

# **Interlinkages of energy SDG 7, poverty SDG 1 and inequalities SDG 10 in the context of the 17 SDGs**

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## **Abstract**

The aim of this thesis is to show interlinkages of access to electricity and clean cooking (SDG 7.1) with poverty (SDG 1) and inequality (SDG 10) reduction in the context of the 17 SDGs. The analysis in Sub-Saharan Africa is an attempt to show interlinkages among the selected SDGs with empirical data in Ethiopia and Ghana.

In both countries access to electricity and clean cooking was improved while extreme poverty was reduced. This implies a likely synergetic interlinkage between the SDG 7.1 and SDG 1. By expanding the perspective towards interlinkages in the context of the SDGs, the MPI (multidimensional poverty index) was explored. Zooming into specific deprivations, the analysis shows in both countries the Food-Water-Energy Nexus could be a helpful tool to meet the SDG 1 target. Moreover, rural areas are identified as the geographical hotspot, with clean cooking accounting for the biggest deprivation.

Due to the lack of data regarding inequalities in Sub-Saharan Africa, only one data point was found during the selected timeframe. Therefore, the findings of this thesis strongly call for more accessible quality data regarding SDG 10. Moreover, findings regarding human development suggest that in Ethiopia and Ghana socio-economic inequalities got reduced. Overall, the findings of this thesis imply that poverty is effected by many other SDGs and that monetary poverty reduction has a synergetic interlinkage with access to electricity and clean cooking. Therefore, effective poverty reduction requires interlinkages assessment rather than assessing poverty in isolated clusters.

## **Keywords**

SDG Interlinkages, Sub-Saharan Africa, energy, poverty

# 1. Introduction

The 2030 Agenda is a framework to address sustainable development for people, planet and prosperity. To assess realisation progress of sustainable development, the 17 Sustainable Development Goals (SDGs) are highlighted, including their 169 targets and 230 indicators. (2030 Agenda, 2015) Targets and indicators of an SDG are affected by each other and among all 17 goals. (GSDR, 2019) These interlinkages must be identified to successfully implement the Agenda. (Nilsson M., Griggs D., Visbeck M., 2016)

Out of the 17 goals, energy (SDG 7) is put in the centre because it is not only essential to sustainable development, but also actions on SDG 7 are positively pushing the other goals. (the United Nations, 2018) Among the goals, poverty (SDG 1) was chosen, because it is addressed as the biggest and most urgent challenge. (2030 Agenda, 2015) Moreover, lacking basic needs such as electricity and clean cooking is a form of poverty. (the United Nations, 2018) Highly interlinked to poverty, reducing inequalities (SDG 10) was selected because it is essential to the scope of the 2030 Agenda, namely leaving no one behind. (2030 Agenda, 2015) Moreover, demographic inequality roots from lacking basic deprivations such as access electricity and clean cooking. (Renner S., Bok L., Igloi N., Linou N., 2018) Because of its' interlinkages to poverty and inequalities, the first target of SDG 7, namely access to electricity and clean cooking, was prioritized in this thesis. (the United Nations, 2018)

## 1.1 Objective

The objective of this thesis is to show how the first target of SDG 7, effects poverty and inequality (reduction). The correlations are analysed with empirical data in Ethiopia and Ghana, in the context of the SDGs in Sub-Saharan Africa.

## 1.2 Methodology

The research field was chosen as interlinkages of SDG 7 energy in the context of the 17 SDGs. Then 2 highly interlinked SDGs were selected, according to their urgency and importance to the scope of the Agenda 2030. Moreover, within SDG 7 the first target was prioritized, due to its' interlinkages with the former selected priority SDGs (SDG 1 and SDG 10). Subsequently, a geographical focal point (Sub-

Saharan Africa) was investigated by analysing the global status of SDG 7.1.

For the analysis, the global status, urban and rural differences and common measurement methods of the selected SDGs were investigated. According to that, common indicators for each SDG were selected for the analysis. In particular, access to electricity and clean cooking (SDG 7.1), the international poverty line IPL (SDG 1) and the growth rate of the bottom 40 (SDG 10).

As an attempt to show interlinkages in the context of the 17 SDGs, synthesis indicators are introduced, such as the MPI (Multidimensional poverty index), HDI (human development index) and the IHDI (inequality-adjusted HDI).

Then the geographical focal point (Sub-Saharan Africa) was analysed, and 2 priority countries (Ethiopia and Ghana) were chosen according to their progress of SDG 7.1 and priority for the region.

In the analysis, the previously discussed common indicators and the synthesis indicators are analysed on empirical data in Ethiopia and Ghana.

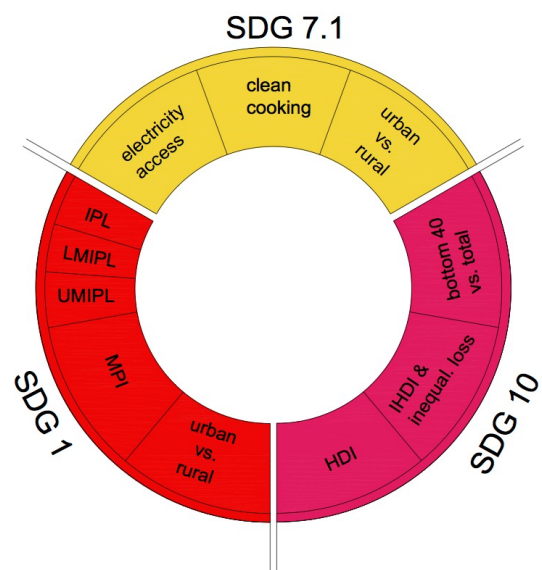


Figure 1 Indicators for the Analysis of Ethiopia and Ghana; SDG 7.1 contains the following indicators: access to electricity and clean cooking, and urban vs. rural electricity access; SDG 1 contains the following indicators: international poverty line (IPL) global poverty lines for higher standards (LM IPL, UM IPL), multidimensional poverty (MPI of the total population and urban and rural); SDG 10 contains the following indicators: monetary inequality (bottom 40 vs. total income growth rate) and human development (HDI, IHDI and loss due to inequalities)

## 2. Theory/ Background

### 2.1 SDG Interlinkages assessment

Scientific research highlighted the importance of displaying SDG interlinkages, rather than working in isolated clusters, when putting the SDGs into practice. (Nilsson M., Griggs D., Visbeck M., 2016) (D. L McCollum, L.G. Echeverri, S. Busch, et. al, 2018) In that context, the need for tools to display the state-of the art empirical knowledge to identify how the goals (and targets) affect each other is pointed out. (Nilsson M., Griggs D., Visbeck M., 2016)

#### Putting Energy in the centre

Promising ones, that put energy (SDG 7) in the centre of SDG interlinkage assessment are synergy and trade-off approaches, point scales, or nexus approaches. (Cameron A., Metternicht G., Wiedmann T., 2018) (Pradhan, P., Costa, L., Rybski, D., Lucht, W. and Kropp, J.P., 2017) (Fuso Nerini, F., Tomei, J., To, L.S. et al., 2018)

Fuso Nerini *et. al* explored synergy and trade-offs of SDG 7 in the context of the 17 SDGs, and showed that the majority of SDG targets need change in energy systems. Additionally, research indicates that between SDG 7 and all other targets synergy effects outweigh trade-offs. (Fuso Nerini, F., Tomei, J., To, L.S. et al., 2018)

The nexus approach is a method to identify synergy effects and trade-offs among selected SDGs. (Liu, J., Hull, V., Godfray, H.C.J. et al., (2018)) In particular, the food-water-energy nexus is among the most analyzed ones. (Allen C., Metternicht G., Wiedmann T., 2016) It indicates that energy is required to for clean water and sanitation, and that “the roots of the crisis in water can be traced to poverty, inequality and unequal power relationships.” (Conceição P., 2019, p. 191) (Mainali, B.; Luukkanen, J.; Silveira, S.; Kaivo-oja, J., 2018) Particularly, it is essential to consider the food-water-energy nexus approach to ensure basic needs and reduce poverty. (Mainali, B.; Luukkanen, J.; Silveira, S.; Kaivo-oja, J., 2018)

Reviewing literature of SDG interlinkages with a focus on poverty revealed, that poverty is the most synergetic SDG in the context of the 17 goals. Moreover, it is particularly synergetic with SDG 7 energy and closely interlinked to SDG 10 inequalities (Pradhan, P., Costa, L., Rybski, D., Lucht, W. and Kropp, J.P., 2017) (the United Nations, 2018) (D. L McCollum, L.G. Echeverri, S. Busch, et. al, 2018) (Fuso Nerini, F., Tomei, J., To,

L.S. et al., 2018) However, research shows that whereas the interlinkages between energy and poverty are well explored, further research is needed between energy and inequalities. (D. L McCollum, L.G. Echeverri, S. Busch, et. al, 2018)

Interlinkages among energy SDG 7 and inequalities SDG 10 show that “unequal access to energy and low human development are highly correlated.” (the United Nations , 2019, p. 72)

#### Data

Several scientific sources strongly called for the need of quality data and consistent methods in the SDG interlinkage assessment. (Lu Y., Nakicenovic N., Visbeck M., et. al, 2015) (Cameron A., Metternicht G., Wiedmann T., 2018) (D. L McCollum, L.G. Echeverri, S. Busch, et. al, 2018)

### 2.2 Global perspective SDG 7.1, 1. 10

Showing the global status and progress in achieving SDG 7.1, 1, 10 globally, is an attempt to illustrate how low-income population is lagging behind in monetary and non-monetary terms.

#### SDG 7.1

Highlighted in the 2030 Agenda, Sustainable Development Goal (SDG) 7 aims to “ensure access to affordable, reliable, sustainable and modern energy for all”. (2030 Agenda, 2015, p. 19) The aim of SDG 7.1 requires global access to electricity by 2030. (2030 Agenda, 2015) The electrification trend since 2010 is very promising, indicated by 920 million people that gained access to electricity until 2017. However, as of 2017, globally 89% of the global population are served with electricity. (GSDR, 2019) (IEA, IRENA, UNSD, WB, WHO, 2019) There are several factors that increase the gap between countries that are on track with SDG 7.1 and those lagging behind. For instance, it’s becoming harder to reach people who lack electricity access, because they either live in informal settlements (see chapter 5.1), or are displaced and/ or hard to reach. Therefore, latest research implies that the 2030 goal will be failed by 650 million people worldwide in 2030, which will be mainly located in Sub-Saharan Africa, as indicated in Figure 2 (IEA, IRENA, UNSD, WB, WHO, 2019).



Figure 2 Percentage of global population with access to electricity (%) reprinted from *tracking SDG 7: the Energy Progress Report 2019*, page 17, IEA, IRENA, UNSD, WB, WHO (2019), Washington DC,

In 2017, 38% of the global population, which accounts for 3 billion people, had no access to clean cooking fuels. (IEA, 2017) This is particularly important in developing countries, where 50 % of the population is affected. Currently, polluting fuels and technologies are mainly used in LDCs. (IEA, IRENA, UNSD, WB, WHO, 2019) The situation is particularly severe in Sub-Saharan Africa, where the population growth has outpaced clean cooking progress. Leading to the fact that only 20% of the population in Sub-Saharan Africa has access to clean cooking in 2017. According to latest scenarios, probably more than half of the residents in Sub-Saharan Africa will be left behind in 2030, accounting for 820 million people. (IEA, 2017)

## SDG 1

Recognized as the world's biggest challenge, SDG 1 aims to "end poverty in all its forms everywhere" (2030 Agenda, 2015, p. 15)

The IPL (international poverty line) is the global instrument to measure and compare poverty. Extreme Poverty, on a monetary basis, is universally defined as "living below the international poverty line (IPL), currently set at US\$1.90 in 2011 purchasing power parity (PPP) dollars." (World Bank , 2018, p. 19)

There are also complementary monetary poverty lines. These are defined as 3.20 USD per day for the lower-middle-income poverty line (LMIPL) and 5.50 USD per day as upper-middle-income poverty line (UMIPL) respectively, in 2011 PPP. (World Bank , 2018) In 2015, the most poor rather lived in middle income countries than in low income countries. Hence, monitoring more poverty factors than the IPL becomes more important. (World Bank , 2018)

Beyond monetary terms there are many essential needs that influence poverty. Therefore, the MPI (multidimensional poverty index) incorporates the right of access to basic services, such as access to

electricity (SDG 7), clean drinking water and sanitation (SDG 6), adequate housing (SDG 11) and education (SDG 4), and health (SDG 3), assets (SDG1) and nutrition (SDG2). (World Bank , 2018) The majority of multidimensionally poor people lives in South Asia (546 million), followed by 342 million in Sub-Saharan Africa. (GSDR, 2019)

Similar to multidimensional poverty, Sub-Saharan Africa is the global hotspot for monetary poverty as well, as indicated in the Appendix in **Error! Reference source not found.** As a result, in 2015 more people live in extreme poverty in Sub-Saharan Africa than all other regions combined. (GSDR, 2019) (World Bank , 2018)

Looking at the top 15 countries that eradicated poverty most successfully between 2000 and 2015, indicates that successful poverty eradication has many different starting points and therefore needs policy recommendations on country level. (Asaidaniel M., Mahlersilvia G., Narayanminh M., Nguyen C., 2019) That is why for the analysis in this thesis a comparison on country level was chosen rather than focusing on a grouping of countries (e.q. Sub-Saharan Africa, BRIC, EU, USA etc.)

## SDG 10

Fighting inequalities within and among states is another key factor to human development, inclusivity is therefore highlighted in the 2030 Agenda as SDG 10 (2030 Agenda, 2015).

It is evident that poverty and inequalities are strongly connected. Therefore, an indicator that interlinks both SDGs is chosen for the analysis of this thesis. (World Bank , 2018) This indicator is also highlighted in the SDG 10.1 target and is demonstrated by the average "income growth rate of the poorest 40 percent of the population", or in short the bottom 40. This describes how the bottom 40 participate in a country's economic success. (2030 Agenda, 2015, p. 21)

Quantifying socio-economic inequalities and measuring humans' capabilities beyond income leads to human development. The human development index (HDI) is similarly to the multidimensional poverty index, a synthesis index that is influenced by many SDGs.

(Conceição, 2019) The HDI is calculated by 3 main indicators such as life expectancy, level of education, and wealth. (technical notes, 2019)

To measure not only the inequalities among countries but also within a specific country the

Inequality-adjusted Human Development Index (IHDI) is defined. (Conceição P., 2019) Additionally, “the loss of human development due to inequality is given by the difference of HDI and IHDI.” (n.d., 2019, p. 4)

### 3. Analysis

#### 3.1 Analysis in Sub-Saharan Africa

Investigating SDG 7.1 deprivations in Sub-Saharan Africa, shows that the region is the global hotspot. Latest research implies that the SDG 7.1 target will likely be failed by mostly Least Developed Countries (LDCs). (the United Nations, 2019) That is why for the analysis one LDC country (Ethiopia) and one lower-middle income country (Ghana) was selected.

Regional differences show that over the past 8 years, East African countries (e.g. Ethiopia) made the biggest progress, whereas West African ones (e.g. Ghana) have the highest access rates. (IEA, 2019) Because of their progress in SDG 7.1 and their importance to the region, Ethiopia and Ghana were selected to be analysed in the next chapter.

In general, in Sub-Saharan Africa, access to basic services is much lower in rural than in urban areas. (GSDR, 2019) Moreover, in urban areas the electrification pace is faster than in rural ones. (IEA, 2019)

#### 3.2 Analysis in Ethiopia and Ghana

##### SDG 7.1 electricity and clean cooking

During the selected timeframe (years: 2000 to 2016) Ethiopia and Ghana had a similar electrification rate, even though Ethiopia had a much bigger population increase and much lower access status. Moreover, the share of population that gained electricity access in urban areas is higher in Ethiopia than in Ghana. In both countries, the rural electrification is still lower than urban ones. Nevertheless, both made significant progress so that the rural electrification pace was faster than the urban one, which aligns with the theory of Sub-Saharan Africa. Both countries are not on track to meet the clean cooking indicator. However, Ghana managed to increase it 19% of the population, up to 22% in 2016. Whereas Ethiopia’s access to clean cooking changed from 1% to 4% over the selected 6 years.

##### SDG 1 poverty

Whereas on average the share of extreme poor (IPL, International Poverty Line) in Sub-Saharan Africa

increased, in Ethiopia and Ghana the situation evolved differently. Both countries roughly halved the share of population below the IPL over the analyzed time period.

Whereas in Ghana uplifting monetary poverty was rather evenly distributed among the 3 different poverty thresholds (IPL, LMIPL, UMIPL). In Ethiopia, monetary poverty for higher standards (UMIPL) remained high. Due to the fact that Ethiopia is still part of the LDCs, it was expected that its’ monetary poverty eradication varied more strongly among the poverty thresholds.

In both countries multidimensional poverty (MPI) was higher than monetary poverty (IPL), which is supported by further research. This correlation suggests, that measuring monetary poverty is not enough to understand human suffering. Zooming into the specific deprivations of multidimensional poverty (MPI), access to clean cooking still accounts for the biggest share of deprivations. According to these findings, acting on the food-water-energy nexus could possibly be a positive way to meet SDG 1. Moreover, people in rural areas are particularly deprived in the water-energy nexus.

##### SDG 10 inequalities

Due to the lack of data regarding the inequalities of the bottom 40, only one data point was found during the selected timeframe in both countries. When analyzing this data point of monetary inequality, in 2015, the bottom 40 participated in Ethiopia’s economic progress. In 2016, Ghana’s bottom 40 couldn’t participate at all. Moreover, the average person in Ethiopia and Ghana could benefit from economic progress, whereas inequality of the poorest 40% is different in both countries.

When looking beyond monetary inequality towards human well-being, over the selected timeframe, access to basic capabilities improved (HDI increase) in Ethiopia and Ghana. However, human development in Ethiopia increased more strongly, even though it still remains in the low human development section below the Sub-Saharan Africa’s average of 0.52. (UNDP, 2016)

In 2010, both Countries had the “same loss of human development due to inequality (given by the difference of HDI and IHDI).” Nevertheless, their situation evolved differently. Ethiopia managed to decrease the difference (because the HDI increased faster than the IHDI), whereas Ghana shows the opposite tendency. This means that Ethiopia managed to decrease the loss of human development due to inequality.

## 4. Discussion

### 4.1 General Indicators

Taking a look at the general indicators for SDG 7.1 (electricity access, clean cooking access), SDG 1 (IPL), and SDG 10 (bottom 40 vs. total population) in Ethiopia and Ghana between the years 2000 and 2016, it seems that all indicators of SDG 7.1 and SDG 1 made positive progress.

*Table 1 Ethiopia SDG Indicator synthesis results over the selected time period (around year 2000 to 2016) all references and more in depth data can be found in the thesis.*

Ethiopia, SDG general indicators results			
SDG 7.1	Electricity access:	Year	% of population
		2000	12
		2004	28
		2010	33
		2016	43
	Clean cooking access:	Year	% of population
		2000	1
		2004	2
		2010	3
2016		4	
SDG 1	IPL: Share of people living with less than 1.9 USD/day	Year	% of population
		1999	61,2
		2004	37,2
		2010	33,5
		2015	30,8
SDG 10	Bottom 40	Year	Growth rate (%)
		2015	1.5
		Total population	2015

In particular, both countries managed to double electricity access and improve access clean cooking, while halving the share of population living in extreme poverty. This synergetic correlation aligns with scientific research that implies that access to electricity and clean cooking is essential to reduce poverty. (D. L McCollum, L.G. Echeverri, S. Busch, et. al, 2018)

Due to the lack of Data, the common indicator of SDG 10 could only be analyzed in one year, which is not enough data points to analyze correlations. Overall, data shortage is a crucial issue when analyzing the SDGs. In Sub-Saharan Africa only roughly a quarter of countries has available data regarding SDG 10. (World Bank , 2018)

*Table 2 Ghana SDG Indicator synthesis results over the selected time period (around year 2000 to 2016) all references and more in depth data can be found in the thesis.*

Ghana, SDG general Indicators results			
SDG 7.1	Electricity access:	Year	% of population
		2000	44
		2005	55
		2010	64
		2016	80
	Clean cooking access:	Year	% of population
		2000	6
		2005	10
		2010	16
2016		22	
SDG 1	IPL: Share of people living with less than 1.9 USD/day	Year	% of population
		1998	35,7
		2005	24,5
		2012	12,0
		2016	13,3
SDG 10	Bottom 40	Year	Growth rate (%)
		2016	-0.2
		Total population	2016

### 4.2 Synthesis Indicators

Synthesis indicators for SDG 1 (MPI, LMIPL, UMIPL) and SDG 10 (HDI and IHDI) and looking at differences in urban and rural evolution of electricity access and poverty, is an attempt to broaden the perspective of the selected SDGs. Its aim is to show interlinkages in the context of the 17 SDGs and evaluate the development progress of each country.

The synthesis indicator analysis indicates that even though Ethiopia has a lower development status than Ghana, it made more significant progress in all analyzed SDGs.

The findings of both countries revealed that multidimensional poverty is higher than monetary poverty (IPL). This suggests that monetary poverty alone doesn't show the whole picture of poverty in Ethiopia and Ghana. Therefore, SDG interlinkage assessment is needed to improve basic capabilities and human-wellbeing for poverty reduction.

Moreover, it was supported that MPI in rural areas is higher than in urban areas. (World Bank , 2018) Regarding SDG 1, the findings of the synthesis indicators align with the analysis of the common indicators in the sense that even though Ethiopia has a lower development status, it made more progress in poverty eradication.

Zooming into specific deprivations of the MPI, the analysis shows that Ethiopia and Ghana need non-monetary approaches to improve nutrition (SDG 2), sanitation (SDG 6) and cooking fuel (SDG 7.1). This could suggest that the food-water-energy nexus could be a good way to help meeting the SDG 1 target. Moreover, clean cooking still accounts for the biggest share of deprivations in both countries, in 2016 and 2014, respectively. Therefore, without creating positive impact in access to clean cooking, multidimensional poverty will not be significantly reduced.

The findings in SDG 7.1 supported theory that electricity access in rural areas is still lower than urban areas. (the United Nations, 2018) Nevertheless, the electrification pace was higher than in urban areas, over the selected timeframe.

The synthesis indicators for SDG 10 (HDI, IHDI) indicate that Ethiopia and Ghana increased human development (HDI), due to the positive influence of health (SDG 3), education (SDG 4) and income (SDG 8). In particular, Ethiopia made more progress in providing access to basic capabilities than Ghana, because of a stronger HDI increase. Moreover, the Ethiopias loss of human development (HDI -IHDI) decreased, whereas Ghanas increased.

The IHDI was only developed in 2010. Therefore, only latest data (2011 to 2016) could be analyzed. Due to the lack of enough data points, the correlations between SDG 7.1 and SDG 10 couldn't be analyzed.

*Table 3 Ethiopia SDG synthesis Indicators synthesis results over the selected time period (around year 2000 to 2016)*

*all references and more in depth data can be found in the thesis.*

Ethiopia, SDG synthesis indicators results					
SDG 7.1	Electricity access:	Year	% of population	urban	rural
		2000	12	76	2
		2004	28	81	18
		2010	33	86	22
		2016	43	86	32
SDG 1	Poverty Lines	Year	IPL	LMIPL	UMIPL
		1999	61,2	90,4	97,6
		2004	37,2	78,7	95,6
		2010	33,5	73,1	93,1
	2015	30,8	68,9	90,2	
	Multi-dimension al Poverty	Year	MPI	urban	rural
		2005	0.56	0.16	0.61
2016		0.49	0.16	0.55	
SDG 10	Growth rate (%)	Year	Bottom 40	Total population	
		2015	1.5	1.6	
	Human Development	Year	HDI	IHDI	HDI - IHDI
		2000	0.283	-	-
		2005	0.346	-	-
		2010	0.412	0.271	0.411
2016	0.460	0.347	0.113		

Table 4 Ghana SDG synthesis Indicators synthesis results over the selected time period (around year 2000 to 2016)  
all references and more in depth data can be found in the thesis.

Ghana, SDG synthesis indicators results						
SDG 7.1	Electricity access:	Year	%total population	urban	rural	
		2000	44	80	15	
		2005	55	81	31	
		2010	64	72	55	
		2016	80	90	67	
SDG 1	Poverty Lines	Year	IPL	LMIPL	UMIPL	
		1998	35,7	63,3	85,4	
		2005	24,5	50,1	77,1	
		2012	12,0	32,5	60,5	
	2016	13,3	30,5	56,9		
	Multi-dimensional Poverty	Year	MPI	urban	rural	
		2008	0.144	0.051	0.021	
2014		0.132	0.056	0.218		
SDG 10	Growth rate (%)	Year	Bottom 40	Total population		
		2015	-0.2	1.3		
	Human Development	Year	HDI	IHDI	HDI - IHDI	
		2000	0.483	-	-	
		2005	0.508	-	-	
		2010	0.554	0.414	0.410	
		2016	0.587	0.417	0.170	

## 5. Conclusion

Based on all analyzed data for the selected indicators and timeframe (years 2010 to 2016), in Ethiopia and Ghana, it seems that overall the general situation regarding SDG 7.1, SDG 1 and SDG 10 has improved, which is beneficial for the objective of the SDGs.

The findings of the common indicator analysis between SDG 7.1 and SDG 1, show in both countries a positive correlation between access to electricity and clean cooking and extreme poverty reduction. This implies a likely synergetic

interlinkage of the SDG 7.1 targets and extreme poverty reduction, in both countries during the selected timeframe.

As expected from the theory, in both countries multidimensional poverty was higher than extreme monetary poverty (IPL). (World Bank , 2018) When zooming into specific deprivations of the MPI, the analysis suggests that both countries could likely improve SDG 1 by acting on the food-water-energy nexus. Moreover, the analysis revealed that rural monetary and multidimensional poverty are the local hotspots of deprivations, which is supported by further research. (the United Nations, 2019) (Conceição P., 2019)

In this thesis an attempt to find possible interlinkages among SDG 7.1 and SDG 10 was made. However, due to the lack of data regarding the inequalities of the bottom 40, only one data point was found during the selected timeframe in both countries. So correlations among SDG 7.1 and SDG 10 common indicators could not be analyzed. Therefore, this thesis calls for more accessible quality data. This suggestion is supported by other research as well (D. L McCollum, L.G. Echeverri, S. Busch, et. al, 2018) (Lu Y., Nakicenovic N., Visbeck M., et. al, 2015) (World Bank , 2018).

Results of the HDI imply that both countries improved human development, by improving health (SDG 3), education (SDG 4) and income (SDG 8) over the selected timeframe. Overall, findings suggest that in Ethiopia and Ghana socio-economic inequalities got reduced.

To conclude, it seems that analyzing how SDGs targets effect each other and broadening the perspective by introducing synthesis indicators enhances the perspective on a countries development. The analysis showed, that monetary poverty reduction has a synergetic interlinkage with access to electricity and clean cooking. Moreover, multidimensional poverty is impacted by many other SDGs. Therefore, the findings of this thesis imply, that effective poverty reduction requires interlinkages assessment rather than assessing poverty in an isolated cluster.



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