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Local Participation in Electrification

A qualitative study of local participation in two small-scale hydropower projects in Tanzania.

HANNA SAND LINDSKOG

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Division of Environmental Systems Analysis
CHALMERS UNIVERSITY OF TECHNOLOGY
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Power lines in the countryside in Tanzania

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This report is based on a master thesis written by the author and published in 2011 for a Master in International Administration and Global Governance, Gothenburg University, Sweden. The thesis was supervised by Helene Ahlborg, Environmental Systems Analysis, Chalmers University of Technology.

The study presented here is conducted within the research program STEEP-RES at Chalmers University of Technology and Göteborg University, Sweden. STEEP-RES aims at interdisciplinary assessments of the potential for an expansive introduction of small/medium-scale off-grid electrification based on renewable energy sources in rural Tanzania and Mozambique. The STEEP-RES program is coordinated by Prof. Sverker Molander, Environmental Systems Analysis, Chalmers University of Technology.

Abstract

The aim of this study is to investigate how different types and levels of participation affect the outcomes of two small-scale hydropower projects in Tanzania. It does not cover all possible aspects of participation and its relation to project outcomes, but focuses on outcomes in terms of the local actors' perceptions of the significance of electricity, their expectations and satisfaction with the project, and their problem solving capacity for the future operation of the hydro plant.

The research design is qualitative using a multiple-case study approach by conducting field studies at two sites and using data triangulation; semi-structured interviews, observations and secondary sources.

The two projects in this study use both different and similar types and levels of participation in the planning, implementation and operation phases. The differences, however, are greater than the similarities. When the users' perception of the significance of electricity and the satisfaction with the project differ, it depends mainly on the expectations created in the planning phase, the capacity of the hydropower system and the amount of users covered in the projects. Participation affects what people expect of the project and in turn also how satisfied they will become. However, participation needs to be put in relation to the financial and technical aspects in order to be effective.

Keywords: local participation, renewable energy, rural electrification, Tanzania,

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1. Introduction

Access to electricity is in many respects seen as a prerequisite for socio-economic development and for achieving the Millennium Development Goals in 2015 (Persson et.al 2010, Klunne & Michael 2009). However, in the rural areas of Sub-Saharan Africa up to 92 % of the population lives without electricity and in Tanzania only 2 % of the rural population is estimated to have access to electricity (Klunne & Michael 2009, Msofe 2009). As it has proven expensive and difficult to extend the national grids renewable energy sources such as small-scale hydropower represent a feasible alternative energy source relying on local resources (Lyimo 2006, Klunne & Michael 2009).

As in most other aid projects participation by beneficiaries in electrification is seen as a necessity for the success of the projects. The importance of shifting from a criticised top-down approach to aid to a bottom-up focus with participation as its main component was emphasized by the World Bank in the early 1990's followed by the Paris Declaration on Aid Effectiveness in 2005 and the ACCRA Agenda for Action in 2008. Participation highlights the importance of the beneficiaries of aid projects taking more control over their own developing processes (OECD 2011, Mikkelsen 2005:55, Eversole 2010, Lewis & Kanji 2009:73). However, the concept of participation is complex and it has several definitions (Mikkelsen 2005), which easily result in different interpretations of how to use participation and in different levels of participation. The World Bank has formulated four different ways in which participation occur; information sharing, consultation, collaboration and empowerment (Mikkelsen 2005:116) and all four of these ways can be translated into different levels of participation; high, medium and low.

Electricity is often an unknown area for most people in rural Sub-Saharan Africa why participation from the beginning of electrification is of high importance in order to create acceptance. Also the continued satisfaction of the beneficiaries of the electricity highly depends on their participation in the projects (Winther 2008). Additionally, participation is together with other factors such as financing, equipment selection and the number of connections reached seen as a prerequisite for the long-term sustainability of the projects (Martinot & Reiche 2000, Barnes & Foley 2004).

This study analyses the type and level of participation in two small-scale hydropower projects in Tanzania; the electrification project at Itete Hospital in the Mbeya Region and the rural electrification project in the Mawengi Ward, Iringa Region, in order to concretize what importance the type and level of participation has for the outcomes of the projects.

2. Participation in aid projects

The aid industry is often criticised for imposing structures and systems on Africa as well as demanding aid-receiving countries to meet several conditions, or “conditionalities”, by “...increasingly insisting upon performance and good governance as a prerequisite for aid, a practice called ‘selectivity’. This is a means of requiring a recipient state to demonstrate the seriousness of its commitment to economic and social reforms.”(Nanda 2006:269). Consequently, the conditionalities are criticised for weakening the ability of Africans to create their own systems; “Even though the balance of power may have shifted supposedly in favour of the African policymakers, it is still the donors who are in the policymaking driving seat...” and in turn, “...aid-dependency undermines the ability of Africans, whatever their station, to determine their own best economic and political policies.”(Moyo 2009:67).

By the early 1990’s the World Bank and other donating institutions began to change its focus on aid and involving people as actors in the development process; “moving from ‘things’ to ‘people’ and reversing power relations from ‘uppers’ to ‘lowers’”(Mikkelsen 2005:55). Participation of the beneficiaries became vital for the aid industry as well as good governance, accountability, transparency etc. (Lewis & Kanji 2009, Burnside & Dollar 2000).

2.1 The complexity of participation

When studying participation, several differences in the definition of the concept occur and it becomes evident how complex participation is. Mikkelsen outlines some of the meanings attached to participation; it can have the meaning of “voluntary contributions by people in development activities, but without their taking part in decision-making”, which in turn implies that implementers like aid organizations control the process by making the decisions. Participation can also have the meaning of “the fostering of a dialogue between the local people and the project staff in order to obtain information on the local context and on social impacts” (2005:53). Thus, communication between implementing organizations and the beneficiaries occur but the implementers control and decide over the process. Participation is also used as “an empowering process which enables local people to do their own analysis, to take demand, to gain in confidence, and to make their own decisions”(2005:54). Consequently, the beneficiaries control the process together with the implementers to begin with in order to finally take the complete control. Additionally, Winther defines

“participation” as a method where “people should identify their own goals for development instead of having such goals defined from a distance by others.”(2008:72). Similar to the empowerment process illustrated by Mikkelsen this definition implies that the participants have control over their own development process. The World Bank’s definition of participation focuses on the distributed control of the development process between stakeholders; “Participation is the process through which stakeholders influence and share control over priority setting, policy-making, resource allocations and access to public goods and services”(World Bank 2011). Thus, beneficiaries share the control and influence with the aid organization.

Several meanings of participation simplify for aid organizations to make different interpretations of how to use it at the same time as it implies different levels of participation, which will be explained later. As a consequence, participation has been criticised as another way to impose the top-down approach where outsiders still impose ideas and solutions on the insiders (Mikkelsen 2005, Eversole 2010, Cornwall 2008). The anthropologist Robyn Eversole explains how participation is claimed to be another method to cover ‘business as usual’; “...to hide power inequities, gloss differences, and enable elites to pursue their own agenda”(Eversole 2010:2). Hence, participation can be claimed to reflect a definition of development based on the best practices, knowledge and institutions of professionals from the outside with their distinct language, organizational structure and assumptions.

2.2 The importance of participatory methods

It is widely agreed within the aid industry that participation of the beneficiaries is a prerequisite for the success of aid projects including electrification projects. But what creates the assumption that participation leads to success? What factors affect the satisfaction of the electricity users and what role does participation play in it?

Much of previous research states that participation of the beneficiaries is a prerequisite for the success of electrification projects (Martinot & Reiche 2000, Holland et.al 2000, Barnes & Foley 2004). The focus is usually on the long-term sustainability of the projects also including other factors than participation as financing and equipment selection and additionally, on the number of connections reached (Martinot & Reiche 2000, Barnes & Foley 2004).

Martinot and Reiche study six cases of “...regulatory approaches for promoting rural off-grid electrification” and come up with several suggestions of “how to deliver electricity services to rural populations sustainably”(2000:1). Similar to Barnes and Foley (2004) they point to the importance of involving participatory methods in electrification projects. However, Martinot and Reiche also explain how the approaches that they describe, like participation, “...are based on project designs and expected results rather than accumulated practical experience.”(2000:2).

Furthermore, Barnes and Foley summarize lessons learned from successful electrification projects and once again the sustainability and the amount of rural people connected are highlighted as most important (2004). When it comes to participatory methods Barnes and Foley argue that by initiating a rural electrification committee the implementation process can go easier as the committee represents the local community and can help to assess the demand, educate and encourage consumers in advance and promote the use of electricity (2004:5). Holland et.al discuss how participation in infrastructure projects like electrification, can be complicated and show how the outcomes from electrification committees are complex and “depends on the local culture and on the extent to which all members of a community have been involved in decisions making.”(2000:4). In order for the participation in electrification projects to lead to sustainable and successful schemes “careful preparation is needed and locally appropriate guidelines prepared, and an external facilitator is recommended” (2000:4).

The focus in previous research on participation in electrification is often on the possibility of participation to make implementation smoother and thus avoid problems. Additionally, previous research highlights foreseen sustainability and expected results of the projects studied without connecting participation to project results. Consequently, the importance of participation is not concretized and put in relation to the long-term outcomes of the electrification projects.

2.3 Participation creates success

Winther explains what importance the participation of Uroa community, Zanzibar, played for the electrification project and the significance of electricity for the users. The electrification project in Uroa, was initiated by donations from the Norwegian Agency for Development Cooperation (NORAD) and Norwegian engineers. Winther argues that the

project is an example of 'best-practice' as the villagers themselves participated to a great extent in both planning and implementation phase (2008:3).

The participation in the electrification of Uroa started from the beginning of the project when the local Chairman of the ruling party in Tanzania and Zanzibar at the time, "...initiated the idea of electrification and, in doing so, defined access to electricity as a need in the village." (Winther 2008:72). Additionally, the villagers of Uroa shared the control of decision-making together with the donors and engineers by organizing meetings, drawing maps and prepare for the electrification (Winther 2008:72). Winther explains how there were shifts in the control and power over the electrification process between the local administration in Uroa and the project managers and states that "Without acceptance and assistance from the project management, there would have been no project."(2008:73). Consequently, there was only a small degree of empowerment of the local leadership as "...the main control over the project remained in the hands of the project management."(Winther 2008:73). Despite the small degree of empowerment Winther illustrates how the electrification was a success "...in terms of village satisfaction, street lighting and a high degree of household connections...", which in turn "was explained exactly in relation to their need to mobilise for electricity."(2008:219).

Winther explains how the Chairman and the project management came from two different knowledge systems and therefore had different worldviews, which in turn could have created problems between the parties. However, Winther claims that it to a large extent was the "partial character of their understanding and the protagonists' acknowledgement of such partiality" that determined the success of the electrification project in Uroa (Winther 2008:221). The long time given for the Chairman's co-workers to decide and reflect on the idea of electricity also contributed to the positive outcomes of the project.

To illustrate the importance of participation in electrification Winther shows one typical example of top-down implementation where the beneficiaries of the electricity did not participate in the planning phase but were informed two weeks before the project was supposed to start. However, as the beneficiaries did not get involved much earlier "...local resistance put a stop to electricity" (Winther 2008:219).

Winther clarify the connection between participation and the significance of electricity for the users and their satisfaction. She also makes it clear that participation of the beneficiaries is important in order for the electrification to be realised.

2.4 Measuring participation

The primary data in this study will be analysed by the use of the World Bank's four ways or types of participation: information sharing, consultation, collaboration and empowerment (Mikkelsen 2005:116) and in addition "cooperation in work tasks" is added.

Participation can in electrification projects be realised by the use of different participatory methods. Information sharing, collaboration, consultation and empowerment can be seen in for instance workshops and meetings where information about the project plans is shared, and where also collaborative decision-making, planning and training can take place (World Bank 1996, Gatti & Biella 2004, Winther 2008:72). Additionally, cooperation in work tasks in electrification can be realised when local stakeholders participate in "clearing the bush and preparing for the erection of the poles."(Winther 2008:71).

Meetings, workshops and different work tasks are a few examples of participatory methods used in electrification projects where different types of participation occur. The methods and types of participation will be studied in order to determine whether the level of participation is high, medium or low in the two small-scale hydropower projects studied in this research. The level also depends on who it is that participates; future direct users and/or indirect users and local leaders.

The level of participation becomes clear when looking at the different definitions of the concept. If describing participation as "an empowering process which enables local people to do their own analysis, to take demand, to gain in confidence, and to make their own decisions"(Mikkelsen 2005:54) or a process where "people should identify their own goals for development instead of having such goals defined from a distance by others."(Winther 2008:72), the level of participation is high as the participants control the process. If instead defining participation as a "process through which stakeholders influence and share control over priority setting, policy-making, resource allocations and access to public goods and services"(World Bank 2011) the level of participation is medium as it does not imply any empowering process and the implementing organization can keep the control. The use of different definitions of participation, including the World Bank's, and the different ways of participation clarify the complexity of the concept, which will be discussed even further in the results.

The different types of participation, who it is that participate and when they participate can decide whether there is a low, medium or high level of participation:

- Information sharing: One-way flow of information to the public → low level as the implementing organization share information to the beneficiaries/participants¹ but not the other way around. Most likely, first the local leaders get information about the plans, which they then share with the future beneficiaries. However, as in the unsuccessful case outlined by Winther, if the future beneficiaries do not get the information, but only the leaders, participation does not take place as other stakeholders than the elite are completely excluded.
- Cooperation in work tasks: Shared cooperation in work tasks between the stakeholders → level that can be medium or low depending on who it is that participates and whether they are future direct or indirect users. Indirect users do not have the same control over the process and perhaps not the same motivation as direct users to cooperate in work tasks.
- Consultation: Two-way flow of information between the coordinators of the consultation and the public → medium or low level depending on who it is at the local level that participates. If all stakeholders participate, share information about the process and are listened to through consultation the level is medium, but if only the local leaders participate the level is low.
- Collaboration: Shared control over decision-making → low or medium level depending on who it is that share the control with the implementers. If all stakeholders participate the level is medium, but if only the local leaders participate the level is low.
- Empowerment: Transfer of control over decision-making and resources to all stakeholders → a high level of participation if *all* stakeholders are included and share control, a medium level if some stakeholders (such as the local leaders) control the process and other stakeholders are included at in consultation or collaboration.

Clearly, to measure participation is a qualitative assessment that needs to take many aspects into consideration, such as: type of participation (how?), who participates under what circumstances and the timely aspect of where in the project phase the participation takes place (when?).

¹ The beneficiaries/participants are direct users that benefit directly from the electricity at their homes or/and in their workplace and indirect users that benefit indirectly when visiting stores or hospital.

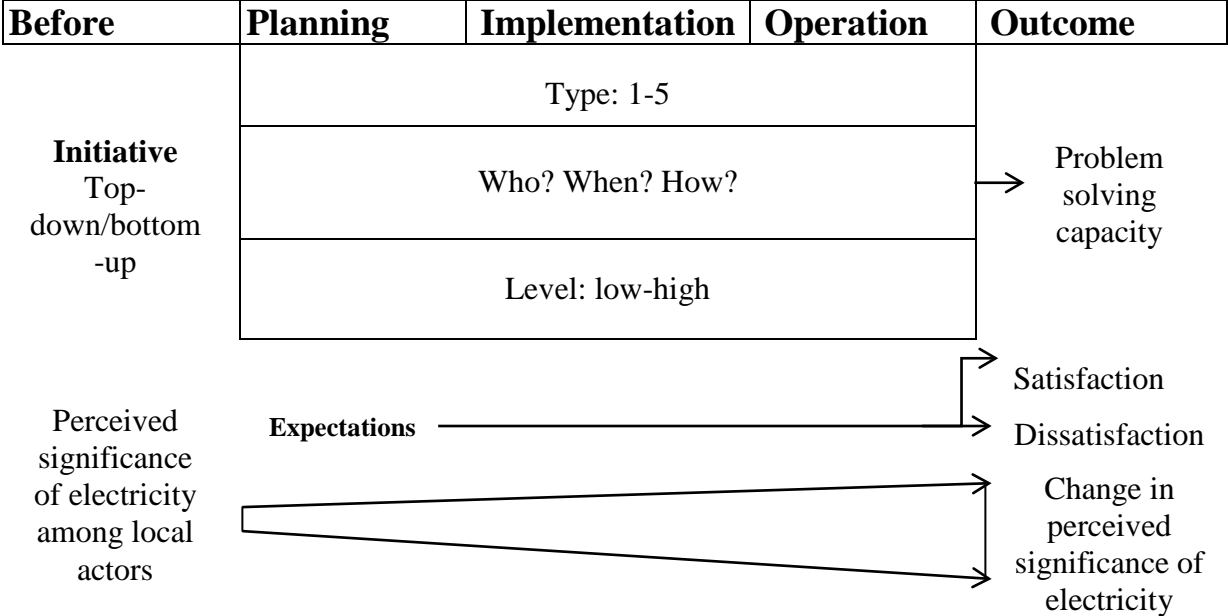
2.5 Aim

Previous research on participation in rural electrification shows that;

- Together with other factors like financing and equipment selection participation is important for the long-term sustainability of the projects (Martinot & Reiche 2000, Barnes & Foley 2004).
- There is little implementation experience from the cases looked at in Martinot & Reiche (2000) and consequently participation is seen as significant for expected results rather than practical experiences (Martinot & Reiche 2000)
- Participation smoothens implementation (Barnes & Foley 2004).
- Participation in terms of mobilising for electricity makes beneficiaries satisfied as their needs and expectations are fulfilled (Winther 2008).

Participation is considered to be of importance and to have effects on the development of electrification. However, among previous research that I know of it is not concretized in what way participation is of significance for the outcomes of electrification projects. In Winther's case, she shows a connection between local participation and the users' satisfaction and their demand for electricity. Table 1 explains how I conceptually understand the role of participation in an electrification process. It does not cover all possible aspects of participation and its relation to project outcomes, but focuses on outcomes in terms of the local actors' perceptions of the significance of electricity, their expectations and satisfaction with the project, and their problem solving capacity for the future operation of the hydro plant. A local perception of electricity as important is necessary from the beginning in order for the project to be initiated and accepted. A local leader who knows of electricity can advocate and convince others of its importance, and thus bring the villagers into the participation process of the project. Furthermore, in the case of Uroa, the users were satisfied as they participated in several stages of the project and their expectations were met. This study will contribute to previous research by investigating how the different ways and levels of participation affect the project outcomes, in terms of the aspects mentioned above, and from the perspective of both implementers and local stakeholders in two hydropower projects in Tanzania.

Table 1. Framework of analysis: the initiative of electrification is raised either from the outside, a top-down perspective, or from the inside, a bottom-up perspective. Without local actors perceiving the significance of electricity to be high, there will most probably not be any locally initiated project. It is expected that a successful participation leads to more local actors seeing electricity as important. Throughout the project phases, the type of participation, who participates, when and how, can vary, as well as the level of participation in each phase. These together are believed to affect the degree to which expectations are met and satisfaction achieved, and what problem solving capacity the participants have acquired by the end of the project.



2.5.1 Research questions

Do type and level of participation matter for the outcomes of small-scale hydropower projects?

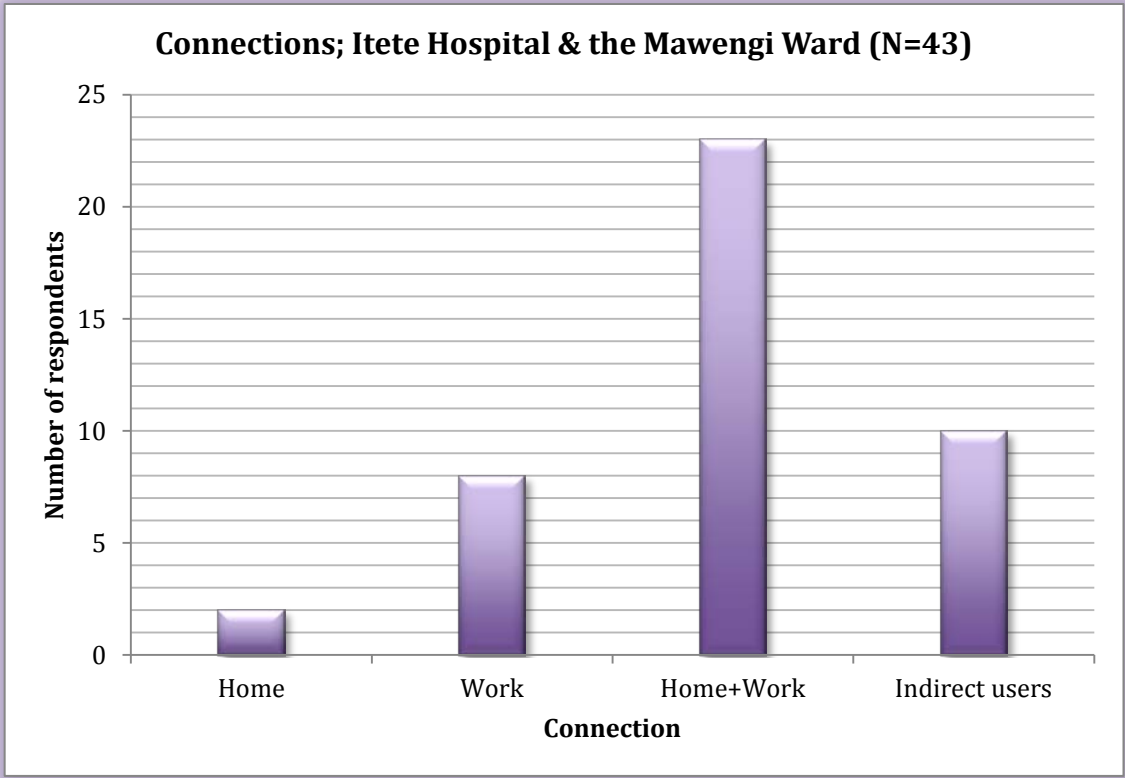
1. What types and levels of participation appear in each case and what are the differences and similarities between them?
2. What importance has the type and level for the users’ perception of the significance of electricity, their expectations and satisfaction with the project?
3. How may the level of participation affect future problem solving capacity?

3. Conducting the study

In order to fulfil the aim of understanding the importance of type and level of participation on the outcomes of the small-scale hydropower projects the chosen research design is qualitative using a multiple-case study approach comparing two cases of small-scale hydropower projects in Tanzania. The two selected cases are one recently implemented project in the Iringa Region and one initiated about 20 years ago in the Mbeya Region.

The study has the focus of a social constructivist view that builds upon the interpretations and understandings of those benefitting from the hydropower both directly and indirectly as well as the implementers of the two projects (Creswell 2009:8). The theoretical approach is both inductive and deductive as the theories concerning the significance of electricity and participation are tested by the use of the empirical data as well as secondary data. Additionally, new theories and concepts are expected to emerge by the explorative analysis of the empirical data from interviews and observations (Mikkelsen 2005:169). The data is based on data triangulation combining semi-structured interviews, observations and secondary data. The primary data was gathered through field studies by the use of interviews and observations in altogether seven villages; Lupata, Itete, Butola and Busoka in the Mbeya Region and Mawengi, Lupande and Madunda in the Iringa Region. The first field study in the Mbeya Region was conducted between March 1st - 16th 2011 and the second one in the Iringa Region between April 6th - 15th 2011. Semi-structured interviews were conducted in both areas with the help of interpreters who also guided me around the area and introduced me to the respondents. The hydropower system at Itete Hospital was implemented 20 years ago which in turn might make it difficult for the respondents to remember the implementation phase and what participatory methods were used. However, by conducting interviews with indirect users present during the implementation phase, direct users working at the hospital at the time of implementation and a Swedish engineer employed by SEM working with the implementation the data could be compared and its reliability strengthened. Additionally, project documents supporting the interview information also helped to increase the reliability of the answers of the respondents. The total number of respondents was 47 including indirect and direct users and staff at the implementing organizations. Most interviews were recorded by the use of an audio recorder and transcribed after each day of interviewing while a few were written down directly during the interview.

Table 2. Number of respondents and their connections²; direct users can be users either at home, at work or both, indirect users benefit from the electricity in stores or at the hospital.



3.1 The cases

Case 1 – Itete, Mbeya Region Tanzania

The Itete Lutheran Hospital was initiated by Finnish Missionaries in the 1950’s and is situated at the top of the Kabembe Hill in the Mbeya Region, Rungwe district on the Southern Highlands of Tanzania. The main tribe of the Rungwe district is Nyakyusa with Bantu origin and the catchment area consists of six surrounding wards; Itete, Lupata, Lufilyo, Lwangwa, Kisege and Kabula with a population of up to almost 43 000. Today the Evangelical Lutheran Church in Tanzania (ELCT) Konde Diocese owns the hospital, which has 123 employees at hospital and dispensaries altogether. In 2008 Itete Hospital admitted 2590 patients and in 2009 the number had increased to 2680 patients (Mwakalo 2009).

The plans to electrify Itete started already early in the 80’s by the Swedish International Development Cooperation Agency (SIDA) and different Swedish collaborating partners like Small Industries Development Organization (SIDO) and SWECO. The plan was then to implement a hydropower station in Itete area to “promote the development of health service

² Four respondents have been left out from the table; in the case of the Mawengi Ward it is unclear whether one respondent is connected or not and three respondents were part of the implementing organization.

as well as small scale industries.”(Riksarkivet SIDA 1983-1987) The electricity was then supposed to be used for maize mills, a carpentry workshop, schools and church centres. However, after several visits by engineers and representatives from SIDA and SWECO the project plans were rejected for several reasons; it was considered too expensive, at the same time as the organizing and responsibility of the project and the system were unclear (Riksarkivet SIDA 1983-1987). After several rounds of applications the Swedish Church, through the Swedish Evangelical Mission (SEM), got involved and the plan changed to only cover the hospital and staff houses that is owned by the ELCT, which is also an actor in the project. Before the hydropower system was put into place the hospital got energy from the national grid owned by Tanzania National Electricity Supply Company (TANESCO) and also two diesel generators. The SEM found that these energy services were not suitable for the hospital as they were unreliable and expensive. Therefore, the aim of the new project was to electrify the hospital and the surrounding staff houses in order to reduce hospital costs and simplify work.

The electricity at Itete Hospital is today used for lighting, operation equipment, sterilization, purification of water, computer use and other activities. At the laundry service washing machines are used as well as a boiling pan driven by firewood in order to make sure the bed linens get cleaned.

The staff connected to the hydropower at home uses the electricity mainly for lightning, ironing, TV, radio, fridge, and charging of phones. While the staff paid nothing in the beginning they today pay 3000 Tsh/month, which is deducted from their salaries. The villagers in the villages surrounding Itete Hospital do not benefit from the hydropower directly in their daily lives however, they are indirect users that benefit from the electricity as patients at the hospital at the same time as they often charge their mobile phones for free at the hospital.

Case 2 – the Mawengi Ward, Tanzania

The villages involved to date in the project “Socio-Economic Development Madunda Area, Through Rural Electrification and Reforestation” are Mawengi, Madunda and Lupande with a population of about 8000 people in the Iringa Region, Ludewa District. The livelihood in the area depends primarily on cultivation of maize, beans and cassava that are usually cultivated on the fields owned by each household (Todeschini 2011).

The national grid does not reach the Madunda area and it also lacks any other sustainable and efficient source of energy. The labour productivity, quality of social services and the life

standard in the area are low (Todeschini 2011). The planning of the project started in 2005 by a proposal from the Njombe Development Office (NDO) to the Italian non-governmental organization (NGO) Associazione di Cooperazione Rurale in Africa e in America Latina (ACRA) asking if they were interested in participating and finding funding for the project. Almost 300 connections have been initiated so far including workshops, stores and villagers' houses. The electricity bill depends on the amount of kWh used and is divided into different categories of users; small, medium and high consumer. The small consumer has up to five sockets and pay 2500 Tsh/month, the medium consumer has up to 10 sockets and pay 3200 Tsh/month and the high consumers which has more than 10 sockets either pay 5000 Tsh/month or has a meter installed in the home and pay 120 Tsh/kWh.

The community association Lupande-Madunda-Mawengi (LUMAMA) was initiated as part of the project in order to take over the ownership of the hydropower system and its management and maintenance. LUMAMA was registered as an NGO under the "Non-Governmental Organization Act, 2002" in the end of 2009 (REA Application ACRA 2006).

The electrification of the Madunda area is one of three linked phases within the project: the second phase started in 2009 and focuses on the up-stream area and the cultivation of the land surrounding the river. It involves farmers and is established in order to protect the natural resources and promote sustainable water use. The third phase started in 2011 and will end in 2014 and involves extensions of the electricity line, additional training of the community association LUMAMA and financial support.

The hydropower system is today owned by LUMAMA with support from ACRA and LUMAMA is for instance responsible for extending the lines, collect users fees and maintenance of the system (Mwakinge 2009). The area with access to the hydropower system will be extended to another three villages.

Table 3. Basic information on the two projects.

Project	<i>The Itete Lutheran Hospital</i>	<i>The Mawengi Ward</i>
Project Area	Itete, Lupata, Butola & Busoka, Rungwe District, Mbeya Region	Mawengi, Madunda & Lupande, Ludewa District, Iringa Region.
Implementers	ELCT, SEM, SIDA	NDO, ACRA, Italian donors, World Bank, The Rural Energy Agency (REA) ³
Project duration	Planning; 1987 (first planning beginning of 80's), Started; 1990	Planning; 2005, Started; 2010
System Capacity	50 kW/rainy season, 30 kW/dry season	150 kW planned peak capacity, 90 kW today
Connections	Hospital + 40 staff houses	280 connections = businesses + villagers
System owners	Itete Lutheran Hospital	LUMAMA Community Association
Aim of project	Supply hospital & staff houses with electricity (from the beginning also businesses & households)	Promote socio-economic growth for the inhabitants of the Madunda Area

³ Autonomous body under the Ministry of Energy and Minerals of the United Republic of Tanzania (REA 2011-08-09)

4. Results and analysis

In order to reach the aim of understanding the importance of type and level of participation on the outcomes of the small-scale hydropower projects this chapter will account for what participatory methods have been used in the projects and the type and level of participation will be shown. Additionally, it will account for the users' perception of the significance of electricity, the projects ability to meet the expectations of the users and the future local problem solving capacity.

The first part of the chapter, Participation at different terms, accounts for how the projects were implemented with focus on the participatory methods used, the application of the five types of participation and the level of participation. Thus, the first part will answer the question; What type and level of participation appear in each case and what are the differences and similarities between them?

The second part, Changes of space and time, describes and analyses the users' perception of the significance of the electricity in their lives and their expectations of and satisfaction with the project. This is necessary in order to understand what importance the type and level of participation has for the outcomes in terms of the aspects mentioned above or what other factors might affect the significance and the expectations.

The third part, Solve past and future problems, will look at how differences in participation can imply differences in problem solving by studying how the problems in the Mawengi Ward are solved in a preventive purpose by the implementing organization while the problems at Itete Hospital are solved locally when they occur. This part studies how the level of participation might affect the problem solving capacity.

4.1 Participation at different terms

To be able to determine the level of participation in the cases the participatory methods will be explained and analysed by the use of the five types of participation; information sharing, cooperation in work tasks, consultation, collaboration and empowerment. The themes that I found important and which will be analysed are *Local leaders advocate for electricity*, *Human power for hydropower* and *Creating ownership from the outside*.

4.1.1 Local leaders advocate for electricity

Before electricity came to the Mawengi Ward most villagers did not know much about electricity except from seeing it in towns like Njombe and Dar es Salaam and the situation was most likely the same in Itete in the 80's before the hydropower system was put into place. Consequently, the villagers in the Mawengi Ward and in villages surrounding Itete Hospital as well as hospital staff had to be told about the benefits of electricity in order to accept the projects. In the case of the Mawengi Ward they got the information from the priests and the parish while in Itete the hospital management and the Swedish engineer present at the time of implementation informed the future beneficiaries.

In Itete and the Mawengi Ward there are several differences in the planning of the projects and also when it comes to the types of participation used, however there are some similarities. In both cases the future beneficiaries got the same information about the benefits of electricity at the same time as meetings were held, both methods implying the type of information sharing. However, the meetings in the Mawengi Ward signified a higher level of participation as consultation and collaboration occurred when the community participated in laying the grounds for the project.

During the planning phase of the electrification project in the Mawengi Ward, ACRA and NDO held meetings with the communities and local authorities in order to discuss the purpose and potential, time lines and methods of execution. These meetings also laid the foundation for the Village Electrification Committee that would play a vital role in several stages of the continued project (Gatti & Biella 2004). These meetings are examples of a participatory method where both a two-way flow of information (consultation) and collaboration, occur. As the beneficiaries in Lupande, Mawengi and Madunda participated in setting the basic plan of the project the level of participation in the planning phase of the project was medium.

Several of the respondents in the Mawengi Ward explain that they got information about the project from the parish and the priests. Most villagers did not know much about electricity in general before getting the hydropower;

“Before I did not know anything about electricity, when I went to town I used to see it but now we really see and feel the presence of electricity but before we had no knowledge except from seeing it in town.” (Male Village Chief, Lupande).

*“I did not know anything about electricity before. I saw it in Njombe but I never used it.”
(Female Store Keeper, Mawengi)*

Most villagers had only seen electricity in bigger cities like Njombe and had a limited knowledge of it. Consequently, the parish and the priests had to inform and in turn also convince them about the benefits of electricity; how it would make life easier by replacing kerosene and diesel, simplifying milling and grinding and improving the situation for shops and dispensaries. The villagers were also asked to accept the project and collaborate with the donors and implementers;

“When they started the implementation the priest of Madunda told his followers that electricity is a new thing for us but when it comes to this area please collaborate with the donors and the project implementers because you are going to benefit a lot through the hospital, the dispensaries, the shops and all the services which are necessary are going to benefit so please be ready to cooperate with the donors so that we can enjoy.” (Female Store Keeper, Madunda)

Obviously, by informing about the perceived benefits from electricity the priests and the parish convinced the villagers to accept the project. In addition, the priests and the parish got information and objectives about the project from the meetings, accounted for above, and both these methods imply that information sharing with the character of one way communication and a low level of participation occurred.

After accepting the project plan the first users in Mawengi, Madunda and Lupande were asked what they wanted electricity for;

“...we had some technicians going to their houses and making all the calculations of “how many lights do you want?” “how many sockets do you want?” “how much cable is required to do what you want?”. We asked to each users what they wanted.”(Project manager ACRA).

By asking the villagers these questions they shared the control over decision-making, collaborated, together with ACRA, a medium level of participation occurred. Similar to the information sharing and the consultation in the Mawengi Ward the hospital management at Itete Hospital got information about the project plan from the Swedish engineers at the same

time as the hospital management and the community leaders participated in meetings. At the meetings, consultation took place between the Swedish engineers, the hospital management and the community leaders in order to establish how to clean the road to the system and put the cables in place and a medium level of participation took place. Additionally, the hospital management had to face the community leaders in the three villages (today four villages as Busoka has become Busoka and Butola) affected by the future project and inform them on how the hydropower would benefit the communities and the villagers;

“We [the community leaders] were told that they had come to implement the system for helping the hospital in different ways. They told us that they were only going to implement the power to help the people to have the power in order to help people in this area to get the health service at full time.” (Male Community leader, Lupata)

Similar to the case of the Mawengi Ward the beneficiaries received information, by the use of information sharing, about the perceived benefits of the hydropower and the information convinced the beneficiaries to accept and implement the project. A low level of participation occurred.

Even if the participatory methods used in the planning phase resemble each other, the project model in the Mawengi Ward uses types of participation implying a higher level of participation than the one in Itete. Not only did the implementing organizations collaborate with the future users by asking them about their desires but they also consulted the community to a higher extent than in Itete. Here it is important to remember that in Itete the electrification included only the hospital and not the villages surrounding it. Discussions about the purpose and potential of the project, implementation methods and time lines show how the communities of the Mawengi Ward shared to a high level the control over the decision-making of the project already from the beginning. In Itete the hospital management did share the decision-making of the project but the project plan did not have the focus of participation and did not involve future indirect and direct users to the same extent as in the Mawengi Ward.

4.1.2 Human power for hydropower

When it comes to cooperation in work tasks, villagers in both cases helped when putting the hydropower system in place; digging trenches for the cables, cleaning the road from trees and unloading materials. In Itete around 30 villagers from the villages Itete, Lupata, and Busoka got employed to perform excavation work. In the Mawengi Ward the electrification committee organized the construction of the hydropower system and the surrounding work, which was done by villagers from all villages. The difference between the cases when it came to the cooperation in work tasks is that in the case of Itete they got paid for the work while they did not in the Mawengi Ward. Additionally, in the Mawengi Ward meetings were held during the initiation of the hydropower system.

The community leader in Itete, whose father was the leader at the time of implementation, states how the villagers helped in preparing for the hydropower to be put into place;

“My father was alive when the project started. The engineers came to my fathers place, to ask my father to give them human power for making the way to the hydro.”(Community leader, Itete).

In order to gather villagers to be able to start the implementation of the hydropower system the Swedish engineers met up with the community leaders in the three villages and asked them to gather villagers for the work task. The employees got salaries for the work as stated by one of the engineers present during implementation;

“All villages should have the same amount of employees during the project. They got contractual salary, it was a clean work.”(Swedish engineer).

The engineer explains the importance of fair labour when it came to the work tasks both by employing the equal amount of people from all villagers and giving the employees just salaries.

In the Mawengi Ward the community leader of Lupande describes how he and the other community leaders participated in meetings held by the same committee once a week where the work was planned and reviewed. Consequently, also in this phase of implementation the

participation method of meetings implied consultation between all the actors involved and a medium level of participation.

In the Mawengi Ward several of the respondents express how they helped during the construction of the road to the hydropower station. They helped in digging trenches for the underground cable and off-loaded the materials that arrived from Dar es Salaam or Njombe.

“When I came here to live here, I participated in the constructional work. I helped in digging trenches for the underground cable. We did not get any payment for the work but they told us that we had to dig the trench so that the electricity could reach to our homes.”
(Female Restaurant owner, Mawengi)

No payment was given for the work task, however it becomes clear that also in this phase of the implementation the benefits from the electricity, which the villagers were about to soon enjoy, legitimated the free labour.

When comparing the two cases it becomes clear why the villagers in the case of Itete got paid while those in the Mawengi Ward did not; the villagers performing the work in Itete were only about to become indirect users of the hydropower, which might be why more compensation had to be given while the villagers in the Mawengi Ward were about to become connected and to enjoy the electricity as direct users. Evidently, in the Mawengi Ward participation played a vital part also in the implementation phase and in the work tasks and the level of participation was higher than in Itete as the communities did not only participate in the work but also in regular meetings.

4.1.3 Creating ownership from the outside

Both projects have been implemented by external aid agencies and the ownership of and empowerment over the systems have been transferred from them to the hospital management of Itete and the community association LUMAMA.

When it comes to empowerment the implementers in the Mawengi Ward has a well-prepared plan involving different participatory methods and also different types of participation leading to empowerment in a long-term perspective. In Itete the control of the hydropower was transferred to an already established management working with all management questions surrounding the hospital. It is important to mention that the ownership

of the hydropower system in Itete was given to the hospital management in the beginning of the 90's and in the Mawengi Ward the transferring of it to the community association is still on-going.

Already from the beginning of the project "Socio-economic development Madunda area, through rural electrification and reforestation" the plan was to start a community association that would take over the ownership of the hydropower system and manage it completely in a few years. Therefore, when the system was put into place the community association of LUMAMA was formed by the help of ACRA and the villagers were asked to elect the committee;

"The donors, ACRA, told the community that now after installing the plant here we will soon leave so you should manage this plant. So we are asking you to elect 9 people from each village, there will be 27, and out of them we are going to make a central committee, which will be the board; the chairman, the secretary, the manager. These will be the steering committee of the plant. Each village called for a general meeting and through that meeting they elected the 9 members."(Man Milling business, Mawengi).

The villagers participated in creating the community association in collaboration with the implementing organization that organized the election and a medium level of participation occurred. Since LUMAMA was formed ACRA provides the association with training in good governance principles and practices, transparency, integrity, accountability, management and business planning as part of the empowerment of the association over the decision-making and the hydropower system. Workshops were held where these topics were discussed and evaluated by the use of various participation methods, which in turn implied consultation and a medium level of participation. The methods used during the workshops were "Brainstorming, small and large group discussions, case studies, plenary discussions, short front lectures, pictorial/diagram viewing/sensing were the main methods used during the training."(Msangi 2010:1). Additionally, the technicians get training in the technical aspects of the system and the connections. The election of LUMAMA and the training of the association and the technicians are all participatory methods that imply that the way to empowerment over the project, the highest level of participation, has started.

Also in Itete the management and maintenance of the hydropower system were meant to be controlled from the start by the hospital management and the technicians employed for serving all technical activities at the hospital;

“ It became clear already in the beginning, that it was the employees at the hospital that would take care of the management, even if I lived there and could give advice and support if needed” (Swedish engineer).

The hospital management took over the ownership of the hydropower system when it was put into place and there were international advisers, like the quoted engineer who was available if needed. Compared to the technicians in the Mawengi Ward, the technician in Itete who is responsible for the hydropower system, among other electrical equipment at the hospital, got his education in Tanzania. When he arrived to Itete for work he learnt the system by the help of instruction books. The Swedish engineer also states that there were training sessions at the hospital educating the staff concerning the use of electricity and its capacity, information sharing occurred and a low level of participation. Even if the engineer was present at one session the hospital management was responsible for the education sessions, which shows how the hospital management was empowered to take over the process at an early stage. In the Mawengi Ward the process of transferring control over the hydropower system involves several types of participation; collaboration, information sharing and consultation. At Itete Hospital the transfer of control over the hydropower system was easier and most probably also cheaper, if comparing to the other case, as it was transferred to an already established management with a technician learning the system without involvement of the implementing organization. The two cases differ as a large part of the beneficiaries in the Mawengi Ward have had some kind of participation in each project phase (voting, members of association etc.), while in Itete it is primarily the hospital management that participated by taking over the control. The hospital management had a high level of participation while the future direct and indirect users had a low.

4.1.4 Participation – similarities and differences

Clearly, both projects involve the beneficiaries in the initiation of the hydropower system. However, the project in the Mawengi Ward has a higher level of participation because of the participation of all stakeholders when establishing the aim and methods of the project, the involvement of direct and indirect users when initiating the hydropower system and when transferring the control over it. At Itete Hospital the level of participation was lower as few

types were used at the same time as it was to a high extent only the hospital management that participated and not direct or indirect users.

Table 4. The types and level of participation in the two cases. Abbreviations: Itete (I), Mawengi (M), 1. Information sharing 2. Cooperation in work tasks 3. Consultation 4. Collaboration 5. Empowerment Hospital management (HM), Local leaders (LL), Direct users (DU), Indirect users (IU), LUMAMA (L), Low level (LL), medium level (ML), high level (HL). Example: 1:HM = Consultation (type (how?)); Hospital Management (participant (who?))

Before	Planning	Implementation	Operation	Outcome
Initiative Top-down/bottom-up	I - 1:HM, LL, DU, IU, 3:HM, LL M - LL, DU, IU:1, LL, DU, IU:3, DU:4	I - 2:IU M - 2:DU, IU, 3:LL, DU, IU	I - 5:HM M - 1:L, 3:L, 4:DU, IU, 5:L	Problem solving capacity
	I - 1:LL, 3:ML M - 1:LL, 3:ML, 4:ML	I - 2:LL M - 2:ML, 3:ML	I - 5:HL M - 1:LL, 3:ML, 4:ML, 5:HL	

4.2 Changes of space and time

This part of the chapter will describe and analyse the users’ perception of the significance of electricity and their expectations of the projects in terms of how the electricity has changed their lives and what their needs and desires are.

Electricity changes the living conditions and transforms both space and time when moving from a life without electricity to a life with. Most changes in space and time become clear when comparing a house with electricity and one without in the studied villages. A house with access to electricity usually has a living room furnished with a focus on the TV, if there is one; wherever in the room you sit, in a sofa or in an armchair, you can see the TV. Additionally, the TV can be on all day and also during both lunch and dinner and it becomes a new way to socialize and gather friends. Houses without electricity normally have smaller living rooms situated close to the front door with sofas and chairs concentrated around the

table where the kerosene lamp is placed when the dark has arrived. Additionally, utensils can be gathered on a smaller table in the living room which may be due to the practicality to have them close to the front door and therefore also closer to the cooking site outside the house. At the same time as electricity changes the way to socialize both inside and outside home, not only by the access to TV but also as a consequence of light, it also transforms the working situation and extends the days and increases the amount of activities. In both the Mawengi Ward and at Itete Hospital similar changes of space and time are expressed and the hydropower is considered to make life easier, reduce expenses, save time and lives at the same time as it is reliable. Furthermore, when it comes to energy services and cooking the two cases differ; the most common energy services in both cases are charcoal and firewood but in Itete several respondents express a desire to use electric cooker while those in the Mawengi Ward do not, at least not to the same extent.

4.2.1 Longer days and shorter nights

Accustomed to street lighting, lit windows and motion sensitive spotlights the darkness that appeared at night when I came to Itete hit my eyes and me with a surprise. Apart from the light from a few houses connected to the national grid the streets in the villages surrounding Itete Hospital bathe in darkness from 7 pm when the sunset is over. Not only the darkness surprised me but when tilting my head back looking to the sky it was covered by millions of bright stars and when looking back down at the valley I realized how small an amount of light actually covered it; the light from the stars. Consequently, I also understood what concerned me earlier the same week when passing by the train station covered in darkness; the women, men and children making business as the train goes by every week are used to the stars and can make their way by only having the stars as light. When walking the streets of Mawengi, Madunda and Lupande a great difference from Itete and the surrounding villages appeared; many houses had fluorescent lamps on the outside over the exterior doors or on the walls, spreading light in the villages during night-time.

Access to electricity makes days longer and nights shorter as it makes people become more active at night. At both Itete Hospital and in the Mawengi Ward the respondents who were asked about the changes in bedtime explained how they go to bed at least one or two hours later today compared to before the introduction of electricity. While they went to bed around 8-9 pm when they used kerosene lamps today's bedtime is around 10-11 pm;

Before electricity we went to bed after eating, it reduced the cost of kerosene if we went to bed earlier. (Male Carpenter, Lupande)

I went to bed earlier, if there was no electricity we would go to bed at 8pm. Just cook and then go to bed. (Female Nurse, Itete since 2001).

Normally, I go to bed at 10pm, but my children go to bed 8.30 or 9pm. When there was no electricity we tried to use the kerosene lamp and another lamp we used with batteries. We ate, prayed and then went to sleep and we went to bed earlier, around 8pm (Male Nurse, Itete since 1990).

The presence of electricity changes the view of time and people have become more active in the sense that they perform more activities at night since the electricity arrived. However, the respondents at Itete Hospital and the Mawengi Ward have somewhat different reasons for later evenings. In the Mawengi Ward one of the main reason for the changes in bedtime is that people work longer as more costumers are attracted to their businesses today than before because of more light. At Itete Hospital the main reason for longer days is TV watching. Additionally, at both sites they do more activities like reading, cleaning and chatting in the evenings compared to before. The reasons for longer days and shorter nights will be described below.



4.2.2 Tv and light – Sources of learning and socializing

As illustrated above the TV and the light change the organization of space and also the circadian rhythm. Additionally, access to electricity changes the way to socialize and learn. In the Mawengi Ward the respondents who are teachers already have a TV or are about to buy one at the same time as most of the hospital staff in Itete possess a TV. However, they have different views of the TV; while the teachers and also the carpenter in Lupande stress the importance to have one for the children to be able to learn more the staff at the hospital highlights how it is a way to socialize. In both cases the access to light is also seen as important because of the possibilities to read, learn and socialize in the evenings.

As mentioned above most of the staff at Itete Hospital possesses a TV and the teachers in the Mawengi Ward express a desire to have one as it is considered to improve life by increasing the knowledge and keep them updated;

“Electricity gives us a good life in many ways because we expect to have a TV after a few days ... The TV will give me news from everywhere. My children will enjoy it because they will be looking at it always and learn things from it.”(Female Teacher Primary School, Lupande).

“In the evening I read and I hope I will use a radio and a TV and it will help my children. The TV will keep me updated and my children will learn and enjoy the pictures.”(Male Teacher, Lupande)

Teachers in the Mawengi Ward express the importance of having a TV as it increases the knowledge at the same time as they consider themselves able to afford a TV. However, most of the respondents in the Madunda Ward do not have enough money to be able to buy a TV;

“Economically I am not able to buy a TV. If my children go to school and have a TV, they will widen the spectrum of knowledge. I have hydro at home and there I use it for light, security – outside light, radio. The income is too small to be able to buy a TV.”(Male Carpenter, Lupande)

Similarly, the access to light is perceived as making a great difference in life as it increases the possibilities to read and learn during the evenings;

“There is a very big difference living with energy and living without energy, for example when it was dark it was difficult for me to do some activities at home, but now with light and the electricity I am able to do other activities even at the night. The children are also able to learn at home, without electricity this was difficult for them.”(Female Storekeeper, Madunda).

“Before I had no good light. I could not read, it was difficult. Now I can read whenever I want “(Female Nurse, Itete since 1995).

Thus, activities at night are perceived as increasing at the same time as the learning is improved. Additionally, those without connection at home highlights the importance of electricity and the access of light as it increases the possibilities to learn. A store keeper in the village of Madunda claims that his family is suffering as the children cannot study because of the absence of light. Several of the staff at Itete Hospital explain how they before the access to the hydropower read the bible at night in front of the kerosene lamp and then turned it off and went to bed for economic reasons. The economic part of the perceived significance of the hydropower will be accounted for further down.

Evidently, the TV and the light also improve the possibilities to socialize and gather friends. TV series, music videos and football games are important reasons to meet up with friends;

*“Yesterday we watched the Champions League, a lot of friends came to watch the game.”
(Male Doctor, Itete since 1990).*

Clearly, teachers and hospital staff have both the economic and the professional opportunities to afford a TV. The differences here is that the teachers associate the TV with learning while the staff associates it with socializing. The teachers also points to the importance of light as it increases the possibilities for the children to learn at night while the staff only explain how the light makes it possible to read, which is seen as a great advantage.

4.2.3 Saving life and time

These days Itete Hospital is always full of people; both inside the rooms where they get treatments and in the hallways where they talk, charge phones or watch TV. As a visitor it is almost impossible to imagine the hospital without the electricity.

At both Itete Hospital and in the Mawengi Ward the hydropower is perceived to save time as it is more reliable and more accessible than energy services like kerosene and generators on diesel. Many of the respondents at Itete Hospital explain how the hydropower is of great importance for the patients as it makes work easier and saves time. Consequently, the electricity from the hydropower saves lives both by being reliable and by giving the patients the possibility to get health care closer to their homes than before. Thus, before the hydropower some patients had to be taken to Tukuyu, almost a three hours drive from Itete, in order to get treatment. Similarly, several respondents in the Mawengi Ward compare the electricity from the hydropower to kerosene and generators with diesel, which are energy sources considered to take time and be unreliable.

Some of the staff worked at Itete Hospital before it was connected to the hydropower and they compare working at the hospital today and in the past. There is a big difference working with hydropower instead of generators and kerosene lamps, as it before was difficult to perform operations and to see properly during deliveries. The generator had to be turned on during operations and if there was no operation they only used the generator between 7pm and 10pm to sterilize instruments. At the same time the kerosene did not give enough light and made the work difficult;

“Before we got hydropower we used kerosene for lighting. At the psychiatric unit most of the patients come during night so it was difficult to give the shot in order to make them sleep.”(Male Nurse, Itete since 1991).

Kerosene made it hard to see and in turn patients suffered. Most of the respondents in the Mawengi Ward mean that the use of kerosene takes time as new kerosene has to be bought several times a week and sometimes it happens that the kerosene is finished in the store. This makes both work and life at home harder compared to the electricity from the hydropower, which is consistent. Similarly, the staff at the hospital expresses how the use of energy services like the generator and kerosene were more time consuming for the work compared to today. One of the nurses' express how the work was before the hydropower:

“Before the hydropower it was difficult for us especially at the sterilization. I was working at the operation theatre during that time, I used to sterilize by using the kerosene, so we used kerosene to boil things and also to sterilize. It was a hard work and it took time. After getting the hydropower there was a big difference; time is saved and the hydropower is safer for sterilization than kerosene.”(Female Nursing Officer in Charge, Itete since 1987).

Sometimes the work at the hospital was not done in time and patients had to wait because of the energy services. Today the hydropower is present for 24 hours almost all year around and the hospital controls the hydropower and pays less at the same time as the patients get the treatment they need in time;

“The electricity from the hydropower is very positive for the patients as they get care in time. In other places patients could have to wait for electricity and waiting is not good for the patients.”(Female Nurse, Itete since 1995).

At Itete Hospital the hydropower saves lives by being reliable; patients do not have to be transported to hospitals far away, they do not have to wait for the electricity to be put on and the light is stronger than kerosene and therefore, also more secure to operate in. Similarly, the electricity in the Mawengi Ward saves time and consequently, people can focus on the activities they are doing instead of worry that the energy service is running out. Other benefits from hydropower compared to other energy services will be described below.



4.2.4 Electricity creates possibilities, needs and desires

The light above the door outside the small restaurant in Mawengi where I had my dinner every night leads the way for the people passing by as well as welcomes guests as myself for dinner. Thus, light does not only affect the circadian rhythm and the working hours for the people in the Mawengi Ward but it also increases the revenues and the feeling of security, which are factors linked to each other. When starting the project in the Mawengi Ward ACRA provided the villages with several machines for the workshops. The carpentry workshop in Lupanda is one of the two carpentries connected to the hydropower that got machines and the carpenter tells how they before had to go to Njombe to do the work. Today because of the electricity giving light and power to the machines he can conduct the work in his own village, which in turn increases the revenues.

Also in Itete the hydropower contributes to additional revenues as the electricity makes it possible to run income-generating activities in the evenings. However, it is not very common for the staff at the hospital to run income-generating activities but on the contrary the villagers or indirect users, in the villagers surrounding Itete Hospital, express how they would start businesses if they had access to electricity;

“...if we could have power I could also have a saloon for shaving and ... this could be done only to my home here!”(Female indirect user, Butola).

The villagers expressed desire to benefit from the hydropower directly becomes clear when several respondent in the villages surrounding Itete Hospital show their disappointments with the project;

“The system was implemented by the engineer from Sweden, his plan was to distribute the power in three villages around Itete Hospital (Itete Village, Lupata, Busoka)... Since that time the villagers expect to have the power, it is only the staff at the hospital that are more happy then we are because they are using the power at home.” (Male indirect user, Itete Village)

As mentioned earlier the first project plan was to electrify households and milling businesses in addition to the hospital and similar to what the indirect user above expresses a

community leader explain how they were promised a milling machine, which should be charged by the use of the hydropower;

“They promised to give us a milling machine and also a water tap. We were not told that the power would not be enough for the milling machine but only for the hospital.”(Male Village Chief indirect user, Itete Village)

The dissatisfaction with the project among the indirect users can be a result of lack in the information sharing and due to that the information sharing was not updated when the project plan changed. However, electricity creates desires even without lack in the information sharing, which becomes evident in the Mawengi Ward where all indirect users want electricity at home. It is likely that the villagers in the villages surrounding Itete Hospital would have showed dissatisfaction with the project even without the gaps in the information sharing.

In the case of the Mawengi Ward all respondents run income-generating businesses. Most of them express how their business has changed to the positive since they got connected to the hydropower. The main reason stated is the access to consistent light;

“By the use of electricity I get more costumers and the costumers are happy to stay in my store because of the light inside and even outside. So there is a very big gain. Before people where not attracted to my business because of the darkness... I have experienced at least 25% increase of income.” (Male liquor store, Madunda)

Light is associated with security and therefore linked to the reason why costumers are happy to go to the stores where there is light at night. Without light people are not very eager to go out after the arrival of the dark as it is hard to see what is out there;

“We are afraid of the darkness. But if you have to go out during night we cannot avoid it (to go to the toilet for example). We are afraid to go out because we don’t know who is outside, maybe it is your enemy.” (Female indirect user, Butola).

One woman and her husband own a *fundi ya baiskeli* (bicycle store) in Madunda where they repair bicycles and the woman expresses how the light makes it possible for them to work later at night and to perform different business activities. If costumers do not arrive her

husband repairs shoes at night. She recognizes the increase in income not only because they do not have to buy kerosene anymore but also because of the reliability of the light which makes more costumers coming to their store;

“I realize the increase in income, before the hydro we used kerosene so there is a saving now, secondly the costumers can come here when it is dark.” (Female Store keeper, Madunda)

One of the staff at Itete Hospital says his life really has changed to the better since he got electricity at home as he is able to run a business at night;

“I lived without electricity before I came here. I have a better life now because I have a stationary during night and use it for computer and light at my stationary, it is a small business where I have to use the light until nine o’clock in the night. I sell books, envelops, cards etc... Before I also had a haircutting saloon at home.” (Male Nurse, Itete since 1991).

Electricity makes it possible to start income-generating businesses as a complement to the employment at the hospital. Life is considered by the respondents in the Mawengi Ward to have improved as a result of better business circumstances and at the same time the indirect users in both cases express how they wish to have electricity to be able to start income-generating activities.



4.2.5 Reduction in expenses and prevention of hospital closure

When walking the streets of Itete Village I noticed how the cables from the national grid stretched over my head, however, not many of the cables were connected to the houses. A teacher and her father in Itete Village who are connected to the national grid do not afford to have an electrical cooker as it would make the electricity bill too high. The teacher also explains how the national grid does not have any benefits for the villagers. She and her father believe that they themselves and other villagers in the villages surrounding the hospital would start income generating activities, instead of spending time on collecting firewood, if they got access to the hydropower as it is cheaper than the national grid. The respondents in both Itete and the Mawengi Ward also consider other energy services like kerosene and diesel to make life difficult. In Itete, the hydropower is believed to prevent the closure of the hospital, as they otherwise would have to use more expensive energy services.

Also the indirect users in the Mawengi Ward explain how the hydropower is cheaper as they before had to travel to charge batteries, which is still the situation for villagers in the villages surrounding Itete Hospital.

Before the users in Mawengi, Madunda and Lupande got connected to the hydropower they had to buy kerosene often and several of the informants express how it is economically difficult to frequently spend money on kerosene;

“Kerosene had to be paid in cash daily which in turn becomes a lot in a month. Hydro is paid monthly and the cost is not high.”(Male Guest restaurant, Mawengi).

“...me and my family we have three rooms; one room for me and my husband, one room for the female children and one room for the male children, this means we need to buy kerosene for each room, first one lamp and then kerosene for each. And I need to go to the shop constantly to buy kerosene...” (Female Store Keeper, Madunda)

Thus paying for electricity once a month is considered easier than to spend money several times a week. The hydropower connection also signifies other reductions in expenses; car batteries were previously charged in Njombe or elsewhere and used as energy service in the villages. As a result of access to hydropower transportation costs have been reduced;

“Before the villagers used batteries that had to be charged somewhere else and they did not last for long until they had to be charged again. Use of batteries signify transportation sometimes all the way to Njombe (3 hours). Now when you need power it is there.”(Male Guest restaurant, Mawengi)

A similar situation is revealed when looking at the situation for villagers in the villages surrounding Itete Hospital as many of them have to travel in order to charge or buy batteries. A family close to Itete Hospital show a lamp construction they make out of batteries and parts of a torch and express how the batteries do not last for long and how they have to go and buy them in the city.



Another energy service sometimes used at home in the Mawengi Ward (and before the hydropower also at Itete Hospital) is the diesel generator. A teacher, who will soon be connected to the hydropower in Lupande, states that the maintenance and management of the generator are difficult to achieve. The diesel running the generator implies expenses; the teacher uses four litre of diesel every week and pays 2300 Tsh/litre which in turn becomes 36 000 Tsh/month. Also in Itete the costs of other energy services like generators or the national grid compared to the hydropower use is highlighted;

“If you compare [the hydropower] with the generator and it’s expensive diesel it is very cheap. We get benefit from the machine. The national grid is also very expensive. If the hydropower system broke down the hospital would have to stop.”(Male Driver, Itete since 1991)

Many of the staff believe that Itete Hospital would have to close down if they did not have the hydropower because of the high costs of other services like the national grid.

The hydropower is clearly very important economically in both the Mawengi Ward and for Itete Hospital, not only because of the severe consequences imagined by the staff at the hospital but also as the reduced costs signifies an easier life for the users.

4.2.6 “Partly a good life”

The popular restaurant in Mawengi where I had my dinner is owned by a woman who also lives there with her children. The house has two rooms; one room where the guests eat and one bedroom. It is connected to the hydropower and the room where the guests eat has one lamp, a radio and the electricity is also used for the charging of phones. The woman cooks all the food by the use of charcoal outside the house in a hut.

In both the Mawengi Ward and the staff houses at Itete Hospital cooking is done by the use of charcoal (*mkaa*) or firewood (*kuni*). Many of the respondents in the Mawengi Ward explain how it is the children or the women who fetch the firewood and cook and the time spent on fetching firewood and cooking vary from one hour up to four or five hours per day. When talking about other means to cook it is in both cases the electric cooker that is mentioned, even if there are other services maybe more efficient and adapted to the environment and circumstances of developing countries like Tanzania.

Only four of the respondents at Itete hospital sometimes use the electricity for cooking and the staff as well as the Swedish engineer present during implementation express how the power is not enough for the use of an electric cooker. The engineer also claims that during the implementation phase the staff was informed about the capacity of the electricity including how the electricity was prioritised for hospital needs and that the use of electric cooker or immersion heater, used at the time of implementation, would be limited. However, a number of the staff explains that they used the electricity for cooking the first years after the implementation but today the system is old and its efficiency is going down;

“When the hydropower was new we used it for cooking but now it is getting older so we are reducing the use of it.”(Female Nurse, Itete since 1987)

As the hydropower system is loosing its efficiency the staff has to reduce the use of electricity at home because electricity has to be used primarily at the hospital and prioritised are activities like sterilization of instruments, which requires a lot of power. However, most of the staff express a desire to be able to use the electricity for cooking too and among them the electric cooker is to a greater extent than in the Mawengi Ward perceived as making life easier and saving time;

“I would prefer to have electricity for cooking too, better to use electricity, in order to simplify the cooking. Then we could cook, and then turn off the cooker. Charcoal takes time, have to look for the charcoal and then prepare it” (Male Nurse, Itete since 1990).

“The energy service helps me partly to get a good life (maisha mzuri) but I would like it for cooking too.” (Female Nurse, Itete since 1987).

In addition, many of the respondents in Itete mention the importance of electricity for cooking when accounting for the future lives of their children, which everyone wish to be as good as possible.

Also in the Mawengi Ward several of the respondents believe that they will buy an electric cooker when the revenues from their businesses have increased, while some express a desire to have one as they believe it would make life easier and the time spent on cooking would decrease.

“Currently I cannot afford to buy an electric cooker once I get enough revenues I can buy it. I want an electric cooker in order to make the work easier. Lifetime for preparing food when using fire wood is longer so it makes the work easier and shorter.” (Female Store Keeper, Madunda)

However, some of them misunderstood the concept of electric cooker and referred to a water heater, which seems to be more common to buy after getting electricity at home;

“I have never seen an electrical cooker. I want a water heater and the heater for ironing clothes. I don’t know what an electrical cooker look like.” (Male Store Keeper, Mawengi).

The staff in Itete wants electricity for cooking while the desire is not as common in the Mawengi Ward. It is important to mention that the respondents in the villages in the Mawengi Ward that express a desire to have an electric cooker and say that they are going to buy one are more wealthy people than the average, most of them teachers. The desire for electric cooker at Itete Hospital may in some cases come from the experience of using it and the knowledge of the differences between using the electricity for cooking and using firewood and charcoal. They have had electricity many more years compared to the people in the

Mawengi Ward, which can also be the reason for the disappointment at Itete Hospital as the power is not enough for cooking.



4.2.7 What matters for users' perceived significance of electricity & their expectations?

Electricity has the impact of changing the way people perceive time, how they organize space and what they do with both time and space. Electricity signifies changes in all parts of life; work, social life, education and life at home (Garnert 1993, Winther 2008), which also becomes clear in both the studied cases. Both direct and indirect users perceive these changes as positive and different factors such as persuasion from the inside (priests, hospital management, local leaders), the level of participation, financial assets and technical aspects affect satisfaction and dissatisfaction.

When electricity came to the villages and the hospital someone on the inside, an authority that people trust and know well informed them about the benefits of electricity and how it would change their lives into the better. Winther gives an example of where no local authority gave information to the villagers about the benefits of electricity, at the same time as future beneficiaries were not involved in the planning phase. Consequently, they did not accept the electrification project to be implemented (2008:219). In the Mawengi Ward and in Itete the authorities convinced the villagers to accept the electrification project and this in turn might affect both direct and indirect users' perception of the significance of the electricity. Even if

the level of participation was low, the information sharing involving both indirect and direct users in the planning phase was of high importance for the continuation of the project.

The electricity at Itete Hospital and in the Mawengi Ward is perceived as significant by both users and indirect users, although in different ways.

Similar to the case of Uroa, the electricity at Itete Hospital and in the Mawengi Ward is considered cheaper than for instance kerosene (Winther 2008:176). Compared to the alternative services used before, electricity is also perceived as making life easier by being consistent and bright, which implies that more activities can be performed more easily also at night (Garnert 1993:144,227). Examples of activities more easily performed today are running a business, which increase the villagers' incomes and facilitates the operations at the hospital. Similarly, Mulder and Tembe show how the access to electricity has improved the health services in the Ribáuè district in Mozambique (Mulder & Tembe 2008:2788). At the same time, the light and the availability of electricity have impact on the social life; in both cases direct and indirect users express how they socialize more with friends today than before, for example at the small restaurant in Mawengi or to watch TV at a friend's place who lives in one of the staff houses at Itete Hospital (Winther 2008:148). Also, the level of knowledge is perceived as increasing as a result of the access to TV and reading lights (Winther 2008, Mulder & Tembe 2008), which by all respondents is seen as a very significant change. For the indirect users in both cases the increased knowledge of electricity gives them desires and dreams. In the case of Itete it becomes clear that these desires have created dissatisfaction among several of the indirect users and that it may have increased as a result of poor sharing of information. From my perspective, the amount of users is of great importance as electricity creates desires and hopes for a better life. If the indirect users in the case of Itete had participated in the project planning, they would most probably have chosen to be connected if the possibility and financial capacity had existed. Clearly, the amount of users covered in the projects has to do with the financial, and in turn also the technical, capacity of the project; the project in the Mawengi Ward has a better economic base than the project at Itete Hospital, implying a more robust hydropower system and additionally a greater amount of connected users. So far, the users in the Mawengi Ward are satisfied as the project lives up to their expectations at the same time as they have been involved to a large part in all phases of the project. Participation affects what people expect of the project and in turn also how satisfied they will become, however, participation needs to be put in relation to the financial and technical aspects in order to be effective.



4.3 Solve past and future problems

The economic and technical sustainability involves both problems and solutions, which are indicated in both cases but in different ways. This chapter illustrates the differences when it comes to how problems are solved in the two cases: by prevention or when the problems occur. In the electrification project in the Mawengi Ward several problems have been foreseen and solutions implemented from the beginning by the implementing organizations. The hydropower system at Itete Hospital has during the years faced several problems and many of them have been solved locally, without the help from any external organization. The case of Itete Hospital can act as an example of what might happen if the implementers do not take into consideration future problems that might occur.

4.3.1 Creating solutions in advance

Sedimentation, lack of water during the dry season and requirements of maintenance and spare parts are all part of possible problems that may happen to the small-scale hydropower systems in general. In the case of the Mawengi Ward the project is young and no great

problems have yet occurred. However, the implementing organizations try to avoid future problems by preparing for them in advance. Sedimentation in the water is a problem in both cases that can risk the technical sustainability of the system in a long run. An employee at ACRA compare the problem with another older project, also developed by the NDO, situated in Lugarawa;

“Concerning the technical sustainability of the plant; high level of sedimentation in the streams fill the plant resulting in decrease of the life time of the plant; the turbine is very much affected by the sedimentation. If you look at an old project in Lugarawa, I think that the turbine now is working at only 20 % of the capacity and this because of the sedimentation, the turbine has been consumed/eaten out by the sediment.”(Project manager ACRA).

In order to avoid future problems with sedimentation and also problems with lack of water during the dry seasons the project involves training of farmers (information sharing), close to the river in sustainable cultivation techniques. In return the farmers get commercial trees and help to plant them. The farmers can be seen as indirect users as they have access to the electricity in stores, restaurants and on the streets in the connected villages. It is also important to mention that the system, purchased and built according to Italian standards, is built to manage changes in the water.

Another important issue in both cases is the economic sustainability of the project. In the beginning of the project in the Mawengi Ward villagers from the three villages were asked to donate a piece of land for the aim of establishing tree plantations (cooperation in work tasks). ACRA also gave the villagers training in cultivation (information sharing) and provided them with seedlings to be able to plant commercial trees. The donation of land and the training in cultivation can also be seen as another step to the highest level of participation; the empowerment of the villagers. The trees are in the future supposed to be sold in order to be able to buy spare parts and pay for maintenance of the hydropower system when needed. The land is today being transferred to the Community Association LUMAMA. In order to ensure the economic sustainability of the project LUMAMA has also been taught to increase the amount of users.

These examples of problems and solutions show how the implementers prepare the villagers and the community association of foreseen problem, by the use of different types and levels of participation. However, it is not possible to foresee all problems that will occur in the future.

4.3.2 Local solutions when problems occur

The technician at Itete Hospital who is specialised on the system, accounts for what problems the system has gone through during the years; sedimentation, fire in the system and lack of water during the dry seasons. The Swedish engineer and also some of the staff at the hospital express how it is unusual for hydropower system to last as long as the one in Itete. However, many of them also praise the technicians who have solved many of the problems. Compared to the participation methods preventing foreseen problems, the solutions in Itete can be claimed not to involve participation but a handover of ownership, this will be discussed later.

As stated by the technician and also by others Itete Hospital has already experienced difficulties caused by sedimentation that have had effects on the hydropower system. Today, employed villagers clean the dam in order to avoid sedimentation problems in time but the first time it happened the problem was solved by employees at the hospital;

“...the carpenter ... together with the other labourers had to find a solution, they tried to diverge the water, move it to another side, but this was also difficult. They made a wooden box, removed some mud and put the box deep down in the dam, so they let some of the mud go out in the box. Nowadays, we do not use that system. We today remove the mud in time.”(Male Technician, Itete Hospital).

The technician expresses how local solutions were found in order to solve the problem of sedimentation; first a short-term solution with a box gathering the mud and today a more long-term solution where villagers clean the dam once a month.

In the beginning of the project in Itete extra spare parts for the hydropower system were bought, however no savings or other means to ensure future problem solving were established. One of the engineers present during implementation remembers how he and the others from the implementing organization talked to the hospital management stating the importance of saving money for future expenses related to the hydropower. At the same time he argues that other things were being prioritized and it would have been important with a fund and also some more extra spare parts.

In the case of Itete, where the system is now more than 20 years old, the possible importance of a fund has already been revealed. For instance in 2009 Itete Hospital experienced a fire in the hydropower system and the accident became expensive for the hospital. However, the technicians solved it themselves;

“We started to try to solve it ourselves, read construction books, and I constructed a solution.”(Male Technician, Itete Hospital)

Also in this case the employees at the hospital had to figure out themselves how to solve the problem.

A more common problem occurs during the dry season in Itete; the small amount of water is not enough for the hydropower system and power cuts occur periodically. When it happens the national grid is put on, as a short-term solution, while waiting for the dam to be filled up with enough water. While some believe it is hard to find a solution as the problem is lack of water some of the staff at the hospital have suggestions on how to solve the problem; one is to have a reserve, like a tank, where the abundance of the water during the rainy season is gathered and saved to be used when there is a lack of water. Another similar solution is also suggested;

“The water is only going in one direction, if somebody can help us recycle the water, as it is not enough. We need new technology that can manage this problem.” (Nurse since 1995)

The nurse has a suggestion of how to solve the problem with the lack of water at the same time, she wants someone to help the hospital to recycle it. On several occasions the staff mentioned how they want help from the implementing organization and how it may be the only way to solve the problem with the decreasing efficiency of the hydropower system;

“Maybe a solution can be to ask our fellowship maybe they can help us as they first helped us and gave us electricity and maybe we can tell them that now it is not working and maybe they can think of modify it. We ourselves do not have any power to modify it.”(Male Nurse, Itete since 1988)

Several of the problems that have been raised from Itete show how local solutions had to be found in Itete and were found at the time when the problem occurred. However, the system

is today losing its efficiency and as Itete Hospital does not have any savings that can create major problems for the hospital. As shown, some of the staff ask for help from the implementing organization, as they do not believe in their own capabilities.



5. Conclusion: Do type and level of participation matter in electrification?

The aim of this study has been to understand what importance the type and level of participation has for the outcomes of the small-scale hydropower projects in terms of the users' perception of the significance of the electricity, their expectations of and satisfaction with the project and the future problem solving capacity.

The two projects in this study use both different and similar types and levels of participation in the planning, implementation and operation phases. The differences, however, are greater than the similarities. When the users' perception of the significance of electricity and the satisfaction with the project differ it depends mainly on the expectations created in the planning phase, the capacity of the hydropower system and the amount of users covered in the projects. Participation affects what people expect of the project and in turn also how satisfied they will become, however, participation needs to be put in relation to the financial and technical aspects in order to be effective.

5.1 Electricity in a complex reality

This study shows how electricity changes both space and time and how these temporal and spatial changes created are considered by all people interviewed to make all parts of life better. What matters for both the users' perception of the significance of the electricity and the users' satisfaction with the project is that they get the right information in the planning phase so that their expectations are fulfilled and result in satisfaction. Of high importance for the users' perception of the significance of electricity and their satisfaction with the project are also that the users get the electricity and that the hydropower system is robust in order for them to remain satisfied and to maintain a socially higher standard.

The villagers in the villages surrounding Itete Hospital are happy for the electricity at the hospital at the same time as they express certain dissatisfaction based both on lack in the information sharing and that they as indirect users want electricity. Additionally, the staff at Itete Hospital explains how the electricity only gives them partly a good life due to that the capacity of the hydropower is not enough for cooking. The low capacity also creates a source of concern as they claim that the hospital would not be able to continue without the hydropower. The capacity is today lower than it was during the first years because of

sedimentation, the major accident in 2009 and also that it is now a relatively old system. Also the power cuts that occur during the dry season as a consequence of the lack of water are a major problem. These problems with the capacity have to do with the robustness of the hydropower system and how it is built, in other words its long-term sustainability (Doug & Barnes 2004). In the Mawengi Ward similar problems have been foreseen and addressed to ensure the long-term sustainability of the system. As the hydropower system is very young in the Mawengi Ward, the users have not yet experienced any problems or dissatisfaction, however not everyone in the villages will be able to connect to the hydropower and this in turn might create future difficulties. In this study, what matters the most is not only that a great amount of people get electricity but also the robustness of the hydropower system in order for the users to remain satisfied and to maintain a socially higher standard.

5.2 Whose participation?

In both cases the external actors, or outsiders, ACRA and SEM, have implemented the hydropower system based on the initiative of local actors. Participation of the future users has occurred in both cases but to different extents. In the Mawengi Ward the project is well planned with focus on the participatory methods and it continues for a longer period of time compared to Itete. In the case of Itete Hospital the system was put into place and when this was done it was handed over to the hospital management. This study demonstrates how there is a higher level of participation in the project in the Mawengi Ward and a lower level in the project at Itete Hospital. However, the concept of participation is complex and the practice is often criticised for being another way to hide business as usual and imposing already determined structures and systems (Eversole 2010:2). The criticism can result in a different analysis of the level of participation. If analysing the definition of participation from the World Bank it can indicate to a high extent the involvement of outsiders; "Participation is the process through which stakeholders influence and share control over priority setting, policy-making, resource allocations and access to public goods and services"(World Bank 2011). If instead studying the definitions outlined by Mikkelsen, where the implementing organization participate in the aid receiving community's project, the involvement of the outsiders might be defined as limited. A high involvement of outsiders can be criticised for undermining the systems determined by the beneficiaries and therefore also result in a low level of participation. On the contrary, a low involvement of outsiders can imply that the beneficiaries

have greater possibilities to determine their own systems and structures resulting in a high level of participation.

ACRA and NDO involved the community in the planning phase by having meetings with leaders in the communities defining the purpose, methods and time line of the project at the same time as the future users were asked about their desires. Additionally, the empowerment over the hydropower system in the Mawengi Ward involves intensive training in accountability, good governance, business and transparency, which all are concepts viewed as prerequisites for development within the aid industry (Lewis & Kanji 2009, Burnside & Dollar 2000, Bendell 2006, Mikkelsen 2005:56). The general criticism of participation in aid projects is that the practice of participation reflects a definition of development based on the best practices, like good governance, transparency and accountability, of outside professionals. Participation is often criticised for being used as a way to cover a top-down approach of aid and the continued imposition of the practices and the knowledge of the outsiders (Mikkelsen 2005, Eversole 2010, Cornwall 2008). In the case of the Mawengi Ward the project model illustrates an assumption that the community will not be able to manage the hydropower system and its problems for a long-time period without the meetings and the training.

When it comes to the project at Itete Hospital the purpose of the project; to electrify the hospital, was decided by SEM who in meetings with the hospital management decided how to implement the hydropower system. The hospital management knew who to contact and who had to be informed and accept the project in order for it to be initiated. No methods were applied by the outsiders, SEM, in order to ensure the future development of the hydropower system but instead the already established hospital management took over the control and also had to solve the problems when they occurred. When studying the participation, the time aspect of the two cases becomes clear as it is the youngest project, in the Mawengi Ward, that uses the modern practice of participation.

The case of Itete Hospital is a project where the project plan did not involve training in good governance or solutions of foreseen problems, which in turn forced the hospital to solve them by themselves. The solutions were created on site in Itete with the knowledge and resources available. In the case of the Mawengi Ward most problems are foreseen and prepared for in advance by training and preparations. However, it is not possible to foresee the future or what will happen when the implementing organization has left. At the same time, the project in the Mawengi Ward involves to a large extent both direct and indirect users and the hydropower system is built to manage problems with lack of water during the dry season

and increases in the amount of users, which in turn can ensure the future sustainability of the project and hinder users' dissatisfaction. Participation can also be seen as a goal in itself and with respect to this the project in the Mawengi Ward is ambitious. It is important to mention that in this research only certain aspects of participation have been studied and there can of course be other important ones.



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