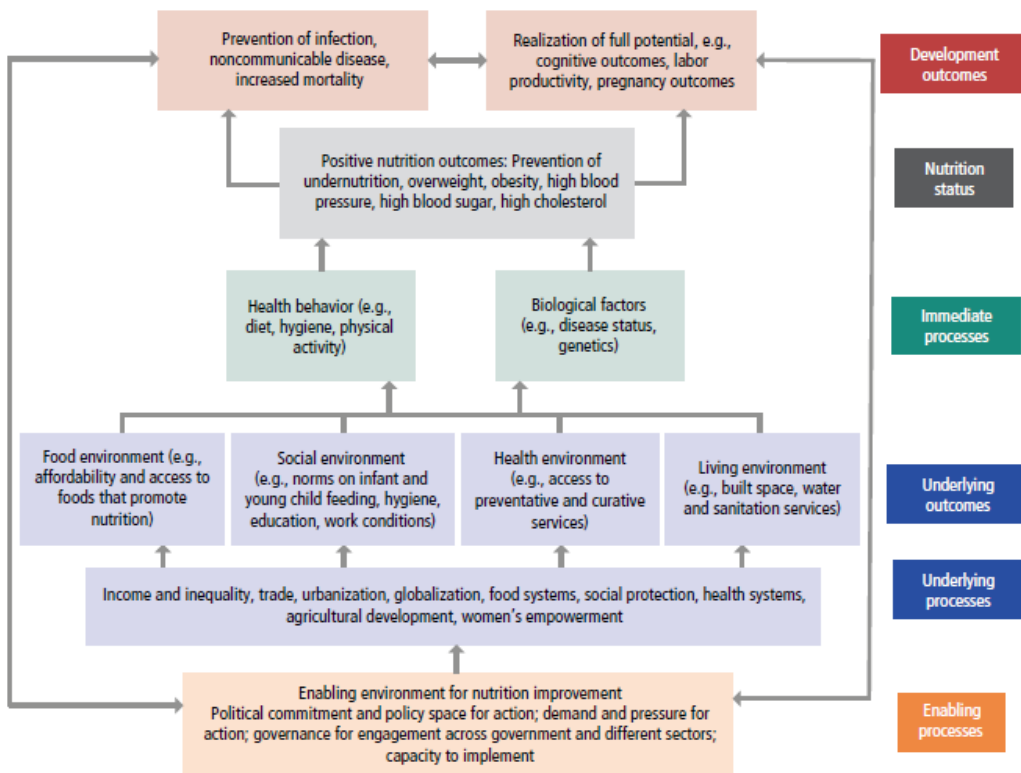
Source: Generation Nutrition Report (2016)

Source: Authors.

Note: Underlying drivers combine underlying outcomes and underlying processes.

Annex 3: Antenatal consultation and Children born in medical facilities
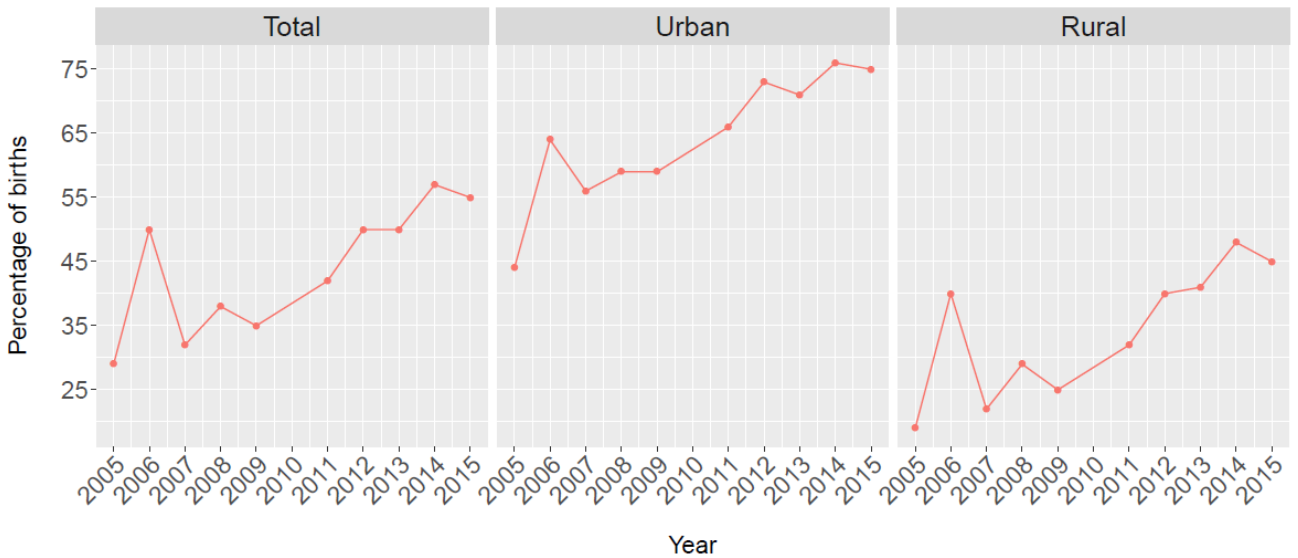
Antenatal consultation
Source: Own elaboration with data from Pakistan Bureau of Statistics Social And Living Standards Measurement Surveys (PSLM) from 2004 to 2015.
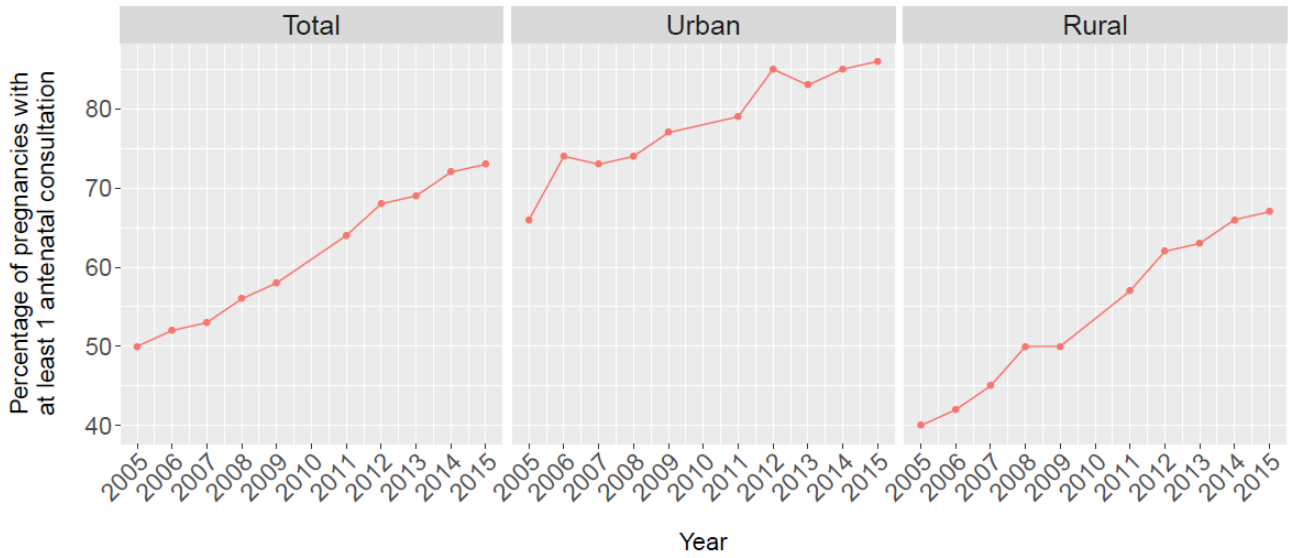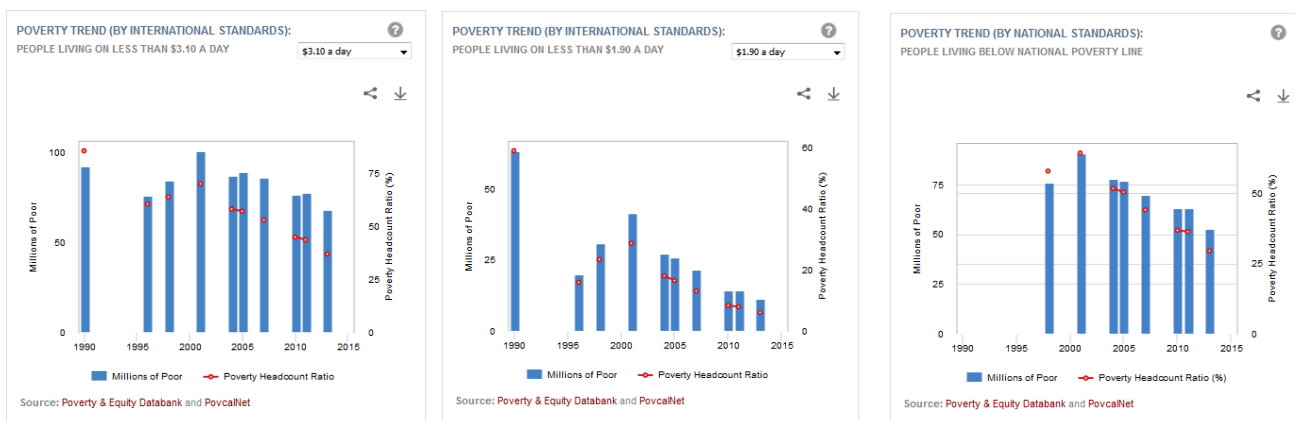

Children Born in Medical Facilities
Source: Own elaboration with data from Pakistan Bureau of Statistics Social And Living Standards Measurement Surveys (PSLM) from 2004 to 2015.
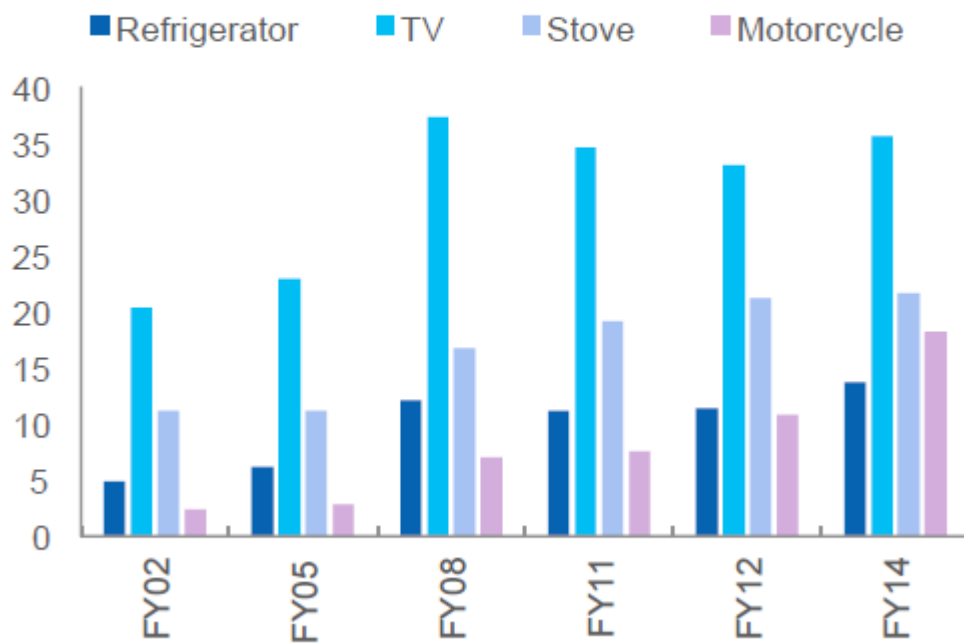
Annex 4: Poverty in Pakistan – Different standards

Annex 5:

Asset ownership in the bottom quintile

Percent

Source: HIES and World Bank Staff calculations