



Infrastructure Provision in Regularised Informal Settlement through Labour Based Approach: Lessons from Miembeni Settlement in Moshi, Tanzania

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Abstract

Labour based approach as a participatory approach in infrastructure provision has become a topical global agenda to ensure success of urban planning practice in informal settlements. This paper contributes to the emerging debate on the roles and critiques of the use of labour based approach in infrastructure provision as one step in the implementation of land regularization taking Miembeni settlement in Moshi Tanzania as a case. The study highlights motives and needs for infrastructure provisioning as an important step for local communities' engagement in land regularization towards improving infrastructure facilities and utilities in the settlement. It provides explanation on technology in which labour adopted, supported by light equipment, which was used as a cost-effective method of constructing and maintaining infrastructure at a required standard. Likely provides donor community contributions and settlement characteristics. The analysis is grounded in understanding labour based approach as a theoretical base in using local community and simple technology in improving infrastructure in informal settlements, implementation process, the role of planning institutions, planning standards and written and unwritten norms. The paper ends by providing reflections and concluding remarks which provide lessons and sharing knowledge for replication in informal settlements of the same context in Tanzania and elsewhere.

Subject Areas

Sociology

Keywords

Labour Based Approach, Infrastructure Provision, Informal Settlement, Moshi, Tanzania

1. Introduction

Infrastructure provision in urban development for decades has been the responsibility of the local and central governments in different countries. In this context, infrastructure provision involves constructions of roads, lined storm water drains and culverts in the informal settlements upgraded to formal status through land regularization. In developing countries like Tanzania where the economic situation is not stable and budget deficit is common, it has been very expensive to provide infrastructure in settlements upgraded or regularized [1] [2]. This has been exacerbated by the fact that infrastructure provision in urban areas competes strongly for funding with other sectors, such as water, health, education, housing, etc. and thus government's budget allocation in developing countries has been found inadequate year after year, and thus implementation of different programmes has become futile [2]. Given the limitations associated with the funding sources, most governments are pursuing the public private partnership strategy consisting of involving the private sector in different modalities. Different forms of public-private partnerships (PPPs) approach used also involve local community, donor, and government. Therefore, adopting labor based approach in infrastructure provision especially in informal settlements is a rational decision [2] [3] [4].

Worldwide infrastructure provision through labor based approach has been supported by the International Labor Organization (ILO) and the World Bank since the 1970s. In this context labor based approach used to describe a technology in which local labour and locally available materials, skills and capacities, supported by light equipment, is used as a cost-effective method of constructing and maintaining infrastructure of a required standard. Instead of using heavy equipment handled by a small labour force, they maximise labour supported by limited (but appropriate) equipment to meet the specified technical and engineering standards [5].

A number of labor based projects were implemented, mainly in Sub-Saharan African and Asian countries after the 1980s. After the year 2000, other development partners, including Asian Development Bank (ADB), Danish International Development Agency (DANIDA), UK Department for International Development (DFID) and German Agency for Technical Cooperation (GTZ) also supported it. Other donor community members that insisted on adoption of this approach are Japan International Cooperation Agency (JICA), Norwegian Agency for Development Cooperation (NORAD), and Swedish International Development Cooperation Agency (SIDA) [3] [6] [7]. It is argued that the labor based

approach is instrumental in employment creation in most public infrastructure investment projects, such as access roads and drainage construction. This leads to a cost effective project implementation and generation of income to residents, especially youth and women in their settlements [3].

2. Literature Review

Labour based approaches have the potential to promote local community development through their work with their multiplier effects. Given the importance of labour based approaches Mtisi [8] provides several important principles guiding their design and implementation. Supportive policy framework, the government should integrate the use of labour based approach on infrastructure projects in national programmes and policies. Institutional framework, the government should develop an effective institutional framework that support the use of labour based approach on infrastructure projects, through capacity building to all stakeholders involved. Infrastructures that serve the poor, development practitioners should use labor based approach in infrastructure projects that improve access to social services in community and eventually reduces poverty. Monitoring and evaluation, is important in implementation of labour based approach to ensure the desired social and economic goals are met.

In addition, it should be noted that labor based approach has been supported by different scholars and donor communities in different ways. In Cambodia the approach has been successfully implemented through small-scale local contractors. It has been utilized for routine maintenance and light grading works whereby trained engineers have led the technical assistance component of the project [7]. In South Africa, local contractors are paid per day, which leads to low quality and drastic increase of cost and this seems to be an expensive approach. In this context, it seems that the estimates during tendering in some cases do not materialize during construction, because the man-working days increase since people do not work in order to complete the task but to complete the day [9]. In Malawi adoption of labor based approach involved six phases which are considered important for successful involvement of local communities in infrastructure provision. These phases include demonstrating the need, conception of need, feasibility studies, preparing work plans, developing production information, construction, operation and maintenance [10].

In Madagascar, the use of labor based approach depends on various factors including nature or design of works, the site conditions, motivation of labour, and willingness of local communities to participate in the process [11]. This shows that before making the decision of using labour based approach these factors need to be considered, since not all works labor based approach can fit.

PRIF [5] discusses that labour based approach provides opportunities which in turn contribute to social and economic development of local communities. This approach allows creation of employment opportunities for youth. It also creates a sense of ownership which enables them to maintain infrastructure provision,

since they already have skills on its creation. The sense of ownership created improves the sustainability of the infrastructure if communities decide to maintain those services. Besides the mentioned opportunities, the approach may not be a blessing, if local communities are paid low wages which may be disincentive and as a result undermines the objectives of this approach. Likewise, labour based approach involves many contacts to involve many contractors; as such, it needs carefulness in managing such contracts and closely supervision in maintaining quality of works.

Infrastructure provision in developing countries is accompanied by a number of challenges which need participation of different stakeholders. Local government depends much on grants, funds from the central government and own source collections to finance infrastructure construction and maintenance. The central government in many countries has been finding it difficult to finance infrastructure at community level. The priorities have been on regional roads and other big projects. Thus, the expected sources of finance for infrastructure have remained to be from grants and from local community sources [12].

The study uses the collective action theory developed by Mancur Olson in 1965, who argues that any group of individuals attempting to provide a public good has troubles to do so efficiently. On the one hand, individuals have incentives to “free-ride” on the efforts of others in certain groups [13]. Public goods are things that are available for the use of everyone, regardless of those people’s investments. Public goods in this study are regarded as infrastructure provision whereby, all residents in settlements enjoy services resulting from the process regardless of their involvement. Without selective incentives to motivate participation, collective action is unlikely to occur even when large groups of people with common interests exist [14] [15].

In addition, according to Babybonela [15] the motivation for collective action ultimately depends on whether stakeholders foresee net profits from taking part in a common project. This is to say that, people agree to cooperate in order to do something that none of them thinks is more easily done independently. When the cooperation is successful, all parties improve their position by virtue of the cooperation. How the theory is linked with the study is discussed in the discussion part.

This paper seeks to explore the trend of the settlement growth and its characteristics and intra-community dynamics in settlement upgrading. Second, we seek to understand better infrastructure standards, norms and conditions adopted. Finally, it examines the role of different actors in implementation of labor based approach, and also, the role of labour based approach in the study settlement.

3. Study Approach and Methods

3.1. Characteristics of the Settlement

This study was conducted in Miembeni settlement, which is found in the Moshi Municipality in Kilimanjaro Region, Tanzania. Miembeni settlement was selected

due to different reasons including upgraded settlement through regularized process, completed land regularization process and infrastructures provision that involved community contractors. Lastly, land regularization in this settlement was community initiated and not top down approach which depicts bottom up participatory urban planning approach. Moshi attained the status of a town in 1956 and gained the Municipal status in 1988. The Municipality in its growth and development depicts functional and administrative functions or processes. The Municipality has 21 Wards, 60 Sub-wards, with Miembeni inclusive. Miembeni settlement is dominated by people from the Chagga (65.5%) and Pare (12.3%) ethnic groups. Others include Rangi (0.7%), Sambaa (9.4%), Sukuma (2.2%), Makonde (1.4%), Mbulu (0.2%), Ngoni (0.7%), Nyakyusa (0.5%), Fipa (0.2%), Gogo (0.2%), and Haya (1%). The residents in the settlement are engaged in various economic activities including tourism, trading and agriculture, which are sources of income to majority of residents.

Sub-Saharan Africa is experiencing an unprecedented rate of urban growth, bringing both opportunities and challenges in city development and growth processes. Each year, an additional 14 million people join the urban population in Sub-Saharan Africa [16], with the vast majority (70 percent) living in “informal settlements” and slums. According to UN-Habitat, it is estimated that Sub-Saharan Africa has the largest slum population in the world, recorded at 199.5 million. The Tanzania National Housing and population census reports indicated that in 1988 population increased from 12.3 million in 1967 to 17.5 million in 1978, 23.2 million in 1988, 34.4 million in 2002 and 44,929 in 2012. In Kilimanjaro region, population has increased from 652,724 in 1967 to 1,640,087 in 2012.

Population data gathered from National population census reports show that in Moshi with Municipality status, population has increased from 26,864 people in 1967 to 52,042 people in 1978; 98,838 people in 1988; 144,336 in 2002 and 184,292 in 2012. With a land area of 58 sq. km. the population density has increased from 926 people per sq. km. in 1967; 1795 people per sq. km in 1978; 3339 people per sq. km in 1988; 4977 people per sq.km in 2002; and 6355 people per sq. km. in 2012. According to National Population census report (2012) population growth rate in Moshi Municipality is growing at 1.8 percent per annum and the urbanisation rate is growing at 4.1 percent per annum compared to the national growth rate of 2.7 percent per annum and urbanisation rate of 5 per cent per annum [17].

Population in Miembeni settlement was 5076 in the year 2012 which is 2.8% of the whole population of Moshi Municipality. Out of this population, 2479 were male and 2597 female. The settlement has 720 householders and the area of the settlement is 42.782 hectares. The population density of Miembeni settlement has increased from 86 persons per hectare in 2002 to 119 persons per hectare in 2012. Likewise, the housing density increased from 13 houses per hectare in 2002 to 17 houses in 2012 [17]. This shows that if there is limited urban development control, increase of population density in the settlement imposes dif-

ferent challenges in terms of food security, ecosystem conservation and land development.

In addition, provision of infrastructure in informal settlements is difficult to be attained due to limited space and the cost involved in developing countries. Adopting labour based approach in infrastructure provision is found to be easily adopted and effective when local community offers its land, labor and financial resources to institute development in their area. Controlling land development with urbanization perspective in informal settlements during and after upgrading is important in ensuring sustainable city growth process and development.

3.2. The Study Approach and Tools

The study used purposive sampling technique, in which 5 key informants were selected from different actors, including surveyor, town planners, and settlement leaders. Also, snowball sampling procedure was used to sample contractors and residents involved directly in the project. Settlement leaders were asked to point at least two residents and contractors, who later pointed their fellow who got involved in the project.

The study used a participatory approach involving landholders in the study settlement. Participant observation, documentary review, interviews and questionnaire were techniques used. Both structured and unstructured interviews were deployed in this study. Structured interviews were conducted with respondents using questions from an interview guide while unstructured interviews were used to supplement the structured interviews in which respondents' feelings and perceptions were noted. Likewise, various documents were reviewed, which provide a clear understanding of the process adopted, institutions involved, insights and reflections on empirical, theoretical and policy standards. Key documents reviewed include legal and policy documents, census report, Municipal profiles, upgrading project report and various empirical studies.

With respect to observation, the ongoing economic activities and changes as the result of infrastructure provision through labour based approach were observed and documented. These include road development and construction of drainage system. Also, questionnaire was used to collect data from 84 respondents involved in infrastructure provision. Questionnaire was administered by the researcher, and information on the process and how local communities have benefited from labor based approach were collected. Data from the questionnaire was analysed quantitatively, whereby, descriptive analysis was done which provided simple summaries about the data in form of frequency and percentages.

4. Results and Discussions

4.1. Trend of Miembeni Settlement Growth and Her Characteristics

It was found that Miembeni settlement was dominated by local tribe "Chagga" whose land was traditionally allocated by their Chief Mangi, or his subordinate

to heads of households. The chief in Chagga had a right to apportion land to male children only. This shows that a social segregation existed for decades in Chagga tribe in Tanzania. Increased housing densities and population have impacted on decreased land per household and land subdivision feature using “*Vihamba System*” which is common characteristics of the Chagga tribe. “*Vihamba*” is a traditional name of the Chagga tribe referring to small land plots subdivided and allocated to family members for meeting any economic activity within their traditional circles. The entrenched customary land tenure system which governs traditionally owned land, although recognised in a policy document of the country, still the context of such land subdivision is important to ensure planned urban development.

The situation is worse when the government fails to pay fair and prompt compensation to the local landholders, in which uncontrolled development continues. According to Land Ordinance (Cap 113) of 1967, the Right of Occupancy system did not bestow on any individual owner the status of owning land. He could not, therefore, turn that piece of land into a commodity for sale or buying. Actually, compensation rates restricted to payments for crops, buildings and other unexhausted improvements only and they were belatedly paid without due consideration of inflation.

Due to laxity in law enforcement, the urban poor who could not afford the stricter building standards applicable to the planned area bought plots from traditional landholders in the settlement. Some of them are lower wage earners in the nearby industries and engaged in micro business enterprises.

The uncoordinated and uncontrolled development result into poor provision and residents’ access to infrastructure services such as poor solid waste disposal sites and inadequate road network and storm water drainage. Piles of solid waste disposal and pools of stagnant foul water are intermittently visible in such settlement, hence causing nuisance aesthetically and a breeding ground for vermin which in turn spread communicable and infectious diseases. Poor liquid waste disposal also contaminates ground water, which was a common feature observed before land regularization in the settlement. The resultant high population density, on the other hand, led to overcrowding and mushrooming of informal sector business services to meet the demand for the particular squatter population and other residents within their market range.

4.2. Intra-Community Dynamics in Settlement Upgrading

1) *Need and Motivation of Local Community involvement in Land Regularization: A Bottom up Approach*

It was revealed that the need and idea of local community engagement in the land regularization process started in 2002 after persistence of floods and poor infrastructure in the settlement. This initiation was raised from community members during their settlement meetings, which was documented clearly by settlement leaders and shared with Ward Councilor. The need of the community

members was presented to the Municipal Council meetings for actions. The Municipal Council organized the meeting, whereby 120 actors attended, including the local community as well as Community Based Organizations (CBOs) and Non-Governmental Organization (NGOs). At the end of the meeting the participants agreed on the critical issues, among them being upgrading their settlement.

2) *Need for Community Involvement in Infrastructure Provision*

The settlement lacked basic infrastructure and services including improved lined storm water drainage and culverts due to flooding. It was acknowledged during the community meetings in the settlement that the sustainable solution to the problems was infrastructure provision and their participation in the land regularization process. The minutes of the meeting which were shared at the Municipal Council showed the willingness of community members to contribute resources such as land and power in the process of infrastructure provision. The readiness of community members was considered important by government, since the cost of providing infrastructures is minimized when community members agree to contribute resources. Infrastructure provision in the settlement started in 2004 to 2006, whereby, lined storm water drainages were designed to drain excess rain and ground water from roads and sidewalks. Culverts are closed conduits used to convey water from one area to another, usually from one side of a road to the other side.

The settlement, according to the 1992 Moshi Master plan, was zoned as flooding and hazard land unsuitable for construction. Thus, all ongoing constructions were considered illegal, and were built with no formal authorization. One could question where was the government to enforce the land development, conflict measures after the enactment of the Master plan and subsequently the detailed land use plan in the settlement. This shows poor policy enforcement existing in the local government authorities in different countries, including Tanzania. Common features in this settlement is overcrowding, inadequate water supply, no provision of space for circulation, poor environmental conditions characterized by lack of proper sanitation, poor drainage, uncollected solid waste and importantly, insecure tenure. Among the strategies proposed to address the problems in the settlement was to involve landholders in land regularization to meet legal requirement and avoid evictions.

3) *Initiation and Decision Making Process in Project Implementation*

The project of infrastructure provisioning initiation in the study settlement was implemented through bottom up approach. It was initiated by local community and supported by the government of Tanzania and DANIDA (as donor). Residents in their community meetings requested their leaders, including settlement leaders, Ward Executive Officer (WEO) and Ward Councilor to discuss and request the Municipal Council (MC) to upgrade their settlement. The ward councilors agreed with the observation and presented the request to the Municipal Council (MC). The MC officials accepted the idea and assigned a deal with

the issue. This task force was called Program Management Team (PMT). The Team comprised of staff from Land and Urban Planning Department, Surveyors, Land Officers, and WEO. Among the responsibilities given to it, were to assess the program, to provide a ward map showing how to implement it, land regularization and how to mobilize fund.

The PMT conducted a comprehensive baseline survey of the project involving local community, CBOs and NGOs, and assisted the local community to come up with a list of priority issues and needs to meet the assigned responsibilities. These problems included crowded and poor quality housing, poor solid waste management, limited accessibility and public transport, poor surface and storm water drainage and inadequate liquid waste management and sanitation. After understanding the situation and the condition of the settlements, the PMT planned and wrote the project proposal with illustrated ward map and activity based budget, which were submitted to DANIDA for funding.

After acceptance of the project by DANIDA, the Community Planning Team (CPT) was formed; comprised of four (4) Technical support staff from Moshi Municipal Council (MMC), the Ward Community workers, the Ward and settlement leaders, and community members elected by residents within the settlement, making the total of 30 members. The purpose here was to ensure involvement of local and donor actors. Criteria for selection were attendance, experience and contribution of members in the meetings. The CPT conducted capacity building meeting of local community. This aims at enhancing awareness of community concerning environmental care and project management. Through community meetings, landholders accepted the idea for implementation. A total of 20 meetings were held involving CPT, local community, and ward Councilor, WEO, and settlement leaders in the settlements during initiation to implement stages. The cost of the initiation process was Tshs 7,375,120 (\approx 3203 USD), contributed by MMC and DANIDA as shown in **Table 1**.

This amount was used to buy sensitization materials such as flipcharts, pens and notebooks. Other use included payment for meetings costs, such as venue, meals and tea, and motivating sensitization team. One could argue whether the process would have taken place without financial support. The answer is no. This shows that creating awareness takes longer in order to enable local residents' engagement in supporting local initiative projects. This shows the need for education and training once one initiate and gets involved in informal settlement upgrading.

Table 1. Financial contribution of different actors during initiation stage.

Actor	Contribution (Tshs)
MMC	1,696,277.6
DANIDA	5,678,842.4
Total	7,375,120.0

Source: Moshi Municipal Council (2018).

4.3. Adoption of Labor Based Approach in Miembeni Settlement and Roles of Different Actors

The infrastructure works were implemented through community contracts with technical assistance from consultant from Moshi Municipal Council. The contract between CPT and contractors were supervised and monitored by the Moshi Municipal Council whereby the works department took a leading role and cooperated with the CPT to facilitate the project implementation. The M.S Env-Consult (T) Ltd (contractor) was engaged in conducting capacity building to the CPT through Training of community contractors and landholders and sensitization towards enhancing community awareness. However, the training of community contractors was more complex, as the level of expertise and skills differed among them (Table 2).

In constructing storm water drainage, Community Labour Based Approach (CLBA) was used. The CLBA refers to the prioritized use of local labor/contractors, skills and capacities in constructing storm, water drainage and roads in the settlements. Contractors were required to apply to MMC for tender of constructing storm water drainage, whereby in the application they were required to specify a total length of storm water drainage one can construct. The application was approved by settlement leaders by considering the conditions set including level of experience and contractors who are residents of Miembeni settlements. A total number of 70 contractors who are community members from the settlement and their assistants were given works of constructing storm water drainage in the settlement after signing the contract. Contractors were trained by Works Department and CPT and working modalities were provided including payment and supplying construction materials.

The Works Department in Moshi Municipal Council supervised, monitored and evaluated the construction process, while provision of working materials was made under special request for easy monitoring and control. However, the estimate of construction materials requested was not fully used and other materials, including cement, were taken away. Contractors were only required to offer their expertise, use their working tools; building materials like cement were offered by the Moshi Municipal Council under special request. The payment was made by Moshi Municipal Council depending on the length of storm water drainage constructed from the project fund. Community contribution was determined by the value of land offered for drainage construction and the non-compensation of crops affected during the project implementation. The amount of money contributed was used in sensitization and awareness raising, consultancy fee, and construction of drainage.

The usefulness of the collective action theory in this study settlement was found important in implementing community labour based approach. It was found that initiatives of government and local communities in the implementation of land regularisation were accompanied by some of the residents unwilling to contribute land for infrastructure process and to provide their labour. However, after sensitization and public education provided by settlements leaders in cooperation

Table 2. Roles of different actors on infrastructure service provision.

Type of infrastructure	Actor involved	Type of support or role played		
		In kind	Financial	Other resources
Roads and Drainage provision	Landholders/ Community	Labour	12,846,600	Offer land service provision
		Attending meetings		Training to local leaders and landholders
		Organizing meetings		
	CPT	Sensitizing landholders to attend meeting		
		Coordinating, supervising and monitoring the construction of roads		
	Moshi Municipal Council	Expertise	7,200,000	Providing training to residents and youth groups organized
	DANIDA		132,627,500	Training, technical support and financing
Contractors	Constructing Drainages			

Source: Moshi municipal council (2018).

with Municipal Council officials, many residents participated in the process. This is also found in Cambodia where collective action is concerned with roads, community members with access to roads do not show much effort of involving themselves construction and maintaining infrastructure in the settlement compared to those with poor accessibility [18]. This shows the need of government and community organizations to provide public education and sensitization to residents before starting land regularisation projects to create a sense of project ownership. Public education helps residents to understand the benefits of the project and thus can be convinced and become willing to participate.

In addition, collective actions in construction of storm water drainage and roads, brought community members together, and contributed resources, in terms of funds, knowledge and efforts which were eventually ensured successful provision of the infrastructure in the settlements. The experience of labour based approach shows the power of collective action theory, where the need of involving the local communities in project such as land regularisation is important and thus among others ensures sustainability of infrastructures. However, community contractors were mobilized and sensitized to participate in the process rather than waiting for the government to provide service and payment for labor. Collective action in this study is supported by [19] who also found that in Sri Lanka where labour based approach has been implemented, community members have

been cooperating together to provide resources and labor, and thus creating temporary employment to both men and women of working age.

Also, labour based approach signifies the bottom up approach, which is emphasized by community development practitioners, especially local government, Non-Government Organizations (NGOs), Community Based Organizations (CBOs) and donor community. The bottom up approach incorporates the needs and visions of the local people in project execution and integrating their expertise in local community needs, priorities, and prospects of the local government in improving informal settlements [20] [21].

4.4. Infrastructure Standards, Norms and Conditions Adopted

During the upgrading of infrastructure through construction, formal planning space standards were reviewed and unfortunately were not able to apply. The storm water drainages were constructed with trapezoidal and rectangular pitch lining (**Figure 1**).

Drainage gradient was made in such a way as to ensure a self-cleaning velocity, which is at 0.6 m/sec at peak flow. Connections from the houses were via small concrete surface channels of 75 mm or 100 mm pipe. Also, roads constructed were agreed to have a standard of 8 to 10 meters for access roads and 3 to 6 meters for access paths (**Table 3**). These standards were adopted after agreement reached between Municipal experts and community members through meetings, considering the existing situation in terms of land availability and cost of construction.

Roads constructed during land regularisation in the study settlements was due to adoption of flexible planning standards which enables one to compare the traditional and conventional urban planning space standard requirements. According to the Urban Planning Act, of 2007 the planning authority shall have



Figure 1. Sample drainage constructed with trapezoidal and rectangular with pitch lining.

Table 3. Planning standard as per Town Planning Drawings (TPD) and adopted.

Infrastructure type procedure	Standard as per TPD (Meters)	Community agreed standard (Meters)
Local distribution road	30	15
Access roads (residential)	10 - 15	8 - 10
Foot paths	2 - 3	1 - 2
Drainage channels	Trapezoidal and rectangular channels with stones pitch lining	-
	Small concrete surface channels of 75 mm or 11 mm pipe	-

Source: Moshi Municipal Council (2019).

power to “...control the use of land, development of land and buildings in the interests of proper and orderly development of the planning area; and formulate by-laws to regulate zoning in respect of use and density of development” [22]. As such, after a land regularization process in Miembeni settlement residents through local leaders’ directives and meeting resolutions established their written norms and conditions to safeguard their land development including infrastructure space standards to be adopted. The settlement chairperson remarked that:

“...in our community meeting we agreed and approved that no resident is allowed to build a house without consulting local leaders, to build a house/fence on road reserve and to throw solid waste and water in roads and house environment. Failure to clean water drainage system surrounding or near to the landholder’s house and non-adherence to other norms and conditions will cause the resident to be punished by paying a fine of Tshs 30,000. This is one of the settlement’s sources of income. Also, failure to comply may cause demolition of houses constructed on the road reserve. In addition agreed space standards for roads and other infrastructure facilities and utilities should be respected by each member”.

It was found that the presence of established unwritten norms to guide and control land development outputs including land use plans, cadastral survey plan, infrastructure provision, etc, shows the role of the community in making their decision in implementing the agreed purpose. The unwritten norms established were instrumental to control their settlement development. The imposition of fines shows the innovative way for others to learn once the settlement is upgraded using labour based approach in the land regularization process [23].

4.5. Role of Labour Based Approach in Infrastructure Provision

The labour based approach was found suitable for construction of storm water drainage and services in the project area. Controlled non-essential demolitions

such as fences, hedges, trees outer buildings like traditional latrines and utilities as non-compensation were considered. Also, 96% (81) of the respondents revealed that the approach offered an ideal opportunity of creating employment and income generating for particular members of the community who were unemployed. For example a total of 70 contractors and their assistants were directly employed. Each contractor was given a piece of work, and for him to accomplish the given work, he was required to have assistants (skilled and unskilled youth) to accomplish the assigned work. Likewise, 35% of the respondents revealed that they were indirectly employed by cooking and selling food, which enabled them to earn income ranging from 2 to 6 USD per day (Table 4).

Respondent 12 (resident) said that:

“Through labour based approach I got a work of cooking and selling food to community contractors. I generated at least 5USD as income per day, which was enough to meet my households’ needs like buying food, shelter, and clothes, also through that business I collected funds for payment of upgrading process to the Municipal”.

Furthermore, 65% (55) of the respondents revealed that the labor based approach developed skills and capacity of local labour which is used in other income generating activities as well as in subsequent maintenance works and participation adopted in the implementation of the infrastructure project in the settlement. Capacity built and skills developed include food safety and hygiene practices, entrepreneurship and customer care for women entrepreneurs, and construction, negotiation, work planning and supervision, and contracting decisions for contractors. Women who involved in selling food gained skills through training provided by settlement leaders when the opportunity of cooking food was introduced. Contractors learned through training provided by consultant together with Municipal Council and through observing the consultant how he was supervising, monitoring and evaluating works (Table 5).

Also, 53% (45) of the respondents revealed that through their involvement in infrastructure provision they have a sense of ownership and commitment. This enables maintenance of constructed infrastructures, as the MMC does not have enough resources to maintain them. In addition, settlement leaders revealed that through involvement of community members, other projects, including rehabilitation and maintenance of infrastructure can be managed and handled. As such, they gained skills to plan, supervise and maintain their environment during and

Table 4. Average income per day earned by women through selling food.

Income	Frequency	Percent
2 - 3 USD	6	17
3 - 4 USD	18	51
5 - 6 USD	11	32
Total	35	100

Source: Field Data (2019).

Table 5. Capacity building and skills development.

Skill/Capacity	Frequency	Percent
Food safety and hygiene practices	13	15.5
Entrepreneurship	12	14.3
Customer care	10	11.9
Construction	14	16.7
Negotiation	10	11.9
Work planning and supervision	13	15.5
Contracting decisions	12	14.3
Total	84	100

Source: Field Data (2019).

after land regularization. Respondent 4 (contractor):

“During the process of constructing drainage channels the consultant was supervising us and giving directives on how to effectively construct drainage channels, which gave me new skills that helped me to get more works in our settlement and outside. Apart from the experience I gained, I also have increased the network beyond our settlement”.

Our findings support arguments which were advanced by Nnkya [24], Lüthi *et al.* [25], AFDB [26], Rajasingham [27] that the use of labour based approach in infrastructure provision provides skills to various residents, and thus, creates employment opportunities. PRIF [5] provides a precaution in ensuring genuine participation of local communities, it is important to empower local contractors to be equipped with skills necessary to undertake desired contraction projects. This shows the importance of strengthening the processing, recruiting or selecting community contractors, to ensure that only those who have the desired qualification get the contract. If the nature of construction needs high technology the use of labour based approach may not be a good option as repeated by Thlala [11] in Madagascar and Ogita [7] in Cambodia.

Challenges explored like lack of transparency among contractors in requesting construction materials and training to community contractors taking long time due to different levels of expertise and skills as discussed before can be managed during the planning, design and implementation stages. But Lüthi [25] provides the precaution when implementing labour based approach that since it involves different contractors with different levels of skills, it needs care in handling and thus needs close supervision. On the other hand, these challenges are not only found in labour based approach but also they are experienced in big constructions and maintenance. Donnges *et al.* [28] and Karim and Magnusson [29] highlight challenges experienced in equipment based approach, especially in roads construction and maintenance; these include insufficient consulting, insufficient planning designs and lack of information about state of roads. Other challenges discussed by Affleck and Freeman [30] include poor control of project and over-

sight. Therefore, the approach needs provision of training to contractors before embarking into construction process as well as making close supervision of community contractors.

5. Reflections and Concluding Remarks

Provision of Infrastructure in informal settlements has attracted national and international development agenda in many countries of the world. The study has shown the role of labour based approach in infrastructure provision. The labour based approach in this context proved to be one of the social capital and a strategy for infrastructure project cost reduction element, income generation, skills development to residents' and youth groups' employment particularly to those who seek jobs. Due to community involvement, it was noted that flexible planning standards were adopted in infrastructure provision which enables one to compare the traditional and conventional urban planning standard requirements.

Furthermore, the discussion shows that local community engagement through labor based approach in land regularization has shown the need to tap untapped capital resource which has been advantageous to settlement improvement. Community engagement in infrastructure provision and control has reduced the cost and minimized donor's contributions, which indicates the demand for public-private partnerships in project implementation. Reflection of scaling up the model and approval is important in developing countries with the similar context. For the most part of research, it corroborates other studies regarding the role and challenges of labor based approach. However, indirect employment created among women selling food to contractors has not been discussed in literatures on labour based approach. This kind of employment eventually reduces poverty, which was not a desired goal of labour based approach.

Reflecting on collective action theory in study context, the study verified that the theory accounts for involvement of community members in provision of infrastructure. The theory contributes that public goods cannot provide equal benefits to community members and therefore, community mobilization and organization are important for effective provision of infrastructure and ensuring its sustainability. This shows how inclusive planning in infrastructure provision is important for smooth implementation of labour based approach.

The study concludes that labour based approach is effective in infrastructure provision in regularised informal settlements; it provides avenues for local community participation to depict bottom-up approach in land regularization program implementation which can be replicated elsewhere with the similar context.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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