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1 Energy access and living standards: Some observations on 2 recent trends

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8 **Key words:** energy access, electrification, human development, SDG, multidimensional poverty

9

10 Abstract

11 A subset of Sustainable Development Goals pertains to improving people's living standards at home.
12 These include the provision of access to electricity, clean cooking energy, improved water and
13 sanitation. We examine historical progress in energy access in relation to other living standards. We
14 assess regional patterns in the pace of progress and relative priority accorded to these different
15 services. Countries in sub-Saharan Africa would have to undergo unprecedented rates of
16 improvement in energy access in order to achieve the goal of universal electrification by 2030. World
17 over, access to clean cooking fuels and sanitation facilities consistently lag improved water and
18 electricity access by a large margin. These two deprivations are more concentrated among poor
19 countries, and poor people in middle income countries. They are also correlated to health risks faced
20 disproportionately by women. However, some Asian countries have been able to achieve faster
21 progress in electrification at lower income levels compared to industrialized countries' earlier
22 efforts. These examples offer hope that future efforts need not be constrained by historical rates of
23 progress.

24

1 Introduction

2 The Sustainable Development Goals (SDG) Agenda sets ambitious goals for accelerating the pace of
3 basic human development. A subset of these goals includes improving people's living standards at
4 home, including the provision of access to electricity, clean cooking energy, improved water and
5 sanitation. These amenities play a critical role in reducing deprivations known to constitute
6 multidimensional poverty (Alkire 2010, UNDP 2010). These goals carry common practical and
7 distributive challenges, in that they require the extension of infrastructure directly to every single
8 home in all countries. Are these goals feasible? Are there challenges within countries related to
9 equitable access? In this study, we examine historical progress in energy access in relation to other
10 living standards. We assess regional patterns in the pace of progress and relative priority accorded to
11 these different services. We give specific attention to the rate and drivers of electrification in a
12 number of countries, which provide examples of accelerated policy-driven efforts. We draw lessons
13 for their future replicability and the likely achievement of the energy access SDGs.

14 Our main findings are as follows. Countries in sub-Saharan Africa would have to undergo
15 unprecedented rates of improvement in energy access in order to achieve the goal of universal
16 electrification by 2030. However, some Asian countries have been able to achieve faster progress in
17 electrification at lower income levels compared to industrialized countries' earlier efforts. These
18 examples offer hope that future efforts need not be constrained by historical rates of progress. On a
19 less optimistic note, we find that, world over, access to clean cooking fuels and sanitation facilities
20 consistently lag improved water and electricity access by a large margin. These two deprivations are
21 more concentrated among poor countries, and poor people in middle income countries. They are
22 also correlated to health risks faced disproportionately by women.

23 The rest of the paper is organized as follows. In Section 2 we describe the data sources and methods
24 used in this analysis. In Section 3, we present and discuss results. We focus first on electrification
25 efforts, where we quantify the rates and time for full electrification in ten countries, industrialized

1 and developing, and relate them to average income. We then describe past progress in the four
2 living standard indicators across countries, and compare them to nourishment, which has historically
3 received the highest priority in development. Finally, we examine distributive patterns of living
4 standards within five countries – India, Brazil, Ghana, Indonesia and South Africa. In Section 4, we
5 conclude with some policy implications and topics for further research.

6 2 Data and Methods

7 In general, we relied on standard macro indicators from the World Bank and United Nations
8 Organizations databases for cross-country analysis for the period 1990-2010, as further specified in
9 Section 2.2 below. For the within-country analysis, we used microdata from the two most recent
10 rounds of nationally representative household surveys for the chosen countries. We next describe
11 the specific data sources and methods for each analysis.

12 2.1 National Electrification progress

13 In order to investigate the pace and time till full electrification, we use historical electricity access
14 data for ten countries compiled for the Global Energy Assessment (Pachauri, Brew-Hammond et al.
15 2012, Grubler 2014), and average GDP per capita (in GK \$) data from the Maddison Project version
16 2013 (Bolt 2014). These are the only countries for which data going back further than 1990 are
17 available. We fit S-curves over the historical electricity access data in relation to time period and
18 average income per capita using R's Non-Linear Minimization (nlm) package.

19 2.2 Regional progress in access to electricity and other living standards

20 We analyze differences in access to electricity, clean cooking, improved water source and sanitation
21 facility, applying consistent definitions at both the micro and macro scale. For access to improved
22 drinking water source and sanitation facility, we adopt the definition of the indicators from the
23 Millennium Development Goals (WHO&UNICEF 2006). Improved water sources include piped water
24 in the home or plot, tubewells or public taps. Improved sanitation facilities include flush toilets

1 connected to a sewer system, septic tank, pit latrines or composting toilets. Note that access to
2 shared facilities, such as public taps, counts as households' access to improved water supply, which
3 is not the case for sanitation. This may serve to overstate household access to improved water
4 supply relative to improved sanitation (Cumming, Elliott et al. 2014), and overstate the convenience
5 assumed in the corresponding service. On the other hand, concerns of hygiene and safety in shared
6 toilets may merit a stricter standard for sanitation. In any case, data limitations prevent a more
7 nuanced measure of access. Clean cooking is defined as households having any fuel other than solid
8 (biomass-based or coal) as their primary cooking fuel, which could include electricity, liquid
9 petroleum gas (LPG) or kerosene. The numbers likely overstate the extent of clean fuel use, because
10 many households enter their 'best' fuel as their primary fuel even if they use traditional (solid) fuels
11 for the bulk of their cooking. There aren't sufficient data available in most countries that enable one
12 to infer primary fuel based on the actual fuel shares. Electricity access refers to a central grid
13 connection in the home and use of electricity as primary lighting source. This indicator might
14 understate the extent of electricity access as decentralized and off-grid lighting systems tend to not
15 be well represented, either because they are excluded from survey samples, or because respondents
16 may associate electricity with the grid. Furthermore, these data do not account for the actual supply
17 or quality of electricity, which, from few household surveys that do measure reliability, can vary
18 widely (Rao 2013).

19 National data on energy access and living standard indicators and their socio-economic correlates
20 are drawn from the World Bank's World Development Indicators Database (WB 2016), which use the
21 definitions described above. Data on the share of population adequately nourished are from the FAO
22 statistics (FAO 2015). Health impacts data for female Disability-Adjusted Life Years (DALY) associated
23 with health risks from household air pollution (HAP) and unsafe water, sanitation, and handwashing
24 (WaSH) are from the Global Burden of Disease (GBD 2013).

1 We present progress in aggregate for the four developing regions: East Asia & Pacific, Latin America
2 & Caribbean, South Asia, and sub-Saharan Africa, using population-weighted country data on living
3 standards. High income countries in the East Asia & Pacific region are excluded from the analysis. We
4 further omitted countries for which data on any of the living standard indicators were missing. We
5 also exclude countries in Middle East and North Africa, North America and Europe, since access rates
6 are close to hundred percent for all indicators in these regions. In total, we used a dataset
7 comprising 68 developing and emerging countries for the period between 1990 and 2010. Table S1
8 in the Supplementary Materials lists included countries by region.

9 2.3 Living standards distribution within countries

10 We also examined access to electricity, clean fuels, water and sanitation within countries. Microdata
11 from nationally representative household consumer expenditure and living standards surveys from
12 Brazil, Ghana, India, Indonesia and South Africa are employed for this analysis. We use data from the
13 two most recent rounds of surveys for the selected countries other than Indonesia, for which we had
14 access to only a single survey. Table S2 in the Supplementary Materials includes a list of national
15 household surveys employed in this analysis and sample sizes. We excluded some living standard
16 indicators for particular countries where either questions were missing from a specific survey or data
17 quality were extremely poor. We further excluded observations from all surveys at the tails of the
18 expenditure distribution (the bottom 2.5 percentile and top 5 percentile) where sampling is very thin
19 and unreliable. The surveys in each country had different options for the responses to water and
20 sanitation access availability, but these options were all easily interpretable under the MDG
21 definitions described so as to make them consistent and comparable as a binary metric. In the case
22 of electricity access, none of the surveys provided information on the quality or reliability of supply.
23 Knowing that conditions vary widely, this is a caveat of the analysis.

1 3 Results and Discussion

2 3.1 Electrification progress and prospects

3 Despite significant improvements in access to electricity over the last few decades, in several sub-
4 Saharan African countries the vast majority of population remains unconnected even today (IEA
5 2015, WB 2015). Historical rates of electrification among the ten selected countries for which data
6 prior to 1990 are available show a large variation across countries and time (Figure 1). In general,
7 countries embarking on electrification more recently have been able to progress faster, and done so
8 starting from lower average income levels than earlier adopters.

9 We find that for countries in our sample that achieved close to full electrification, progress is well
10 represented by an 'S' curve, with respect to both time and income (Figure 1). This implies that
11 countries achieve up to 80 percent electrification relatively fast, but take comparatively longer to
12 achieve universal access. It took the UK only 11 years to increase access coverage from 20 to 80
13 percent of its population (but a further 17+ years to reach full access). However, the UK is an outlier.
14 For countries that embarked on electrification prior to 1970, countries took from 19 to 27 years to
15 achieve from 20 to 80 percent electrification, and an additional 20 to 40 years to get to universal
16 access. However, Vietnam and Thailand, which embarked on electrification after 1970, took 15 years
17 to increase access coverage from 20 to 80 percent, and at least a further 11 to 20 years to reach full
18 electrification.

19 Geographic expanse and population density play a part. While the US started a decade after the UK,
20 it took 25 years to reach from 20 to 80 percent access. China, with a similar geographic area but
21 much larger population size and density than the US, took 19 years to achieve the same percent of
22 coverage expansion. Rapid rural electrification in Vietnam and Thailand was also aided by the
23 relatively high population densities in these nations. This contributed to lowering costs of
24 transmission and distribution and ensured a larger industrial and commercial base of customers that

1 helped with revenue generation and the financial sustainability of the efforts(Shrestha, Kumar et al.
2 2004, WB 2011).

3 Early achievers, like the UK and USA, started electrification at a relatively higher average per capita
4 income level compared to today's emerging countries. Average income in the UK and the USA was
5 around GK \$15/capita/day when electricity access was about 20%. More recently, China and
6 Vietnam started the electrification process when average income was less than GK \$5/capita/day.
7 However, countries achieved >90 percent electrification only when average incomes reached about
8 GK \$15-20/capita/day. However, there are a few exceptions, including China, that achieved universal
9 access at relatively low income levels (<GK \$10/cap/day).

10 The relationship to income doesn't necessarily imply that countries require a certain financial or
11 industrial base in order to have the capability to extend access. Rather, it may just be that
12 governments give priority to electrification at a certain development stage indicated by the income
13 level. Indeed, the experiences from countries that have successfully extended electricity access to
14 their populations suggest that strong and sustained public commitment, and coordination between
15 central and regional bodies was critical (Brew-Hammond 2010, ADB 2011, Gencer 2011, Bouille,
16 Altomonte et al. 2012).

17 While country specific contexts and conditions certainly contributed to the successful electrification
18 experience in specific nations, certain broader lessons can be drawn from such cases that are
19 relevant to other regions. In particular, prioritized and sustained government policy, dedicated
20 institutions that coordinate closely with local governments, and the embedding of electrification
21 efforts within the broader framework of rural development are common features of successful
22 electrification efforts in Vietnam and Thailand and other nations (Shrestha, Kumar et al. 2004, WB
23 2011). In addition, following a gradual phased approach, with clear planning, effective institutions
24 and dedicated funding that allows for flexibility are also common features of the efforts in these
25 successful cases (Barnes 2007).

1 Today, many low-income countries are still far from achieving universal access. What would it take
2 for them to achieve the SDG goal of universal electrification by 2030? Examples, such as those of
3 Vietnam and Thailand provide evidence of rapid upscaling of electrification efforts that might be
4 replicated elsewhere. For sub-Saharan Africa in general, if they were to follow Vietnam's example of
5 rapidly extending access from 20 to 80 percent of the population in 15 years, and crossing 95
6 percent access in 25 years, close to full electrification might be achieved by about 2035. In India,
7 universal electrification might be achieved even by 2020, if it were to follow Vietnam's experience.
8 In any case, achieving the SDG in these regions will require unprecedented growth rates in access
9 provision compared to past trends. The deployment of decentralized, small-scale systems in remote
10 regions, as has been successfully implemented in Bangladesh and China, may also offer options for
11 more rapid electrification (Alstone, Gershenson et al. 2015, Groh, Pachauri et al. 2016). However,
12 whether such systems are scalable to support growing demand from rural development is still an
13 open question (Practical Action 2014, Rao 2016).

14 3.2 Energy access in the broader context of human development

15 The SDG related to living standards include access to clean cooking fuels and electricity (SDG 7),
16 access to clean water and sanitation (SDG 6), and safe and resilient housing (SDG 11). All these
17 elements, with some variation, also comprise the living standard dimension of the Multidimensional
18 Poverty Index, which provides a more revealing measure of human deprivations and progress (Alkire
19 2010, UNDP 2010). Indeed, the headcount of the poor measured by the MPI exceeds that measured
20 by the International Poverty Line (IPL) (PPP \$1.2.50/day in 2005) in most developing countries, in a
21 few cases up to 40-50 percent higher (Alkire and Santos 2014).

22 To raise human living standards to that implied by the relevant SDGs (6, 7 and 11) would go a long
23 way towards eradicating poverty. Not only are these living standards seen as entitlements in their
24 own right (UN 1966), but they are also instrumental to achieve a number of other goals, such as
25 those related to health and education. Indeed, many of the SDGs are related, and implicitly even

1 dependent on each other, in ways that have not been fully articulated (Waage, Yap et al. 2015,
2 Nilsson 2016). Learning these dependencies is important to their collective achievement.

3 One potential dependency that has received attention is the relationship between income and
4 human development (Srinivasan 1994; Boozer et al. 2003). The widely used Human Development
5 Index is a clear indication that income captures an important part, but only one part, of
6 development. However, HDI is an aggregate 'outcome' indicator of societal progress, which gives
7 little indication of the intermediary standards that need to be in place to make progress. Systematic
8 evaluation of the relationship between such means indicators and income, such as to ask whether an
9 income threshold is required to be able to put certain infrastructure into place, remains missing.

10 Besides income, other dependencies between energy and SDGs are underexplored. While shifting to
11 clean cooking fuels is known to lower health risks from inhaling noxious emissions from traditional
12 cook stoves (Smith et al., 2014), without electricity access, households may continue to inhale
13 emissions, albeit in lower amounts, from burning kerosene for lighting (Lam et al, 2012). Similarly,
14 modern cook stoves free up women's time spent on collecting fuel towards productive or leisure
15 activities, but without in-house access to water they may still spend as much time collecting water
16 (Pachauri & Rao, 2013).

17 These dependencies extend into practical limitations of achieving some goals without others. For
18 instance, electricity access is known to have benefits for children's education by enabling them to
19 study at night (World Bank 2008; UNICEF 2015), but electricity is also necessary to create a
20 comfortable learning environment in schools, and to treat water and pump it to people's homes.

21 There have indeed been cases where programs in one sector have combined with programs in other
22 sectors, such as between female reproductive health and cook stoves (WB 2011).

23 Viewing progress in these goals together is one step towards identifying gaps or inconsistencies
24 between common or dependent goals. Here, we look across all countries at the progress in
25 extending living standards to populations, compared to income growth, and to the progress in

1 adequate nourishment, which is in some ways a benchmark, since it is typically a high priority in
2 most countries and development aid agendas, and has been the primary basis for poverty
3 measurement (Practical Action 2014, Groh, Pachauri et al. 2016).

4 3.3 Regional progress in living standards

5 Figure 2 (a) shows regional progress from 1990 to 2010 of access to adequate nourishment and to
6 different living standards, including electricity, clean cooking, improved water source and sanitation.

7 One common observation is that in all regions of the world, over the entire period, sanitation and
8 clean cooking have the lowest access rates. Between S. Asia and SSA, by 2010 less than 30 percent
9 (700 billion) had access to clean cooking fuels. It is perhaps some consolation that, with few
10 exceptions, growth rates in access to sanitation have been higher than other living standard
11 indicators, though from a lower base (Table 1). In contrast to clean cooking and sanitation, improved
12 water access is most widely available and growing relatively fast.

13 In sub-Saharan Africa (SSA), uniquely, electricity access is equally low as sanitation access, and clean
14 cooking is even lower than both. In contrast, in Latin America and East Asia & Pacific, electricity
15 access is the most widely prevalent living standard, substantially more than even the population
16 with adequate nourishment. Adequate nutrition remains unavailable to around 15% of the
17 population even in these regions that have done relatively well in expanding access to basic living
18 standards. In South Asia and SSA around 20% of the population still lacks access to adequate
19 nutrition.

20 We expect that deprivations in some of these living conditions, particularly clean cooking fuels, but
21 also sanitation, would increase health risks, due to exposure to smoke from cook stoves, and
22 hygiene-related illnesses from water-borne diseases. However, other factors that may mediate
23 between exposure and health effects, such as immunity from healthy diets and health care, could
24 diminish the relative importance of living conditions. We examine the correlation between these
25 two living conditions and the associated female disability-adjusted life years (DALYs) for household

1 air pollution and water-borne illnesses respectively. We examine these statistics for women in
2 particular, because these risks are likely to affect women to a greater extent, due to common gender
3 roles related to household chores, such as cooking and washing clothes.

4 The results show that indeed there is a strong and similar relationship between living condition and
5 health impact for both sanitation and clean cooking access, both mediated by general economic
6 conditions (GDP) (Figure 3). In the poorest countries in Sub-Saharan Africa small improvements in
7 access are associated with large reductions in DALYs. Greater vulnerability to illness, poorer health
8 facilities, among other factors, likely contribute to a greater extent in poorer countries. With
9 increasing income, DALYs reduce substantially, leading to diminishing returns for further reductions
10 in DALYs from improving access levels.

11 In other words, the greatest gains for reducing health risks are to be had in the poorest countries
12 where access is neglected the most. Though this is sadly a recurrent phenomenon in the developing
13 world, we show that this extends to the provision of safe living conditions as well.

14 3.4 Living standards and income growth

15 Figure 2 (b) shows progress in living standards and nourishment against average GDP over the period
16 1990-2010. While in general countries with higher GDP have higher living standards, national income
17 growth isn't sufficient or even necessary on its own to achieve improvements in living standards.

18 This point has been made earlier with regard to other 'outcome' indicators such as life expectancy
19 (Bloom David E 2007). It has also been used as an argument for expanded public policy engagement

20 that is more holistic, inclusive and universalistic, and that recognizes the multidimensionality of
21 poverty (DESA 2010). However, it has only been implied, but not explicitly assessed, for 'means'

22 indicators such as household living conditions (Rao, Riahi et al. 2014). GDP growth rates far exceed
23 those of living standards improvements (Table 1). In rare cases, such as clean cooking in SSA, access

24 has increased at a rate exceeding that of GDP growth, but from a very low base. There is

25 considerable variation in access levels for all living standard indicators with income across countries.

1 At similar income levels (considering only country averages at this point), South Asian countries have
2 higher levels of access than in SSA. Countries in East Asia have equally high (or higher) levels of
3 access for electricity and water at lower incomes than those of Latin American countries.

4 3.5 Distribution of living standards within countries

5 To what extent do the national averages in access to living standards mask differences in access
6 within countries? We examine this question for five countries for which we have microdata,
7 including at least one in each of the four developing regions South Asia, sub-Saharan Africa, Latin
8 America, and East Asia & Pacific (Figure 4). We focus on the rural population, since most of the
9 population without access lie in rural areas. As would be expected, access levels show the same
10 pattern with respect to income within countries as they do between countries, except with starker
11 differences across income levels. What is striking is that in countries that have relatively lower
12 average access levels (India, Indonesia and Ghana), clean cooking access is persistently worse than
13 other living standards even at high income levels. Brazil may look like an exception, in that improved
14 water supply is the least available of the four indicators among the poor. However, overall access
15 levels are high (the national estimates suggest much higher improved water access at 99.4% for the
16 country as a whole) (IBGE 2010), so the differences in living standards apply to a very small
17 population, while the rest of the population have comparably high living standards. High access to
18 living standards in South Africa show that it is an outlier in sub-Saharan Africa. This may be related to
19 the fact that the average GDP per capita of South Africa is over four times that of the average in sub-
20 Saharan African countries (~\$7.3K vs \$1.7K in 2012). South Africa is unique also in regards the
21 significant political and social transformation that occurred in its post-apartheid history. Significant
22 shifts in non-income welfare, in particular, have occurred in South Africa since 1993 (Leibbrandt,
23 Finn et al. 2016).

24 Earlier, we discussed the extent to which countries' income reflect their general living standards.

25 Here, we ask a similar question of populations within countries - are people with poorer living

1 standards also income poor? We compare the population share with access to each living standard
2 to the share of total expenditure held by them (Table 2). If those with access are particularly
3 concentrated in higher income groups, their expenditure share would be higher, except at very high
4 levels of access, where there isn't much room for income share to be higher. As expected, by and
5 large the total expenditure share of those with access is higher or roughly the same for all groups.
6 What stands out looking across countries, except in Brazil (where living standards are high across
7 most of the population), is that those lacking clean cooking fuels and a solid roof seem to be more
8 concentrated among the income poor. The two groups likely correspond to rural poor and urban
9 slum dwellers.

10 4 Conclusions and policy implications

11 The conditions of our homes, their hygiene, livability and basic amenities, influence our basic
12 wellbeing. We have examined recent global trends in the provision of energy access in the context of
13 these living conditions, including energy for cooking and electricity, water and sanitation, and to a
14 limited extent, a good roof. Growth rates for all living conditions are far below those of GDP. Among
15 the living conditions, inadequate sanitation and solid cooking fuel use, both of which are associated
16 with high health risks, lag other services everywhere, but to the greatest extent in sub-Saharan
17 Africa. The differences in progress in these two living standards across regions are stark, and
18 correlate with improvements in women's health. We find even starker inequities in provision within
19 the developing countries we examined, wherein deprivations in living standards are concentrated
20 among the income poor.

21 There is potential for the SDGs to rectify this imbalance by generating the necessary impetus at the
22 global level to alter development priorities, provided that the goals are subdivided and targeted
23 equally to women and men, and to urban and rural areas. To achieve full electrification in sub-
24 Saharan Africa by 2030 would require unprecedented growth rates in Africa, but which have been

1 found elsewhere in Asia. To achieve universal access to clean cooking, annual growth in SSA would
2 have to increase from the historical rate of ~1 percent to almost 9 percent.

3 That energy access is its own SDG (7) represents significant progress in the recognition of the
4 importance of energy for development. Yet, the potential interaction of the achievement of other
5 SDGs related to living conditions on energy access merits further exploration. Best practices in the
6 non-energy sectors should also be examined to determine the feasibility of achieving other SDGs
7 related to living conditions. That these SDGs serve the same end point, share similar infrastructure
8 and the need for financial support to ensure affordability, offer considerable scope for coordinating
9 their future provision, notwithstanding the known institutional silos and coordination issues
10 prevalent in policymaking. Ultimately, the nature of public policy and actions that target access to
11 the necessary range of basic needs and infrastructure services at appropriate levels and with quality
12 assurance are likely to have the greatest bearing on outcomes that directly impact the living
13 standards of the poor.

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1 Figure Legends

2 Figure 1: S-curve fits to historical electricity access data by year and average income level in GK\$: See
3 Data section.

4

5 Figure 2: Regional (population-weighted) average access to living standards and nourishment 1990-
6 2010 by year (a) and average income (b).

7

8 Figure 3: Relationship between average living conditions and women's health risks by region. Data
9 labels show average per capita GDP/day (\$2011 PPP) (a) Sanitation access vs water-borne illnesses
10 DALYs; (b) Clean cooking fuel access and household air pollution DALYs

11

12 Figure 4: Distribution of living standards access by income, rural areas in select countries

13

14 Table Legends

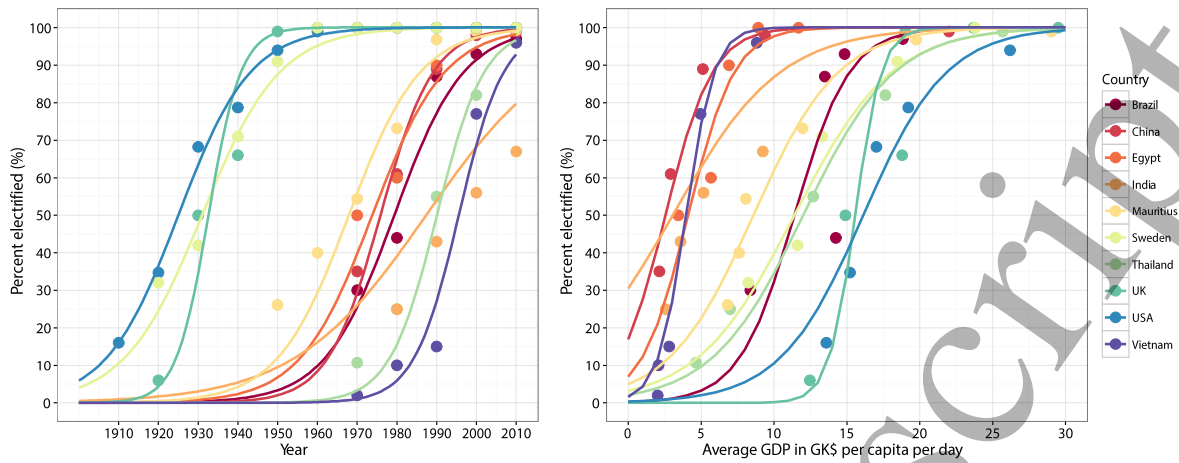
15 Table 1: Average annual growth rate in GDP and access to living standards 1990-2010

16

17 Table 2: Income share of those with access to living standards. NA: missing or poor data quality.

18

1 Fig1 (a) & (b)

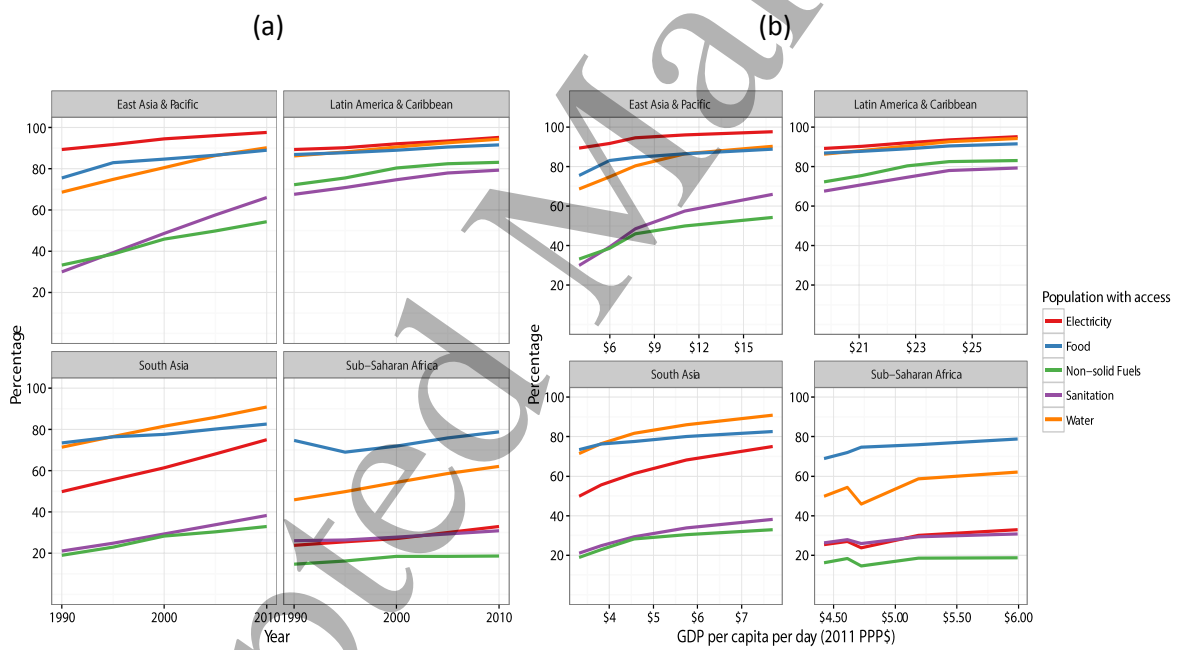


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4 Fig 2 (a) & (b)

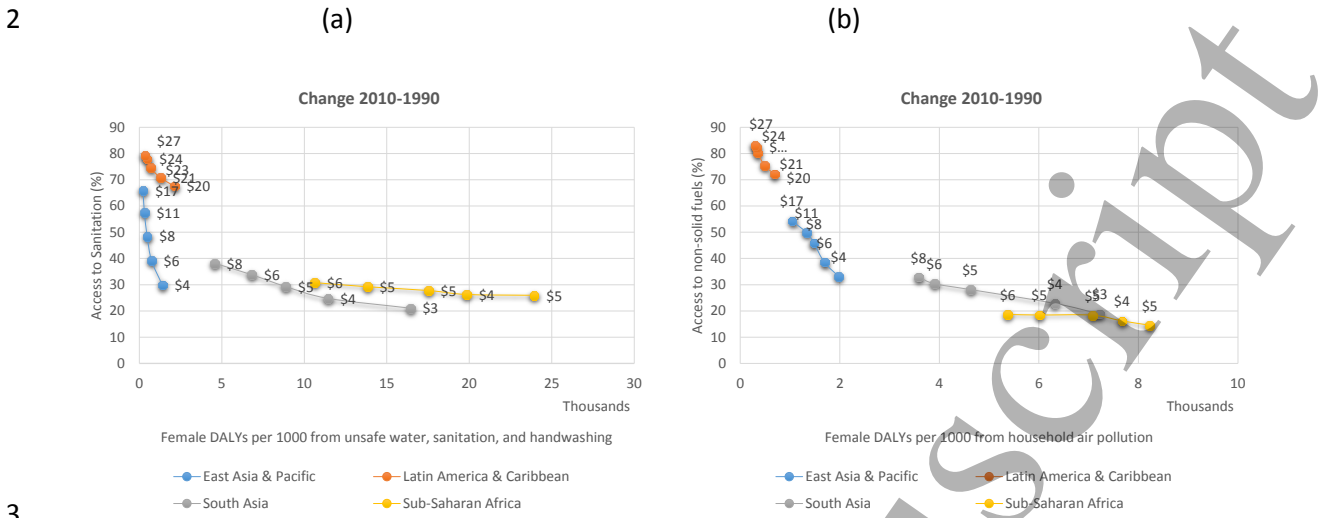
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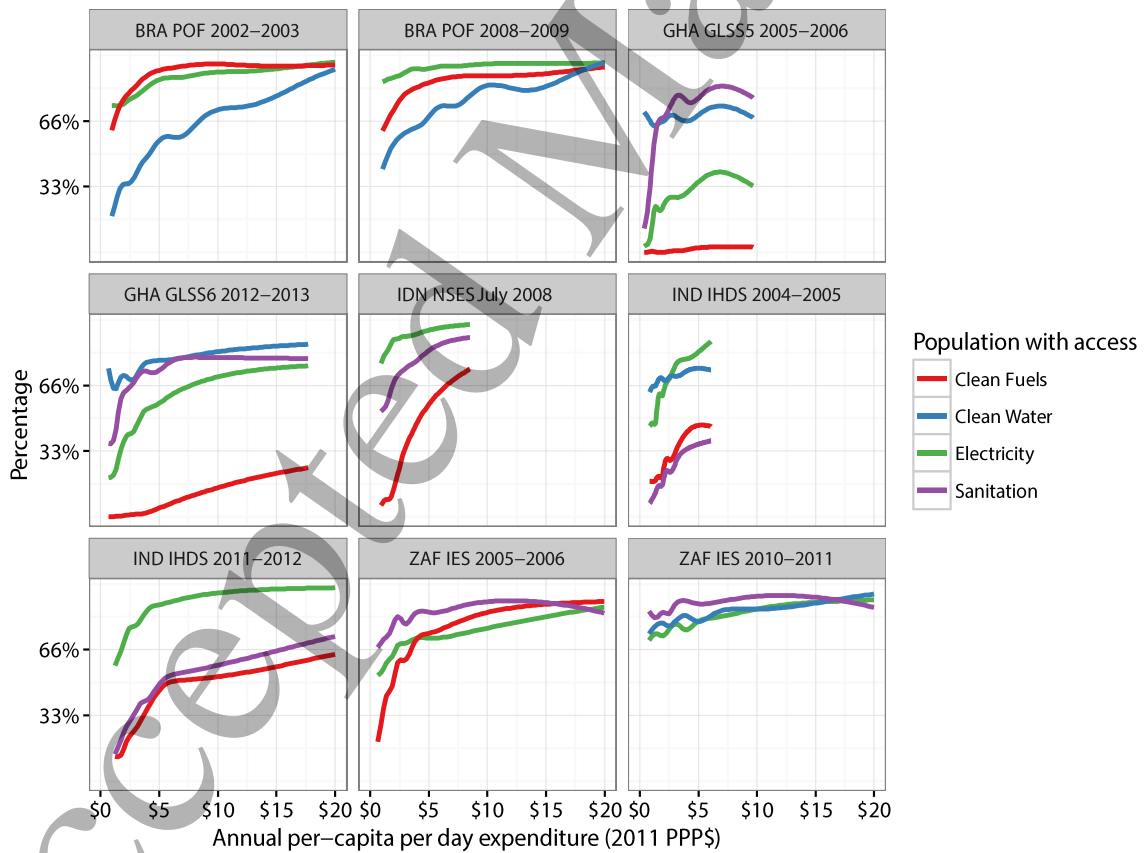
1 Fig 3 (a) & (b)



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4

5 Fig 4



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7

1 Table 1: Average annual growth rate in GDP and access to living standards 1990-2010

Region	GDP pc	Electricity	Sanitation	Improved Water	Adequate Nourishment	Clean Cooking
<i>Pacific/East Asia</i>	7.6%	0.4%	4.0%	1.4%	0.8%	2.5%
<i>Latin America</i>	1.5%	0.3%	0.8%	0.4%	0.3%	0.7%
<i>South Asia</i>	4.3%	2.1%	3.0%	1.2%	0.6%	2.8%
<i>Sub Saharan Africa</i>	1.2%	1.7%	0.9%	1.5%	0.3%	1.2%

2

3 Table 2: Income share of those with access to living standards. NA: missing or poor data quality.

Income Share % (Popn Share with Access)	Clean cooking	Electricity	Improved Water	Sanitation	Solid roof (shelter)
<i>Brazil 2008-2009</i>	90 (90)	99 (99)	97 (93)	NA	99 (99)
<i>India 2011-2012</i>	53 (40)	91 (83)	NA	52 (46)	86 (80)
<i>South Africa 2010-2011</i>	NA	96 (87)	97 (93)	98 (94)	54 (26)
<i>Ghana 2012-13</i>	37 (23)	83 (72)	92 (87)	88 (81)	18 (14)
<i>Indonesia 2007-08</i>	70 (51)	96 (93)	69 (73)	NA	64 (66)

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