

# SES

Social Inclusion and Energy Management  
for Informal Urban Settlements

## CASE STUDY ENERGY MANAGEMENT IN INFORMAL SETTLEMENT AREAS OF GONDAR CITY, NORTHWESTERN ETHIOPIA

Meseret Kassie and Tadesse Negash



Funded by the  
Erasmus+ Programme  
of the European Union



# CASE STUDY

# ENERGY MANAGEMENT IN INFORMAL SETTLEMENT AREAS OF GONDAR CITY, NORTHWESTERN ETHIOPIA

Meseret Kassie and Tadesse Negash

Funded by the Erasmus+ program of the European Union

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

The views expressed in this work and the accuracy of its findings is matters for the author and do not necessarily represent the views of or confer liability on the Center of Urban Equity.

© University of Gondar.



This work is made available under a Creative Commons Attribution 4.0 International Licence:  
<https://creativecommons.org/licenses/by/4.0/>



## ABSTRACT

The objective of this study is to assess the current state of energy access, expenditure and the perspectives of different stakeholders on current state of energy supply in informal settlement areas of Gondar City, Ethiopia. Cross sectional survey research design with mixed approach was employed. Out of the six major informal settlement sub-cities in the city, three were chosen purposely. Data was collected from 309 randomly selected households using face-to-face interview. Moreover, workshop was organized to gather data from researchers, informal settlers and government officials. Descriptive statistics, using SPSS version 20, was used to analyze data collected from households while stakeholder analysis grid was used for comparison of the different perspectives. The result

showed that more than 98% of the respondents have no own power meter while the remaining 2% have got access illegally, through corruption. Of the respondents that have no own power meter, about 89% rented in one light bulb from the nearby houses with power meter. Wood and charcoal are the main sources of energy for settlers and they spent more than 29 % of their income for energy, which exacerbates the vicious cycle of poverty for informal settlers. Though there are different views among stakeholders, it is found that tenure insecurity is the most important challenge to supply energy for informal settlers. Informal settlers have no much choice to live; they are excluded from service provisions like electrification. Therefore, inclusive planning is highly recommended. ♦

**Key words:**

**energy supply, power-interest grid, stakeholders**

## CONTENTS

Abstract	3
<b>PART 1</b>	
<b>Introduction</b>	<b>5</b>
<b>PART 2</b>	
<b>Materials and methods</b>	<b>7</b>
<b>PART 3</b>	
<b>Results and discussion</b>	<b>10</b>
<b>PART 4</b>	
<b>Conclusion and policy implication</b>	<b>16</b>
References	17

## PART 1 INTRODUCTION

Globally, cities are growing rapidly and more than half of the world's population live in urban areas (UN-Habitat, 2016). Most of this growth is related to unbalanced urban development, which is complex and is linked to livability of urban areas along with water, food and energy security. In Africa, more than half of the urban population (61.7%) live in informal settlement and slums and by 2050, Africa's urban dwellers are projected to have increased from 400 million to 1.2 billion (UN-Habitat, 2015). The trends indicate that the informal housing sector is growing at a faster rate than the formal one (Butera et al, 2016; Belete, 2019) in developing countries.

Similarly, urbanization in Ethiopia has been increasing mainly due to rural-urban migration, which is also the main driver of informal settlement. Even though one of the main agenda of sustainable development goals is ensuring access to affordable, reliable, sustainable and modern energy for all, in most developing countries extensive need for energy forced the people to use unsafe energy sources (Wolpe & Reddy 2010; Gaunt & Borchers, 2012; Makonese, et al, 2016). Provision of energy becomes more important for developing countries as they are in the track of industrialization process. In the Ethiopian context, where structural transformation is envisioned, steering and managing urbanization process including energy management in sustainable track is important (Makonese, et al, 2016). However, there has always been a gap between energy supply and demand in both rural and urban areas of Ethiopia (Mondal et al., 2018; Bekele et al., 2013).

More than 90% of energy for cooking and heating is derived from biomass fuel including wood,

charcoal, crop residues and animal dung (Bewket, 2003; Mekonnen & Kohlin, 2008; Damte et al., 2012; Mondal et al., 2018), and often times this may create major environmental problems through deforestation (Teketay, 2004; Duguma, 2010) since the majority of the population rely on fire wood for energy production (Bewket, 2003; Mekonnen & Kohlin, 2008).

The situation of energy supply is worst in informal settlement of urban areas since they have no formal way to obtain the available energy like other settlers. The need of access to modern energy systems is located in rapidly growing informal urban settlements throughout the developing countries (Singh, et al, 2015). Studies show that solutions to the problems of supplying energy to informal urban settlements are mysterious because the contexts of the settlements are so different and rapidly changing (Butera et al., 2016; Singh et al., 2015), and the resources available are generally scarce. Lack of choice in accessing adequate, reliable, good quality, safe and environmentally friendly energy services to sustain economic and human development is the way in which energy poverty manifests itself (UNDP, 20003).

Most energy assessments in Ethiopia tried to show the supply and demands in rural areas in relation to fuel wood (Duguma & Hager, 2010; Desta, 2015). However, such kind of information has not been given much attention in informal settlement areas. There are literature gaps that show in what status the informal settlers of Ethiopian urban centers are found in terms of energy provision and how much they expend to get minimum energy for cooking

and lightening. Moreover, perspectives of different stakeholders for energy supply challenges and future plans for addressing the challenges have not yet been assessed in Gondar city, where huge numbers of informal settlers are residing. According to the city administration report, the number of informal settlers is increasing through time mainly due to rural to urban migration that needs integrated planning for social service provision (Gondar City Administration, 2018). Thus, assessing the current regime of energy management in informal settlement areas in the city will put a pathway for policy makers in energy sector for the solution. Therefore, this study wants to: 1) assess the source, amount and expenditure of energy in informal settlement areas; 2) explore the views of different stakeholders on the challenges of sustainable energy supply; and 3) explore the power and interest of stakeholders for sustainable solution of energy supply based on stakeholders' perspective. ♦

## PART 2 MATERIALS AND METHODS

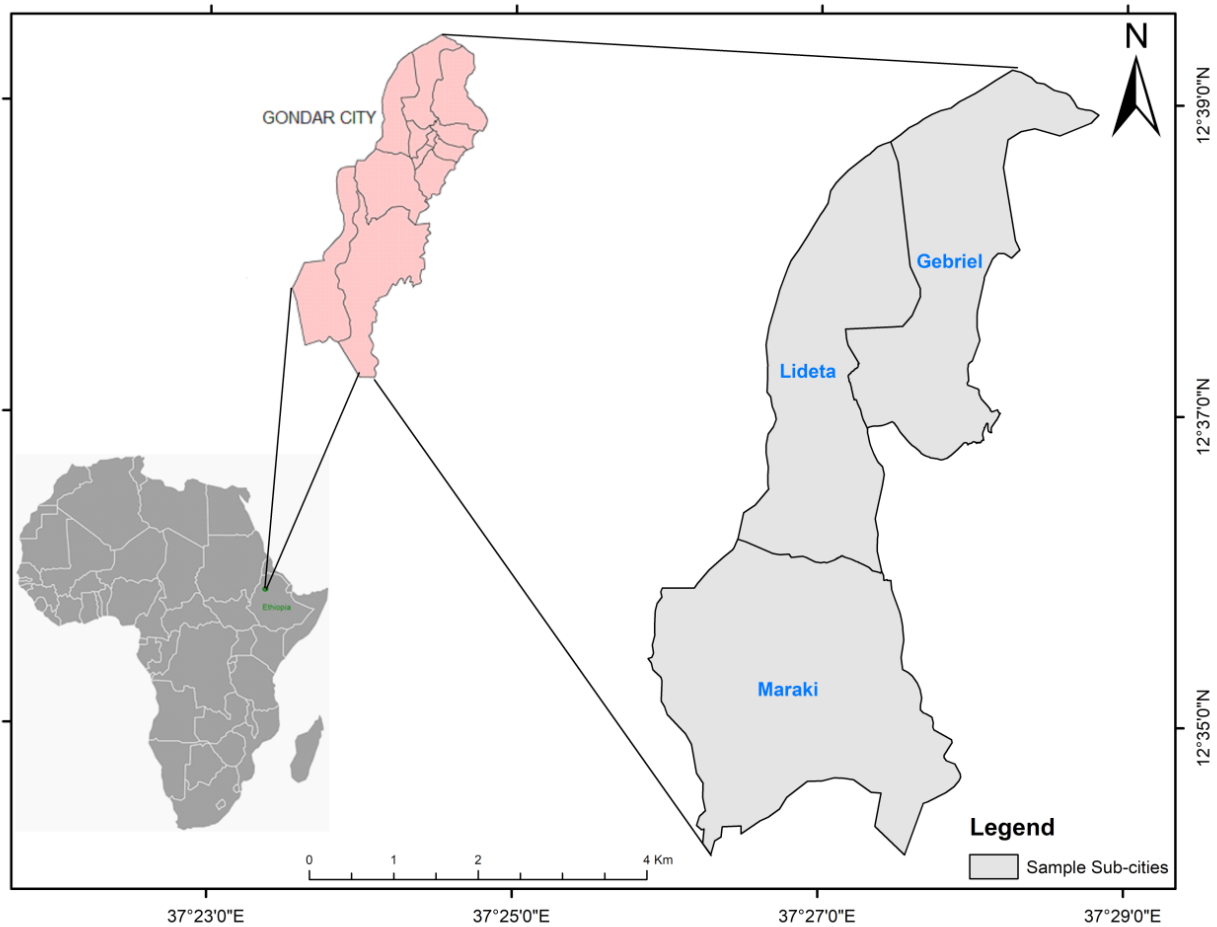
### Description of the study area

Gondar is one of the largest cities in Ethiopia, which has great economic and historical importance and where more than 600,000 people are residing (Gondar City Administration, 2018). Geographically, Gondar

is situated in Northwestern highlands of Ethiopia, Amhara National Regional State at about 12°3'N latitude and 37°28'E (See Figure 1). It is located at a distance of 727 kms from Addis Ababa, the capital of Ethiopia and 120 kms from Bahr Dar, the capital city of Amhara National Regional State.

**Figure 1**

Location map of Gondar



Gondar has a total area of 192.3 square kms with undulating mountainous topography. In the north-west direction, Semien National Park, a world's heritage site registered by UNESCO, is situated at about 120 kms. Gondar is situated in the foothills of the Semien mountain chains at an average elevation of 2200 meter above sea level, and a crown of 3,000-meter high mountains in three sides surrounds it. To the south, the landscape opens to a valley and distant views of Lake Tana, source of the Blue Nile.

#### Methods of data collection

Cross sectional survey research design that makes use of a systematic combination of both quantitative and qualitative approaches was employed in this study. Household questionnaire survey, workshops (with different stakeholders: government officials, researchers and community groups), focused group discussion (FGD) and personal observations were the major tools used for data collection.

To select the sites and samples for the study, a preliminary discussion was held with stakeholders including the city's administration. In consultation with these parties, six sub-cities were identified as major areas of the informal settlement. Out of these, for this study, three sub-cities were purposely selected, considering their accessibility. Lideta, Maraki and St. Gebreal were the sample sub-cities selected for the study. Though there was lack of well-documented data in the city administration, about 2079 of informal settlers were believed to settle in the three sub cities. Of these, about 15 % of the households (312 samples) were taken proportionally from the three sub cities. Each participant was selected through simple random sampling technique.

**Table 1**

Sample households of the study population

SUB CITIES	TOTAL HHS	SAMPLE HH
Maraki	1340	201
Lideta	427	64
St. Gebriel	312	47
<b>Total</b>	<b>2079</b>	<b>312</b>

Household questionnaire survey was used to generate data on energy access, expenditure and sources of energy. The questionnaire was first developed in English language and then translated to the local language (Amharic). Face to face interview was drawn on fill in the questionnaire in order to accommodate diversity that could relate to literacy as illiterate people might be part of the sampled subjects and to minimize the non-response rate of the questionnaire.

Workshop was also the main data collection tool and the participants for the workshop were basically from the three categories of stakeholders who were expected to have different views for energy supply to the informal settlers in Gondar city. The first category includes government officials from the city who were working in city municipality, electric supply authority and land administration offices of the city. The second category includes staff from University of Gondar as well as graduate students from the same university. Lastly, community groups from informal settlers themselves were also involved to capture their views on energy issues.

For all the groups a highlight was given about informality and the concepts of power/interest grid for stakeholder prioritization. After this, the three stakeholder groups were sat separately to make them free to discuss what they feel. This helped to identify major challenges in supplying sustainable energy for informal settlement areas and to identify other stakeholders who have different interest and power for sustainable energy provision.



Moreover, the data collected from focused group discussion was used to support data collected from the household survey through questionnaire. Three FGDs (one in each sub-city) were also employed by including six to eight persons in each discussion group.

**Method of data analysis**

The quantitative data which was gathered from household survey was analyzed using SPSS (Statistical Packages for Social Sciences) version 20 software. Three samples were discarded due to incomplete responses. Descriptive statistics was used to see the energy sources, types and expenditure at household level for informal settlers.

The data obtained through the workshop and discussion was also analyzed qualitatively using thematic analysis and power-interest grid. This helped us to see different perspectives to prioritize stakeholders based on power/interest relationships for energy solution (Mints & Kamyshnykova, 2019). ♦

## PART 3 RESULTS AND DISCUSSION

### General backgrounds of informal settlers

Before we proceed to presenting the results and discussion relating to energy management in the study's site, it is very important to see the background information of the informal settlers in Gondar city since it might have its own implication for energy management. The background data, as can be seen in Table 2, reveals that the majority of the households (78.6%, N= 309) were headed by male, with women headed households being only 21.4%.

The result also shows that the majority of the informal settlers in the study area were in youth age (71% below 30) and the majority of them (79% ) were married (Table 1).

Significant number of the respondents (44%) did not get formal education while about 28.5% of them attended primary school and 7.4 % of the respondents completed their higher education from colleges or universities. Even though the literacy rate is higher than the figure for the ten least developing countries as indicated by Easton & Moussa (2019), which was about 54% in 2015, considering the urban population, this might be very low. As it is indicated on Table 1, the majority (65%) of the respondents migrated from rural areas to the city of Gondar in search of better life. This might be seen as the reason for their higher dropout rate from schools. The majority of the households (76.4%) had their own house which was poorly constructed using wood and mud (Figure 2) while remaining were living either in rented house or in their relative/parents' house. About 77.3% of the settlers were found to live in a single confined room with no partition. This result matches with the result which was observed by. According to these researchers, 70% of the households in Kismu, Kenya had single room.

**Table 2**

Households' Background

HHS BACKGROUND		FREQUENCY (N=309)	PERCENTAGE
Sex	Female	66	21.4
	Male	243	78.6
Age ranges	20 years and less	29	9.4
	21 -30	190	61.5
	31-40	62	20.1
	41-50	21	6.8
	greater than 50	7	2.3
Marital status	Never married	35	11.3
	Currently married	244	79.0
	Widowed	17	5.5
	Divorced	13	4.2
Level of education	Illiterate	103	33.3
	Religious Education	11	3.6
	Can read and write	25	8.1
	Primary Education	88	28.5
	Secondary Education	59	19.1
	College/University	23	7.4
Place of birth	Gondar City	61	19.7
	Other rural area	201	65.0
	Other urban area	47	15.2
Housing ownership	Private	236	76.4
	Rent from Private	61	19.7
	Others	12	3.9
Number of rooms owned	1	238	77.3
	2	55	17.9
	3	10	3.2
	4	3	1.0
	5	2	0.6

**Figure 2**

Informal settlement areas in Maraki sub-city (Photo by the author)

**Energy supply, source and expenditure**

More than 98% of the respondents have no own power meter while the remaining small number of households have got access illegally through informal communication with the city electric suppliers, through corruption. The findings in this study is similar to the findings of a study conducted in Bahrdar city (Ambaye, 2011). As Ambaye's (2011) study reveals, the absence of electricity forced some of the people to illegally connect electricity from the nearest area. About 89% (N=306) of the respondents rented one light bulb from the nearby houses with power meter (Figure 2) while others were not using any since they had no enough money to cover the connection cost and the monthly fees for one light bulb. In this case, they rather used their mobile

phones in the evening to eat their dinner for lightening purpose. The result from FGD also indicated that the people who have power meters continuously increase the amount of money for one light bulb. In addition, informal settlers explained that the owners could disconnect the line any time they wanted though they were paying their monthly rents. It is also observed that the connections were dangerous since they stuck to using very thin wooden poles with warped line of connection which could create electric shocks as shown in Figure 2.

All households were found to use wood and charcoal as their main source of energy for cooking and heating. Niyongabo & Makonese (2017) also found similar result in Mubuga informal settlement area

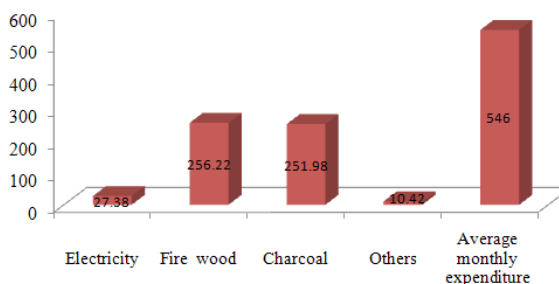
of Burundi where more than 84% of the settlers use wood based energy sources for cooking. This might have also significant impact on health due to pollution as many of them were observed to live in a very small confined single class rooms. Indoor air pollution due to the burning conventional fuels is responsible for many health, environmental and social problems that disproportionately and adversely affect children’s health (Shahsavari & Akbari, 2018). The World Health Organization (WHO) states that about 4.3 million premature deaths have been recorded each year as a result of household air pollution (WHO, 2014).

Respondents were also asked whether they were using solar energy for lightning purpose. The result shows that only 14% of them were using the solar panels for lightning purpose while the majority of them were not using this source. The result from FGD indicates that householders were not using the solar panels for lightning purpose due to their durability problem. Moreover, they also added that these solar panels were not affordable for them. As studies show if renewable energy sources are not affordable to the poor households, they will not be used so that they may need effective way of financial support for their implementation in developing countries (Shahsavari & Akbari, 2018).

Moreover, as revealed in the responses of the samples, the households were found to invest much of their income to buy fire wood and charcoal. The result shows that about 29% (mean monthly income= 1896 ETHB<sup>1</sup>) of the income in informal settlement areas were used for energy, which leads to vicious cycle of poverty (Figure 3). As compared to other studies, these poor households were found to spend huge proportion of their income for energy. For example, in Brunei Darussalam, Pacudan & Hamdan (2019) found that the energy expenditure of households ranges from 2.7% to 4.7% of their income.

**Figure 3**

Monthly average energy expenditure of informal settlers for different sources in Gondar city (Author’s survey, 2019).



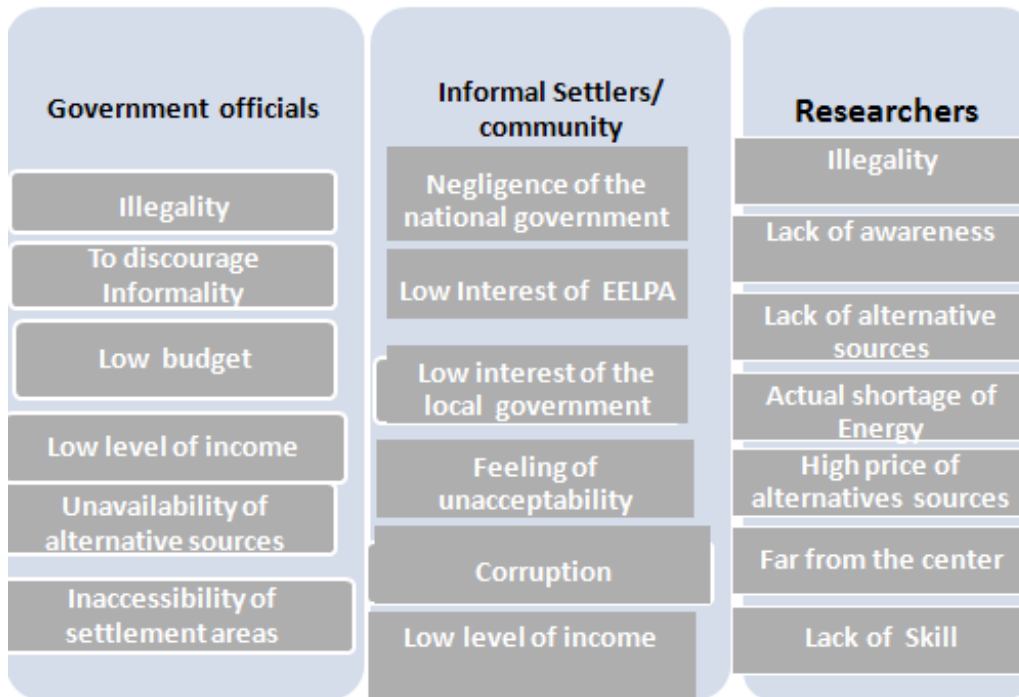
**Challenges in supplying sustainable Energy: Different Perspectives**

To explore major challenges to supply sustainable energy for informal settlers, a workshop that participated different stakeholders, including the community, the government officials and researchers in higher education institutions was organized. The result indicates that there were different views among the stakeholders on the challenges (Figure 4). The government officials emphasized that since the settlements were illegal, there was no need to supply electric power to them as this might in turn encourage other informal settlements. Singh et al.(2015) also pointed out that the supply of energy for poor households is highly attributed to lack of tenure-ship as well as improper planning to solve the problem of informality and social services, which is important to bring sustainable urban development.

1. Ethiopian Birr, 1 ETHB is about 0.03 Euros.....

**Figure 4**

Major stakeholders' view for the challenge of supplying energy



On the other hand, the poor informal settlers considered themselves as neglected group by the government officials due to their tenure insecurity. Thus, the Ethiopian Electric Power Authority (EELPA) showed no interest to supply power meters to these settlers. The result from the focus group discussion with informal settlers also indicated that though they had no option to live as a result of unaffordable house rent in the city, the government was not considering the problem that led them to insecurity and frustration. The researchers in the university also pointed out that though illegality was the main cause, the government officials' lack of awareness about the problem and know how to supply energy for these settlers was the most important challenge. It is believed that, for sustainable urban growth, inclusive planning is needed since the issue of informality is a serious problem in developing countries (Penrose et al., 2010).

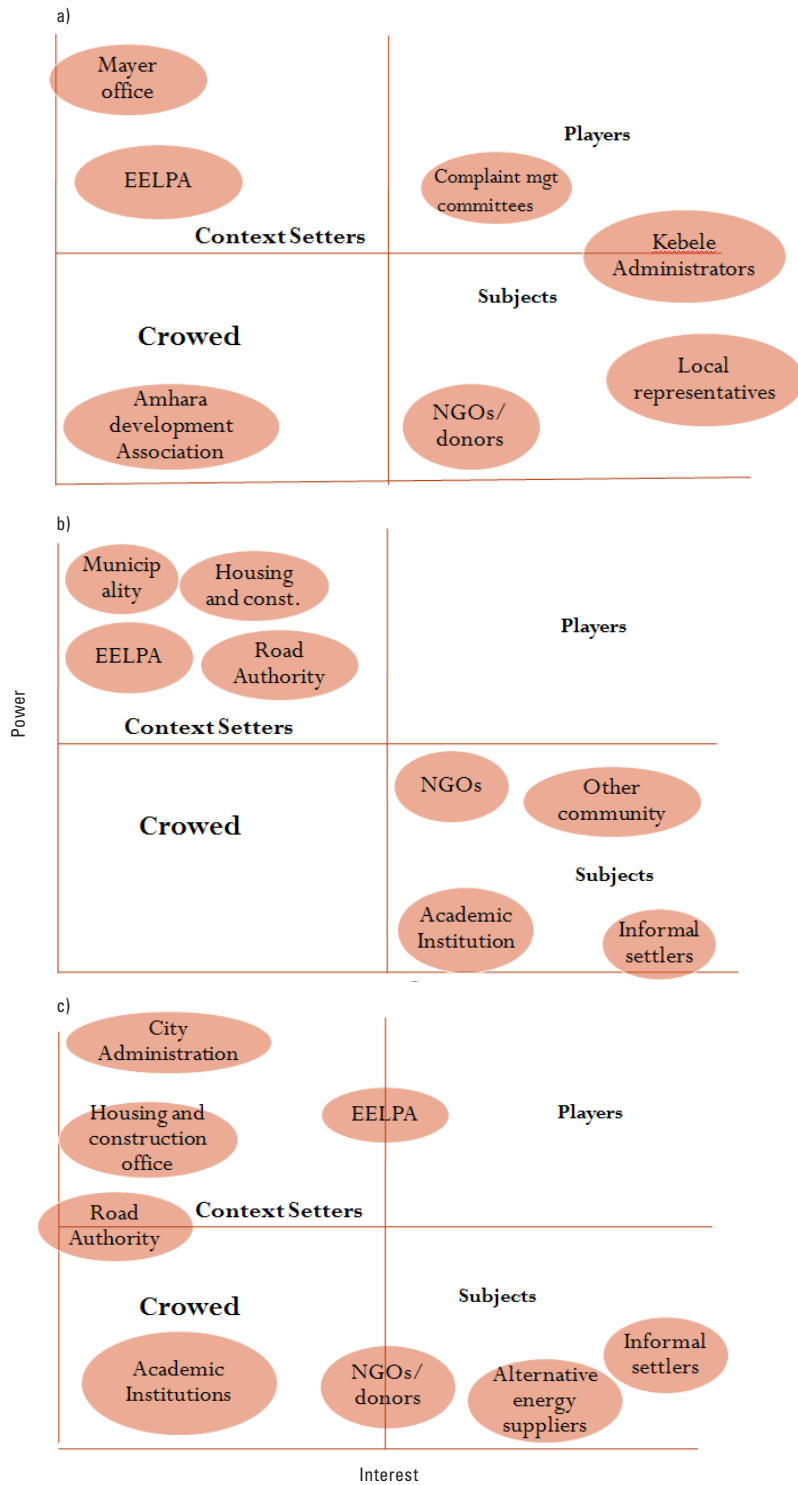
Though the millennium development goals, especially goal 7 and 8, state that any intervention in informal settlements must give greater attention to inclusive, safe, resilient, and sustainable development (Nassar & Elsayed, 2018), the challenge still remains behind this fact and many government officials are not taking care of it.

**Power/interest analysis of stakeholders for solution (Stakeholders' view)**

From the above challenges, it is also important to see the possible power/interest relations of different stakeholders for the solution to provide energy for the poor informal settlers. The three major stakeholders who participated in the workshop had different views as shown in Figure 5. Major stakeholders like the city administration, the city Mayer office and EELPA were identified as stakeholders with high power but with less interest to provide energy, mainly electric power to the poor society as indicated by them in Figure 5a.

**Figure 5**

Power/interest views by a) Government officials b) researchers c) informal settlers on solution of energy provision



Source: Adapted from Ackermann & Eden, 2011

On the other hand, the government officials also indicated that the researchers in higher education institutions were less interested as well as had no power for the supply of energy to the poor informal settlers. This might be related to their background knowledge since most of them were graduates of universities that they did not learn about informal settlers as well as service provision issues for these settlement areas during their stay in universities.

The view of researchers was also similar in that the city municipality and housing and construction offices have greatest power followed by the EELPA and road authorities with low interest to supply energy; while informal settlers, other community groups, academic institutions and non-governmental organizations (NGOs) have interest but no power (Figure 5b). Similarly, the informal settlers indicated that the Mayer office had greatest power but showed less interest to provide electric power for them. As the samples revealed, despite the power they possessed, the management committee did not volunteer to solve the problem of the informal settlers.

During the focus group discussion, settlers pointed out that they settled informally due to lack of options available to them to live though the government always insisted complaining about them for being illegal. They also added that if they could get affordable housing in the city, they would have no any interest to live informally, devoid of infrastructure and services. Poor economic opportunities and an increasing shortage of affordable housing lead to informal settlements where the residents live without security of tenure and limited access to basic infrastructure (Penrose et al., 2010). This has adverse impacts on the life of informal settlers and urban development (Abebe et al., 2019).

All the above explanations indicated that the future urban development should focus on inclusive planning to bring relative equitable living standards in the cities. This might be achieved

through education. However, the education policy of Ethiopia, as part of the country's policy and strategy, has not yet given much attention for the informal settlers though understanding the key trends of urbanization likely to unfold over the coming years is crucial for the implementation of the 2030 agenda for SD, including efforts to forge a new framework of urban development (UN, 2018; Larson et al., 2019). Considering Ethiopia's policy and legal aspects of land, is the best example of marginalizing the urban poor. Despite high rate of urbanization in Ethiopia, both the land lease policy and condominium housing strategies could not satisfy the poor who are living in informal settlement areas (Belete, 2019).

In order to acquire a plot of urban land through a lease contract or a condominium unit, a significant amount of lump sum fee or initial/down-payment is requested from personal saving. The allocation of plots through lease contract and allocation of condominium flats seem to provide greater benefits to the urban middle and higher classes, not to the low-income communities (Belete, 2019). The insensitiveness of the formal land and housing supply for the poor has led to the explosion of new informal settlements in the peri-urban areas (UN-Habitat, 2011).

All the above explanations hint that the poor informal settlers, who are deprived of social services in Gondar, and probably in all other cities of Ethiopia, have settled informally due to lack of options to survive. This needs thinking outside the box as explained by Adam (2019). As mentioned in the Sustainable Development Goals (SDGs) by the United Nations, social inclusion is the key indicator of social sustainability. Moreover, implementing and achieving SDGs are meaningful when all people experience a sustainable way of life in which socio-ecological lifestyle is deeply tied with their livelihoods and natural environment (Wang & Wang, 2019). ♦

## PART 4

# CONCLUSION AND POLICY IMPLICATION

This paper has attempted to explore major energy sources, supply and expenditure in Gondar city's informal settlement areas. It has also investigated challenges relating to sustainable supply energy taking views of different stakeholders. It has revealed that the majority of informal settlers have no formal way of electric power sources for lightning, cooking and heating. The main source of energy for cooking and heating is wood. Lack of diversity in energy access and heavy dependence on biomass energy is needs seeking alternative renewable energy sources. One of the major potentials to solve this problem is improving the solar panel since the provision of solar panels is critical problem for the poor households. On the other hand, the informal settlers are investing much of their income to buy wood and charcoal. This may also exacerbate their worst living condition in the future as well. Thus, involving multi-stakeholders appear to be imperative to avert the vicious circle of poverty likely to prevail. Bringing different stakeholders, including NGOs, civic societies and settlers themselves to discuss the problem of informal settlers to access for affordable energy is a mandatory issue for the city administration.

The central challenge identified in provision of energy for informal settlement is tenure insecurity. This might have also vicious problem for future development of the city. Though informal settlers have no choice to live, they are complained by the government and excluded in getting social services, like energy or electrification. They feel that they are neglected by the government which may also lead to grievance against the government if it is not properly solved. As can be inferred from the reports by informal settlers, many of the stakeholders are not

playing their role to solve the challenge of energy supply. They contend that many have power, but they lack interest to address the problem. They claim that decentralizing power of the decision makers and considering inclusive planning is needed. Therefore, addressing problems of informal settlers would be much easier if all stakeholders come together and discuss ways of energy provision in particular and improving the life of informal settlers in general.

Generally, inclusive planning by participating various stakeholders is one of the possible avenues to address problems relating to informal settlements in the city of Gondar. This could pave the way to bringing about future positive development of the city through improving the livelihoods of the poor informal settlers. ♦



## REFERENCES

- Abebe, M. S., Derebew, K. T., & Gemed, D. O.** (2019). Exploiting temporal-spatial patterns of informal settlements using GIS and remote sensing technique: a case study of Jimma city, Southwestern Ethiopia. *Environmental Systems Research*, 8(1). <https://doi.org/10.1186/s40068-019-0133-5>
- Ackermann, F., & Eden, C.** (2011). Strategic Management of Stakeholders: Theory and Practice. *Long Range Planning*, 44(3), 179–196. <https://doi.org/10.1016/j.lrp.2010.08.001>
- Adam, A. G.** (2019). Land Use Policy Thinking outside the box and introducing land readjustment against the conventional urban land acquisition and delivery method in Ethiopia. *Land Use Policy*, 81(August 2017), 624–631. <https://doi.org/10.1016/j.landusepol.2018.11.028>
- Ambaye, D. W.** (2011). *Informal Settlement in Ethiopia , the Case of two Kebeles in Bahir Dar City Informal Settlement in Ethiopia , the Case of two Kebeles in Bahir Dar City* (No. TS06D; Issue May 2011).
- Bekele, K., Hager, H., & Mekonnen, K.** (2013). Woody and non-woody biomass utilisation for fuel and implications on plant nutrients availability in the mukhantuta watershed in ethiopia. *African Crop Science Journal*, 21, 625–636.
- Belete, A. W.** (2019). Examining Rental Housing Affordability Among Eastern Ethiopian Cities. *Developing Country Studies*, 19(6), 25–33. <https://doi.org/10.7176/DCS>
- Bewket, W.** (2003). Household level tree planting and its implications for environmental management in the northwestern highlands of Ethiopia: a case study in Chemoga watershed. *Land Degrad. Develop.*, 388(April), 377–388.
- Butera, M. F., Caputo, P., Adhikari, S. R., & Facchini, A.** (2016). Urban Development and Energy Access in Informal Settlements . A Review for Latin America and Africa. *Procedia Engineering*, 161(2018), 2093–2099. <https://doi.org/10.1016/j.proeng.2016.08.680>
- Damte, A., Koch, S. F., & Mekonnen, A.** (2012). Coping with fuelwood scarcity household responses in rural Ethiopia. In *Environment for Development: Vol. DP 12-01* (No. 12–01; Issue January).
- Duguma, L. A.** (2010). *Agroforestry as a tool for integrated land resources management : improving farmers ' livelihood , providing wood products and minimizing forest encroachment* (Issue November). University of Natural Resource and Life Sciences.
- Duguma, L. A., & Hager, H.** (2010). Consumption and species preference for house construction wood in central highlands of Ethiopia — implications for enhancing tree growing. *Journal of Forestry Research*, 21(1), 104–110. <https://doi.org/10.1007/s11676-010-0018-y>
- Easton, P. B., & Moussa, M. L.** (2019). Literacy usage in impoverished African settings: Post-Education for All (EFA) research needs. *International Review of Education*, 65(3), 471–496. <https://doi.org/10.1007/s11159-019-09778-1>
- Gaunt, T., & Borchers, M.** (2012). *Informal Electrification in South Africa*.
- Larson, L., Yeshitela, K., Mulatu, T., Sisay, S., & Desta, H.** (2019). The Impact of Rapid Urbanization and Public Housing Development on Urban Form and Density. *Land*, 6(66), 1–13.
- Makonese, T., Masekameni, D. M., & Annegarn, H. J.** (2016). *Energy use scenarios in an informal urban settlement in Johannesburg , South Africa. March*. <https://doi.org/10.1109/DUE.2016.7466703>
- Mekonnen, A., & Kohlin, G.** (2008). Biomass Fuel Consumption and Dung Use as Manure: evidence from rural households in Amhara region of Ethiopia. *Environment for Development*, April, 08–17.
- Mints, A., & Kamyshnykova, E.** (2019). Methods of stakeholder prioritisation in the context of stakeholder management. In *International Scientific Conference Contemporary Issues in Business, Management and Economics Engineering*. May 9–10 2019, Vilnius, Lithuania. <https://doi.org/10.3846/cibmee.2019.046>
- Mondal, A. H., Bryan, E., Ringler, C., Mekonnen, D., & Rosegrant, M.** (2018). Ethiopian energy status and demand scenarios : Prospects to improve energy efficiency and mitigate GHG emissions. *Energy*, 149, 161–172. <https://doi.org/10.1016/j.energy.2018.02.067>
- Nassar, D. M., & Elsayed, H. G.** (2018). From Informal Settlements to sustainable communities. *Alexandria Engineering Journal*, 57, 2367–2376. <https://doi.org/10.1016/j.aej.2017.09.004>
- Niyongabo, P., & Makonese, T.** (2017). Analysis of Household Energy Uses in Mubuga Informal Settlement, Gitega, Burundi. *J Hum Ecol*, 57(1,2), 38–46. <https://doi.org/10.1080/09709274.2017.1311653>
- Pacudan, R., & Hamdan, M.** (2019). Electricity tariff reforms, welfare impacts, and energy poverty implications. *Energy Policy*, 132(June), 332–343. <https://doi.org/10.1016/j.enpol.2019.05.033>

**Penrose, K.,** De Castro, M. C., Werema, J., & Ryan, E. T. (2010). Informal urban settlements and cholera risk in Dar es Salaam, Tanzania. *PLoS Neglected Tropical Diseases*, 4(3), 1–11. <https://doi.org/10.1371/journal.pntd.0000631>

**Shahsavari, A.,** & Akbari, M. (2018). Potential of solar energy in developing countries for reducing energy-related emissions. *Renewable and Sustainable Energy Reviews*, 90 (June 2017), 275–291. <https://doi.org/10.1016/j.rser.2018.03.065>

**Singh, R.,** Wang, X., Ackom, E. ., & Reyes, J. C. . (2015). *Energy access realities in urban poor communities of developing countries : assessments and recommendations. Report prepared for the Global Network on Energy for Sustainable Development (GNESD) by the Energy and Resources Institute (TERI).* [www.gnesd.org](http://www.gnesd.org)

**Teketay, D.** (2004). Forestry Research in Ethiopia : Past , Present and Future. In G. Balcha, K. Yeshitela, & T. Bekele (Eds.), *Proceedings of National Conference on Forest Resources of Ethiopia: Status, Challenges and Opportunities, 27-29 November 2002* (pp. 1–39).

**UN-Habitat.** (2015). *HABITAT III ISSUE PAPERS 22 – INFORMAL SETTLEMENTS* (Vol. 2015, Issue III). [https://unhabitat.org/wp-content/uploads/2015/04/Habitat-III-Issue-Paper-22\\_Informal-Settlements.pdf](https://unhabitat.org/wp-content/uploads/2015/04/Habitat-III-Issue-Paper-22_Informal-Settlements.pdf)

**UN-Habitat.** (2016). Urbanization and Development: Emerging Futures. In *UN Habitat World Cities Report 2016*. <http://wcr.unhabitat.org/main-report/>

**Wang, J.-H.,** & Wang, S.-Y. (2019). Indigenous Social Policy and Social Inclusion in Taiwan. *Sustainability*, 11(12), 3458. <https://doi.org/10.3390/su11123458>

**WHO.** (2014). *TitleWorld Health Statistics* (Issue August). WHO.

**Wolpe, P.,** & Reddy, Y. (2010). Alleviating urban energy poverty in the informal sector : The role for local government. ‘*Overcoming Inequality and Structural Poverty in South Africa: Towards Inclusive Growth and Development*, September, 14.