FINAL REPORT
Actor network analysis of the Zambian building industry
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Emphasizing intervention points for the promotion of green and decent jobs in Micro, Small and Medium Scale Enterprises

FINAL REPORT

Commissioned by the Zambia Green Jobs Programme
Compiled by
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Supported through field research carried out by the Copperbelt University of Zambia

The Zambia Green Jobs Programme is a United Nations System initiative comprising the Food and Agriculture Programme, the United Nations Environmental Programme (UNEP), the International Trade Center (ITC), the United Nations Conference for Trade and Development (UNCTAD), and the International Labour Organization (ILO)
# Table of Contents

i. Foreword 1
ii. Executive summary 2
iii. List of abbreviations 11

## PART I: BACKGROUND

### Overview:

13

I.1. About the ILO-led joint UN programme on Green Jobs Promotion 14
I.2. Terms of Reference for the industry analysis 17

## PART II: ANALYTICAL FRAMEWORK

### Overview:

21

II.1. A rights-based approach to private sector development 22
   II.1.1. People rights 22
   II.1.2. Rights of other actors 24
   II.1.3. Towards a heuristic model for balancing the interests of people and the interest of the environment in private sector development 25
II.2. A systemic view of what constitute sustainable business practices 27
   II.2.1. The link to social systems theory 27
   II.2.2. References to social network analysis 30
II.3. Research design 32
   II.3.1. Specification of the building blocks of the actor network map 32
   II.3.2. Demarcation of network boundaries 34
   II.3.3. Classification of actors 35
   II.3.4. Qualification of network linkages between actors 36
II.4. Research process 38
   II.4.1. Taking a first snapshot of the actor network: Desk research 38
   II.4.2. Probing deeper: Field consultations 39
   II.4.3. Building consensus around the intervention points for MSME support 40

## PART III: RESEARCH FINDINGS

### Overview:

41

III.1. Findings from desk research 42
   III.1.1. Qualification of the data set 42
   III.1.2. The actor network map of the Zambian building construction industry 43
      III.1.2.1. Snapshot of the status quo 43
      III.1.2.2. Micro-level actors 46
      III.1.2.3. Macro-level actors 50
      III.1.2.4. Meta-level actors 51
   III.1.3. MSME development opportunities linked to green building 53
      III.1.3.1. Use of renewable resources 54
      III.1.3.2. Improvement of resource efficiency 54
      III.1.3.3. Utilization of environmentally friendly building materials 56
      III.1.3.4. Minimization of waste 57
      III.1.3.5. Sourcing of local skills 57
III.1.4. MSME-specific bottlenecks to market systems development 59
   III.1.4.1. Micro-level constraints 59
   III.1.4.2. Macro-level constraints 60
   III.1.4.3. Meta-level constraints 60
III.1.5 Draft conclusions and recommendations for field testing 61
   III.1.5.1 Draft conclusions 61
III.2. Findings from field consultations 67
   III.2.1 Qualification of the data set collected during field research 67
   III.2.2 Description of the research findings 68
      III.2.2.1 Micro-level actors 68
      III.2.2.2 Macro-level actors 72
      III.2.2.3 Meta-level actors 83
   III.2.3. Modifications to the actor network resulting from the field research 85
   III.2.4. Amendments to the draft conclusions and recommendations 87
III.3. Final validation of findings with local actors 89
   III.3.1. Qualification of the validation mechanism 89
   III.3.2. Description of the actors’ feedback 90
   III.3.3. Final amendments to the research findings, conclusions and recommendations 93

Annex A: Bibliography of publications on the Zambian building industry, with emphasis on activities of MSMEs 95
Annex B: Templates of research tools 97
Annex C: Case study market development potential for Hydraform blocks 108
Annex D: List of conventions ratified by Zambia 110
Annex E: Stakeholder Validation Workshop Report 112
i. Foreword

Unemployment and climate change are two intertwined development challenges: Unemployment is one of the main causes of poverty, and poor people often need to resort to survival strategies which add pressure to the environment and thus accelerate climate change. Climate change also affects business further eroding the employment base of the local economy and setting in motion a vicious poverty cycle. To break out of this cycle, strategies to create jobs and combat climate change need to be interlinked; one way to do this is to facilitate the creation of jobs in Micro, Small and Medium-scale Enterprises (MSME) that make a contribution to the conservation or improvement of environmental quality.

The joint UN programme on the promotion of green and decent jobs, through the development of MSME in the Zambian construction sector, works to unlock this contingent job creation potential, and along the way contribute to shifting the economy towards more environmentally-sustainable business practices. The construction sector plays an important role in Zambia both in terms of its contribution to the country’s GDP and also in terms of employment creation effects. Its contribution to the national gross domestic product was over 16 per cent, excluding informal building activities that make up an important part of overall construction. The sector’s contribution to formal employment stands at around 13,000 jobs, while estimates about the number of people drawing income from their involvement in informal building activities put the figure as high as 200,000.

The demand for building of housing structures is fast expanding, on the back of fast population growth and rapid urbanization. Forecasts for housing demand show that there will be a need for 1.3 million new dwellings from 2011 to 2030, equating to building one house every two minutes of the working day for 19 years. The majority of this housing demand will be in the low-cost housing segment but middle- and high-income housing demand is likewise set to increase on the back of a growing urban middle class.

The building industry is dominated by MSME, and these enterprises are thus strategically positioned to benefit from this fast expanding market as in principle they have excellent growth perspectives and hold high job creation potential. The building industry is furthermore an excellent conduit to promote the creation of green jobs, which make a direct contribution to the preservation or restoration of environmental quality, and which include jobs linked to the construction of buildings that minimize the consumption of energy, materials, and water, as well as limiting the generation of all forms of waste and pollution.

To fully unlock this job creation potential, a number of MSME-specific development challenges will need to be overcome. MSME businesses’ growth is often not self-propelling, at least at the early stage of the business development path, and the jobs created by these enterprises often register decent work deficits. Also, as this report will document, the barriers to entry into the market for green building construction require in many cases external technical and financial support, lest the opportunity to ‘green’ many housing projects be lost.

The actor network analysis of the Zambian building industry is meant to provide the basis for UN Programme’s mix of interventions in the context of the web of interactions within which MSME are imbedded. As the report findings indicate, two types of interventions will be needed: support directly aimed at MSMEs or MSME’s development organizations, and interventions targeting network hubs. These are often not directly linked to MSMEs but are a critically important in order to trigger behavioural change across the industry.

The actor network analysis of the industry takes a sociological view by laying bare the dynamics of the web of people underpinning related economic activities, and by pointing out how a critical balance between the interests of the people and the interests of the environment affect building construction. The research was carried out by a team from the ILO, and while aiming for balance between people and the environment in economic development, the research does reflect a people-centered and rights-based approach to sustainable business. In order to gain a complete picture of the industry the report should be read in conjunction with concurrent research carried out by the other members engaged in United Nations’ activities.

Andreas Klemmer

Enterprise Development Specialist and research team leader

ILO Decent Work Support Team for Eastern and Southern Africa
ii. Executive summary

Over the last few years, Zambia has managed to maintain an impressive macro-economic growth rate; however, this track record has not translated into the requisite progress in the fight against poverty. The Government of Zambia fully recognizes the challenges it faces in creating more-broad based wealth and job creation, and has identified private sector development as a strategic means to boost employment, with particular emphasis placed on the development of Micro, Small, and Medium Enterprises (MSMEs).

One sector with high potential for the creation of employment in Zambia, by way of MSME development, is through the construction sector, identified as one of the main enablers of economic growth by the Government of Zambia. The sector has experienced rapid growth in recent years, and is poised to grow further on the back of strong demand, particularly in the local market for residential housing. The building industry offers excellent potential for broad-based wealth and job creation due its comparatively high labour intensity, low entry barriers for semi-skilled and unskilled labour, and a high concentration of MSMEs. The industry is also an excellent conduit through which to promote the creation of green jobs, employment that make a direct contribution to the conservation or improvement of environmental quality, and which includes jobs that help reduce energy, materials, and water consumption through high-efficiency strategies, by de-carbonizing the economy, and by minimizing or avoiding the generation of all forms of waste and pollution.

The ILO-led joint UN programme on the promotion of green and decent jobs through MSME development in the Zambian building industry seeks to unlock this contingent job creation potential. With this broader goal in mind, ILO has facilitated research on the web of economic interaction underpinning building construction in Zambia, this is in order to pinpoint intervention areas which will boost the creation of green jobs through MSME development. What follows are the report’s findings, conclusions, and recommendations.

The research has been rooted in a rights-based approach to private sector development. It is argued that all people linked through economic interaction in a given market system enjoy certain inalienable rights – and that the same rights potentially apply also to other actors in the environment affected by, or variably affecting, the transaction process. Two categories of rights are further explored, namely socioeconomic rights and the environmental rights of actors involved in the market exchange; a heuristic model is proposed to group these interests along a people dimension and an environmental one. Next, an analytical framework for market systems development is drawn up, to assess the people web underpinning the Zambian building industry, and which takes inspiration from social network analysis, in order to identify entry points for MSME development interventions that aim at the critical balance between the interests of people and their environment. The analytical framework distinguishes three system levels, a meta level where actors shape the views and mindsets of people across the network; a macro level where actors facilitate policies, laws and regulations which will determine the rules of doing business in the building industry; and a micro level where actors exchange building goods and services in the market place. The findings and recommendations on network entry points and priority measures for MSME development interventions presented below have been organized along these three system levels.
Key findings

MSMEs constitute the bedrock of the Zambian building industry and account for the vast majority of building activities, either with responsibility for the entire building project (mostly in the low-cost housing segment) or as sub-contractors carrying out piece-work for large-scale contractors and property developers. The market for MSMEs is poised to grow fast in the coming years, as demand for lower cost housing is soaring.

By direct comparison, the market for green building is still in its infancy in Zambia. Green building refers to the construction of a structure using processes that are environmentally responsible and resource efficient throughout the building’s life-cycle; essentially, the same value creation process for conventional building construction applies, and the same actors are potentially involved, but the methods applied and inputs required may differ. Public awareness about green building principles is limited, and as a result perceptions about green building designs and materials tend to be dominated by negative stereotypes. Industry-specific policies, laws and regulations are largely mute on green building standards, and macro-level actors like the National Construction Council and the National Housing Authority are yet to deliberately exert a push and pull on the market in order to shift towards green building practices. None of the MSME contractors and very few of their input suppliers were found by the research to have specialized in green building designs or materials. There are however signs of an emerging debate on green building, and a few examples of green buildings in Zambia already exist; industry regulators and providers of industry-specific skills training take an interest in the subject, and have in some cases done exploratory research; while large-scale hardware merchants have added some environmentally-friendly building materials to their stocks.

MSMEs in the building construction industry stand to economically benefit from a shift towards greener building construction, and might as a result create new jobs, but differentiated business development support services are needed to facilitate their market entry and successive specialization. At present, these MSMEs have limited or no access to formal tertiary level skills training and business finance, and this observation applies in particular to any service differentiated towards green building construction, and to non-registered MSME contractors. The strands of the MSME supply chain for critically-important processed building materials, like cement and timber, as well as machinery and equipment, are controlled by a few corporate producers and distributors with limited incentive to change the status quo.

The research findings also imply that macro-level actors with mandates to facilitate the policy, legal, and regulatory framework for building construction in Zambia will require capacity building to initiate and, where applicable, facilitate these interventions. At present, the outreach of industry statutory bodies like the National Council for Construction, particularly among non-registered contractors is still limited, as is the minor role of macro-level actors meant to protect the interests of the environment in building construction. Interestingly, the research findings indicate that MSMEs do have institutional representation in formalized, industry-specific, policy dialogue in Zambia, including businesses owned or managed by women entrepreneurs. What is less evident is to what extent these representative bodies effectively execute their mandate.

The research also found that the voices of meta-level actors advocating the critical balance between the interests of people and that of the environment are not yet articulate – none of the entities advocating for a shift in mindsets and perceptions vis-à-vis green building construction seems to command network hub status at this point in time. Further to the above, the following MSME development challenges which are specific to the creation of green and decent jobs in the Zambian building industry have been identified.
Actor network map of the Zambian (green) building construction industry.
### Challenges and opportunities for the promotion of green and decent jobs through MSME development in the Zambian building construction industry

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Limited access for both registered and non-registered MSME contractors to green building skills training.</td>
<td>• MSMEs can readily draw on traditional know-how in building design, which is adapted to climatic conditions and local context.</td>
</tr>
<tr>
<td>• Established corporate suppliers of conventional building materials might obstruct market introduction of environmentally friendly substitute products including materials produced locally by MSMEs.</td>
<td>• MSMEs can readily draw on traditional know-how in low-cost local building construction, including know-how on use of local building materials.</td>
</tr>
<tr>
<td>• Lack of access to green building technology.</td>
<td>• Diversified informal production and distribution networks for many local building materials.</td>
</tr>
<tr>
<td>• Lack of accessibility to appropriate green products and materials (in volume and at reasonable cost) within the Zambian building industry.</td>
<td>• Households potentially keen to reduce heavy reliance on a single power provider through installation of decentralized energy generation solutions.</td>
</tr>
<tr>
<td>• Current methods applied by MSME suppliers to extract local building materials are often unsustainable. (particularly those related to stone quarrying, sand mining and logging)</td>
<td>• Households potentially interested in technology solutions and services to secure water supply, reduce water bills, and improve wastewater management.</td>
</tr>
<tr>
<td>• Consumer markets serviced by MSMEs are highly price-sensitive and might refuse to absorb additional costs related to green building.</td>
<td>• Judging from trends in developed economies, significant business development opportunities in urban mining.</td>
</tr>
<tr>
<td>• Property developers might be hesitant to adopt untested greener building practices, mindful of customer preferences, financial risk, and quality concerns.</td>
<td>• Informal builders can draw on experience in recycling and reuse of building materials.</td>
</tr>
<tr>
<td>• Absence of industry-specific MSME finance products to support switching towards greener building technology and greener building methods.</td>
<td>• Relatively low barriers to entry for solar and energy efficiency products, due to their promotion by macro and micro level actors.</td>
</tr>
<tr>
<td>• Limited comprehension among housing estate management companies about the merits of operating, maintaining, and upgrading housing units in line with green building practices.</td>
<td>• The country is rich with natural building materials for construction, notably soil and wood, which gives Zambia a competitive edge on other countries.</td>
</tr>
<tr>
<td>• Limited acceptance among utility providers to support decentralized household-level energy generation and water management solutions.</td>
<td></td>
</tr>
<tr>
<td>• Limited feasibility to involve MSMEs in services (water, energy,) due to current market distortions.</td>
<td></td>
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<tr>
<td>• Limited comprehension among real estate agents about selling points for increasing the market value of, and trade in, green buildings.</td>
<td></td>
</tr>
<tr>
<td>• Market awareness about opportunities and risks related to the mining of secondary raw materials is very low.</td>
<td></td>
</tr>
<tr>
<td>• Lack of capacity to properly treat and dispose toxic building material waste, such as asbestos plates and pipes.</td>
<td></td>
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<tr>
<td>Macro-level</td>
<td>Meta-level</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>• Lack of coordination among associations representing registered and non-registered MSME contractors in the emerging national policy dialogue on green economy transition and green building practices.</td>
<td>• Limited awareness in consumer markets about the green building practices and what they mean.</td>
</tr>
<tr>
<td>• Lack of representative voices for entities representing the interests of people with special vulnerabilities in the policy dialogue on green building construction (like women and people affected with HIV and AIDS).</td>
<td>• A mistaken association of green building practices with low cost housing and poverty.</td>
</tr>
<tr>
<td>• Lack of emphasis on the promotion of green building practices in the draft construction policy.</td>
<td>• A consumer mindset that values imported building materials higher than locally manufactured inputs.</td>
</tr>
<tr>
<td>• Lack of emphasis of the draft construction policy on the promotion of a closed-system loop and the management of building life-cycles.</td>
<td>• Stereotypes about the perceived higher costs of green building.</td>
</tr>
<tr>
<td>• A commanding position (with limited capacity) of a single macro-level regulatory body (the NCC) which is biased in favour of registered MSME contractors and in favour of conventional building methods and materials for the building of middle and high income houses.</td>
<td>• Reluctance among policy-level decision-makers to take on western post-industrial concepts related to the green economy.</td>
</tr>
<tr>
<td>• Lack of laws and regulations to incentivize the use of green building methods, materials, and services (pull).</td>
<td>• Limited comprehension of actors across system levels about the link between green building practices, environmental sustainability and economic development.</td>
</tr>
<tr>
<td>• Weak enforcement of laws and regulations penalizing unsustainable/harmful building practices (push).</td>
<td>• A conservative mindset among MSMEs which often emphasizes retaining tried practices rather than innovation.</td>
</tr>
<tr>
<td>• Lacking in capacity to implement, regulate and finance existing regulatory frameworks to provide sustainable services (water, waste and energy).</td>
<td>• No network hub to raise awareness and appreciation in the marketplace for greener building practices.</td>
</tr>
<tr>
<td>• Commanding position of a single macro-level actor (NCC) biased in favour of conventional and tested building methods and materials.</td>
<td>• No dedicated R&amp;D body on green building design.</td>
</tr>
<tr>
<td>• Prices for services such as water, energy and waste are regulated beyond private sector participation feasibility.</td>
<td>• A vibrant scene of meta-level actors that could, and in some cases already do, advocate both people’s interests and environmental interests in the building industry.</td>
</tr>
<tr>
<td>• Lack of standards and industry representation to guide RE and EE products could result in inferior and/or inappropriate green technologies being used in the Zambian Building industry.</td>
<td>• Several actors that have a de jure mandate to be a network hub.</td>
</tr>
</tbody>
</table>

- Regulatory frameworks that support the development of greener cities.
- A diversified spectrum of macro-level actors representing the interests of both registered and non-registered MSMEs that could be mobilized in support of membership uptake of green building practices.
- Consumer demand for services (Water, energy, waste) outweights current supply.
Recommendations

Network entry points for MSME-specific development support

As indicated above, the Zambian building industry is overwhelmingly made up of MSMEs, and while in theory it would be desirable to target the entire industry with development support, in practice this approach is not feasible. It is therefore necessary to pre-identify MSME target groups where interventions are most likely to make a significant contribution towards the attainment of the programme objectives, and which can be measured against the overall programme indicators of achievement: decent and green job creation, and increased household income.

In using direct employment creation and increases in household incomes as yardsticks for the pre-identification of MSME beneficiaries, it is recommended to focus on the following MSME target groups:

<table>
<thead>
<tr>
<th>Primary target group</th>
<th>Secondary target group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within the actor population of National Construction Council-registered contractors: MSME contractors listed in either Grade 5 or Grade 6.</td>
<td>Within the actor population of non-registered contractors: Contractors not registered with NCC but registered with the Patents and Companies Registration Agency.</td>
</tr>
<tr>
<td>The actor population of small-scale producers of environmentally-friendly building materials – such as compressed blocks.</td>
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</tbody>
</table>

The target group of NCC registered contractors in grades 5 and 6 is pre-identified as entry point for MSME development support because contracting work is labour intensive and the target enterprises are highly likely to recruit additional staff as soon as a building project is secured. NCC registration is treated as an indication of their propensity to grow their business and move upwards on the informality/formality continuum, which in turn can result in new and decent jobs that provide increased household income. A similar observation applies to contractors not registered with NCC yet but registered with PACRA. PACRA registration is interpreted as a willingness to formalize and expand business operation, albeit starting from a lower point of departure on the informality/formality continuum. By focusing on grades 5 and 6 it is also ensured that programme support reaches MSMEs that are particularly vulnerable and in high need of external capacity-building interventions.

By direct comparison, other potential MSME target groups in the Zambian building industry have either lower job creation potential, or are more likely to create jobs that do not meet basic criteria for decent work. For example, the labour intensity of the production methods for many building materials is limited, or production is capital-intensive and requires specialized skills, thus barring many MSME from market entry. An exception is the production of compressed earth blocks that might offer further market penetration opportunities for small-scale manufacturers, as the required technology is comparatively low-cost and the skills needed to operate the machinery more easily obtained. In the case of specialized knowledge providers like engineers, architects, planners and surveyors, the barriers to labour market entry are punitive for most job seekers, and the nature of the service is not labour intensive. In the case of MSME contractors neither registered with PACRA or NCC, the growth propensity is much less evident, and there is a risk in creating jobs that fail to meet the fundamental rights at work outlined earlier in this report.

Seen in market system development context, the principal entry point to facilitate the adoption of greener building practices among MSME contractors, are the network hubs linking into this actor population. Network hubs can serve as communication transmitters and often can exert bargaining power that serves as a trigger for behavioural changes.

The following network hubs have been identified as intervention points for catalyzing behavioral changes among contractors in the Zambian building industry:

<table>
<thead>
<tr>
<th>Micro level</th>
<th></th>
<th>Macro level</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Zambia, TDAU</td>
<td>Thornpark Construction Training Centre</td>
<td>The National Council for Construction</td>
</tr>
<tr>
<td>School of the Built Environment at Copperbelt University</td>
<td>NCC Construction School</td>
<td>The National Housing Authority</td>
</tr>
<tr>
<td>TEVETA</td>
<td>Architects</td>
<td>Zambia Environmental Management Agency</td>
</tr>
<tr>
<td>Architects</td>
<td>Property developers</td>
<td>Zambia Bureau of Standards</td>
</tr>
<tr>
<td>Property developers</td>
<td>Hardware merchants, such as MICA, MICAR and Handyman’s Paradise</td>
<td>Local Authorities</td>
</tr>
<tr>
<td>Hardware merchants, such as MICA, MICAR and Handyman’s Paradise</td>
<td>Timber producers and manufacturers</td>
<td>Association of Building and Civil Engineering Contractors</td>
</tr>
<tr>
<td>Timber producers and manufacturers</td>
<td></td>
<td>National Association of Medium and Small Scale Contractors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Meta level</td>
</tr>
<tr>
<td></td>
<td>Mass Media</td>
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</table>

Through the universities and construction schools, it is possible to widely diffuse green building skills among architects, they in turn are likely to influence contractors to put green buildings designs into practice. Property
developers are considered to be gamechangers, as they can shift building practices in the marketplace by commissioning the construction of hundreds of housing units at a time. Hardware merchants control shelf-space for building materials, machinery, and equipment, and thus can stimulate market uptake for green building materials. The National Construction Council and the National Housing Authority facilitate, and City Councils are the main interface which enforce the policy, legal, and regulatory framework for building construction, and thus affect the way building projects are executed. The Association of Building and Civil Engineering Contractors and the National Association of Medium and Small-Scale Contractors give the MSME beneficiaries a voice in national policy dialogue while at the same time can influence their membership to adjust their business practices.

Notably, the network hubs listed above are all directly interlinked, opening the prospect of triggering circular chain reactions across the people web. For example, a green building design proposed by an architect and accepted by a property developer might catalyze registered contractors to adapt their building practices and source more environmentally-friendly building materials from merchants. The green building projects might have a demonstration effect, stimulate customer demand and motivate more architects to offer green building designs.

As indicated in the network map, in some cases individual actors are strategically positioned in such manner that they can exert influence over a network hub even through a single connector; for example, the Ministry of Transport, Works, Supply and Communication is mainly linked to the building industry via the Nation Council for Construction, and has leverage over this statutory body. In other cases, an actor like the Zambia Environmental Management Agency has the contingency to constitute a network hub due to its mandate. A similar observation would apply to the Zambia Network for Environmental Educators and Practitioners (hosted by the Zambia Environment Management Agency) that is currently classified as an actor but could play an important role as coordinator of meta-level advocates for green building practices. The following actors have been identified as potentially playing an important supportive role in the network environment of registered contractors.

<table>
<thead>
<tr>
<th>Micro level</th>
<th>Macro level</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Zambia Institute of Architects</td>
<td>• Ministry of Transport, Works, Supply and Communication</td>
</tr>
<tr>
<td>• Occupational Health and Safety Institute</td>
<td>• Ministry of Local Government and Housing</td>
</tr>
<tr>
<td>• National Pension Scheme Authority</td>
<td>• Ministry of Commerce, Trade and Industry</td>
</tr>
<tr>
<td>• Citizens Economic Empowerment Commission</td>
<td>• Ministry of Labour and Social Security</td>
</tr>
<tr>
<td>• National Pensions Scheme Authority (NAPSA)</td>
<td>• Ministry of Lands, Natural Resources and Environmental Protection</td>
</tr>
<tr>
<td>• Zambia Bureau of Standards</td>
<td>• National Union of Building, Engineering and General Workers (NUBEGW)</td>
</tr>
<tr>
<td>• National Union of Building, Engineering and General Workers (NUBEGW)</td>
<td>• Zambia Development Agency</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Meta level</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Local print, radio, and electronic mass media</td>
<td></td>
</tr>
<tr>
<td>• The Zambia Network for Environmental Educators and Practitioners (ZNEEP)</td>
<td></td>
</tr>
</tbody>
</table>

Priority interventions in support of MSMEs

The joint UN programme intends to prioritize MSME-specific development interventions that promote the creation of jobs which meet the fundamental rights at work and make a measurable contribution to the reduction of the carbon footprint of residential housing stock, including reductions in the average energy, materials and water consumption of households as a result of green building design and construction. Interventions would also need to balance the interests of people with the interests of the environment and capture the meta-, macro-, and micro-levels of the actor network, mindful of the cause-effect relationships playing out across system levels. An additional factor to be considered is the core competencies of the UN consortium that could be leveraged in support of an MSMEs-driven green economy transition in Zambia. These considerations have shaped the draft recommendations.

**Micro-level: MSMEs have enhanced capacity to penetrate the market for environmentally-friendly building materials and services in Zambia**

**Access to Finance**

- Facilitate the market development for industry-specific MSME green business finance products and services to support the switch towards greener building technology and building methods.

**Access to Green material inputs**

- Promote linkages to finance products and services, such as the Forestry Industry Credit Facility, with
governmental incentives and tax rebates for the establishment and expansion of forest plantations so as to attain a sustainable wood supply.

- Promote private-public partnerships in the management of forestry plantations.
- Encourage farm woodlots and out-grower schemes in order to supplement the plantation of forests.
- Provide capacity building support to timber and non-wood forest product producers and manufacturers associations along the supply chain.
- Interact with utility providers for piloting decentralized household-level energy generation and water management solutions.

**Access to Markets and business linkages**

- Promote MSMEs’ alliances with corporate suppliers and/or distributors of at least one building material critical to green building construction (rainwater harvesting equipment, compressed blocks, or timber) so as to broaden the local supply base and stimulate market uptake in consumer markets.

**Better Entrepreneurship and small business management**

- Support the development of green building design training courses tailored towards registered MSME contractors in grades 5 and 6.
- Commission action research on business development opportunities related to the recycling, reuse, and disposal of secondary building raw materials, and pending findings, train and support MSMEs to enter this stage of the value creation process for green building construction.

**Improved Technical and vocational skills and technology transfer**

- Strengthen the existing supply with industry-specific green building construction skills’ training aimed at registered contractors, and where applicable, non-registered MSMEs with willingness to register.
- Facilitate the introduction of a green building construction trade-specific training module in TEVET schools.
- Establish new or strengthen existing green building technology transfer mechanisms, including for technology related to the construction of new green buildings and the retro-fitting and upgrading of existing building stock in line with green building principles.

**Better working conditions for increased workforce productivity**

- Promote occupational health and safety improvements in MSMEs’ workplaces
- Facilitate the extension of basic social protection to workers in MSMEs in the building construction sector.

**Promote innovation and creativity**

- Facilitate the documentation of traditional knowledge on local building methods and building materials.
- Promote innovation and creativity in green building design and building construction.

**Macro-level: Promote an advanced policy, legal and regulatory framework (PLRF) for the building industry that stimulates uptake of green building materials and building designs**

**Policy review**

- Support analytical research on the investment context (cost benefit) and opportunities arising from greening economic sectors (such as building construction) with a high growth potential, and social and environmental impact, considering both the opportunities and interests of people, in addition to the necessary balance between people and the environment.
- Facilitate training and exposure visits for policy level actors so as to sensitize them towards the economic, social, and environmental merits of green building and capacitate macro level actors to speak with one voice.
- Provide policy advisory services to amend the draft construction policy and to emphasize the promotion of greener building practices.
- Support policy measures to amend existing laws and regulations in order to exert push and pull levers on the market in order to adopt greener building practices.

**Legal and regulatory reform**

- Consider the establishment of a green building council and explore the potential for crafting, adopting, and implementing national green building standards.
- Review the role of the NCC in facilitating the uptake of green building construction methods and materials.
- Review the role of the National Housing Authority (NHA) and Local Authorities in facilitating the uptake of green building designs.
Institutional capacity-building support for exit and sustainability

- Capacity-building support for organizations which represent the interests of informal contractors in order to strengthen their voice in the emerging national policy dialogue on green building practices among MSMEs, including capacity-building support to amend existing standards for building materials.

- Support macro-level actors representing the interests of both registered and non-registered MSME contractors in support of their membership’s uptake of green building practices.

Meta-level: Increased stakeholder appreciation of business opportunities in green building construction

Raising awareness and sensitization on green building

- With the support of media and other meta-level actors in the industry, facilitate a system-wide ‘friends of the environment’ actor awareness campaign to advocate for the adoption and application of green building principles.

- Run awareness campaigns about the cost and benefit potential of greener building practices.

- Sensitize property developers on the business case underpinning greener building practices.

- Sensitize housing estate management companies on the business case underpinning the marketing housing stock that complies with green building principles.

- Sensitize housing consumers including women entrepreneurs and women’s groups to make them aware of the financial savings and utility advantages of both decentralized energy and water technologies which can alleviate some of the burden of women’s household cores.

Based on the findings of the research and the recommendations drawn from the stakeholder validation workshop, it is recommended that MSME development interventions should focus on provinces key to the development of the value chain, including provinces where timber production is concentrated and where demand for green goods and services are at their potential peak. Furthermore, low hanging fruits could be found in the peripherals of major cities such as Lusaka and Kitwe (demand for affordable and workplace-convenient urban housing); developing towns like Chipata (driven by trade), Livingstone (driven by tourism), Solwezi (driven by mining) and Choma (the new provincial administrative centre for the Southern province). A number of new administrative districts such as the Vubwi district in Chipata Province, have been formed, raising the housing and infrastructure development demands in the now 75 districts of Zambia.
### iii. List of abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>ACCE</td>
<td>African Carbon Credit Exchange</td>
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<tr>
<td>AfDB</td>
<td>African Development Bank</td>
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<tr>
<td>AMSCO</td>
<td>African Management Services Company</td>
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<tr>
<td>BDS</td>
<td>Business Development Service</td>
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<tr>
<td>BoZ</td>
<td>Bank of Zambia</td>
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<tr>
<td>CBU</td>
<td>Copperbelt University</td>
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<tr>
<td>CEEC</td>
<td>Citizens Economic Empowerment Commission</td>
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<tr>
<td>CPE</td>
<td>Continuous Professional Education</td>
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<tr>
<td>CSO</td>
<td>Central Statistical Office</td>
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<tr>
<td>CTA</td>
<td>Chief Technical Advisor</td>
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<td>DaO</td>
<td>Delivering as One</td>
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<tr>
<td>DWCP</td>
<td>Decent Work Country Programme</td>
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<tr>
<td>EIZ</td>
<td>Engineering Institute of Zambia</td>
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<tr>
<td>ERA</td>
<td>Energy Regulation Act</td>
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<tr>
<td>EU</td>
<td>European Union</td>
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<tr>
<td>FAO</td>
<td>Food and Agriculture Organization</td>
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<tr>
<td>FD</td>
<td>Forestry Department</td>
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<tr>
<td>FFTUZ</td>
<td>Federation of Free Trade Unions in Zambia</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
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<tr>
<td>GRZ</td>
<td>Government of the Republic of Zambia</td>
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<tr>
<td>HFH</td>
<td>Habitat for Humanity</td>
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<tr>
<td>HIV/AIDS</td>
<td>Human Immune Deficiency/Acquired Immune Deficiency Syndrome</td>
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<tr>
<td>HUZA</td>
<td>Human Settlements of Zambia</td>
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<tr>
<td>SHEFA</td>
<td>Shelter for All</td>
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<tr>
<td>ILO</td>
<td>International Labour Organization</td>
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<tr>
<td>ILUA</td>
<td>Integrated Land Use Assessment</td>
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<tr>
<td>ITC</td>
<td>International Trade Center</td>
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<tr>
<td>MTWSC</td>
<td>Ministry of Transport, Works, Supply and Communication</td>
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<tr>
<td>MLGH</td>
<td>Ministry of Local Government and Housing</td>
</tr>
<tr>
<td>MCTI</td>
<td>Ministry of Commerce, Trade and Industry</td>
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<tr>
<td>MDG</td>
<td>Millennium Development Goal</td>
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<tr>
<td>MEWD</td>
<td>Ministry of Energy and Water Development</td>
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<tr>
<td>MLSS</td>
<td>Ministry of Labour and Social Security</td>
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<tr>
<td>MLNREP</td>
<td>Ministry of Lands, Natural Resources and Environmental Protection</td>
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<tr>
<td>MST</td>
<td>Ministry of Science and Technology</td>
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<tr>
<td>MWS</td>
<td>Ministry of Works and Supply</td>
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<tr>
<td>ZBS</td>
<td>Zambian Bureau of Standards</td>
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<tr>
<td>MSME</td>
<td>Micro, Small, and Medium Scale Enterprises</td>
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<tr>
<td>NAMSSC</td>
<td>National Association of Medium and Small-Scale Contractors</td>
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<tr>
<td>NAPSA</td>
<td>National Pensions Scheme Authority</td>
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<tr>
<td>NCC</td>
<td>National Construction Council</td>
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<tr>
<td>NHA</td>
<td>National Housing Authority</td>
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<tr>
<td>NUBEGW</td>
<td>National Union of Building, Engineering and General Workers</td>
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<tr>
<td>NTBC</td>
<td>National Technology Business Centre</td>
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<tr>
<td>OSHI</td>
<td>Occupational Health Safety Institute</td>
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<tr>
<td>PACRA</td>
<td>Patents and Companies Registration Agency</td>
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<tr>
<td>R&amp;D</td>
<td>Research and Development</td>
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<tr>
<td>REA</td>
<td>Rural Electrification Authority</td>
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<tr>
<td>SNDP</td>
<td>Sixth National Development Plan</td>
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<tr>
<td>TEVET</td>
<td>Technical Education and Vocational Training</td>
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<tr>
<td>TEVETA</td>
<td>Technical Education and Vocational Education Training Authority</td>
</tr>
<tr>
<td>UNCTAD</td>
<td>United Nations Conference for Trade and Development</td>
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<tr>
<td>UNEP</td>
<td>United Nations Environment Programme</td>
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<tr>
<td>UNZA</td>
<td>University of Zambia</td>
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<tr>
<td>WWF</td>
<td>World Wildlife Fund</td>
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<tr>
<td>WSC</td>
<td>Water and Sewerage Companies</td>
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<tr>
<td>ZABS</td>
<td>Zambia Bureau of Standards</td>
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<tr>
<td>ZAFFICO</td>
<td>Zambia Forestry and Forest Industry Corporation</td>
</tr>
<tr>
<td>ZBS</td>
<td>Zambian Bureau of Standards</td>
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<tr>
<td>ZDA</td>
<td>Zambia Development Agency</td>
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<tr>
<td>ZEMA</td>
<td>Zambia Environmental Management Agency</td>
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<tr>
<td>ZIA</td>
<td>Zambia Institute of Architects</td>
</tr>
<tr>
<td>ZNEEP</td>
<td>The Zambia Network for Environmental Educators and Practitioners</td>
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</table>
ZCSMBA  Zambian Chamber of Small and Medium Business Associations
ZEMA  Zambia Environmental Management Agency
ZESCO  Zambia Electricity Supply Corporation
ZRA  Zambia Revenue Authority
The first part of the report puts the research into context, this chapter now describes how the ILO-led joint UN programme aims to support Zambian stakeholders in the local building industry in overcoming the twin development challenges of employment promotion and transitioning to a green economy. Chapter I.2 makes the connection between the joint UN programme objectives and the analysis of the Zambian building industry described in part II and III of the report.
I.1. About the ILO-led joint UN programme on Green Jobs Promotion

Over the last few years, Zambia has maintained an impressive macro-economic growth rate; however, this track record has not translated into requisite progress in the fight against poverty. The Government of Zambia fully recognizes the challenges in facilitate more broad-based wealth and job creation, and has identified private sector development as a strategic means to boost employment, with particular emphasis on the development of Micro, Small and Medium Enterprises (MSME).

One sector with high potential for the creation of employment in Zambia, by way of MSME development, is the construction sector. The construction sector has been identified as one of the main enablers of economic growth by the Government of Zambia; it has experienced rapid growth in recent years, and is poised to expand further on the back of public sector funded infrastructure development projects and strong demand in the residential housing and office retail market. The building industry offers excellent potential for broad based wealth and job creation due its comparatively high labour intensity, low entry barriers for semi-skilled and unskilled labour, and high concentration of MSMEs.

The building industry is furthermore an excellent conduit to promote the creation of green jobs that make a direct contribution to the preservation or restoration of environmental quality – including jobs that help protect ecosystems and biodiversity, reduce energy, materials, and water consumption through high-efficiency strategies, by de-carbonizing the economy, and/or minimizing or altogether avoiding the generation of all forms of waste and pollution. In the Zambian case, a low hanging fruit in the quest for green jobs is the reduction of greenhouse gas emissions of the built environment through the promotion of eco-friendly building designs and environmentally-friendly building materials.

From evidence collected during the programme design stage, it is known that MSMEs cluster along the value creation process, and that these clusters hold untapped potential to facilitate the creation of additional
green jobs. The joint programme accordingly seeks to unlock the job creation potential of the emerging green economy in Zambia, with a focus on the local building industry and the promotion of green building designs and materials, all which hold new market development potential for MSMEs. The overall programme outcome is sustainable livelihoods through the creation of green jobs in sustainable MSMEs operating in the Zambian building industry.

The target group universe of the programme are MSMEs along the entire value creation process, but bearing in mind the budget ceiling and timelines of the initiative, the programme will focus on selected clusters of beneficiaries where the green job creation potential is highest and where the consortium of UN agencies can best leverage their respective core competencies. The industry analysis is to inform the choice of programme intervention points along the value chain and to pinpoint the interventions needed to promote the development of these MSMEs. The joint UN programme has a duration of four years. It is implemented by a consortium of UN agencies that work in close collaboration with local partner organizations and that draw on technical inputs from both local and international research institutions. The programme intends to create at least 5,000 jobs, particularly for youth entrepreneurs; improve the incomes of at least 8,000

About the consortium of UN agencies

International Labour Organization (ILO)

The lead UN Agency, draws from its extensive experience in promoting decent work and protecting people and their environment. In particular, the ILO is using its global experience in the facilitation of value chain development initiatives, and its sector expertise in the promotion of green and decent jobs in the construction sector.

ILO support focuses on meta-level institutional capacity building support for local business development services facilitators and providers coupled with targeted incentives to stimulate service uptake at micro level. In both cases emphasis is on producers of building inputs and providers of various services along the value creation process in the building construction industry sector. As the lead agency the ILO is also responsible for inter-agency coordination across system levels and facilitates knowledge and experience sharing as well as the documentation of best practice and lessons learnt.

The ILO is a member of the Green Economy Coalition, whose vision is one of a resilient economy that provides a better quality of life for all, within the ecological limits of the planet and which aims to accelerate a just transition to a green and fair economy.

United Nations Environmental Programme (UNEP)

UNEP brings in its macro-level expertise in providing sector-specific policy level advisory services for building construction industry stakeholders. The thematic emphasis of these advisory services is on the review of the existing building construction sector policy and the formulation of a set of green building standards. Pending demand from local stakeholders, UNEP will furthermore provide guidance on the establishment of a national green building council.

Food and Agriculture Organization (FAO)

FAO interventions will focus on micro-level capacity building support for producers of raw material inputs for building and construction. Emphasis will be on small-scale producers growing forestry products.

International Trade Centre (ITC)

ITC is facilitating micro-level capacity building support for local finance service providers to in turn reach out to MSMEs in the green building construction value chain with their financial products. Emphasis will be placed on emerging contractors providing green building services and on the installation and maintenance of energy and water efficiency systems.

United Nations Conference on Trade and Development (UNCTAD)

UNCTAD will be focusing on the facilitation of business linkages at the micro-level between MSMEs and large corporations in the building construction industry sector.
households; and improve the quality of at least 2,000 jobs in the MSME sector. The programme will also make a direct contribution to the conservation of environmental quality in Zambia.

The joint UN programme is financed by the Government of Finland; Finland is a member of the European Union (EU) which believes a green economy will ‘improve environmental justice and reduce inequalities, environmental scarcities and the stress on ecosystems, by investing in and preserving natural capital, securing sustainable and efficient use of resources and addressing social concerns, while maintaining competitiveness.’

The EU proposes a capacity development scheme involving IFIs, UN, multi/bi-laterals and the private sector, to provide country-specific advice and support on a green economy transition. The EU also suggests an international partnership programme to share best practices on investing in natural capital and to promote the role of innovative private finance instruments.

In the case of Zambia, Finland further believes that natural capital stocks such as forests and ecosystem services need to be valued and internalized into national accounting plans, and that any support towards the green economy transition should have an explicit focus on job creation via green stimulus packages and employment targets.
I.2. Terms of Reference for the industry analysis

The Terms of Reference for the industry analysis were as follows: The industry analysis is to make an important contribution towards the achievement of immediate outcome one (1) of the programme (increased appreciation in the Zambian public at large, and building industry stakeholders in particular, for green building principles), and is one of two activity clusters to deliver output 1.1. (Increase awareness in the Zambian public about the link between green building, environmental sustainability and employment creation through MSME development). The second activity cluster under output 1.1 – a national conference to widely disseminate the analytical findings – hinges on the successful completion of the research, and will itself pave the way for concrete follow-up action in support of MSMEs along the programme implementation timeline.

In line with the above, the objective of the industry analysis is to assess the value creation process for building construction in Zambia, and to pinpoint intervention areas for boosting the creation of green jobs through MSME development.

The target audience of the industry analysis is predetermined by the target groups of the joint programme. The direct or intermediate target groups are selected local public and private sector partners, among them the Ministry of Commerce, Trade and Industry, the Ministry of Local Government and Housing (MLGH), the Ministry of Labour and Social Security (MOLSS), the Ministry of Transport, Works Supply and Communication (MTWSC), the National Council for Construction (NCC), the Zambia Development Agency (ZDA), the National Technology Business Centre (NTBC) and the ThornPark Construction Training Centre. The indirect or ultimate target group of the programme is MSME linked into the value creation process for eco-friendly building materials and green building services, with a focus on established and formalized businesses. The intermediate beneficiaries of the programme will be technically and financially supported by a consortium of UN agencies led by ILO, in order to in turn implement activities in support of the ultimate beneficiaries. The consortium of UN agencies includes ILO, UNEP, FAO, UNCTAD and ITC.
The primary target audience of the industry analysis correspondingly comprises:

- Governmental and non-governmental organizations with a mandate to facilitate the development of the building industry in Zambia, here with thematic emphasis on the green economy transition, MSME development and employment creation, and with the strategic focus on setting and enforcing an industry-specific policy, legal, and regulatory framework.

- Providers of industry-specific financial and non-financial business support services, with target group focus on MSMEs and expertise in green building practices.

- MSMEs (including producers and processors of eco-friendly building materials and providers of green building services), with focus on established and formalized businesses.

- Participating UN agencies in the joint programme.

The secondary target audience of the industry analysis is the Zambian public at large, including actual and prospective clients of MSMEs offering green building goods and services in the country.

The programme design is inspired by a market system development framework. The programme takes a sociological or people-centered view of the building industry, where it is assumed that the industry is constituted by a web of people—equivalent to a complex social system—that exchange goods and services with the purpose of generating personal benefits; these people benefits can be measured along with indicators that emphasize financial performance or non-financial performance, or a combination of both.

Together, these performance criteria demarcate the sphere of interest of people (the people dimension of the market exchange), and translate into pressure points to track the extent to which the interests of people become addressed.

The programme builds on a number of empirically-founded premises made in social systems theory:

- Power laws: The people web in a given social system (the building industry) is spun in line with power laws where few actors tend to attract a disproportionally high number of connections and consequently form network hubs. These network hubs then shape the behavior patterns of actors through asymmetric power relationships. To develop the market system of the building industry means (1) identifying these network hubs (and where applicable note their absence); (2) tracing the main connections among these network hubs, and between these network hubs, and the surrounding actors; and (3) mindful of power law dynamics, improving network performance through the establishment of new connectors and new actors, or by rerouting connections.

- Feedback loops and emergent behavior: Interaction between people is not to be envisioned as a linear process (as in mainstream economic theory about value chain development) but as interactions constituted by circular cause/effect relationships, which thus trigger feedback loops. The assumption has implications for the analysis of the people web underpinning the industry. In a nutshell, the analysis will need to trace linkages between actors not only along but also across the people web constituting the value creation process, and take into account feedback loops that might trigger emergent behavior.

- Critical balance: The programme assumes that interaction between people in a given social system is never static but rather in a state of critical balance, since the interest of all parties to the exchange constantly shift. These shifts often announce themselves in subtle manners but can also arrive by way of sudden paradigm change. In both cases, they cannot often not be captured in the outcomes of institutionalized communication processes, which tend to reflect only present and past consensus. To trace these shifts requires continuously talking to people. The assumption implies that the industry analysis will need to place strategic emphasis on social dialogue to first assemble and later continuously re-assemble the shape of the people web. In addition, the social dialogue tools used during the analytical stage should be made available for continued use during the programme implementation stage, so as to produce new snapshots of the system at periodic intervals.

The programme furthermore assumes that the exchange process between people always involves non-human actors which may need to be taken into account from the outset if the transaction is meant to be sustainable. Non-human actors are typically associated with the natural environment that the social system is imbedded within, and it is now widely acknowledged that both spheres are inextricably linked and need to be factored into account if the system is meant to remain sustainable. The programme also assumes that like with human actors, the interests of non-human actors in the transaction process can be tracked along performance criteria (like stock and flow of selected natural resources). The industry analysis will consequently need to factor from the outset the impact of non-human actors on the people web of the building industry, where applicable by consulting with human actors speaking on their behalf.
The programme takes a sociological or people-centered view of the building industry, where it is assumed that the industry is constituted by a web of people—equivalent to a complex social system.

Closely related to the above, the programme assumes that in order for the market system to survive over time (that is, sustain itself), all actors that are party to the exchange process will need to be able to realize satisfactory returns (and in the case of the non-human actors at least safeguard against their depletion or collapse).

It is furthermore assumed that the minimum ceiling for each criterion below which system sustainability is threatened can in many cases be quantified or qualified. The choice of performance criteria to track the pressure points of the social system as part of the industry analysis needs to reflect this concern for demarcating both a social floor, and an environmental floor for system sustainability.

The industry analysis is expected to render the following results:

- A demarcation of the system boundaries of the building industry, bearing in mind the parameter outlined above, so as to allow for the inclusion or exclusion of a given actor, and to reduce system complexity down to a level where programme interventions in support of actor groups become feasible.
- The visualization of the web of people (or organizations representing these people) underpinning the building industry in Zambia in general, and the value creation process for eco-friendly building materials and services in particular, within the proposed system’s boundaries; in the process, demarcate network hubs, and where applicable cluster actors, trace connectors between network hubs and actor clusters, and also identify network ‘holes’—where a lack of connectors translates into poor performance or highly asymmetric power relationships.
- A categorization of the spheres of interests of non-human actors that impact on the people web in the building industry, among them non-human actors plotted in the natural environment, but where applicable, also other actor categories.
- The identification of pressure points/performance measures to track system performance vis-à-vis vested interests of both human actors and non-human actors, and propose minimum sustainability thresholds for each measure.
- The identification of intervention points to boost system performance, by way of strengthening existing connections, creating new connectors, redefining relationships between network hubs, and between network hubs and surrounding actor clusters.
- A set of tools to continue querying system operations through dialogue during the programme implementation stage, and using the pressure points for reference.

The assignment also includes the:

- Compilation of an inception phase report including a draft table of contents of the actual research report, and describing the research tools and process
- Documentation of the research findings in a draft report
- Presentation and validation of the research findings by way of a stakeholder workshop in Lusaka
- Documentation of the validated research findings in a final report.

The industry analysis is to build on the findings of the conventional industry stakeholder mapping exercise that hwasas been carried out in June–July 2012 in order to facilitate the assembly of a draft network map. Pending the categories of non-human actors to be reflected in the analytical effort, the stakeholder list might need to be expanded. For the purposes of the programme, the smallest divisor to make up an actor is an individual person, but in practice is more likely to be a group of persons with aligned interests, and represented through an organization, like a business, a business cluster, a federation or another institutional entity. The aggregation level is to be determined as part of the analysis.

The network map groups actors along three categories:

- Firstly meta-level actors that shape the values and perceptions held by other actors, here towards green economy transition in general, and green building in particular. Examples of meta-level actors are mass media, faith-based organizations, schools and universities.

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1 For example, in the people dimension, minimum financial performance thresholds for businesses can be calculated, and minimum standards for decent work set. As regards performance of non-human actors, the lower sustainability threshold could be the minimum stock level below which a given resource is depleted.
Secondly, macro-level actors that codify the policies, laws, rules and regulations for doing business in the building industry, including ‘push and pull’ to stimulate market uptake of green products, or penalize eco-inefficient building practices. Examples of macro-level actors are the Ministry of Commerce, Trade and Industry and the Ministry of Environment.

Thirdly, micro-level actors that interact along the value creation process for eco-efficient building materials and services, and pending the viewpoint of the analysis of either suppliers or customers. Examples of micro-level actors are architects and building contractors.

The classification scheme above is motivated by the observation that in private sector development, the ‘view of the world’ held by market actors is as relevant as the enabling policy environment and the demand and supply of a given business support service – a factor often ignored in enterprise development initiatives, which instead tend to focus on either macro-level policy reform, or micro-level business support service, but that rarely treat these interventions as inherently interlinked.

The classification scheme then paves the way for identifying intervention points to boost system performance along core functions of actors. They should either be instrumental in interweaving the perceptions and value that make up the social ‘fabric’ of the people web, or codify the rules and regulations that formalize interaction along connectors, or interplay as buyers and suppliers in the market place. In practice, many actors will occupy more than one role, but their core mandate in most cases still allows for classification, a precondition for identifying partners for programme interventions at a later point.

Refer to the template of an actor-network map that classifies selected actors along different core functions, while at the same time acknowledging their interlinkages. Colours depict core functions and the font size of individual network points allow to distinguish between network hub or simple actor. Pending the analytical purpose, the resolution of the map might be increased or decreased. In a higher system resolution, strands linking actors to lower tier suppliers might be shown, and individual connectors might effectively show lines of interaction between sub-actors. In a lower system resolution, actors might be collapsed in black boxes to focus on the analysis of the connections between network hubs only. Variable connector width might indicate the relevance of a given interaction, expressed in volumes of trade (micro-level), or the level of influence over the decisions of other actors (macro-level). Also, structural holes in the network could be graphically illustrated, and the pressure points for system performance should be plotted next to the actor(s) with principal responsibility.

The implementation timeframe of the assignment is a period of five calendar months, which began in October 2012 and ended in February 2013. Field research was to be completed by the second week of December 2012, and the stakeholder workshop to validate the research findings took place in the third week of January. The final report will was to be submitted by the second week of February 2013.

Template for a map visualizing the actor network underpinning a given social system
PART II: ANALYTICAL FRAMEWORK

Overview:

The second part of the report describes the analytical framework of the industry analysis, within the context of the Terms of Reference for the research set forth by the joint UN programme on Green Jobs promotion.

The research is rooted in the notion of a rights-based approach to private sector development, according to which all people linked through economic interaction in a given market system enjoy certain inalienable rights – and that the same rights potentially apply also to other actors in the environment affected by, or variably affecting, the transaction process. Two categories of rights are further explored, namely socioeconomic rights and environmental rights of actors involved in the market exchange, and a heuristic model is proposed to group these interests along a people dimension and an environmental dimension. Next, an analytical framework for market systems development is drawn up, and which takes inspiration from social network analysis to assess the people web underpinning the Zambian building industry, and to identify entry points for MSME development interventions that aim at the critical balance between the interests of people and their environment.

The research also takes up the call for a systemic view of what constitute sustainable business practices within the force field established through the interrelationships between the people dimension and the environmental one. Chapter II.2 proposes a framework for market systems analysis and development that is rooted in social systems theory and draws from social network analysis, in order to assess the people web underpinning transactions in a given economic system. The analytical framework distinguishes three system levels, namely a meta-level where actors that shape the views and mindsets of people across the network are grouped, a macro-level where actors are grouped that facilitate the policies, laws and regulations that together determine the rules of doing business in the building industry, and a micro-level where actors are grouped that exchange building goods and services in the marketplace. Chapter II.3.6 explains step by step the application of this analytical framework in the context of the Zambian building industry.
II.1. A rights-based approach to private sector development

II.1.1. People rights

The essence of what constitutes the rights of people is codified through the first, second and third generation of human rights frameworks enshrined by the United Nations. These human rights are not prescriptive of the purpose of life, but define essential building blocks that together form the fundament from which to embark on the search for life’s meaning.

Building on the fundament of these human rights, a number of codices have been developed that delineate people rights in the world of work. The most prominent example is the catalogue of labour standards defined by the International Labour Organization, and it serves as the common source of reference for all other international and national bodies with a mandate to promote rights at work for their respective constituencies.2

Among these standards, the ILO’s Governing Body has identified eight conventions as fundamental, covering subjects that are considered fundamental principles and rights at work, namely freedom of association and the

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2 International labour standards are legal instruments drawn up by the ILO’s tripartite constituents (governments, employers, and workers) and setting out basic principles and rights at work. They are either conventions, which are legally binding international treaties that may be ratified by member States, or recommendations, which serve as non-binding guidelines. In many cases, a convention lays down the basic principles to be implemented by ratifying countries, while a related recommendation supplements the convention by providing more detailed guidelines on how it could be applied. Recommendations can also be autonomous, i.e., not linked to any convention.

First, second and third generations of human rights

First-generation human rights deal essentially with liberty and participation in political life. They are fundamentally civil and political in nature, as well as strongly individualistic. First-generation rights include, among other things, freedom of speech, the right to a fair trial, freedom of religion and voting rights—they thus serve to protect the individual from possible excesses of the State. While the discussion of core human rights is as old as mankind, first generation rights were given status in international law first by Articles 3 to 21 of the 1948 Universal Declaration of Human Rights, and later in the 1966 International Covenant on Civil and Political Rights (which entered into force in 1976). An example for a first generation right is article 7 of the Universal Declaration of Human Rights: “All are equal before the law and are entitled without any discrimination to equal protection of the law. All are entitled to equal protection against any discrimination in violation of this Declaration and against any incitement to such discrimination.”

Second-generation human rights are likewise embodied in the Universal Declaration and the 1966 Convenant, but unlike first generation rights they are fundamentally economic, social and cultural in nature. They guarantee different members of the citizenry equal conditions and treatment and include a right to be employed, rights to housing and health care, as well as social security and unemployment benefits. The duty of Governments to realize these second generation rights is a positive one. An example of a second generation right is Article 23 of the Universal Declaration of Human Rights that reads as follows (1) “Everyone has the right to work, to free choice of employment, to just and favourable conditions of work and to protection against unemployment. (2) Everyone, without any discrimination, has the right to equal pay for equal work. (3) Everyone who works has the right to just and favourable remuneration ensuring for himself and his family an existence worthy of human dignity, and supplemented, if necessary, by other means of social protection. (4) Everyone has the right to form and to join trade unions for the protection of his interests.”

Third-generation human rights are those rights that go beyond the mere civil and social, as expressed in many progressive documents of international law, including the 1972 Stockholm Declaration of the United Nations Conference on the Human Environment, the 1992 Rio Declaration on Environment and Development, and other pieces of generally aspirational “soft law.” Third generation rights comprise a very broad spectrum, including rights for a healthy environment and rights to access natural resources, and unlike first and second generation rights are not enacted in a single legally binding document.

Refer to rights of other actors below in this chapter for more information on the bridge between the people dimension and the environment dimension built by third generation rights.


Effective recognition of the right to collective bargaining, the elimination of all forms of forced or compulsory labour, the effective abolition of child labour and the elimination of discrimination in respect of employment and occupation. The Government of Zambia has ratified the eight core conventions, plus 36 other standards (32 are currently in force). These standards have been further fleshed out in the labour law of the country and define a framework for people rights in the world of work in Zambia, including the local building industry.

Core ILO conventions

- C029 Forced Labour Convention, 1930 (No. 29)
- C087 Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87)
- C098 Right to Organise and Collective Bargaining Convention, 1949 (No. 98)
- C100 Equal Remuneration Convention, 1951 (No. 100)
- C105 Abolition of Forced Labour Convention, 1957 (No. 105)
- C111 Discrimination (Employment and Occupation) Convention, 1958 (No. 111)
- C138 Minimum Age Convention, 1973 (No. 138)
- C182 Worst Forms of Child Labour Convention, 1999 (No. 182)


Notably, none of the fundamental rights at work relate to fair renumeration from economic interaction. However, the link between a minimum financial return (variable defined as minimum wage of living wage) and social justice has been frequently highlighted in ILO publications, prominently among them the 2008 Declaration on Social Justice for a Fair Globalization. The link between minimum wages and social justice is likewise emphasized by the Government of Zambia, by stipulating minimum wages into law, and more recently by unilaterally increasing its threshold in 2012. Thus, while the threshold might be at dispute, the principal right of all parties to economic interaction to ‘earn at least satisfactory return’ is clearly established.

II.1.2. Rights of other actors

As regards the contingent rights of other actors affected by economic interaction between people, two approaches can be distinguished: One approach assumes the existence of inalienable rights of non-human actors, while the other approach treats these actors chiefly as (natural) resources that need to be sustainably managed. The first approach is rooted in the belief that the right to live (a good life) extends in principle to any inhabitant of the Earth, whether human or non-human. Like with the assumption of inalienable rights for all people, this belief translates into a first principle—the belief that all inhabitants on Earth share the same entitlements. An example for a (draft) codex that seeks to enshrine inalienable rights of non-human actors is the Great Ape Project which is campaigning to have the United Nations endorse a Declaration on Great Apes. This would extend what the project calls the “community of equals” to selected primates. The declaration seeks to extend to non-human great apes the protection of three basic interests: the right to life, the protection of individual liberty, and the prohibition of torture.

In Zambia, the discussion about a community of equals between animals and people is at a very early stage, but cruelty against animals is punishable by law and killing of animals strictly regulated. Numerous organizations are dedicated to the task of monitoring the enforcement of environmental rights in Zambia, among them international non-governmental organizations like the World Wildlife Fund but also local initiatives like the Wildlife and Environmental Conservation Society of Zambia.

The second approach takes the rights of people for equal access to natural resources as a starting point and seeks to define rules for sustainable resource management to ensure that they are administered in such manner that stock levels are not depleted. Examples for catalogues of rights and duties related to the sustainable access of people to natural resources, are the World Charter for Nature, developed in 1982 by the United Nations, that recognizes the need to protect nature from further depletion due to human activity, states measures needed to protect nature, outlines the need for sustainable use of natural resources and suggests that the protection of resources should be incorporated into the law system at the state and international level. The World Ethic of Sustainability developed by the IUCN, WWF, and the UNEP in 1990 builds on the World Charter for Nature and, taking inspiration from the 1987 report of the World Commission on Environmental and Development, sets out eight values for sustainability, including the need to protect natural resources from depletion. These values were further developed and later enshrined at the 1992 World Conference on Sustainable Development and have since been reviewed and amended in the Rio+20 World Conference in 2011.

In Zambia, the universal rights of the environment have been delineated into national law by way of a National Policy on the Environment released in 2009, the establishment of a Ministry of Lands, Natural Resources and Environmental Protection, and the establishment of a statutory body called the Zambia Environmental Management Agency. Whether non-human actors in the environment are treated as potentially equal to man, or chiefly as a
resource for (responsible) consumption, the term environment is usually treated as being synonymous with the term nature, here encompassing all subsystems of the natural environment within which people live and from which they draw resources. The work of UNEP in the field of eco-system support services needs to be seen in this context.

In a nutshell, the environment is classified in categories of eco-systems that render services to people. These eco-systems both affect and are affected by the economic interaction of people and therefore need to be counted by consulting with actors representing their interests; refer to chapter 1.3 and chapter 1.5 for more information on how to consult with actors representing the natural environment and on the value of the environmental benefit rendered by the eco-systems of nature.

However, the term environment can also be defined more broadly, for example by making a distinction between technology and nature. In this line of thinking, the term technology captures all technological subsystems within which people operate and on which they draw as a resource. These technological subsystems both affect and are affected by people, and like eco-systems need to be taken into account. The approach has often drawn the criticism that technology is man-made and should thus not be treated as an external environmental force, but in light of the fast growing dependency of people on machines this logic is becoming ever less evident. For example, in the case of the Zambian building industry, access to electricity is vital to economic interaction, and while it is a man-made source of energy, industry stakeholders have no control over it.

### II.1.3. Towards a heuristic model for balancing the interests of people and the interest of the environment in private sector development

The previous chapters have outlined two actor spheres of interest, namely the sphere of people and the sphere of the environment, which both need to be taken into account if economic interaction is meant to be sustainable. It has been argued that in the sphere of people, the interests of actors are delineated from inalienable rights in the world of work. It has been left open whether non-human actors likewise enjoy inalienable rights, but it has been pointed out that even if they are treated as mere resources for consumption, and if sustainability is the goal, then it is in the self-interest of people not to deplete stock levels. The call for sustainable natural resource management thus translates into a quasi-right to life for actors in the environment sphere.

The contingency of the sphere of the environment has been repeatedly stressed, where the interests of actors are frequently associated with the interest of nature but might likewise refer to other environmental divisions, like technology.

The graph overleaf illustrate the relation between the sphere of people and the sphere of the environment, and how the interests of people and the interests of actors in the environment shape the space for doing sustainable business.

The illustration shows that the two spheres are imagined to be inextricable, with circular cause and effect relationships playing out between different categories of interest. In this sense, people will ignore the interest of non-human actors at their own peril, but likewise non-human actors—or human actors representing these non-human actors in consultations—cannot escape the fact that people themselves are part of the environment, and that they might have a right to draw on environmental resources to pursue economic and social benefit. For economic interaction to endure over time, the critical balance between people interests, expressed as economic or social benefits, and environmental interests as residual category grouping the benefit accruing to all other actors, must be maintained. Refer to the next chapter for more information on how to ‘count in’ actors from the environment in practice.

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In Zambia, the universal rights of the environment have been delineated into national law.

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Sphere of people

Sphere of the environment

Force-field determining space for doing sustainable business
II.2. A systemic view of what constitute sustainable business practices

II.2.1. The link to social systems theory

The market systems development approach promoted by the joint UN programme on Green Jobs promotion draws inspiration from research on complex social systems as a discipline in the broader field of systems theory.

A system is defined as a collection of components that purposefully interact, like water molecules that form a snowflake, or people establishing a supply chain for a product or service. What matters is the ability to define, to a sufficient degree of accuracy, the relevant components of the system and how they interact.

Systems theory is about the study of general system properties, including matter and organization of its components, searching for concepts and principles which are independent of the specific domain, substance, type, or temporal scales of existence.\(^\text{10}\)

Systems theory is an interdisciplinary field of research, cross-cutting the analysis of complex systems observed in natural sciences like physics and biology, together with social sciences like sociology and economics.

Examples for universal properties shared by all types of systems are the following:

- Systems have structure, defined by components and their composition;

Systems have behavior, which involves inputs, processing and outputs of material, energy, information, or data;

- Systems have interconnectivity, that is, the various parts of a system have functional as well as structural relationships among each other;

- Systems have functions or groups of functions.

Social systems – like the people web of purposeful economic interaction underpinning the building industry in Zambia - typically fall into the category of complex adaptive systems. Complex adaptive systems are complex in the sense that they are dynamic networks of interactions and relationships, not aggregations of static avior in the system, it has to arise from competition and cooperation among the actors themselves. The overall behavior of the system is a result of a huge number of decisions made every moment by many individual actors.

Further to the universal properties shared by all systems listed above, social systems typically share the following characteristics:

Large number of agents: Social systems contain a large number of interacting actors. For example, in the case of the Zambian building industry and for the sphere of people alone, even in the most conservative estimate, tens of thousands of women and men are directly involved in the value creation process. Linkages between these actors may arise because they are physically close to each other, or because they are members of an actor population with aligned interests, or because they share some common information.

Rich interactions: Any element in the system is affected and affects several other systems. Likewise, any interaction can feed back onto itself directly, or after a number of intervening stages. System actors influence one another both directly and indirectly within given populations and across populations in the entire system. For example, in the Zambian building industry, the decision of one building input supplier to offer cement at a certain price can prompt other suppliers in the same population of agents to do the same. Furthermore, the selling decisions taken by a sufficiently large population of suppliers have a direct effect on the price for cement in the market and thus a knock-on effect on the entire value creation process. There is strong feedback at work, where the action of one actor influences the reaction of another actor, and vice versa.

Notably, the interactions in social systems are primarily, but not exclusively, with immediate neighbors. For example, in the Zambian building industry, an individual brick-layer is likely ignorant about the overall structure of the system, and primarily relates to other bricklayers or artisans offering related building services at the same step of the value creation process. However, particularly where network hubs are concerned, linkages might extend beyond individual steps of the value creation process, and even stretch along the entire chain. This observation applies particularly to market information that can travel fast along the entire loop. For example, the operator of a commercial timber plantation might adjust prices upwards in response to growing demand in downstream consumer markets for wooden flooring.

Non-linear interactions: In social systems, interactions can result in unpredictable outcomes, i.e., the activity of one actor might trigger unexpected responses of another actor in the same population, or have unintended side effects across the entire system (the “butterfly-effect”). As discussed further below, these effects can be extreme and can result in the reconfiguration (or even collapse) of the entire system. For example, small and undetected quality variations in the production of screws later used in the assembly of scaffolds can have a catastrophic impact on workplace safety at a building site.

Scale-free network structures: Social systems are typically not random but exhibit structures of scale-free networks (at least where they have grown organically). This means that there is a hierarchy that keeps these networks together with few heavily connected hubs, sometimes followed by several less connected sub-hubs, and trailed by many individual agents. In scale-free networks, a few hubs tend to grab most of the links with populations and actors. For example, it can be assumed that Lafarge Zambia constitutes a hub among building input suppliers in the country since it is the principle manufacturer of cement, and consequently is better connected to contractors (a capacity sometimes termed as “fitness” of an agent in network theory). Hubs tend to emerge along the pattern of preferential attachment where “success breeds success” and individual actors often unconsciously prefer to link up to a hub because others have done so earlier. In this regard, while individual choices of actors remain highly unpredictable, as a group they follow strict patterns.11

Adaptive complexity: The behavior of the actors in a social system is affected by memory or “feedback”. This means that something from the past affects something in the present, or that an activity at one location affects what is happening at another, sometimes by way of a knock-on effect. For example, if a contractor has experienced an unreliable supply of bricks in the

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11 For a discussion of the small world phenomenon and the emergence of hubs in complex systems (and using the example of the world wide web, refer to Barabasi, L. 2003: Linked. How everything is connect to everything else and what it means for business, science and everyday life.
past, this memory will likely affect his procurement decisions in the present. The net result of everyone having such memories can be that the system as a whole ‘remembers’ and that a particular global pattern or sequence emerges in response. Two examples are pedestrians moving along a corridor who inadvertently self-organize in counter-flowing streams, or a busy highway where the individuality of drivers is often entirely submerged beneath average driving behavior. For the observer, it might appear that the system is ‘alive’, driven by agents who interact and adapt under the influence of feedback. The emergent phenomena typically arise in the absence of any sort of ‘invisible’ hand or central controller. In other words, a social system can evolve in a complicated way all by itself. For this reason, complex social systems are often regarded as being more than the sum of their parts.

**Systems theory is about the study of general system properties, including matter and organization of its components, searching for concepts and principles which are independent of the specific domain, substance, type, or temporal scales of existence.**

Further to adaptive complexity, recent research points towards the phenomenon of evolution in leaps (so called ‘bursts’) where apparent inactivity (in practice numerous small steps with very limited impact) is followed by a single major step or leap. For example, in the Zambian building industry, the recent breakthrough in research on 3D printers could revolutionize building design in Zambia. These bursts of adaptation might be triggered on 3D printers could revolutionize building design in Zambia. These bursts of adaptation might be triggered off deliberately, for example by way of launching a new product line at a particular point in time, but more often they are emergent, the product of pure chance or opportunity. **The past shapes the future of the system:** All complex systems have a history, they evolve, and their past is partly responsible for their present behavior. Closely related to the observation of ‘feedback’ in social systems, the systems’ past tends to shape the systems’ future, where actors adapt their behavior by themselves based on past experience and in the hope of improving their performance in the future. This is not to say, though, that the past determines the future of a system, and that its behavior patterns thus become easily predictable. In fact, while the options might be well defined, the actual choice is arbitrary. Two systems that are wholly identical at the outset might end up on quite different courses of action while experiencing the same driving force, simply because they happened to take different paths at each junction.

**Open system boundaries:** It may be difficult or impossible to define system boundaries, and its environment can influence the system. An example for external factors impacting on the Zambian building industry is the global ban on asbestos products in building construction. The ban impacted on asbestos mining (mainly in Zimbabwe) and ruptured linkages in asbestos trade across southern Africa, including Zambia. Another example for open system boundaries is demand in eastern Asia for tropical hardwood, fuelling illegal logging in Zambia and illicit cross-border trade. Refer to Chapter 1.5 for more information on how to demarcate system boundaries in the case of the Zambian building industry.

**Emergence:** Complex systems operate under conditions that are far from an equilibrium – they are dynamic and in a permanent state of flux, like a river whose water is constantly flowing from high to low ground but generally stays in a steady state and in which the waters are confined between its banks at a roughly constant level. Living cells are also in such a ‘dynamic steady state’, maintaining their integrity and their function while constantly burning up energy and churning out waste. This steady dynamic state ‘on the edge of chaos’ (also described as the ‘self-criticality’ of the system) is candid, and the system might suddenly move from order to disorder and back, and seemingly of its own accord. In other words, the system exhibits emergent phenomena, which are surprising in that they could not have been predicted based on the knowledge of properties of the individual actors. An example for emergent behavior is the wildcat strikes in the Zambian mining sector in 2011; the tension among actors in the sector had been known, and pressure built up for some time, but when the system suddenly went from order to disorder it caught all actors by surprise – including the unions.

Complex systems might not only unexpectedly change their state from disorder to order (and back), but also the scale of events and impact of these emergent phenomena can be massive and can snowball through the network.12 Anything can happen in a complex system and it generally will –it is only a matter of time.13 A recent

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12 For a popular account of the tipping point that sets off this snowball effect refer to Gladwell, M. 2000: *The tipping point. How little things can make a big difference.*

13 This phenomenon can be statistically observed by way of power laws. A power law is a special kind of mathematical relationship
example of an extremely unlikely event that nevertheless happened (a so-called black swan) is the mass shooting of mine workers in the wake of a wildcat strike in South African platinum mine—events spiraled out of control and the fallout has affected all extractive industries in the country.14

(Thermodynamcis: As indicated above, complex systems are dynamic, they constantly evolve, ‘powered by purpose’, and in the case of a social system like the Zambian building industry by economic interests driving people to interact. The system will configure its components so as to minimize the inputs required to maintain itself in line with the laws of thermodynamics, and this observation applies to living organisms as much as ‘quasi-living’ self-organizing systems—such as the Zambian building industry.15

In this logic, to sustain the system over time, its components need to be configured so as to minimize the inputs required to maintain a steady dynamic state. This aspect is revisited in Chapter 1.5 in its discussion on how to assess net benefit from interaction in the Zambian building industry.

The list of characteristics above has served as guidelines for the assembly and analysis of the actor network underpinning the Zambian building industry presented in the third part of this report. Refer to Chapter II.3 for more information on how the actor network map was assembled.

II.2.2 References to social network analysis

As per the Terms of Reference, the research focused on visualizing the network linking the actors to the market exchange. This approach leans back on social network analysis, a discipline of social science which draws inspiration from mathematics and ethnology, and by applying elements of system theory.16

Major characteristics of social network analysis are:

- Social structures are traced back to linkages between social actors (emphasis on relational context rather than the individual).
- The linkages are assessed empirically.
- Results are graphically presented.

The emphasis on relational context of the economic interaction process needs to be stressed here.17 The actor network map presented in the third part of this report classifies players as per their actual level of connectivity with other actors, not along the principal weight of their mandate. For example, a given line Ministry might be plotted as a conventional actor since its organizational mandate does not translate into a requisite number of actual linkages, while a corporate business effectively controlling an entire actor population of suppliers might be shown as a network hub. Also, actors with strong influence over the value creation process have been plotted near the core of the network map, while actors with limited impact are plotted closer to the shore.

To assess the Zambian building industry empirically, a three-step process was followed:

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16 The roots of relational thinking and empirical approaches in social science relate back to the 19th century, but social network analysis as a distinct discipline gained popularity through Harvard university in the 1970s when sociological research was combined with mathematical modeling, increasingly supported by computers. The approach has since been applied to study a wide range of phenomena, from the internet, through to the organization of markets; the latter strand of research is most relevant for the analysis of the Zambian building industry. For an thorough introduction to social network analysis refer to Stegbauer, C. and Haeussling, R. (eds.) 2010: Handbuch Netzwerkforschung; the mathematical models underpinning social network analysis are described in Wasserman, S. and Faust, K. 1994: Social network analysis: Methods and applications. For more information on the application of social network analysis to economics refer to White, H. 2005: Markets from networks. Socioeconomic models of production.

17 A brilliant introduction to the notion of society as a web of associations is found in Latour, B. 2005: Reassembling the social—an introduction to Actor-Network-Theory.
1. Desk research: secondary data about the Zambian building industry was collected by way of desk research. The information was cross-referenced with the observations made earlier about complex social systems so as to assemble a draft actor network map of the people web underpinning the industry.

2. Field consultations: a draft network map was queried by way of dialogue with stakeholders, taking the form of focus group discussions and interviews with key informants. The main outcome of this stage was a revised actor network map that reflected first-hand information from stakeholders.

3. Building consensus for change: the revised actor network map was validated with local stakeholders as part of an industry round-table, together with a set of draft conclusions and recommendations for interventions in support of MSME in the industry.18

A special feature of the research has been its focus on concepts promoted by actor network theory, a niche discipline within the field of social network analysis.19 While in social network analysis, the smallest denominator of analysis is the individual (and the social correspondingly reserved to the sphere of people), in actor network theory an actor can be any entity affecting, or being affected by the interaction.

This broad definition of an actor thus explicitly includes non-human actors, including beings from other species but also things, like a piece of technology. The criteria to be potentially counted is thus not being a human but exerting impact on interaction in a relational context. For example, in the case of the Zambian building industry, actor network theory might argue that the market exchange is affected by non-human actors like forests, from which people draw timber for building purposes. In the same logic, technological systems like the Zambian power grid and water supply network. Furthermore, acknowledging the challenge of ‘consulting with nature’ or other non-human actors for that matter, the research will emphasize on human actors speaking on behalf these non-human actors.

More specifically, the reference point will be organizations set up by people to give non-human actors a voice, like environmental NGOs, but also Government line Ministries or a print magazine dedicated to environmental subjects.20

The classification of actors in the context of the Zambian building industry and the steps of the research process followed by the industry analysis are further elaborated in the next chapter.

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18 The three step approach takes inspiration from a (four-step) process proposed by Bruno Latour, including creation of perplexity (about the status quo), consultations with actors about possible futures, hierarchization of desirable change, and institutionalization of change. He sees four actor groups as drivers of the process, namely scientists (furnishing evidence), economists (assigning a common language to the ensemble of entities through economic calculus), politicians (negotiating shift in status quo) and moralists (testing proposed change against ethical standards). Latour, B. 1999: Politique de la Nature. In a similar line of thinking, the actor classification scheme proposed for the Zambian building industry distinguishes three core functions. Refer to Chapter 1.4 for more information.


20 In the context of this discussion, a fascinating but frequently ignored question to ask is whether organizations set up by people do not in fact constitute non-human actors in their own right, as implied by law through the incorporation of companies as legal bodies. In this logic, institutions would become quasi self-aware as soon as they have been embodied and develop institutional self-interests, and that often do not equal the interests of the people that established the actor in the first place.
II.3. Research design

II.3.1. Specification of the building blocks of the actor network map

As outlined earlier in the report, the concept of an actor network map is drawn from social network analysis, while the definition of an actor takes inspiration from actor network theory. For the purpose of the research, the concept has been adapted and simplified, while retaining many of the basic ideas.

For the purpose of the research, the following building blocks of an actor network are distinguished and further described in the following:

- Actors
- (Actor) Populations
- Network hubs
- Linkages

An actor is an entity that interacts with other actors in the network; it thus constitutes a reference point in the actor network. For the purpose of the research on the Zambian building industry only, actors have been classified to be organizations that represent the interests of either the people dimension or the environment dimension. These organizations are thus to be treated as black boxes that enclose large number of ‘lower level’ actors in either of the two dimensions, like individual workers and entrepreneurs, or individual non-human entities in the environment. These organizations might be further categorized as meta-level, macro-level or micro-level actors, as per their core function in the network. Refer to the chapter II.3.3 for more information on the classification of actors in the local context.

An example for an actor in the Zambian building construction industry is the National Council for Construction, mandated by the Government to regulate economic interaction among other actors, while another example of an actor could be labour union speaking on behalf of construction workers. The second example implies that while all actors in the network map need to be organizations, the same does not apply for the actors on whose behalf these organizations speak. The lower-level actors enclosed into the black boxes represented by the actors in the network map might be individual people or groups of people, or non-human entities like animals, machines,
or eco-systems like a forest or a lake. In this sense, an environmental NGO set up to protect Zambian hardwood tree species would speak on behalf of these non-human actors, effectively seeking to secure environmental benefits on their account, but also trading economic and social benefits in return.

An actor network analysis of the Zambian building industry

An actor population is a group of actors with largely similar characteristics interacting within the system. An example for a population of actors is the cluster of metal frame welders operating out of Kalingalinga township in Lusaka. A population of actors can count dozens, hundreds or in extreme cases thousands of entities, and while individual entities might only count for single linkages, taken together their weight in the interaction process will be felt.

When a given entity should ‘exit’ the black box of an actor population and turn into an actor in its own right depends on the chosen network resolution – that in turn is determined by the research purpose and scope. As a rule of thumb, organizations with many connectors in the web of interactions, or a strong connector indicating high leverage over the decision of another actor, or a combination of these linkages, should always be plotted as actors in their own right, pending the density of linkages also as network hub.

The chosen resolution level implies that the preferred actor classification scheme are organizations representing the interests of groups of individuals – otherwise, network complexity is potentially infinite due to the number of actors involved, and the research focus is consequently lost. In line with the above, for the purpose of the research, individual actors will be enclosed in organizations representing their interests. These institutional black boxes constitute the pixel for calculating map resolution.

A network hub is an actor, or variably an actor population, exerting high leverage over other actors in the network, here represented through a high number of linkages, and possibly also by way of strong connectors. For example, the actor population of registered architects is linked through multiple connectors with other actors, and exerts strong leverage over the building construction projects commissioned from contractors.

A linkage, or connector, refers to regular interaction between actors or population of actors, and between actors or population of actors and hubs. Linkages are drawn by way of connectors between network reference points. A linkage is given if interaction is recurrent and can be classified as either ‘infrequent–frequent’ or ‘frequent–highly frequent’, and either ‘more informal’ or ‘more formal’. Refer to chapter II.3.4 for more information on how to qualify these linkages.

How to choose the right network map resolution

As indicated in Chapter II.2.1, social systems are characterized by the phenomenon of self-similarity, where features of interaction replicate both laterally and vertically. For example, the complexity of interaction between workers and management in a given business tends to find self-similar reflection in the relations between trade unions and business federations at the sector level, and between umbrella federations of organized business and organized labour at the national level. The choice of system resolution, or chosen focus of the industry analysis, then determines the choice of actor classification scheme, looking variably at individuals, or smaller or larger groups of individuals organized in institutions of some sort.

For the purpose of research on the Zambian building industry, the proposed system resolution is interaction within boundaries of an industry. Laterally, the building industry stands next to, and is connected with other industries like civil engineering. Vertically, and looking upwards, the building industry is component part of the construction sector that itself is part of the economy of the country (that itself is a sub-system of the society of Zambian people); while looking downwards it is a repository of connections between individual actors linked to building construction.
II.3.2. Demarcation of network boundaries

To demarcate the system boundaries of the building industry in Zambia, the definition of the term building industry proposed in the International Standard Industry Classification (ISIC) of the United Nations Statistics Division is applied. ISIC classifies building construction as a division of economic activities grouped under the construction sector, and related to the construction, completion, finishing, alteration and repair of buildings of all kinds, or part of these buildings, both under sub-contract or with responsibility for the entire project.

The official definition of the term building industry applied by the Government of Zambia is broadly aligned with the ISIC classification. The National Council for Construction (NCC) in Zambia, established by Government to give the implementation of the 1996 national construction policy effect, groups construction activities into specific categories of which general building and housing is Category B with the following sub categories:

- Brick/Masonry works/Wet trades, Concrete in Buildings, Building frame-shell
- Partitions and Ceiling finishes (Aluminum, Steel, Timber, Boards)
- Painting, Glazing, Interior & Exterior Decorating Services
- Electrical Installations to Buildings
- Flooring & Tiling Services
- Plumbing and Sanitary Installations
- Carpentry, Joinery, Roofing & Waterproofing Services.

Further to the ISIC definition, the main focus of the research was laid on actors involved in activities related to the construction of residential housing, since it was hypothesized that this segment of the building industry accounts for a very high concentration of MSMEs. By direct comparison, the construction of office premises, shopping malls and other buildings meant for commercial use is typically controlled by large-scale contractors providing turnkey solutions to their institutional clients. This assumption was verified during the desk research.

Illustrated below is the template of the actor network underpinning the Zambian building industry; to be counted as part of the industry, an actor must

Range of building activities as per ISIC classification

As per International Standard Industry Classification, economic activities in the construction sector are grouped along three divisions, namely (41) the construction of buildings (residential and non-residential), (42) civil engineering and (43) specialized construction activities. Division 41 includes general construction of buildings of all kinds (residential and non-residential), including new work, repair, additions and alterations, the erection of pre-fabricated buildings or structures on the site and also constructions of a temporary nature. Likewise included is the construction of entire dwellings, office buildings, stores and other public and utility buildings, farm buildings, etc. Division 42 includes the general construction of civil engineering objects and comprises three groups, namely (421) construction of roads and railways, (422) construction of utility projects and (429) construction of other civil engineering projects. Examples for civil engineering projects are motorways, streets, bridges, tunnels, railways, airfields, harbours and other water projects, irrigation systems, sewerage systems, industrial facilities, pipelines and electric lines, outdoor sports facilities, etc. Division 43 includes specialized construction activities (special trades) i.e., the construction of parts of buildings and civil engineering works carried usually under sub-contract and without responsibility for the entire project. These specialized construction activities can be divided in four groups, namely demolition and site preparation, electrical, plumbing and other construction installation activities, building completion and finishing, and other specialized construction activities. These activities will usually require specialized skills or equipment, such as pile driving, foundation work, carcass work, concrete work, brick laying, stone setting, scaffolding, roof covering, etc.

Included are activities such as plumbing, installation of heating and air-conditioning systems, antennas, alarm systems and other electrical work, sprinkler systems, elevators and escalators, etc. Also included are insulation work (water, heat, sound), sheet metal work, commercial refrigerating work, the installation of illumination and signaling systems for roads, railways, airports, harbours, etc. Also included is the repair of the same type as the above-mentioned activities. Building completion activities encompass activities that contribute to the completion or finishing of a construction such as glazing, plastering, painting, floor and wall tiling or covering with other materials like parquet, carpets, wallpaper, etc., floor sanding, finish carpentry, acoustical work, cleaning of the exterior, etc. Also included is the repair of the same type as the abovementioned activities.

perform activities that are related to the construction, completion, finishing, alteration, and repair of residential buildings of all kinds, or part of these buildings. Refer to the following chapters for a classification of actors within these system boundaries and parameters to qualify a given connection.

From ‘core to shore’ of the Zambian building industry

II.3.3. Classification of actors

The actor classification scheme proposed in the following is delineated from the heuristic model introduced in Chapter II.1.3, and two dimensions are distinguished that together shape the space for doing sustainable business in the Zambian building industry, namely a people dimension and an environment dimension, where the former reflects the interests of people and the latter reflects the interests of all other entities (non-human actors) affected in the interaction process.

Consequently, actors are classified as representing the interests of either the people dimension or the environment dimension. Examples for actors representing people’s interests are trade unions, business federations, Line Ministries with a mandate to promote trade and industry, but also Non-Governmental Organizations lobbying for the interest of a given local community.

Examples for actors representing the interests of non-human entities in the environment are line Ministries with a mandate to protect the environment, NGOs established to protect animal rights, but pending context, also faith-based organizations. In the context of the Zambian building industry, actors will be classified as belonging to either the people dimension or the environment dimension, pending their core mandate.

Actors will furthermore be classified according to their core role. For the purpose of the report and to capture the context of the Zambian building industry, three core functions are distinguished. Actors might either shape the values, perceptions and norms held by other actors across the web of interaction in the building industry (meta-level), or codify these value sets and norms in policies, rules and regulations that determine the ‘rules of doing business’ (macro-level), color-coded blue, or be directly involved in the exchange of goods and services along the value creation process for building construction (micro-level).
It is acknowledged here that these three core functions are interlinked and mutually reinforcing; for example, shifting meta-level consumer perceptions about the attractiveness of green building designs can boost market demand on the micro-level, and the resulting supply bottleneck can trigger macro-level policy reform. It is also acknowledged that in practice, an actor might carry out more than one function; for example, a business federation with a mandate to influence the legal and regulatory framework by way of policy dialogue might also want to offer micro-level business support services. The classification along core functions therefore is not meant to firmly reflect all facets of interaction on the ground, but to be able to plot actors in line with their strategic mandate in the bigger picture of things. The graph below summarizes the proposed actor classification scheme.

### II.3.4. Qualification of network linkages between actors

In the context of the research on the actor network underpinning the Zambian building industry, for a linkage to be drawn between two actors, their interaction must be recurrent and related to building construction. In order to be considered as being related to building construction, the goods and services exchanged must make a direct and felt contribution to the value creation process. For example, electricity and water are critical inputs in the building construction process and weigh on the price of a given product or service, hence a linkage should be drawn between a contractor and the respective utility providers. By direct comparison, electricity and water are a marginal factor input as far as the provision of building design services through architects, surveyors and planners is concerned, therefore no linkage should be drawn between utility providers and these actor populations. As a rule of thumb, the map should merely depict linkages that are instrumental to the value creation process, in order to reduce complexity and focus the analysis on key connectors.

For the purpose of qualifying recurrence, interaction is classified as either being less frequent or more frequent. More frequent transactions can imply the presence of a strong connector between two actors, while less frequent transactions can imply a weak connection. There is neither a causal link, nor does the qualification of a given linkage as ‘strong’ denote a positive value, since economic interaction might be infrequent by default, or infrequent interaction can still be mutually beneficial. Also, strong connectors can be indicative of an asymmetric power relationship, where a network hub exerts disproportional bargaining power over an actor because switching costs are lower.
Furthermore, interaction is classified as being either ‘more informal’ or ‘more formal’, the distinguishing criteria being the measure of (non-) compliance with the laws and regulations for doing business in the local context. The matrix below illustrates how to determine the quality of a connection between two actors; in practice, and as will be shown in the next chapter, most connections between actors in the Zambian building industry fall somewhere in between extremes.

**Matrix to determine the strength of a connector**

It is acknowledged that the classification scheme above is rough, and that it does not allow for the computation and graphical representation of exact weights of given connectors. Also, the classification is at least partly based on the views of stakeholders on the ground, and thus subjective. However, the classification does allow for the visualization of economic interaction in the Zambian building industry in relational context, and with emphasis on the level of MSME embedment, allowing to identify network hubs, structural holes and ultimately interventions points for MSMEs’ upgrading support.
II.4. Research process

II.4.1. Taking a first snapshot of the actor network: Desk research

At the first step of the analysis, desk research was undertaken to produce a snapshot of the actor network underpinning the Zambian building industry.

The desk research focused on actors and interactions that fall within the definition of building (support) activities as established in chapter II.3.2. Notably, it included actors representing either the people dimension or the environment dimension engaged in sustainable business, in the latter case with an emphasis on the natural environment.

The desk research sought to capture data from publications on the Zambian building industry since 1990, accessible either via the Internet or circulating as ‘grey literature’ in Zambia. For example, the 2012 UNHABITAT housing sector profile can be downloaded from the Internet, while the construction policy of Zambia released in 1995 is only available as hardcopy.

Each publication identified as part of the research was recorded and stored electronically in an internet-based drop-box, in the case of grey literature, this was done after making a scanned digital version from the hard copy of the document. The bibliography of publications is attached to the Annex of this report.

The data set collected through these secondary data sources was analyzed with the following guiding questions:

- Who are the actors in the local building industry?
- What core role do these actors play (at the meta-level, macro-level or micro-level)?
- Who are the key network influencers (hubs)?
- To what extent do actors affect, or are affected by, the industry-specific value creation process –should they accordingly be placed at the core or the shore of the people web?
- Where do actor populations of MSMEs cluster along the value creation process?
- Are there less visible actors who influence the actor network that should be included (less powerful...
informal or powerful external actors, actors representing the interests of the environment)?

- How dynamic are the network processes; for example, are there cyclical/seasonal changes to the actor network map?
- Which existing actors and which existing connections would be instrumental in order to catalyze MSMEs to shift towards greener building practices?
- Are there any new linkages to be forged between actors to support the development of MSMEs in the building industry?

Based on the analysis of the data set, a draft actor network of the Zambian building industry was drawn up, making use of the building blocks for actor networks, and applying the actor classification scheme, the definitions for network boundaries, and criteria for the qualification of network linkages discussed in chapter II.3.1. and II.3.4. The network map would thus reflect a picture of the building industry painted from secondary data sources and shaped in the image of the predictions made by social systems theory.

The draft actor network map was then used to develop hypothesis on intervention strategies meant to stimulate the creation of green and decent jobs through MSMEs’ development. These hypothesis were next tested during the field consultations.

The desk research sought to capture data from publications on the Zambian building industry since 1990, accessible either via the Internet or circulating as ‘grey literature’ in Zambia.

II.4.2. Probing deeper: Field consultations

In the second step, the desk research findings about the actor network underpinning the Zambian building industry and intervention strategies in support of MSME development were validated and further refined through qualitative research –here with an emphasis on field consultations taking the form of focus group discussions and interviews with key informants. The actors to be consulted during the field consultations were gleaned from the draft actor network map. The aim was to consult as widely as possible but with a focus on network hubs and actors at the core of the industry.

The focus group discussions were held in three data collection stages from mid November onwards through to early December 2012; at each stage grouping actors from different geographical regions and by core function (i.e., meeting meta-level, macro-level and micro-level actors separately).21 The discussions were facilitated by a team of enumerators from the University of the Copperbelt University. Each focus group meeting comprised up to ten actors and had a duration of 2–3 hours. The focus group discussions were semi-structured, using guidelines drawn up based on prior desk research findings (see Chapter II.4.1.), and convened separately for meta-level, macro-level and micro-level stakeholders. The focus group guidelines are attached to the Annex of the report.

The interviews with key informants targeted actors identified as network hubs during the desk research. The interviews were carried out by members of the programme management unit and by enumerators from the Copperbelt University. The interviews were based on questionnaires constructed with both closed and open questions. The interview questionnaire is attached as an Annex of the report.

The protocols of the focus group discussions and the transcripts of the interviews with key informants were processed by the programme management unit and fed into Chapter III.2. of this report. The findings have provided further perspective to the people web of interaction in the Zambian building industry and helped further shaping the draft conclusions and recommendations presented in Chapter III.2.

21 The original idea laid out in the inception report to cluster focus groups along the principal stages of the value creation process (green building design, green building construction, green building maintenance and operation and green building demolition) was given up in light of the findings of the desk research, as it illustrated that many actors would intervene repeatedly and at various stages of the value chain.
Why qualitative research

In the context of actor network analysis, qualitative research is meant to reveal the subjective views about the state of the industry held by actors—and later to contrast these perceptions with the picture of the situation on the ground painted from quantitative research. Consequently, qualitative research is organized along two principles: It applies open data collection methods (like open questions asked during focus group discussions) and it emphasizes the interpretation of data sets and capturing statements that allow for deduction of relational context and to fill observed action with meaning.

Further to the above, in the context of the analysis of the Zambian building industry, qualitative research was chosen for the following reasons:

- Exploration of an ‘unknown’ actor network: Qualitative research is particularly suited to explore lesser known and sometimes invisible networks, for example, while the Zambian building industry is comparatively well researched from an economic (development) perspective, an actor-centered analysis with an environmental and social angle added to the economic angle is new; here qualitative research opens a pathway for taking actors along and enabling them to shape the research agenda as data is collected.

- Reconstruction of networking practices: Qualitative research emphasizes relational context, and consequently allows for the reconstruction of interaction (rather than looking merely at actors). This point matters particularly for the assessment of intangible social benefits (like work satisfaction or a sense of work purpose) that is generated during interaction, rather than accumulating as a result of interaction.

- Interpretation of network practices: Qualitative research is essential to interpret network practices of local actors, i.e., to put them in relational context and to explain why actors do what they do – including why they sometimes seem to act ‘irrational’ from an economic point of view.

- Analysis of network impact: Qualitative research opens avenues to assess not only how actors shape the organization of the network, but conversely also how the network shapes actors, by effectively limiting their choices and ‘creating order out of chaos’.

- Assessment of network dynamics: Qualitative research can shed light on a blind spot of quantitative research, namely how to analyze dynamic network process and changes in network organization over time. For example, while quantitative network analysis will usually reveal a static snapshot of network configuration at the time of data collection, qualitative research allows for querying of actors about relational context, and how interaction might shift along vectors of time and space. This strength of qualitative research comes to full play in cases, where actor consultations are held in periodic intervals –to take the pulse of the system in real time.

For more information on the range of applications for qualitative research, also in mixed design settings like for the Zambian building industry, refer to Axinn, W. and Pierce, L. 2006: Mixed Method Data collection; also Hollstein, B. 2010: Qualitative Methoden und Mixed-Method-Designs, p.459-470, in Stegbauer and Haeussling (eds.) Handbuch Netzwerkforschung.

II.4.3. Building consensus around the intervention points for MSME support

The conclusions and recommendations presented in the amended draft report were tabled for discussion during a one-day national building industry actor workshop to be convened in the second week of January 2013 in Lusaka. The workshop brought together about 70 actors across system levels of the Zambian building industry, many of them consulted earlier during the field research and some of them identified during the field research but not yet consulted. The findings, conclusions and recommendations in this report were then amended based on actor feedback received during the validation workshop, and tabled for final approval to the national programme steering committee in mid January 2013. The final version of the report was submitted to the programme management unit by the end February 2013.
PART III: RESEARCH FINDINGS

Overview:

The third part of the report presents the research findings. Chapters III.1–6 describe the findings from desk research and conclude with a set of draft conclusions and recommendations for MSME upgrading interventions.

Chapters III.2.1–3 synthesize the findings from the field consultation, as they provide first-hand perspective of the actor network map underpinning the Zambian building industry, and have further shaped the conclusions and recommendations for MMSE upgrading interventions.

Chapters III.3.1–4 cast light on the feedback and comments to these conclusions and recommendation received from industry stakeholders during a national validation workshop.
III.1. Findings from desk research

III.1.1. Qualification of the data set

The desk research involved an intensive literature search, review and synthesis of all relevant documents pertaining to greening the building construction industry, with a particular focus on Zambia. The desk research sources consisted of both primary literature (reports, journal articles, government and international/NGO publications), and secondary literature (journals, books, newspaper articles). Refer to the Annexes of this report for a bibliography of the documents identified and processed.

The desk research comprised of three loops of data collection, Loop 1 consisted of research related to Zambia and the Zambian building construction industry (51 literature sources), Loop 2 consisted of research related to South Africa, SADC and the construction industry (16 literature sources). The third loop consisted of research related to international green building (32 literature sources). All sources were digitally uploaded to an online data storage and sharing platform thereby ensuring that all team members could upload and share literature.

Some of the challenges experienced by the research team are detailed in the table below, including the mitigating actions taken.

A literature review on green building construction was undertaken, with a specific focus on the inherent capacities of MSMEs in Zambia to effectively and sustainably implement projects that embrace green building technology.
<table>
<thead>
<tr>
<th>No</th>
<th>Challenge</th>
<th>Mitigation action taken</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td><strong>Incomplete/unpublished research:</strong> The team relied on external information, which may not be accurate and often was incomplete. A number of the research sources collected in Loop 1 were unpublished grey research, and were indicated as draft reports</td>
<td>The research team ensured that there was a sufficient body of literature to draw from (albeit grey research), allowing the research team to draw conclusions beyond one source.</td>
</tr>
<tr>
<td>2</td>
<td><strong>Out-dated data:</strong> A number of the research sources accessed in Loop 1 were over five-years-old, as more recent reports were unavailable. The available data was extrapolated based on trends, and used in the actor network analysis report; however, this does potentially limit the rigor of some of the indicated statistics as included within the report.</td>
<td>The inclusion of extrapolated data based on outdated statistics was only included where it was required and there was a confidence that the data was reflective of the reality.</td>
</tr>
<tr>
<td>3</td>
<td><strong>Limited access:</strong> The desk research was conducted primarily by using available research accessed via the internet and provided by the research team. The research team used an online data storage system (Dropbox) to share information. Given limited telecommunication in Zambia, sharing information and particularly information that was only available in hard copy, proved challenging.</td>
<td>The research team members all had access to the platform which was available live—online and offline—on their computers. Further, versions of desk research were circulated for inputs to ensure that crucial data was not excluded.</td>
</tr>
<tr>
<td>4</td>
<td><strong>Validity:</strong> Relevant and recent research specifically related to Zambian building construction is limited and a majority of the information was provided by UN Habitat. UN Habitat sources provided rich content and this was a key source; however, at times it seemed to be overused. The lack of further content potentially limits the validity of the actors within the actor network, their role, location and subsequent influence over other actors.</td>
<td>The information accessed from UN Habitat sources was confirmed through separate key word online searches in an attempt to increase their validity. Furthermore, the development of the actor network map was completed over eight drafts which were circulated to team members for inputs.</td>
</tr>
</tbody>
</table>
| 5  | **Limited information:** There was limited information available relating to the groups below, which could potentially result in actors being excluded from the network map;  
• women in the construction sector;  
• vulnerable groups in the Zambian construction sector;  
• informal construction sector; and  
• less visible actors. | The project consulted with a gender expert who assisted in providing inputs into the design of the research. Furthermore the research team was cognisant of the inclusion of vulnerable groups (informal, youth, and less visible actors) and ensured they were represented in the actor network. |

III.1.2. The actor network map of the Zambian building construction industry

III.1.2.1. Snapshot of the status quo

The following illustration is the actor network map of the Zambian building construction industry assembled from desk research. As indicated in the previous chapter, the map captures actors involved in economic activities grouped under the construction sector, and related to the construction, completion, finishing, alteration and repair of residential buildings of all kinds, or part of these buildings, both under sub-contract or with responsibility for the entire project. As will be further highlighted, green building construction is considered to be integral part of these building construction activities, since it involves essentially the same actors and largely similar processes in the Zambian case.

The map should be read as follows:

- **Actors** are plotted by assigning them a reference point with a standard font-size. To illustrate a hub, the font-size of the reference point for a standard actor is increased.

- A **colour code** denotes the core function of the actor/hub as being related to either the meta-level (green), macro-level (blue), or micro-level (red).

- Populations of actors are depicted in the network map as clusters of actors and where applicable carry a reference number to indicate the number of individual actors in the cluster. For example, the size of the actor population of registered architects in Zambia has been specified as n = 175.

- Network linkages are depicted by way of linear connectors between actors, hubs or actor populations and the strength of the connector (frequency of interaction) is implied by the width of the line.
Connections that are thought to be mainly informal are illustrated as a dashed line.

The vortex of the network denotes the demand side of the micro-level market exchange for building construction as it fuels interaction among supply side entities. Please note that in the particular case of building construction, all supply side actors are likewise potential house buyers/tenants and thus constitute customers in their own right.

The graph below illustrates the basic building blocks of the network template. The actual network map is described in further detail on the following pages.
Draft actor network map of the Zambian (green) building construction industry
The analysis of the actor network reveals that the people web underpinning the supply side of the Zambian building industry evolves around a number of network hubs. In a nutshell, on the micro-level, these network hubs are architects, registered and non-registered contractors, property developers, and selected suppliers of key construction inputs like materials, finance or skilled labour. On the macro-level, actors with hub status are the National Construction Council and the National Housing Authority; other macro-level actors that appear to exert strong leverage on the network are the Association of Building and Civil Engineering Contractors, the National Association of Medium and Small-scale Contractors and the Zambia Association of Manufacturers. On the meta-level, there are a number of actors variably advocating for special interests related to the environment dimension or the people dimension in building construction, but there is at this stage no entity commanding network hub status.

III.1.2.2. Micro-level actors

Demand side

The demand for building construction services is growing fast in Zambia, driven by the expansion of the Zambian economy, population growth, urbanization, investment and national infrastructure development. Forecasts of housing demand based on Vision 2030 show that there will be a demand for 1.3 million new dwellings from 2011 to 2030, equating to one house built every two minutes of the working day for 19 years. The majority of this housing demand will be stimulated from households with limited or no formal employment, very low incomes, and no state social security.23

Home ownership in Zambia is high, with more that 70 per cent of all adults (and more than 80 per cent of rural adults) or members of their households claiming to own the dwelling that they live in, however, 87 per cent of homeowners do not have title deeds for their land. Home ownership is mainly held by men, and affordability levels for conventional housing are low. A recent study suggests that the housing needs of only one per cent of the population, or 20,000–30,000 households, are adequately served.24 This 1% of households, have an average monthly income of ZMK 16.7 million (US$3,300) and housing typically consists of a three bedroom, single storey unit on a 1,500m² plot of land. In urban areas, this costs about US$150,000.25 In the low-moderate income market, housing is generally offered at about US$70,000 for a three bedroom house on a 600m² plot. At these rates, a household would have to be formally employed and earn about ZMK11.5 million (US D2,300) a month to afford this housing.26 In informal areas, housing is expensive, with prices ranging from around ZMK 100 million (about USD 20,000) for a house constructed with basic materials to ZMK 500 million (USD 100,000) for quality construction.27 With only 11 per cent of employed adults earning a formal salary, a majority of buyers purchase finished units, and often houses tend to be built incrementally based on savings, with the result that many houses remain uncompleted.28

As with owner occupied housing, the affordability of rental housing is largely dependent on the cost of housing and incomes of the households occupying it. The formal rental market in Zambia is regulated through the Rent Act 1972, and in practice the act applies to houses in high/medium cost formal residential areas, however informal renting and subletting is expanding in informal settlements.29

Urban households are fairly evenly divided between ownership, and renting from private landlords, with the majority of private renting taking place in what once was owner-occupied housing; site and service housing; and squatter settlements. Most of the renting is of a whole dwelling or a suite of two or three rooms and it is estimated that approximately five per cent of all urban housing is rented from an employer (with rent being paid), in addition to those occupying free housing owned by their employer.30

Supply side

As indicated in the map, a major network hub in the map is constituted by architects: They develop the building design, facilitate the related planning permits, link the customer with a contractor and supervise the latter during the implementation of the building project. Architects also exert leverage over the building construction process since their designs shape customer demand and determine the building material mix, an aspect further discussed in Chapter II.3.3.

As of 2012, 175 architects were registered with the Zambian Institute of Architects (ZIA, refer below for more information on this body), mostly operating out of Lusaka or urban sub-centers in the Copperbelt, and either heading their own small bureau or employed by an

23 UN Habitat, 2012.
24 UN Habitat 2012.
26 CAHF, 2012; UN Habitat, 2012.
27 CAHF 2012.
28 CAHF, 2012; UN Habitat, 2012.
29 UN Habitat, 2012.
30 UN Habitat, 2012.
office. These enterprises are locally owned and managed and mostly work under formal contract for Government, corporate clients or individual house builders. Judging from the extent of informal building construction in the country, it must be assumed that many more individuals not registered with ZIA also offer building design and planning services in the market, or that registered architects work sometimes with non-registered contractors.

Two other network hubs on the micro level are registered and non-registered contractors, tasked with the actual construction of residential buildings. To be classified as a registered contractor, an entity must have registered with NCC (further described below). To register with NCC, a contractor must have registered with PACRA first, thus effectively formalizing its business operations on paper. NCC registration is not mandatory for contractors but a precondition to participate in Government tenders and can be a requirement set forth by property developers or large-scale contractors when subcontracting out piecework in a building project. NCC also maintains a separate category for artisans that hold a formally recognizable trade qualification.

In 2011, 1,665 small and medium scale contractors had registered with NCC, graded into categories 4 to 6 along a set of criteria related to in-house expertise, asset base, and project handling capacity. Another 186 contractors had been classified as large-scale businesses. According to NCC, a registered small-scale contractor on these grades is typically a sole-proprietorship firm or a family owned business, with a few foremen and casual labour, employed on a need-to-need basis. Equipment and tools owned may comprise a set of hand-tools, control and measurement aids, with probably a small truck or pick-up, pedestrian roller, and tractor for the established small contractor.

Registered contractors might hold a skill/qualification in a particular trade relevant for building construction but will more typically have specialized on the management function of the building project.

A 2008 breakdown of the NCC registration figures show that about 60 per cent of the contractors then registered were classified as specialized in building construction—the equivalent of about 1000 registered MSME contractors. 2012 figures furnished by NCC during the field consultations imply that the number of MSME contractors has further grown; according to these figures, 418 contractors are currently classified as Grade 4, 1,170 contractors are classified as grade 5 and 1940 contractors are classified as Grade 6—this would be equivalent to a two-fold increase in entries over the space of twelve months.

**NCC grading of contractors (2011)**

![NCC grading of contractors (2011) chart](image)

Source: National Council for Construction: Contractors Registered in 2011 (Adapted from Sumaili, 2012)
The number of non-registered contractors in Zambia is estimated to be around twice the number of contractors registered in Grade 6, about 4,000 entrepreneurs. According to UNHABITAT, the unregistered contractor is typically a single person hired on a labour only contract (with limited equipment), to incrementally build houses on a room by room basis, based on the available resources of the client, using locally-sourced materials and labour based technologies. Most informal contractors hold some degree of skill/qualification in a particular trade relevant for building construction (like bricklaying or carpentry) but might have acquired these qualifications through channels that are not formally recognized in the national skills qualification framework.

Another micro-level network hub is the population of property developers that exert significant influence over local building construction activities due to the size of the building projects. Commercial-scale housing property development relates to the construction of gated estates, public housing facilities or company housing compounds.

In some cases, these building projects can comprise thousands of housing units –meaning that a single investment decision of a property developer can reset the entire supply chain for a given building construction input. These property developers pre-finance and manage the building project (in the latter case often through an intermediary), while the actual planning and construction work is commissioned out as a single assignment or in work packages. The developer might decide to sell the housing stock off after completion, or variably retain ownership of the property and rent out individual housing units; in both cases, developers will often draw on the services of real estate management agents. Commercial-scale real estate management services are currently offered only through few agents, among them prominently local branch offices of internationally operating companies like Knight Frank and Palm Golding.

As illustrated in the map, several other micro-level network hubs were identified for critically important factor inputs into the building construction process. In some cases, these network hubs appear to effectively control the supply chain.

Building materials: Basic building materials are produced in Zambia while high value-added materials tend to be imported. In many cases, the supply chains tend to be controlled by few actors. For example, the production of cement is controlled by Lafarge, with some market share now taken by Zambia Portland Cement (and a third player, the Dangote group of companies, set to take up production in 2014); while the local supply of timber is effectively monopolized by the Zambia Forestry and Forest Industry Corporation (ZAFFICO). Higher value-added building materials like sanitary ware, tiles or electrical components are usually imported via agents, that sometimes double as hardware merchants, with retail chains like MICA, MICAR and Handyman’s controlling shelf space. For other locally sourced materials like sand, brick stones, and building blocks that do not require capital intensive means of production, the local manufacturer base is more diversified, and inputs are distributed through actor populations of both formal and informal traders doing business along roadside markets.

Machinery and equipment: Most machinery and equipment, except locally produced basic tools are imported through the abovementioned network of agents.
Utilities: Building construction activities (as much as the production of building materials like cement or steel), which rely heavily on electricity and water, are provided by the National Water Supply and Sanitation Council (NWASCO) and the Zambian Electricity Supply and Power Corporation (ZESCO), and Lunsemfwa Hydro Power Station.

Finance: No entity could be identified that would be specifically dedicated to the provision of financial services for the building construction industry, or for SME contractors for that matter, implying that actors source debt finance either through commercial banks, or in the case of non-bankable, non-registered contractors through micro-finance providers or traditional money lenders.

Skills: Academic training for architects, planners, surveyors and engineers is carried out mainly by the University of Zambia and the University of the Copperbelt, through the Department of Civil and Environmental Engineering and the School of the Built Environment.

Notably, no research and development body dedicated to environmentally-friendly building design could be identified that would provide the industry with access to information or skills training in this specialized field. The Technology Development and Advisory Unit (TDAU) linked to the University of Zambia might partly perform this role but its exact mandate and range of services will need to be further explored. The same observation applies to the national science and technology council; both entities were assigned actor status.

Access to industry-specific formal technical education and vocational training (TEVET) is mainly through the Thornpark Construction Training Centre and the Construction School linked to NCC. Numerous other TEVET institutions offer entry-level training in skills like bricklaying, carpentry and welding, all of which are potentially relevant for building construction, these institutions are plotted as an actor population at the shore of the industry. Supply for skills training for workers employed by informal builders is mainly through the above mentioned TEVET institutions, plus local and international non-governmental organizations like the ‘Human Settlements for Zambia’ and ‘Shelter for All’ that offer entry-level and short-term certificate training courses in plumbing, welding or brick-laying. The same organizations also offer basic business management training for MSME’s owner managers. The NGOs are plotted next to the TEVET institutions as another actor population at the shore of the industry. Otherwise, informal contractors and tradesmen working for them typically rely on traditional apprenticeships, internships or other means of learning-on-the-jobs to acquire qualifications.
III.1.2.3. Macro-level actors

At the macro-level, the key institution tasked with the facilitation of the regulatory framework for building construction is NCC, the central body for issuing permits and approving building projects in the country. NCC is plotted at the very core of the value creation process, and classified as hub – other macro-level actors like MLGH (tasked with the facilitation of the policy and legal framework for building design), the MTWSC (tasked with facilitation of the construction policy and regulatory framework) the MLNREP, town councils and the District Development Committees (the latter tasked with the enforcement of existing rules and regulations at the local level) link to micro-level actors and other macro-level actors through this entity.

About NCC

The National Council for Construction (NCC) is a reconstituted statutory body. The National Policy on the Construction Industry, a Government policy document, initiated and approved by cabinet in 1995, prompted the initial formation of the NCC. The aim of the National Council for Construction is to promote and build the capacity of the Zambian construction industry. The NCC has two operations departments, namely training and registration:

- Training: The construction school’s core function is to provide training, coordinate, improve, and facilitate the accessibility to training in the construction industry in Zambia that comprise building (residential and non-residential) and civil engineering (roads, bridges, water and sanitation infrastructure, etc.) in order to achieve and maintain the highest possible standards in the industry.
- Registration: The NCC is responsible for registration of contractors, construction manufacturers and suppliers conducting routine and random inspection of construction sites countrywide; and capacity building for local contractors.

The NCC grades contractors in categories according to the maximum value for which they can tender (graded as 1–6). Grades 1–3 are larger scale developers and grades 4–6 are MSME’s (emerging contractors). All construction companies who wish to tender for government work must be registered with the NCC and therefore the NCC acts as the “informal” regulatory actor between formal and informal contractors.

Another network hub is NCC, with a mandate to facilitate the development of the construction sector. NCC is plotted as a network hub since it exerts significant leverage particularly on formal building construction activities of micro-level actors, and in practice acts as the

About NHA

The National Housing Authority (NHA) was established in 1971 by an Act of Parliament to make better provision for the development and control of housing throughout Zambia. The NHA is a fully government-owned institution and the only major player in Zambia in the production of housing for sale as well as for rent. The NHA is divided in five main business units: consultancy, town planning, construction division, finance division and personnel and administration division. The main functions of the institution are: to advise the Government regarding the formulation and implementation of national policies on housing; to undertake, support and encourage research in all aspects of housing, with particular emphasis on low housing development; to provide consultancy services in all fields associated with housing development and to develop, manage and control housing estates. In order to properly implement these different functions, the National Housing Authority provides its clients with different services ranging from town planning, land surveying, from architecture, to engineering and quantity surveying services. The development of housing schemes by National Housing Authority has spearheaded home ownership in various towns and cities where houses have been constructed and sold to the general public (www.nha.co.za).

The Act allows the NHA to enter into Public Private Partnerships (PPPs) for housing developments and in practice the implementation of the Act has been largely driven by market conditions resulting in more expensive private housing units being built and less affordable public housing. Although the NHA has a legal mandate to upgrade squatter settlements/informal housing, this remit has been sidelined over the last decade, mainly due to inadequate government funding and limited resources. This has resulted in large developers (in PPPs with the NHA) benefitting from government subsidies, leaving MSME’s and low income groups with little or no benefit. (UN Habitat, 2012).
interface between industry and other macro-level actors like the MOLSS.

Another government entity plotted as network hub is the actor population of **City Councils**, as they are the interface between industry actors and Government in all matters related to compliance with building construction rules and regulations at the municipal level. Refer to Chapter III.3 for stakeholder feedback about the performance of the city councils.

A number of industry associations exert some leverage over the people web, representing variably the interests of registered or non-registered contractors, construction workers, input suppliers or the environment from which people draw resources in the interaction process. Most of these entities have been plotted as actors due to their more limited outreach, but the **Association of Building and Civil Engineering Contractors** and the **National Association of Medium and Small-scale Contractors** (NAMSSC) have been singled out as network hubs since they speak on behalf of the registered and non-registered contractors in the industry, and in this capacity are linked to NCC and a host of other macro-level actors.

Furthermore, the **Zambia Association of Manufacturers** has been plotted as a hub due to the bargaining power of its membership in the industry; the field consultations were to shed light on the question whether this entity de facto exerts the assumed leverage. The principal actor speaking on behalf of the environment and thus plotted in the network map as is the Zambia Environmental Management Agency. Another macro-level actor plotted in the network map is the Technical Education, Vocational and Entrepreneurship Training Authority (TEVETA) since it regulates the operations of the TEVET institutions in the country and thus exerts leverage over the skills training offering for building construction workers.

Finally, the work of selected technical professions directly involved in building construction is regulated through dedicated entities like the Institute of Architects, the Surveyors Institute of Zambia, the Zambia Institute of Engineers, and the Zambia Institute of Planners. These institutes serve as industry ombudsmen, and are meant to safeguard minimum service standards for each profession, and represent the interests of their membership in national policy dialogue. Based on the findings of the desk research, none of these entities was classified as a network hub.

The primary macro level actor speaking on behalf of the environment in the building industry should be the Ministry of Lands, Natural Resources and Environmental Protection (MLNREP). The MLNREP provides the policy framework for Land, Natural Resources and Environmental management and through a statutory body called the Zambia Environmental Management Agency (ZEMA), previously known as the Environmental Council of Zambia, advises on the formulation of policies on all aspects of the environment and sustainable management of the environment.

Both MLNREP and ZEMA are plotted as actors, not network hubs, since it appears from the desk research that their linkages, particularly to micro-level actors in the building construction industry, are weak or absent. Also refer to the findings of the field consultations for a further qualification of the role of MLNREP and ZEMA.

**III.1.2.4. Meta-level actors**

A number of actors intervene on the meta-level as advocates for the environment in building construction, among them environmental NGOs like the Green Living Foundation, the Earth Foundation, the Sakakimbi Ecovillage Foundation, Habitat for Humanity, the Earth Living Organisation, People’s Process on Housing and Poverty, and an organization called Green Living. At this stage none of these organizations seems to command the status of a network hub. On the Government side, organizations like NHA and NCC perform the role of advocates as a side role; and the same observation applies to the University of Zambia (UNZA) and the Copperbelt University.

Other meta-level bodies intervene as advocates for vulnerable groups of people involved in building construction; examples of these organizations are the civic forum on housing and habitat, the Zambia Association of Women in Construction, the Zambia Alliance of Women, and the Zambia National AIDS network.

At this stage, no industry specific mass media appears to exist but building construction topics are frequently captured in local newspapers.
Meta, micro or macro-level? The peculiar role of environmental NGOs in Zambia

Environmental NGOs have been plotted as meta-level entities in the network map. The classification could be challenged, since these actors are among the main drivers behind existing MSME-specific development initiatives focused on green building in Zambia, and their interventions effectively cut across at least two system levels, combining meta-level advocacy with capacity building support for micro-level actors. NGOs have been still grouped as meta-level actors since in the view of local actors, the core role of these entities is to act as advocates for a social or environmental causes, not to compete with micro-level actors for market share or establish parallel macro-level governance structures. In the case of international NGOs, one could argue that these actors should not be plotted in the actor network map at all (similar to multi-bilateral development partners) since they are meant to not interfere at all into economic transactions but reach out to their beneficiaries via local intermediaries.

Examples of (green) building construction initiatives supported by NGOs

<table>
<thead>
<tr>
<th>Project/ company name</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Homeless And Poor People's Initiative</td>
<td>Provides affordable natural building and sustainable technology services by advising, teaching, and training poor and homeless people and communities in underdeveloped rural areas.</td>
</tr>
<tr>
<td>Imagine Rural Development Initiative (IRDI)</td>
<td>Empowers rural communities in Zambia to improve access to quality nutrition, water, shelter, education, health, information technology and equitable income-generating opportunities.</td>
</tr>
<tr>
<td>People's Process on Housing and Poverty in Zambia, PPHPZ</td>
<td>Supports poor urban communities to plan and implement their own solutions to the challenges of inadequate land, housing and infrastructure provision. It advocates for changes in policy and practice by actively engaging local and national governments. They have used hydraform blocks in its projects to good effect.</td>
</tr>
<tr>
<td>CARE Zambia</td>
<td>Operating in Zambia since 1992, CARE operates programmes on infrastructure improvement in peri-urban areas partnering GRZ in the PUSH programme. CARE has pioneered community water supplies, employing management and maintenance workers from the communities, and improved sanitation and health awareness, through local Water Trusts.</td>
</tr>
<tr>
<td>Civic Forum on Housing and Habitat (CFHH)</td>
<td>CFHH is a network that advocates for decent, affordable and adequate housing for poor and marginalized people in Zambia. The network creates space for participation of organized low-income communities to access adequate housing in a sustainable way. It also expects to conduct dialogue with governments and local authorities to address housing in innovative ways.</td>
</tr>
<tr>
<td>Habitat for Humanity (HFH)</td>
<td>Founded on Christian principles, Habitat for Humanity works world-wide to champion decent housing as a human right and to mobilize and support communities to overcome barriers to safe, decent and appropriate housing.</td>
</tr>
<tr>
<td>Human Settlements of Zambia (HUZA)</td>
<td>Human Settlements of Zambia (HUZA) a national NGO has been working to upgrade urban settlements in Zambia since 1971. HUZA’s major areas of activities have included construction, appropriate technologies, environmental conservation, education, food security, health education, income generation, and micro credit.</td>
</tr>
<tr>
<td>Shelter for All (SHF)</td>
<td>Shelter for All is an NGO promoting low cost and affordable housing based on partnerships and participatory strategies involving beneficiaries and other players involved in human settlements development.</td>
</tr>
<tr>
<td>African Housing Fund</td>
<td>Under the auspices of UN-Habitat and Shelter Afrique, the African Housing Fund supplements government and other international development funding for improvements in housing, water, sanitation and energy supplies, and housing microfinance.</td>
</tr>
<tr>
<td>Biogas digester construction</td>
<td>MEWD is working with the Water and Sanitation Association of Zambia (WASAZA) to build capacity for biogas digester construction.</td>
</tr>
<tr>
<td>NAPS</td>
<td>A Finland-based company, is planning to set up a solar energy plant in Zambia to provide cost-effective solar kits for people.</td>
</tr>
</tbody>
</table>
III.1.3. MSME development opportunities linked to green building

In order to specify analyze specific development opportunities linked to the promotion of green building practices in Zambia, it is important to clarify the meaning of green building construction in the local context. Green building refers to the development of a structure using processes that are environmentally responsible and resource efficient throughout a building’s life-cycle. Essentially, the same value creation process as for conventional building construction applies, and the same actors are potentially involved, but the methods applied and inputs required may differ somewhat.

The following principles of green building are often cited:

1. Being locally appropriate: Green building should be in sync with social, economic and cultural context within which they are situated.

2. Conserve the natural environment: Green building implies an environmentally-sensitive approach to the design and construction of the built environment, and an approach that aims to conserve the natural resources and ecosystems that sustain life in the area.

3. Use resources efficiently and effectively: Green buildings should be designed to maximize the efficiency of energy, water and materials, and to optimize resource use to achieve the desired function.

4. Approached on a life cycle basis: When deciding about the design of a building and the specific materials from which it is to be made, the entire life cycle of products must be considered in order to select the best overall option. Particular consideration should be given to the resource intensity (embodied water or carbon) and end-of-life effects (toxicity, recyclability) of materials. Lifecycle costing should also be used to select design solutions that optimize the cost over the life of the building, not just upfront.

5. Minimize waste: Green buildings should aim to eliminate waste in their construction and operation by selecting materials and systems that are reusable or recyclable, and eliminating those that are not, through careful procurement and the design of efficient systems in closed cycles where waste streams are utilized in other systems. This requires a systems-thinking approach in the planning and design phases, aiming to emulate nature by reusing, constantly recycling, and putting to use discarded resources elsewhere in adjacent systems.

6. Use renewable resources: Resources and materials that can be sustainably renewed through natural processes and sustainable cultivation are preferred to resources from non-renewable sources. Solar energy, harvested rainwater and sustainable timber are all examples.

7. Implement sustainable procurement: The procurement of goods and services for the planning, operation, management and maintenance of buildings should take environmental considerations into account. Sustainable procurement includes a wide range of factors, including the selection of low-toxicity and renewable materials, local products and services as a mechanism for local job creation, and materials and equipment based on life-cycle assessments. Every project should state procurement criteria that are suited to the project type and location as well as its immediate environmental and social impacts.

8. Utilize locally sourced materials and skills: Products and materials sourced and manufactured in the vicinity of a development site reduce the energy embodied in transporting materials over long distances to the site. Furthermore, the use of local materials boosts the local economy and promotes local job security.

9. Maximize the health and well-being of users: developing healthy environments for people to live and play in should be a primary goal when designing and constructing the built environment. Avoiding the impact of toxic emissions from materials in the indoor environment and during their manufacture requires particular attention. Consideration should be given to natural light, indoor air quality, visual comfort and thermal comfort in the built environment.

10. Allow real time monitoring and evaluation: building managers and homeowners play an important part in ensuring the optimal performance of green building systems.

The effective operation of buildings requires an environment rich in data on building performance, at least in terms of energy use, water use and internal conditions. Real-time feedback on building performance...
is the only way for facilities managers to be alerted to poorly performing systems. Described in the following are MSME-specific development opportunities related to green building construction that focus on selected aspects of these green building principles. Some of these opportunities can draw on concrete examples from the local market place while many others are contingent and without local precedent—a reflection of the fact that judging from secondary data sources, the Zambian building industry is still at an early stage of transition towards greener building practices.

**III.1.3.1. Use of renewable resources**

Zambia has an installed electricity capacity of 1850MW, of which 96 per cent is generated from hydropower and four per cent from thermal power. The main producer is ZESCO, supported by two smaller suppliers, CEC and Lunsemfwa Hydro Power Station. The Ministry of Energy and Water Development (MEWD) together with the Energy Regulation Board facilitates the sector-specific policy, legal and regulatory framework in line with the provisions of the Energy Regulation (Amended) Act 2003. A Rural Electrification Authority (REA) was established by an Act of Parliament No. 20 of 2003, with the primary aim of providing electricity infrastructure to rural communities.

Most of the supply from the power grid is consumed by the mining sector; as the grid connectivity of private households in Zambia is very low (only one of every five households) with the result that the majority of Zambians—in both rural and urban areas—depend on unsustainable and expensive means of energy generation like firewood, coal, or diesel generators. In light of current population growth rate and urbanization trends, this trend is unlikely to change, notwithstanding efforts by the Government to increase electricity generation and transmission by 1000MW by 2015.

The renewable energy potential in Zambia is vast and largely untapped. Untapped commercial hydro-power generation is estimated at 6 000 MW; further, an average of 5.5 kWh/m²/day of solar energy is available in the country, with approximately 3,000 sunshine hours annually; wind speeds average 2.5m/s at 10m above the ground, a speed which is mainly suitable for mechanical applications; biomass energy woodlands and forests are estimated to cover about 50 million hectares, or 66 per cent of Zambia’s total land area.

In light of the situation above, the case for the promotion of decentralized power generation from renewable energy sources seems strong. However, there are no specific macro-level regulatory frameworks for renewable energies in Zambia in place and the Energy Regulation 7Act (ERA), the SNDP and Zambia’s national environment policy (2011) make only limited reference to the subject. On the micro-level, there are few and so far largely uncoordinated initiatives to facilitate a green economy transition: For example, REA promotes the utilization of solar power within its rural electrification programs. Also, ZESCO has formed a joint company with the Zambia electrometer Ltd for the production of energy saving Compact Fluorescent Lamps (CFLs) and has implemented a “swap six for six” project aimed at promoting the use of CFL’s. This project is financed through World Bank and the GoZ for $1.350m which has been used to buy and distribute energy saving bulbs (at no cost) through ZESCO’s demand side management programme. MSME-specific market development opportunities related to decentralized energy generation and provision of energy-saving related devices include:

- Installation and maintenance of solar thermal and photovoltaic applications into new and existing housing stock.
- Establishment of energy service companies or micro-utilities to decentralize and diversify current energy where there is sufficient traditional electrical energy, or in rural non electrified contexts.
- Trade, installation and maintenance of energy efficient lighting technologies (like CFL’s and LED’s).
- Installation and maintenance of energy consumption monitoring devices (smart meters).

**III.1.3.2. Improvement of resource efficiency**

Fresh water is a scarce and critical resource. Less than one per cent of water on Earth is easily accessible and ready for human consumption. Unlike many other countries in the region Zambia has more than adequate water resources however particularly the enforcement of the regulatory framework for water management is weak and as a result water quality remains a challenge.

The regulatory water supply and sanitation frameworks are provided by the Local Government Act (No. 22

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34 REEEP, 2012
35 GoZ, 2012.
of 1991), which makes city councils responsible for water supply throughout their areas, and the Water and Sanitation Act (No.28 of 1997), specifies how the city councils should provide the services directly or through private sector commercial utilities. The latter act also set up the National Water Supply and Sanitation Council (NWASCO) which regulates the suppliers. The National Water and Sanitation Strategy of 1994 provide an overall policy framework for water and sanitation and aims at equitable and good quality service for all users.36

Zambia has an installed electricity capacity of 1850MW, of which 96 per cent is generated from hydropower and four per cent from thermal power.

In urban areas, the provision of water and sanitation services is nominally the domain of the Zambian Water and Sewerage Companies owned by City Councils. As far as the provision of water is concerned, they provide water to the perimeter of their supply areas and thereafter through Ward Development Committee’s and NGO’s distribute water through Ward Committees and Tap committees. As far as sewerage services are concerned, Water and Sewerage Companies are only responsible for sewerage in large urban areas, other forms of disposal for human waste, such as composting waste and pit latrines are the responsibility of the city councils. 35 sewerage schemes are currently in existence but most of them require rehabilitation.37 There are regulations stipulating distance between latrines, houses, water source and ground water however the standard is rarely followed especially in urban informal settlements.38

In rural areas, the public water and sanitation infrastructure is largely undeveloped and the provision of water and sanitation services consequently largely relies on decentralized solutions, like the provision of tap water through boreholes and the disposal of human waste in community level composting schemes and through household pit latrines.

The lack of water infrastructure management and distribution has led to local water quality concerns as effluent is not adequately managed. This has lead to the pollution of ground and surface water, posing serious health and aesthetic challenges to the population.39 For example, WHO estimates that there are more than 12,700 annual deaths in Zambia due to diarrhoea caused by polluted water and bad hygiene.40 Even in urban areas, only half of households have access to proper sanitation facilities.41 In the face of rapid urbanization in Zambia, the existing water and sanitation infrastructure is likely to come under further strain and the situation particularly in the informal settlements at the fringe of larger cities like Lusaka could thus further deteriorate.

Access to sanitation services has remained unsatisfactory due to inadequate funding for capital investments, ineffective community participation and stakeholder involvement in the design, operations and management of sanitation facilities, a scarcity of appropriate low-cost standardized sanitation technologies and the sprouting of unplanned settlements and urban areas.42 Also, financial sustainability is a major concern particularly in the operation of all Water and Sewerage Companies since their tariffs are regulated by NWASCO and do not take into account the full cost, resulting in collection deficits and limited resources available for maintenance or expansion.

Specific development opportunities for MSMEs related to greener building practices with a focus on the provision of clean water and sanitation services include:

- Production, installation and maintenance of rainwater harvesting and grey waste water systems as an alternative to using potable water for gardening, cleaning or flushing toilets.
- Installation and maintenance of water efficient devices such as low-flow devices (taps, shower heads).
- Installation and maintenance of biogas digesters to produce fertilizer and gas that can be used for cooking and heating.
- The rehabilitation and construction of boreholes in rural areas.
- Alternative sanitation options could also be considered, and include composting toilets, black

37 MoFaNP, 2011.
38 WHO, 2011.
40 UN Habitat, 2012.
42 GoZ, 2012.
water systems, which are already in wide scale use in informal houses.

III.1.3.3. Utilization of environmentally friendly building materials

An interesting aspect is that most building materials traditionally used in local housing construction in rural areas, and particularly in low cost housing, would classify as environmentally-friendly along the green building guidelines quoted above. Building materials like adobe, timber, stone, clay, thatch and dung have been dominant in rural and urban housing construction. Some of these materials are good conductors of heat (corrugated iron); some prevent heat from passing through and are therefore good insulators (cardboard, wood and glass fibre); while others can store heat efficiently (clay brick, concrete, stone and water). Most importantly in the context of this research report, many of these traditional building materials are produced locally and involve less capital intensive and more labour-intensive manufacturing processes that open entry routes for MSME.

However, with increasing living standards, consumer preferences in urban areas, among the emerging middle class, and the elite have notably shifted, in some cases due to superior quality of substitute building materials, and in other cases due to change in lifestyles. For example, urban Zambians attitude towards “earth buildings” for housing provision is associated with poverty and low socio-cultural status; this stigma has an impact on the selection of materials. This aspect is further explored in the following chapters.

Against the background of this consumer shift in building material preferences, the current primary materials inputs into the Zambian building industry are cement, asbestos pipes and roofing sheets, stones, timber, steel rods, plywood, emulsion paint, oil paint, steel window frames, steel door frames and laterite. Many of these building materials –but prominently materials made out of steel, cement, asbestos and paint– require capital intensive production processes and the local manufacturing base or variably the import channels are controlled by few large firms, with limited opportunities for MSME market entry. A case in point is asbestos-cement roofing sheets that are used in approximately 50 per cent of all urban dwellings in Zambia. As indicated in the actor network map, the local manufacturing base is largely controlled by one producer and distribution is done through large hardware stores like Mica, Micar and Handymans paradise –MSME only feature in the supply chain as far as the distribution of asbestos sheets to informal builders and through roadside traders is concerned.

As indicated above, many of these primary building materials could be potentially re- substituted by more environmentally-friendly and locally sourced products that offer MSME specific market development opportunities since manufacturing is less capital intensive. For example, TDAU, NGO’s and the National Science and Technology Council have been involved in testing compressed earth blocks and stabilized soil technology that could replace cement blocks. Also, ceramic roof tiles or thatch could replace asbestos roof sheeting, thus phasing out a product that is known to pose serious health risks from the inhalation of toxic loosened fibers. Furthermore, wooden doorframes and wooden window frames could once again replace steel frames. However,

Product substitution potential and risks: The case of timber

In Zambian urban formal construction, timber is used for roof trussing, purloins and doors. In the informal sector, lintels, windows and door frames are also made of wood. Currently Zambian planning and building regulations do not allow timber structure in cities as they are believed to be susceptible to termite attack and fires, however this perception is altering.

Zambia has a variety of timber species and many managed forests, however Zambia’s forests are under pressure as the deforestation rate is above regional and global levels. Deforestation is approximated at about 300,000ha annually due to clearing for settlements and large infrastructure development, clearing for agricultural expansion, unsustainable timber logging, fire wood and charcoal production and bush fires. This has been exasperated by limited afforestation and reforestation activities and the lack of an enabling policy and legal framework for effective sustainable forest management.

While opportunities exist to exploit timber for building applications, such measures will need to be carefully controlled to ensure that it does not undermine key ecosystems and is harvested sustainably.

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45 UN Habitat, 2012.
46 UN Habitat, 2012.
47 UN Habitat, 2012.
other than overcoming the hesitance in consumer markets, any of these product substitution strategies, requires a cautious supply chain development approach, to minimize risk of overexploiting increasingly scarce local natural resources or irreparably damaging the environment as part of the extraction process.

MSME development opportunities related to the production, marketing and use of environmentally friendly building materials include:

- Production of environmentally friendly building materials like lime, compressed earth blocks, small-scale termite hill clay bricks and timber.
- Removal and safe disposal of asbestos pipes and roofing sheets.

### III.1.3.4. Minimization of waste

Solid waste is garbage, refuse, sludge, and other discarded substances resulting from industrial and commercial operations and from domestic and community activities.\(^{48}\) Waste management is managed through the National Solid Waste Management Strategy of Zambia (2004) implemented by the Ministry of Energy and Water Development (MEWD) through ECZ in collaboration with MLGH-DISS. The strategy was developed on the premise that if systematic improvements were introduced at the various stages in the waste cycle (from generation to disposal), the quantity of waste generated at each of the subsequent stages would be considerably reduced.

Recycling of waste—including building construction waste—is a very important component in the sound management of waste. Recycling involving the utilization of discarded material to produce another product of the same grade or lower. The waste management strategy commits the GoZ to “vigorously promote and encourage investment in the establishment of infrastructure and technology for the reuse and recycling of waste” and support industries that are reusing and recycling waste through reducing the external costs of reuse and recycling and indicates their intention to introduce a mechanism to incorporate levies, penalties and tax rebates in order to encourage industry to adopt environmentally friendly technologies.\(^{49}\) The strategy is however largely silent on the minimization of waste during building construction and -demolition, including the recycling of secondary raw materials from building rubble deposit of toxic building rubble.

The Ministry of Local Government and Housing is de jure responsible for waste management service provision and operation of dumpsites, public awareness, formulation of by-laws and the development of waste management infrastructure whereas local authorities (city councils) are involved with service provision either directly or through private contractors. De facto, the capacity of both national and local Government authorities to execute their respective mandates is limited. For example, the current outreach of the waste management services rendered through local authorities is weak: Only 7% of households (18% in urban areas) see their waste being collected while approximately 33% of all households (21% in urban areas) dump their garbage on the road and 57% of all households (61% in urban areas) bury their garbage in pits on site.\(^{50}\)

It is important to note in this context, that waste recycling does take place, but that the related processes are mostly informal. In urban areas, waste items of residual value like cans, plastic containers or glass bottles are picked by informal waste pickers operating on dumps sites or along the roadside. In rural areas, volume of solid waste tends to be limited in the first place, and organic waste is often composted. The same observation applies to waste from building construction and –demolition, particularly in rural areas but also in low-cost housing developments in urban areas, building rubble is typically mined for secondary raw materials. Here, the main challenge relates to the proper recycling and where applicable proper disposal of potentially toxic waste like paint and asbestos sheets.

MSME development opportunities related to building construction waste management include,

- Solid waste management services during building construction.
- Reclaiming and recycling of secondary raw materials from building rubble.
- Safe disposal of toxic building material waste.
- Re-naturation of building sites.

### III.1.3.5. Sourcing of local skills

As indicated in the green building guidelines above, sourcing of local skills and products relates to the procurement of products and services from providers in the vicinity of a housing development, as a measure to boost the local economy and to promote job security. Sourcing of local skills and products thus directly connects to sustainable procurement – another principle

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50 UN Habitat, 2012.
of green building construction – with its emphasis on local products and services as a mechanism for local job creation and where every housing project should state procurement criteria that are mindful of its immediate environmental and social impacts.

An emphasis on local sourcing of products and skills puts MSME at the center-stage of attention throughout the building life cycle, from design and construction through to demolition. Particularly as far as informal building projects are concerned, this potential for the involvement of MSME seems largely exhausted, since virtually all services are locally sourced from informal providers. A similar observation applies for the sourcing of local building materials where many products might be imported but where the nature of the production process and structure of the supply chain bars MSME from market entry. Refer to the chapter on utilization of environmentally-friendly building materials and to the chapter with the description of the actor network map underpinning the building construction industry for more information.

A different picture applies as far as formal building projects are concerned. While MSME dominate this market segment as far individual housing projects are concerned, there is plenty of scope in strengthening their involvement in the implementation of large-scale housing projects commissioned by public sector or private sector property developers. More in particular, corporate building companies might commission piecework from MSME contractors when carrying out large-scale housing development projects under contract from these property developers. This practice is now actively promoted by GRZ but can carry challenges related to capacity constraints by MSME contractors. Refer to the next chapter for more information.

Large-scale property developers in Zambia
There is a small cadre of property developers serving the Zambian growing middle class consisting of local and foreign firms (mostly notably Malaysia, China and South Africa) from the private and public sector. The majority of these firms have established joint ventures with the NHA and are involved in supplying dwellings (individual houses or in estates) or bulk housing stock for rent or resale. Prospective buyers are expected to raise their own finance through loans from their employers, commercial banks, building societies and pension schemes and generally developers require a 50% upfront payment and the balance on completion.

Public sector firms include: NHA, National Pensions Scheme Authority (NAPSA), Kwacha Pensions Trust, and the Zambia State Insurance Corporation. Private sector developers include: Lusaka South Housing Park, Lilayi, Foxdale, Roma Park and Meanwood Housing Estate Companies.

A growing role in this market segment is played by corporate business aiming at the provision of staff housing or variably the development of community housing project as part of their corporate social responsibility work. For example, First Quantum Mines has started the construction of 10,000 housing units in Solwezi at an estimated cost of 500 million USD under its corporate homeowner scheme. The homeowner scheme is targeted at company employees and residents of Solwezi and offers housing finance at preferential rates. (Source: Zambia Daily Mail 12th December 2012). Another example is the Kabompo Gorge Hydro Power community housing initiative launched by the Copperbelt Energy Corporation (http://www.cecinvestor.com/, there click on social responsibility).

Further to the above, MSME contractors in particular are strategically positioned to implement piece work related to green building construction as part of large-scale housing development projects as they can readily draw on traditional know-how in building design, including use of locally sourced and environmentally friendly building materials, and adapted to local context and climatic conditions. In this niche market, they hold a competitive advantage over foreign building companies with their standard shelf designs and pre-fab components often not adapted to local conditions.
III.1.4. MSME-specific bottlenecks to market systems development

There is fast growing body of literature on the development challenges faced by MSMEs in Zambia. Most of these publications relate to generic development challenges while few highlight challenges that are specific to the building construction industry. None of the publications have an explicit focus on MSME development challenges to the green building construction.

III.1.4.1. Micro-level constraints

On the micro-level, skills shortages (both technical/vocational skills and functional skills), a lack of innovation in material technology and application, and a lack of access to business finance are frequently cited as bottlenecks to the development of MSMEs in general, and in the building construction industry in particular.51 This statement is corroborated by the actor network map; at present there are only two technical and vocational skills training entities dedicated to skills transfer in the building construction industry operating in the local marketplace, and another two academic institutions offering undergraduate courses in technical professions related to building construction.

These dedicated industry specific skills training providers are supported by a network of public TEVET institutions and private sector and third sector actors offering vocational education and technical training courses of which only two (the NCC Construction School and the Thorpark Construction Training Centre) are specialized in building construction. In the case of many private sector and third sector bodies, the courses are not accredited. Also, some of these courses are not accessible to some workers in the building construction sector, because they do not meet the eligibility criteria, cannot afford the course fees, or because these services are only accessible in the capital city or major urban sub-centers. Likewise, lack of access to markets particularly for informal MSMEs, here including non-registered MSME contractors is singled out as a development challenge.52 It is important here to qualify this observation for the building construction industry, since it appears from the desk research that non-registered MSME contractors in fact account for the most informal building projects, and therefore seem to easily access customer segments that are highly price sensitive and demanding low cost housing solutions. For them, the main barrier is market entry to customers like government or property developers and any other customer that might require formal registration as a precondition to do business. In any case, the barrier seems to be permeable, because there are many cases documented in the literature of non-registered MSME contractors carrying out piecework in formal building projects, or variably drawing on the services of registered professionals to implement their own informal building projects. These more informal business linkages are marked in the network map as weak connectors.

Another aspect with a potential bearing on demand for MSME contractor services in local consumer markets is the lack of access by MSME customers to housing finance: Zambia has a diversified financial sector which has been growing rapidly over the last five years, but the mortgage market remains small. A few of the commercial banks offer mortgage finance, in which commercial mortgages seem to dominate.

Interest rates are high: building societies charge over 20% and commercial banks around 18%, and otherwise have lending conditions (like minimum collateral requirements) that cannot be met by low income and middle-income households. A number of micro-finance institutions have started offering housing loan products to cater for customer segments, but the market is still in its infancy.53


III.1.4.2. Macro-level constraints

On the macro-level, an MSME development challenge frequently cited in the literature is the MSME compliance gap and resulting decent work deficits in the building construction industry, even though opinions vary on whether it is caused by lack of by regulatory bodies, prohibitive building regulations, excessive lead times to secure construction permits (also see text box below), lack of finance to meet compliance costs, and poor business ethics or ignorance of MSME owner managers.54

The case of construction permits

Good regulations ensure the safety standards that protect the public while making the permitting process efficient, transparent and affordable for both building authorities and the private professionals who use it. If procedures are overly complicated or costly, builders tend to proceed without a permit. According to data collected by the Doing Business report (World Bank, 2012), dealing with Zambian construction permits requires 14 procedures, takes 196 days and costs 2% of income per capita. As a result of these time consuming and costly barriers, many builders opt out or simply bypass the regulations (The World Bank, 2012). The UN Habitat (2012) found similar results, where regulations are ignored by many and due to poor enforcement; building outside of regulations is common within Zambia.

Related to the (lack of an) enabling policy environment above, an MSME development challenge specific to the promotion of green building construction is the lack of regulatory push to accelerate uptake of environmentally-friendly building materials that can be locally produced by small-scale businesses. As indicated earlier, the current Zambian building regulations specify materials rather than specific strength and thereby exclude many alternative and more labour-friendly earth technologies.55 TDAU, NGO’s and the National Science and Technology Council have been involved in testing compressed earth blocks and stabilized soil technology however the regulations are currently still silent on their inclusion.56

III.1.4.3. Meta-level constraints

On the meta-level, a frequently cited concern related to MSME development in Zambia is mistrust in consumer markets about the reliability and quality of their services rendered. Case in point is the lack of any warranty for services particularly from informal MSME, and the high rate of contract default. This mistrust weighs particularly heavily in the building construction sector where the financial risk involved for house buyers and builders is high and default can result in ruin.

Further to the meta-level and linked to green building construction but not specific to MSME only is the earlier mentioned attitudes particularly among urban Zambians towards traditional building materials like hatch, earth blocks and stone. In the mindset particularly of the emerging middle class these materials are associated with poverty and low socio-cultural status. This mindset translates into a barrier to the development of the market place for green building construction that directly affects both MSME contractors and MSME producers of environmentally friendly and locally sourced building materials.

There is apparently also inadequate awareness and information in the local consumer market –both among house buyers/builders and providers of building construction services– on the benefits of cleaner technologies.57 Green buildings are often perceived to be considerably more costly than conventional buildings which are a result of excluding the embedded cost savings for the green technologies/materials over the long term. The seemingly high up–front costs often discourage investment, particularly where the benefits are long-term or are externalized beyond the individual or organization making the investment. This poses a particular challenge in developing countries like Zambia where the majority of consumers finances their homes with cash or short term mortgages and is therefore very price sensitive. This sensitivity and related building decisions have an impact on the MSMEs’ material and technologies used.

54 Lack of MSME outreach of regulatory bodies is cited by MoCTI, 2008 and UN Habitat, 2012, excessive lead times to secure construction permits is singled out by the World Bank 2012, lack of finance to meet compliance costs, and poor business ethics, or ignorance of SME owner managers is prioritized (Sichombo, 2009, Phillips and Bhatia-Panthaki, 2007 and ILO 2012, Regulatory Impact Assessment of the Zambian construction sector.

55 UN Habitat, 2012.

56 UN Habitat, 2012.

III.1.5. Draft conclusions and recommendations for field testing

III.1.5.1. Draft conclusions

From the analysis of the actor network map it can be concluded that the web of economic interaction in building construction is spun around MSMEs but that the network mesh is cast wide. MSMEs constitute the bedrock of the industry and account for the vast majority of building activities, with responsibility for either the entire building project mostly in low cost housing segment or as a sub-contractor for large-scale contractors and carrying out piece work in commercial scale property developments.

Notwithstanding their paramount importance as network hubs, MSMEs have limited access to tertiary level skills training and limited access to finance —this observation applies in particular to non-registered MSME contractors and also for the whip strands of the MSME supply chain for critically important processed building materials like cement and timber, but also for machinery and equipment are controlled by few corporate producers and distributors.

In the building construction process and as far as MSMEs are concerned, informal and formal activities tend to inter-link; for example, informal traders might supply building materials to registered contractors while registered professionals might carry piece work for non-registered contractors. Registration is a prerequisite to tender for government contracts or with property developers, though, translating into an effective entry barrier to these market segments for informal contractors.

The actor network map also implies that the inter-action of many macro-level stakeholders like the Ministry of Labour and Social Security or the Ministry of Lands Natural Resource and Environmental Protection with a de jure mandate to facilitate the policy, legal and regulatory framework for building construction in Zambia is rather limited in practice; the statutory bodies under the Ministry of Transport, Works, Supply and Communication constitute an exception here as they exert strong leverage over the market place.

In some cases, where a macro-level stakeholder does seem to occupy network hub status (like the City Councils), it remains to be determined to what extent these default linkages translate into de facto bargaining power over micro-level actors.

The actor network map furthermore implies that MSMEs do have a voice in policy dialogue in Zambia; even subgroups with higher vulnerability like women seem to have organized in association that represent their interests. It will need to be further tested though, to what extent organizations like the National Association of Small and Medium Scale Contractors effectively execute their mandate.

Unlike with actors representing the interests (including special interests) of the people dimension, the voice of actors speaking on behalf of the environment affected by, or variably affecting, economic interaction in the building industry, seems far less articulate. As indicated above, the inter-linkages between actors in the building industry and the ‘default’ actor to represent the environment, the Ministry of Lands Natural Resources and Environmental Protection and its statutory bodies, appear rather weak. Likewise, while there are a number of meta-level actors advocating for balance between the interests of the environment and the interest of people in building construction, none of them seems to command network hub status. However, it must be noted that embracing the concept of a Green Economy not only achieves a critical balance between the interests of people and the environment but also creates employment ‘opportunities FROM the environment working FOR the people’.

The above said relates to building construction activities in general, but also to green building construction in particular. Green building construction at this stage essentially involves the same actors, including the same MSME contractors, albeit the choice of building materials and the building designs might vary. There appear to be no micro-level actors operating in the market place with specialization in green building design, green building construction or green building finance, and only very few actors with specialization in green building materials like solar power generation equipment. Where these inputs are made available, it is usually as a side service or supplementary offering.

Likewise, macro-level actors with an explicit and exclusive mandate to facilitate a policy, legal or regulatory framework for green building construction are notably absent. On the meta-level, and as indicated above, a number of non-governmental organizations have established themselves as advocates of green building designs but none of them has industry wide outreach at this stage.

Further to the above, the following MSME development challenges specific to the creation of green and decent jobs in the Zambian building industry have been identified:
Challenges and opportunities for the promotion of green and decent jobs through MSME development in the Zambian building construction industry
Draft findings from desk research

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Limited access for both registered and non-registered MSME contractors to green building skills training</td>
<td>• MSMEs can readily draw on traditional know-how in building design, adapted to climatic conditions and local context.</td>
</tr>
<tr>
<td>• Established corporate suppliers of conventional building materials might obstruct market introduction of environmentally-friendly substitute products, including materials produced locally by MSMEs.</td>
<td>• MSMEs can readily draw on traditional know-how in low-cost local building construction, including know-how on use of local building materials.</td>
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<tr>
<td>• Lack of access to green building technology.</td>
<td>• Diversified informal production and distribution networks for many local building materials.</td>
</tr>
<tr>
<td>• Lack of accessible and appropriate green products and materials in volume and at reasonable cost within the Zambian building industry.</td>
<td>• Households potentially keen to reduce heavy reliance on a single power provider through installation of decentralized energy generation solutions.</td>
</tr>
<tr>
<td>• Current methods applied by MSME suppliers to extract local building materials are often unsustainable (particularly related to stone quarrying, sand mining, logging).</td>
<td>• Households potentially interested in technology solutions and services to secure water supply, reduce water bills, and improve waste (water) management.</td>
</tr>
<tr>
<td>• Consumer markets serviced by MSMEs are highly price-sensitive and might refuse to absorb additional costs related to greener building.</td>
<td>• Judging from trends in developed economies, significant business development opportunities in urban mining.</td>
</tr>
<tr>
<td>• Property developers might be hesitant to adopt untested greener building practices, mindful of customer preferences, financial risk and quality concerns.</td>
<td>• Particularly informal builders can draw on experience in recycling and reuse of building materials.</td>
</tr>
<tr>
<td>• Absence of industry-specific MSME green business finance products to support switch towards greener building technology and greener building methods.</td>
<td>• Relatively low barriers to entry for solar and energy efficiency products, due to their promotion by macro and micro level actors.</td>
</tr>
<tr>
<td>• Limited comprehension among housing estate management companies about the merits of operating, maintaining and upgrading housing units in line with green building practices.</td>
<td>• Limited feasibility to involve MSMEs in services (water, energy) due to current market distortions.</td>
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<tr>
<td>• Limited acceptance among utility providers to support decentralized household-level energy generation and water management solutions.</td>
<td>• Limited comprehension among real estate agents about the selling points to push market value of, and trade in green buildings.</td>
</tr>
<tr>
<td>• Limited awareness about opportunities and risks related to mining of secondary raw materials is very low.</td>
<td>• Market awareness about opportunities and risks related to mining of secondary raw materials is very low.</td>
</tr>
<tr>
<td>• Lack of capacity to properly treat and dispose toxic building material waste like asbestos plates and pipes.</td>
<td>• Lack of capacity to properly treat and dispose toxic building material waste like asbestos plates and pipes.</td>
</tr>
<tr>
<td>Macro-level</td>
<td>Meta-level</td>
</tr>
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<td>-------------</td>
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</tbody>
</table>
| - Lack of coordination among associations representing registered and non-registered MSME contractors in the emerging national policy dialogue on green economy transition and green building practices.  
- Lack of adequate voice for entities representing the interests of people with special vulnerabilities (like women and people affected with HIV and AIDS) in the policy dialogue on green building construction.  
- Lack of emphasis on the promotion of green building practices in the draft construction policy.  
- Lack of emphasis of the draft construction policy on the promotion of a closed system loops and the management of building life-cycles.  
- Commanding position (with limited capacity) of a single macro-level body (NHA) biased in favour of registered MSME contractors (?), and conventional building methods and materials to middle to high income houses.  
- Lack of laws and regulations to incentivize the use of green building methods, materials and services ($pull$).  
- Weak enforcement of laws and regulations penalizing unsustainable/harmful building practices ($push$).  
- Law of capacity to implement, regulate and finance existing regulatory frameworks to provide sustainable services (Water, waste and energy).  
- Commanding position of a single macro-level actor regulatory body (NCC) biased in favour of conventional and tested building methods and materials.  
- Services (water, energy and waste) prices regulated beyond private sector participation feasibility.  
- Lack of standards and industry representation to guide RE and EE products thus could result in inferior and/or inappropriate green technologies being used in the Zambian Building Industry.  
| - Regulatory frameworks that support the development of greener cities.  
- A diversified spectrum of macro-level actors representing the interests of both registered and non-registered MSMEs that could be mobilized in support of membership uptake of green building practices.  
- Consumer demand for services (Water, energy, waste) outweighs current supply.  
| - Limited awareness in consumer markets about the meaning of green building.  
- Association of green building practices with low cost housing = poverty.  
- A consumer mindset that values imported building materials higher than locally manufactured inputs.  
- Stereotypes about the perceived higher costs of green building.  
- Reluctance among policy-level decision makers in a developing country like Zambia to take on western post-industrial concepts of a green economy.  
- Limited comprehension of actors across system levels about the link between green building practices, environmental sustainability and economic development.  
- Conservative mindset among MSMEs, often emphasizing on retaining tried practices rather than innovation.  
- No network hub to raise awareness and appreciation in the market place for greener building practices.  
- No dedicated R&D body on green building design.  
| - A vibrant scene of meta-level actors that could, and in some cases already do, advocate both people interests and environment interests in building industry.  
- Several actors that have a de jure mandate to be a network hub.  
|
Entry points for MSME-specific development support

As indicated in the network map, the Zambian building industry is overwhelmingly made up of MSMEs, from registered contractors through to architect bureaus and building input manufacturers and traders. While in theory it would be desirable to target the entire MSME universe with development support, in practice this approach is not feasible. It is therefore necessary to pre-identify MSME target groups where interventions are most likely to make a significant contribution towards the attainment of the programme objectives and measured against the overall programme indicators of achievement — and green job creation and increased household income.

Using direct employment creation effect and increase in household incomes (of people linked to these MSME as owner-managers or workers) as yardstick for the pre-identification of MSME beneficiaries, it is recommended to focus on the following MSME target groups:

<table>
<thead>
<tr>
<th>Primary target group</th>
<th>Secondary target group</th>
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<tbody>
<tr>
<td>• Within the actor population of NCC registered contractors: MSME contractors listed in either Grade 5 or Grade 6.</td>
<td>• Within the actor population of non-registered contractors: Contractors not registered with NCC but registered with PACRA. • The actor population of small-scale producers of environmentally friendly building materials—likely compressed blocks.</td>
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</table>

The target group of NCC registered contractors in Grades 5 and 6 has been profiled in the previous chapter. These registered MSME contractors were pre-identified as entry point for MSME development support because contracting work is labour intensive and the target enterprises are highly likely to recruit additional staff as soon as a building project is secured. NCC registration is treated as indication of their propensity to grow their business and to move upwards on the informality-formality continuum and as a result create new and decent jobs that provide increased household income.

A similar observation applies to contractors not registered with NCC yet but registered with PACRA, here, PACRA registration is interpreted as principal willingness to formalize and expand business operation, albeit starting from a lower point of departure on the informality-formality continuum. By focusing on Grades 5 and 6, it is on the other hand ensured that programme support reaches for MSMEs that are particularly vulnerable and in particularly high need for external capacity building interventions.

By direct comparison, other potential MSME target groups in the Zambian building industry have either lower job creation potential, are more likely to create jobs that do not meet basic criteria for decent work. For example, the labour intensity of the production methods for many building materials is more limited, or production is capital intensive and thus barred to most MSME. An exception is the production of compressed earth blocks that is further discussed in the next chapter and might offer further market penetration opportunities for small-scale manufacturers. In the case of specialized knowledge providers like engineers, architects, planners and surveyors, the barriers to labour market entry are punitive for most job seekers, and the nature of the service is not labour intensive. In the case of MSME contractors neither registered with PACRA or NCC, the growth propensity is much less evident, and the risk to facilitate the creation of jobs that fail to meet at least the fundamental rights at work outlined earlier in this report.

Seen in relational context, the principal entry point to facilitate the adoption of greener building practices among MSME contractors are the network hubs linking into this actor population. Network hubs can serve as communication transmitters and often can exert bargaining power that can serve as a trigger for behaviour change.

The following network hubs have been pre-identified as intervention points for catalyzing behavior change among contractors in the Zambian building industry:

**Micro-level**

- Department of Civil and Environmental Engineering in the University of Zambia and the School of the Built Environment in the Copperbelt University
- Thornpark Construction Training Centre and the NCC Construction School
- Architects and draftsmen
- Property developers
- Hardware merchants, here with emphasis on MICA, MICAR and Handyman's Paradise

**Macro-level**

- The National Construction Council
- The National Housing Authority
- City Councils
- The Association of Building and Civil Engineering Contractors
- The National Association of Medium and Small-scale Contractors

**Meta-level**

Through the Universities and construction schools it is possible to widely diffuse green building skills among architects, who in turn are likely to influence contractors to put green buildings designs into practice. Property developers are considered to be game changers since
they can shift building practices in the market place by commissioning the construction of hundreds of housing units at a time. Hardware merchants control shelf-space for building materials, machinery and equipment and thus can stimulate market uptake for green building materials. The National Construction Council and the National Housing Authority facilitate, and City Councils are the main interface to enforce, the policy, legal and regulatory framework for building construction and thus potentially affect the way building projects are executed. The Association of Building and Civil Engineering Contractors and the National Association of Medium and Small-Scale Contractors give the MSME beneficiaries a voice in national policy dialogue and at the same time can influence their membership to adjust their business practices.

Notably, the network hubs listed above are all directly inter-linked, opening the prospect of triggering circular chain reactions across the people web. For example, a green building design proposed by an architect and accepted by property developer might catalyze registered contractors to adapt their building practices and source more environmentally friendly building materials from merchants. The green building projects might have a demonstration effect, stimulate customer demand and motivate more architects to offer green building designs.

As indicated in the network map, in some cases individual actors are strategically positioned in such manner that they can exert influence over a network hub even through a single connector. For example, the Ministry of Transport, Works, Supply and Communication is mainly linked to the building industry via the National Council for Construction, and does have leverage over this statutory body. In other cases, an actor like the Zambia Environmental Management Agency has the contingency to constitute a network hub due to its mandate. A similar observation would apply to the Zambia Network for Environmental Educators and Practitioners (hosted by the Zambia Environmental Management Agency) that is currently classified as an actor but could play an important role as coordinator of meta-level advocates for green building practices. Further, Forest Department and Ministry of Forestry could also be an important player as it regulates the issuing of licences to timber producers.

The following actors were pre-identified as potentially playing an important supportive role in the network environment of the registered contractors.

| Micro-level | Zambian Institute of Architects |
| Macro-level | Ministry of Transport, Works, Supply and Communication |
| | Ministry of Labour and Social Security |
| | Zambia Association of Manufacturers |
| | The Zambia Environmental Management Agency |
| Meta-level | Local mass media |
| | Possibly: The Zambia Network for Environmental Educators and Practitioners |

**Priority MSME support interventions**

The joint UN programme is to prioritize MSME specific development interventions that promote the creation of jobs that meet the fundamental rights at work and make a measurable contribution to the reduction of the carbon footprint of residential housing stock, here including cuts in the average energy, materials and water consumption of households as a result of green building design and construction. Interventions would furthermore need to balance the interests of people with the interests of their environment and capture the meta-level, macro-level and micro-level of the actor network, mindful of the cause-effect relationships playing out across system levels. An additional factor to be considered is the core competencies of the UN consortium that might be leveraged in support of MSME driven green economy transition in Zambia. These considerations have shaped the draft recommendations presented below.

**Micro-level:**
- Facilitate the establishment of an R&D unit dedicated to research on green building designs adapted to local context
- Support the development of a green building design training courses tailored towards registered MSME contractors in grades 5 and 6.
- Strengthen existing supply with industry-specific green building construction skills training geared
towards registered contractors, and where applicable non-registered MSMEs with willingness to register.

- Facilitate the documentation of traditional knowhow on local building methods, and use of local building materials.
- Enter into alliances with corporate suppliers and/or distributors of at least one building material critical to green building construction (like cement, compressed earth blocks or timber) to broaden the local supply base and stimulate market uptake in consumer markets.
- Linked to the above point, facilitate upgrade skills of small-scale manufacturers along the building construction supply chain.
- Establish new/strengthen existing green (building) technology transfer mechanisms, including for technology related to the construction of new green buildings and the retrofitting and upgrading of existing building stock in line with green building principles.
- Introduce industry-specific MSME green business finance products to support switch towards greener building technology and greener building methods.
- Commission action research on business development opportunities related to the recycling, reuse and disposal of secondary building raw materials.
- Pending findings, train and support MSMEs to enter the value creation process for green building construction.

Macro-level:

- Provide policy advisory services to amend the draft construction policy, to promote a closed system loop approach to building construction, and more strongly emphasize on the promotion of greener building practices.
- Policy advisory services to amend existing laws and regulations in order to exert push and pull on the market to adopt greener building practices.
- Training and exposure visits for policy level decision making units in order to sensitize them for the merits of green building.
- Capacity building support for organizations representing the interests of informal builders to strengthen their voice in the emerging national policy dialogue on green economy transition and green building practices.
- Review the role of the (NHA) in facilitating the uptake of green building designs among MSMEs.
- Review the role of the NCC in facilitating the uptake of green building construction methods and materials among MSMEs, including capacity building support to amend existing standards for building materials.
- Mobilize macro-level actors representing the interests of both registered and non-registered MSME contractors in support of membership uptake of green building practices.
- Capacitate these macro level actors to speak with one voice.
- Interact with utility providers regards the prospect for piloting decentralized household-level energy generation and water management solutions.

Meta-level:

- With the support of meta-level actors in the industry, facilitate a system-wide actor awareness campaign to advocate for green building principles, making the link to environmental sustainability, economic development and social development.
- Run customer education campaigns to sensitize consumers for the financial savings potential of greener building practices, including upgrading of existing building stock to reduce reliance on power grid and water grid.
- Sensitize property developers for the business case underpinning greener building practices.
- Sensitize housing estate management companies about the business case underpinning marketing housing stock that complies with green building principles.
III.2. Findings from field consultations

III.2.1. Qualification of the data set collected during field research

As per research methodology outlined in part II of this report, two methods were applied to collect first hand information from network actors, direct interviews and focus group discussions. Research tools in the form of structured and guiding questionnaires for the interviews and focus group discussions were developed and applied. Templates of the focus group discussion guidelines and interview questionnaires have been attached to the Annex of this report. Fifteen interviews were held with key informants of the building industry in Lusaka. Several field visits to informal settlements, formal building sites and some completed buildings in Lusaka and Livingstone were made. Additional information was collected by informally talking to different trades of the building industry such as carpenters, brick layers and electricians.

Five focus group discussions (2 Macro, 1 Meta, 2 Micro) were held with each lasting for around three hours. The attendance was low, and average four participants. This was because of two main reasons: the lack of organization and preparation in inviting stakeholders led to many last minute invitations and resulted in stakeholders not showing up. Second, the effort to come to the ILO office Lusaka seems to have been quite important without any incentives.

When applying a ‘strict’ focus group approach, meaning to lean back after the question and letting the group discuss, lead to discussions with little content and a lot of ‘talk’. One reason was that groups were too small, and another that some actors were not represented. Often no actor cluster or association representing certain actors exist. The same is true for those actors representing the environment. However, with more guidance and a more to direct interviews related approach the discussions lead to interesting insights. The expert interviews, and notably the field visits revealed better results giving insights into underlying system dynamics. In addition, more ‘direct
data collection’, that is, passing from ministry to ministry, from stakeholder to stakeholder, from formal building area to informal building area would be needed to get some core facts which are still lacking.

To accommodate for the research constraints described above, two more focus group discussions and another round of stakeholder interviews were conducted in the first two weeks of December. The second round of data intake gathered mainly macro-level stakeholders like the Zambia Bureau of Standards, the National Water and Sanitation Council, the Lusaka City Council, the National Housing Authority and the Ministry of Transport, Works, Supply and Communication. Micro-level interviews were held with financial service providers and architects.

III.2.2. Description of the research findings

The research findings are presented by system level of interaction, starting with micro-level actors, and moving on to macro-level actors and meta-level actors. Indirect speech is used to stress peoples’ view of the system. A focus is laid on the perception and knowledge of environmentally-friendly buildings, the political and economic interrelations between actors, the dependencies of actors on environmental goods and services and the interaction with social outcomes, training and finance.

III.2.2.1. Micro-level actors

Perception and knowledge of green buildings

- The terms ‘environmentally friendly’ and ‘green buildings’ were not new to contractors and architects (micro actors). Solar technology, the use of natural resources, more energy efficient lighting systems and the use of water resources were mentioned as key features of green housing. In addition, using less cement through the use of hydra blocks, the building of biogas plants and the establishing of public toilets for collecting gas from human excrement was mentioned to contribute to green buildings (SNV was mentioned in this context).

- Contractors’ unanimously outlined a broad definition of the green building industry and included the (i) building structure itself as well as (ii) the service of the building structure in terms of energy, water and materials over its lifetime. Meaning that, the installations of environmentally friendly technologies were seen as fully part of the building industry and mentioned even before the structure itself. Environmentally-friendly buildings were believed to be a cross cutting issue.

- Despite the knowledge of concrete green applications the concept of sustainability appeared not to be well understood. The reason behind green buildings and the mutual interaction between buildings and the natural environment was not fully understood. So it was mentioned that ‘water lying in the bush or underground’ could be exploited for electricity and freshwater. The limits of its exploitation were not discussed.

Similarly, it was said that using hard coal from newly discovered pits was good for cooking energy as it was ‘very strong’ as opposed to charcoal which was leading to deforestation. When asking whether it pollutes, the solution of a chimney was mentioned. Equally, green buildings were believed to be those with large plots of ‘green land’ of minimum 1200 m² of which only 20 per cent had to be built on. Flowers around the house were mentioned. As a solution to non-green housing the population were to be spread outwards to rural areas where boreholes could be drilled to access water within large enough catchment areas. Further, it was discussed that in condensed cities there were no sewerage and spaces were too small. This led to everyone using pit latrines which were very polluting. Architects, however, seemed to have a more in depth understanding although a systemic concept seemed to be lacking as well.

Actor network linkages – social, political and economic

- The most important actors for contractors and the National Association of Medium and Small Scale Contractors (NAMSSC) representative for the contractors were the NCC, the municipalities and councils, the crafts persons and architects as well as the suppliers of building materials and technology. On the demand side the homeowners, the public and private business were the most important players the micro actors depend on.
Contractors were most ‘influenced by’ the NCC (registering and regulating their enterprises) and the councils (providing and approving the drawings as well as inspecting the construction). In addition, contractors depended on the hardware supply stores and the cement, building blocks, wood, sand and gravel suppliers. The most important actors on which contractors had an influence on were the artisan workers of the different trades. Also, while working for homeowners, public institutions and private business, contractors said to have an indirect influence on those.

The NCC was seen as the main regulator doing the registration of small contractors and the regulation of the industry. NCC was seen as very helpful. However, regarding small scale contractors’ tendering for public contracts it was highlighted that after the tenders were submitted many projects were dropped and costs for writing the tender not refunded. This led to a situation where many contractors decided not to tender anymore for any public contracts, leaving a small pool of well-connected and established contractors only.

NAMSSC was thought to represent the interests of formal/registered contractors. It was a membership organization with currently 4000 members and registration was an on-going exercise. The filling of the registration form was not complicated and for the lowest category (there are 6) costing K25,000. Member contractors abided to the building code whereas non-members might not. However, all contractors followed building instructions of the architect or the draftsmen, as they were supervised by them. Contractors had no decision power on the drawings and were therefore only the executing agents of the building sector.

Contractors found the classification of contractors into 6 categories very good. This classification allowed foreign contractors only into the 1-4 classification while local contractors were also allowed in the 5-6 categories. As categories 5-6 were reserved for small projects, local and small contractors were favoured over foreign firms. However, because a lot of small scale projects had been dropped in the past, it was felt that in practice this system was not working and that foreign companies were ever more dominating.

It was estimated that only half out of a total of 8000 small scale contractors were registered. As mentioned, the informal and hence non-traceable contractors were most likely not to comply with the building code. Registered contractors saw their non-registered peers as unfair competitors and were reporting informal building projects to the NCC. However, the incentives for registering for those not willing to tender for public contracts were low. This was explained to be the main reason for not registering. However, law required the registration of all contractors also for private projects.

Regarding workers’ rights it was said that these were not always respected, which was also true for the registered contractors. The reason why workers’ rights were not always respected was said to be the seasonality of work. Work contracts could not be given for more than the project period. Complains of non-payment were rooted in the delays in payment because of late or non-disbursement of funding. This was seen as another reason why ‘most’ contractors said they did not tender anymore for government.

The Zambian Institute of Architects ZIA was a statutory body established by parliament act. ZIA’s mandate was to (i) register architects, (ii) provide a point of contact and Information and (iii) offer Continuous Professional Education (CPE). The CPE included courses on new technology and design with an exam that provided for a certificate. Although green construction was not yet offered it had already been discussed in the institute’s council, which was the decision making body of ZIA. Further, the ZIA was the body that administered exams for architects, who after having worked for the private sector for two years needed to sit a professional exam. The ZIA committee oversaw the exam and certified the architects. The institute comprised 150 Architects, who are, with some exceptions, the total number of architects in Zambia. The only way to become an architect in Zambia was through the Copperbelt University which had a university degree. Despite the importance of architectural drawings for the building industry, most drawings used in the building industry in Zambia were not site specific. The majority of plans were bought on the second-hand market or passed on by friends or relatives having let little influence to architects.

Architectural technicians and draftsmen. Before a University degree for architects was created in Zambia, the Zambian Institute of Technology offered training for architectural technicians. Only when the Copperbelt University was created out of the Zambia Institute of Technology did the first university degree course for architects begin. Due to the former existing construction certificates issued by the Zambian Institute of Technology the architectural technicians or draftsmen still today provided the drawing and specifications of most construction in Zambia. Although there was no association and documentation it was estimated that around 300
architectural technicians exercised the profession of architects. Most of them worked in the provinces for the municipal councils providing drawings for house builders. The Zambian Institute of Engineers has similar mandate as the ZIA but in relation to the provision of infrastructure to buildings. However, even engineers were providing drawings for buildings.

- The architects, draftsmen and engineers give specifications on how to build as defined in the ‘Bill of Quantities’ guiding the whole construction industry. The contract specified what kind of materials was required to be used. Typically it should have been the architects or engineers who checked the quality and oversaw the construction, not the constructor. This was however theory as mostly architects were not involved.

- Regarding the demand, private households were the main clients of contractors, purchasing primarily formal low, medium and high cost houses. Those which were below 120 m² did not require an architectural contract. Further, private business and government having commissioned business and public buildings were, along with households, major clients. Out of the different ministries, the Ministry of Transport Works, Supply and Communication commissioned most of all governmental buildings. Under its roads department, roads works were undertaken while the disaster management unit covered emergency works. The Ministry of Education commissions school buildings while the Ministry of Health has been building health centres and hospitals. The Ministry of Agriculture had been commissioning infrastructure works and agricultural buildings. The Ministry of Local Government and Housing is not directly involved in commissioning buildings as the National Housing Authority was its implementing arm.

- In respect to building materials, in some parts of the country, compressed earth blocks have already been used by architects and contractors. In Lusaka, there was a school entirely built out of compressed earth blocks including classrooms, office buildings and staff houses covering an area of several thousand square meters. In Kitwe, a whole settlement of community buildings were planned and built by a group of women utilizing compressed earth blocks. An architect and lecturer from university built a compressed earth blocks Eco Hotel in Solwezi. There, the soil was even used for the finishing: soil was diluted to produce a sort of paint which was then applied to the blocks. Such sort of vanishing was very clean and nice keeping water away due to the high content of anthill. Despite some examples of compressed earth blocks buildings, the majority of building in urban areas were built out of cement blocks (see table 1). Burnt bricks were the majority in rural areas.
**Main resources extracted from the natural environment were sand, gravel and limestone.** Limestone was used for cement while block-mix and sand for the production of cement blocks. Wood was said to be mainly sourced from the Copperbelt region. Key players in cement production were Lafarge involved in the operation of the three existing plants. The block making industry (formal and informal) was an important player along with the truck owners, the sand and quarrel mining companies, the crusher plants as well as the informal gravel sector mining from small pits all over the country. In the timber supply chain, it was the Forest Department that gave out licences for hardwood logging whereas ZAFFICO, which was owned by the Government and overseen by the Forest Department, was the main timber supplier. Plantations were said to be used but often overexploited and not replanted.

**Regarding negative effects of the sourcing of natural resources it was said that those who quarried and broke stones caused soil erosion, destroyed the landscape and created water reservoirs in which mosquitos breaded.** However, contractors said they had neither information nor influence on whether the supply for timber, sand and stones were sourced sustainably.

**Timber:** As far as construction timber was concerned it was coming from timber (soft wood) plantations run by ZAFFICO. While deforestation was caused by illegal logging of hardwood. Although the Forest Department gave out licences to formal companies informal logging was continued and illegal logged wood sold to formal companies making it impossible to control. Some of that wood ended up in doorframes and window frames but not in construction wood. Eventually, hardwood logging was believed to contribute to deforestation.

**Energy** was said to be a key resource in the supply of building materials and notably in the production of timber, cement and other building materials. On the contrary, energy was not seen as a major input in construction itself for most work was manual. However, regarding the servicing of the buildings, energy was crucial for cooking, lighting and heating.

**Water**, although seen as a major input in all production processes, was not regarded as an important issue as it was available in abundance.

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**Building a house in Lusaka**

A taxi driver in Lusaka stated that he got a piece of land of 600m² from a party official before the elections. He did not get a land entitlement document as the land is in the informal settlement around Lusaka. The taxi driver asked a friend, who also built a house, whether he could borrow the drawing to build his house. The council approved the photocopied plan although when starting to plan for the construction it was found that the drawing of the house from his friend was too big for his plot of land. The taxi driver started to ask for bricklayers in the neighbourhood. Contractors were said to be too expensive. Employing local people such as brick layers and roofers was much cheaper. So he went back to his friends’ house to look at the construction which was well done. This is how he got the contact of the same bricklayer of his friend who was subsequently engaged. To reduce the size of the house to fit on the plot the bricklayer adopted the drawing by cutting a quarter of the plan. The cost of the house is not yet clear as the taxi driver buys the building materials day by day depending on his daily income. However, from friends he has heard that the cost of his 80–100m² house (the final size have still to be decided) will be around Kwacha 50-60 million (USD 9574–11488). The aim is to build a five-room house with rooms of around 10-15m² each. The cost apparently includes the building, the roof, door and window frames. Cement blocks are made on the spot mixing cement, blockmix and sand by shovel and filling it into moulds. Once the taxi driver could afford some bags of cement and some blockmix the cement blocks were made. Regarding services there is an electrical connection 500 metres away. The connection cost is 1.5 million. There is no water and sanitation but installation of septic tank is envisioned, however there is a pit latrine so far. A communal water point is not too far from the plot. For cooking an electric oven would be great, but they were quite expensive and electricity supply very unreliable these days. So out of necessity charcoal will be used probably in an outside shed.
In construction it was used mostly from existing boreholes and not seen as a major cost in the construction process. Water was seen as being a free resource. It was supplied either by the 11 municipal utilities (regulated by NWASCO), by private borehole owners or by individuals simply having sourced it from surface run off water.

- Land for construction was allocated by MLNREP to which local councils are agents when state land was concerned (six per cent of total covering all towns and larger settlements) and by the chiefs when customary land was involved (rest of the country, mostly rural). To develop land, individuals, housing developers, private businesses and public institutions ask permission from either the land committee within the councils or the chiefs. Contractors had no influence on the allocation of land. Municipalities were supposed to develop land, coordinate utilities’ servicing of the land, approve building plans, oversee construction and inspect the building. However, municipalities were considered inefficient in all aspects from servicing to final inspection leading to under serviced buildings and substandard building materials and finalization.

- Green materials and technology was seen as new to the country. For that reason the life span of environmentally friendly technology and materials was questioned. Green technologies were rare in the smaller hardware shops in Zambia. The reason was said to be the lack of clients (individual households). It was stated that ‘no one came to the store asking for solar or water technologies’. Handyman’s Paradise, Micar and Mica, the main hardware suppliers in Zambia, offered some green technologies. Smaller hardware owners confessed that they would offer if there were demand. The main supply channels for conventional as well as green technologies came from South Africa and Dubai. If a major order is placed; for example on solar water geysers or solar electricity, the time necessary to order, ship, and supply those to Zambia was estimated to be three months.

**Finance**

- Regarding financing, typically, at the inception of the project a minimum of 20% was advanced to the contractors. In private project it was not unusual to fund up to 50% upfront. If loans were involved the land was used as collateral but loans were very rare. Some contracts included the supply of building materials while others provided the materials on the spot. Finance was a major challenge as collateral was required for loans. This was true for conventional as well as micro finance.

**Training**

- Regarding training, 50–60 per cent of contractors were estimated to have attended courses and have a trade certificate. However, differences existed between trades. Some brick layers often did not have a certificate, as they learnt on the job, whereas plumbers and electricians mostly had certificates. Certificates were issued by TEVET training Institutions which offered trade specific courses.

- In respect to green construction materials and technologies, there was no school offering trade specific certificates. Accordingly, there were no curricula for solar geysers. Nevertheless, solar geysers were installed around the country by workers who learnt on the job. Typically the combined knowledge of conventional plumbers and electricians were sufficient. Some workers were trained in South Africa. Contractors confessed they were all capable of installing solar geysers taking them around 5 days for one system. As such there had been no skills shortage in solar geyser and solar panel technologies. Nevertheless, the challenge was said that technologies were new and water harvesting systems not well known in Zambia. Asked about companies that might offer training to its workers, there was Davis & Shirtliff, as well as SNV, which offered training for 20-30 days.

- Asking contractors how much time and money they were willing to spend on getting trained on hydromould earth blocks, on average, they mentioned 1 week paying a maximum of K750,000. Concerning solar technology the willingness was higher and contractors mentioned to be willing to spend on average two weeks on solar training paying a maximum K1,5 million.

- An outlier was an older contractor, who being an accountant was not willing to invest time or money neither for himself nor to send someone from his workers. Conventional wisdom might be applied that older generations were less interested.

- Asking which institution was best placed to offer trades training and certificates NCC was mentioned as best placed to run training. This was because it was said to be user friendly.

**III.2.2.2. Macro-level actors**

**Perception and knowledge of green buildings**

- For some of the macro actors, such as the NCC, the concept of green buildings was relatively tangible whereas others only had a very vague idea. For
those with a better understanding, green buildings were said to promote sustainability and a healthy living, reduce carbon emissions and use natural building material and technology. Despite the general understanding of environmentally friendly techniques, many ‘non-green’ perceptions were subordinated under green construction. For example, green buildings were believed to counter the illegal building of fences around plots and the erection of advertisement boards on road corners. The non-use of paper and the utilization of Autocut, architectural software, was further believed to be part of greener construction. Overall, there was a general agreement that green buildings are a very important concept for Zambia. Again, as in the case of micro actors, the concept of sustainability and the interdependencies of the different economic, social and environmental systems were not fully understood.

**Actor network linkages – social, political and economic**

- The NCC was seen as the main player in the building industry as it was established by parliamentary act mandated to regulate the building industry and promote its growth. It oversaw the Code of Conduct for Contractors. It further provided services to its members. While macro actors generally acknowledged the NCC as an effective regulator, the NCC itself recognized that it had not yet delivered fully on its mandate. Notably, there was still much to be done to make the Zambian building industry competitive and a major contributor to national growth. While the NCC had been effective in registering contractors, the lack of synergy between the infrastructure development regulators, insufficient financial and human means together with bureaucracy hindered the NCC to make the industry a competitive growth sector.

- Originally, when set up in 1967 the NCC was to host the school for the roads department and the service and training centre for the public works department. This was why the linkage to the roads and works and supply departments were still very important. While it was only in 2004 that the NCC school was extended to include housing, there were major opportunities to shape the trade curricula including new techniques and technologies such as used in green construction. In addition to the training and registration department the NCC had a finance department. There were plans to open two new departments on R&D and BDS.

- The registration department of the NCC handed out registration certificates that were valid for one year. Small scale contractors struggled to renew their registration. Attached to the paperwork, a small fee had to be paid annually. This contributed to the operation of the NCC as it relied on Government for funding which was said to not be sufficient. This setup led to some contractors not renewing their registration. The code of conduct was the main guidance and regulating tool for contractors. It was developed by the NCC registration department. It was a short and easy to read paper.

- The formal sector of the Zambian building industry (for which NAMSSC represented small enterprises with no representation of large ones), was said to comprise approximately 60% of all construction companies. The informal sector might be even larger as most buildings were not built by companies but by informal self-employed brick layers, roofers and carpenters. Most often these individuals do not form any enterprise structure making enforcement of taxes very difficult. As a result only 20% of these were paying taxes.

- Regarding informal housing, 70% of all settlement (of the total population) within Lusaka council was unplanned and hence illegal. Municipalities and Councils, and ultimately their national policy actor, the MLGH, were the responsible actors for curbing informal settlements within city boundaries. While these settlements were partly developed because party cadres handed out land illegally having abused power all buildings are informal and most of the area was not supposed to be built upon. The water level was too high and the geography not suitable for servicing infrastructure. This made it impossible to serve these areas by sewerage and drainage. Pollution and flooding was a serious threat.

- The Zambia Environmental Management Authority (ZEMA) under MLNREP (previously the Environmental Council) plays the regulating role in the field of the environment of the building sector. All buildings had to comply with the Public Health Act (which looked at safety), the Factories Act (which looked at the minimum wage) regulated through Local Councils, and the Zambia Environmental Management Act (which looked at minimum standards for environmental stewardship). These minimum codes were applied and monitored by the MLGH and the Municipal Councils. While there was no regulation on green buildings as such there was potential for a Green Building Code. It could be aligned to the other acts or even become part of a renewed Environmental Act (more on environment in the following section on environmental actors).

- Formally, the NHA was recognized by other macro actors to be the governmental institution to build housing. NHA is a state body under the MLGH
mandated to develop low, medium, and high cost housing in Zambia. The awarding and overseeing authority of NHA was the MLGH. Within Lusaka various projects have been under taken in Ibex Hill, Nyumba Yanga and more recently in Northgate Gardens building 235 units. Other NHA housing projects are in Kafue and Kitwe.

- Regarding the process of housing development, NHA accesses land through the Ministry of Land, natural Resources and Environmental Protection and developed building sites. It either contracts the land out to private developers and contractors or built it with its own contractors, supervisors and architects or external Contractors. To develop a site, first a model house was build. Then, typically pre-buildings were sold requiring a 60% upfront payment with the latter being paid once the shell and/or interior was finished. Currently NHA’s own architects, engineers, supervisors and contractors were not trained in green construction and no green housing was so far built.

- Several problems hindered NHA to deliver its mandate:
  - The biggest challenge for NHA was that it had not enough funding from the Government restricting their capacity to build houses. This was one reason why NHA is now beginning to engage in joint ventures with international companies, such as in, the Sherter project. While the profit share is meagre in low-cost housing, the trend in joint ventures is towards developing more costly medium and high income housing.
  - When starting a new project, a first problem was to get land allocated by the Ministry of Lands. It was not necessarily the availability of land but land which could be serviced and which was close to the city. There was little demand for housing too far from the city centres as few people wanted to buy a house on the outskirts. To get land close to the city was difficult.
  - Servicing housing plots was also a challenge, notably once NHA accessed land the service provision was slow and hindered the development of the land. NHA closely collaborates with NWASCO and ZESCO and have a very good relationship but their capacity was not sufficient for quick delivery.
  - Another important problem was the price of the houses, the cost of which for the lowest prototype is currently K170 million, most people cannot not afford that. Building cheaper would have been possible but people were said to aspire to something that they cannot pay. To get around that problem the solution was to build only shells for K120 million which included sanitation, doors and windows, while the owner decided on the finishing. However, competing with the private and the informal building industry of low cost housing for around 50 million for 80m² was not possible.
  - Finance and the sales of NHA housing units was the major problem once the housing units are built. NHA provided the opportunity to pay in installments (60% upfront, 30% when roof is completed and 10% after completion over a period of 10 months). However, few people were able to pay, and availability of funds from lending institutions barely existed.
  - The main challenges during the construction of housing were delivery in time, as NHA contracted other companies which did not deliver on time. In addition, getting good quality materials at a reasonable cost was compounded as it was skilled labor.
  - Regarding the functioning of NHA, it was the MLGH that decided on the policy directions. The NHA board was the executive body receiving those policy directions while the management provided recommendations to the board which further informed the Ministry. In the case of a new MLGH policy on environmentally-friendly housing the NHA would have moved. Once land was given by the Ministry of land and a project was to be developed, NHA was the responsible authority, coordinating servicing, contracting contractors, and overseeing finalization.
  - Regarding the servicing of the buildings major challenges persisted. The main problem was that the planning needed to be properly done in the beginning before building construction started. Coordination between land allocation, environment planning, water and energy, road and waste infrastructure were needed previous to the construction planning. The reason why this was not happening was due to the lack of supervision by the local authorities which were responsible but lacking the capacity to properly coordinate the planning.
  - In addition to lacking planning capacity, the councils did not have enough capacity to provide sewerage and a water supply. Water and sewerage was regulated by NWASCO, overseeing 11 local Water and Sewerage Companies (WSC). ZESCO was the electricity utility for generation, transmission and distribution in Zambia. To cope with energy demand which was higher than generation capacity, load shedding programs were set up that targeted the
Regarding service infrastructure to buildings, the provision of waste collection and waste management services was even worse. Solid waste management lied within the district and municipalities councils’ domain. While waste collection was a major challenge and formal recycling did not exist, ZEMA was interested in new projects with councils to provide local solutions. Overall, regulators of the build environment were said not to be able to enforce their mandate due to financial and human capacity constraints. One of the main reasons was said to be the lack of payment from private and public clients. The underlying cause seemed to be the limited willingness to pay market tariffs for water and energy which covered operational costs, as well as the investment costs to increase access. In relation to water, Zambian people often believed: ‘Water is from God and need not to be paid for’.

The city council and the local authorities were the responsible authorities to build housing before the mandate had been moved to MLGH. This is why 60 per cent of Lusaka was once owned and built by the council. Most buildings were today sold, and the council only retained its planning and controlling authority on behalf of the MGLH. The mandate foresaw to acquire land, to offload it to the open market for the construction of buildings, to coordinate the servicing of plots, to approve plans and building projects, and to oversee and inspect their finalization. Whereas the mandate was very broad it was difficult for the councils to deliver due to a number of reasons:

- Regarding land, all land was state land vested in the President. The commission of land under the Ministry of Land handled the land on behalf of the President. The councils were allocated statutory land/municipality land while the rest was customary land in the hands of chiefs. Councils’ challenged that they had little influence on the allocation of land.

- Regarding permitting, all designs had to be submitted to the council for approval. Most drawings for housing were not site specific but bought and used before. Notably, in the medium and low cost housing segment, more than 80 per cent was estimated to be borrowed from a friend. However, as long as it met the standards it was accepted. Construction was monitored and inspection theoretically undertaken. But due to the lack of human and financial capacity most buildings were not inspected.

- The 11 WSCs each covering a district, were owned by local governments, and coordination for the supply of water and sanitation as well as electricity was in the hands of local councils. However, most often neither sewerage nor electricity could be provided due to lack of finance and human capacity.

- Regarding the political organization, the local authorities were under the auspices of the MGLH. The mayor and the town clerk, who was the chief executive, plus the different services, made up the local government which reported to the council. The council was made up of elected members and organized its work in committees. One committee typically dealt with real estate and construction issues, receiving and approving the building plans. Most often, politicians and not specialists were in the committees, this led to inefficiencies, corruption, and lack of coordinated planning.

- Further challenges for local authorities were rapid urbanization and lack of finance and manpower to provide planning, monitoring, and servicing for the emerging construction activities of the incoming population. Access to land was a major problem in Lusaka, and the reason why most people were just building on illegally occupied land or on private agricultural land for which formally a rezoning into buildable land would have been needed. These informal settlements house 70 per cent of the population in Lusaka while occupying only 10–15 per cent of land. Accordingly, the density was huge and the rate at which informal settlements were grown made it impossible to service it. In terms of water there were no individual connections but communal water standpoints for 25 households. Water was typically sold at the standpoints for K1 per litre. Sanitation was onsite provided by pit latrines.

- The ex-post upgrading with infrastructure was a solution for informal settlements, whereas improved planning and servicing of newly developed land the solution for formal settlements. The improvement area act regulated the building in informal settlements. Under this regulation no plans were to be submitted. The council provided for improvement offices in informal areas which oversaw the construction.
As long as buildings were not on the road everything was permitted. Most buildings were built by individual bricklayers based on hand-drawn schemes, with no plans. The reason was that informal settlements were organic structures which constantly grew and changed. Part of the policy on ‘improvement areas’ was giving tenants the security of land which helped trigger investment into improving housing structures. This was seen as another reason for the constantly on-going construction activity. Regarding statutory land a policy to subdivide big plots of land in central urban areas into smaller areas hoped to alleviate pressure on accessing formal land. As mentioned, the main responsible authority for the informal settlements lied within the city council as they were built on statutory council land. Theoretically the council had the power to evict people from that land without compensation. Only with ownership papers would compensation have been provided but in practice there was no solution to resettle the population.

- The MTWSC was responsible for building most public buildings for civil services such as housing for police and military officials. The government is still the biggest constructor in the country, and the MTWSC the biggest public developer. Thereby, the Ministry surpassed its mandate, as officially they should only monitor and maintain the buildings while new construction was not foreseen in the mandate. This was why it had independent and parallel construction and building officers and procedures. The Ministry itself was responsible to access land from the Ministry of Land, to plan, and develop the land and service structure. The municipal authorities were not involved. A team of engineers and seven architects provided plans for standardized houses and buildings which were developed, monitored and inspected under the auspices of the MWS and not the local authorities. Accordingly, there was a conflict between the local authority and Ministry. For example, there were currently 2000 prefabricated housing units (a new trend) built on the outskirts of Lusaka financed by a grant from China. The Ministry of Works and Supply was solely responsible for the site development, planning, servicing infrastructure, contracting and overseeing of the construction. The building plans and the specifications were self-approved by the MWS and needed no submission to local authorities.

- The Ministry used standardized plans with the same specifications, this made its procedures and building so efficient. Still today the plans and specifications for housing dated from 1973 based on the British code but with new building regulations were being utilized. In case green specifications were included into the standardized building plans this would have a massive scale and trickle-down effect on other construction in the country. For that to happen a procedure to bring out green standards would be needed. The NCC was the major regulator to lead such processes, whereas the material specifications remained within the domain of the engineering institute. The ZBS had then to register the green specifications. While it would be difficult to pass a green building law and policy was a possibility.

- The most influential construction and building laws and policies were said to be the housing act, the environmental act, and the housing policy (which created the NHA). The Citizen Economic Empowerment Act was very effective as the rebate for local construction companies was 12 per cent as compared to foreign ones, and any procurement by government applied that rule. This has led to increased empowerment of local suppliers. Concerning the supply of natural resources there were no regulations in place as they were within the domain of the Ministry of Environment.

- NWASCO is the main regulator for water and sanitation, and established in 1997. In addition, to provide regulation, it linked to ZBS to develop standards for water supply and treatment plants and all infrastructures related to water and sanitation. Further, it collaborated with the NCC in technical committees to agree on engineering issues. However, there were no direct collaboration with local authorities but with local utilities and private investors.

- NWASCO gives licences to water utilities with defined duties and boundaries for water supply and sanitation. Conditions are attached and utilities licenced for a determined period of time. Target numbers of increased access were part of the licencing. However, no private actors have been attracted due to the unprofitability of water supply and sanitation. All 11 utilities licenced by NWASCO were publicly owned (one per province plus one in Copperbelt province). Still, seven private water providers such as Zambia Sugar and some mining companies did exist notably servicing their employees. These private providers were not allowed to sell their service but only supply it for their own operations.

- NWASCO’s mandate, in addition to licence service contracts, was to set tariffs which were supposed to cover the cost of producing water, operation and maintenance. No cost of investment was included; however, payment was a major challenge and eventually it was hard to fully cover production, operation and maintenance costs as only 80 per cent
or sometimes 60 per cent were collected. People looked at water companies as inefficient utilities often incapable of servicing more than five hours a day. Even governmental agencies did not pay the bills. People’s confidence was lost having led to a widespread perception that boreholes were the only solution to reliable supply.

- Regarding financing of infrastructure investments goals were defined by government in the 2030 plan. A finance plan was developed with cooperating partners. NWASCO only regulated urban areas while in rural areas independent schemes were possible.

- It was estimated that 80 per cent of people in urban and peri-urban areas were connected to fresh water supply. The percentage for sanitation was much lower and below 30 per cent. The national urban water and sanitation program aimed at universal coverage.

- The trend from 1990 showed an increasing coverage in water supply and sanitation so that the MDG were to be met. However, major challenges remained, with finance seen as the major concern. Budgetary allocations were often not disbursed. Most new houses were not serviced. Private companies were very skeptical to partner with the water utilities because they were not able to make money.

- While it was widely acknowledged that centralized services would not be able to meet demand in the near future, decentralized systems were promoted by a Devolution Trust Fund, funded by the German Development Bank KfW. While notably the poor had no access to centralized services, the Trust fund provided for projects such as water kiosks, biogas digesters, and decentralized water systems. For example, a decentralized wastewater sanitation project was developed in Sulawesi, Northern Province, and in Livingstone. Biogas digesters were installed for the sewerage of 10 households each having provided enough gas for one or two families. While this pilot project was still under construction it was said that sensitization campaigns run by a team of sociologists were needed for acceptance of the project. People were even encouraged to pay some money to feel ownership of the project but the uptake was slow as no results could be demonstrated yet. While the projects under the Trust Fund were still limited it would be open to include new ideas such as rainwater harvesting.

- The ZBS mandate was to formulate standards for all sectors of the economy. ZBS was a very open public institution to serve the public. For that the ZBS worked with all government departments, the private sector, academia and individuals. There was a development standards department as well as a unit on inspection. In developing the standards ZBS work with ZEMA and NCC. In the case of construction NCC looked into materials and technologies. Every year two workshops were organized to look at around 50 standards related to construction. An example would be a machine which needed recalibration. A company would then come to ZBS, ZBS would hold roundtable workshops to develop a standard for the recalibration. The same procedure could be made to work for the development of green material and technology standards. Several workshops might be needed to develop a certain standard consulting with manufacturers, practitioners and government departments. Once a standard was agreed all the details were published in a paper for the public to comment on over the course of 60 days. After having received comments the committee had to re-sit, after which it went to the ZBS council for approval. Different experts from different sectors were involved. Once approved the standard became public.

- In case of green building standards, ZBS had a secretariat which would call for meetings on the green building standards to be developed. A common and very efficient way of developing new standards for Zambia was the use of existing international or better regional standards. Quite often standards came from South Africa and sometimes were based on ISO guidelines. The process was accelerated as already applicable in other countries. Taking the hypothetical case of developing a standard for compressed earth blocks, solar geysers, or solar electricity the easiest way to go would be to undertake research whether a standard existed in South Africa or elsewhere. The same procedure had been undertaken for burnt bricks. There was even a presentation in one of the workshops on rammed earth by Dr Nyirenda Ilema; however, no standard was yet developed.

- The main benefit of having standards was for enterprises to have security on which and materials and technologies were to be used. This might lead to new economic activity of enterprises developing business ideas around standards and open new businesses producing against this standard. Jobs might be created in the process.

- The ZDA was another macro actor in the building industry, but not seen as very influential. One Department within the ZDA was mandated with promoting MSME development. Enterprises might register with ZDA applying for tax holidays for the first years of operation. Further, ZDA offered support to MSMEs including youth entrepreneurship and training. The youth enterprise unit had been created after staff attended an ILO training course. As ZDA
was open to new initiatives a Green Enterprise unit might be conceived according to staff.

- ZCSMBA was seen as an actor in the field of business membership organizations. Members were the 93 business associations out of which 69 were district based. The remaining 24 were sector-based associations including one association on construction, several women’s groups, with one association of women contractors and two youth groups. These associations represented a total of 60,000 MSMEs. The key service to members included capacity building, long and short-term technical and vocational skills and business training. Advocacy for a conducive policy environment was a major mandate of the ZCSMBA. Neither work has been done in promoting a more conducive environment for green enterprises in general, or in green construction in particular. According to ZCSMBA, the main issues for private sector development were:
  - The registration of MSMEs was a continuous challenge. While the registration with ZDA was voluntary, the mandatory registration authority was the PACRA of the MCTI. Most formal companies were registered whereas informal ones were not.
  - In addition, companies with an annual turnover of K200 million had to register with the tax office under the Zambia Revenue Authority (ZRA) of the Ministry of Finance. For those below the threshold, a two per cent income tax was to be paid or, under special circumstances, a request for tax breaks had to be asked at the Ministry of Commerce. One way was to register with ZDA, to a cost of K300,000, upon which tax exemption could be given for the first 3–5 years of operation. But as different tax regimes applied in each sector, the provisions were too complex for formal MSMEs to understand what was needed. As a result, most formal companies were not registered with the tax office and hence not allowed to tender. Informal enterprises were never registered with the tax office having no tax registration number. A further practical hindrance were said to be the fact that MSMEs had to travel to tax offices, as they were not established in all districts.
  - Informal micro businesses did operate without tax numbers despite being illegal. While they were not controlled this did not matter, as long as the businesses did not grow. However, once they grew they would have been penalized for the years they were not paying taxes. Eventually this hindered companies growth.
  - The cost of doing business was high. Borrowing money was a difficulty and costs were high, as interest was about 16–20%. Enterprises without collateral were not able to access loans.
  - The numbers of licences that MSMEs had to have for doing business were many. For example, there were annual levies for licences such as the fire safety licence, health licence, etc., with a total of 22 licences. While the Government had promoted a single licence it had yet not become the case.
  - ZIA was established by a parliamentary Act mandated to be the registration, point of contact, training and information body of architects. The Council of ZIA already discussed green construction. This was because of a conference organized by the Green Building Council in South Africa. While ZIA was keen to foster work on green buildings, the bottleneck was that there were no projects in Zambia. In addition, there were several other challenges such as the shortage of architects in Zambia, with only around 150 registered with ZIA. The concept for an individual to take an architect for any construction to be built was not established, and seen as an expensive venture. Most buildings were not designed by architects but by technicians, draftsmen, or brick-layers. The law required that any building above 120 square metres needed to be designed by an architect; under 120m² could be designed by draftsmen. Most councils had no architects but relied on draftsmen and building inspectors which were not registered under the ZIA. All draftsmen’s plans were accepted by councils even if an architectural plan would have been required. The Plans Works and Development Committee of the council that sat to approve the plans often lacked this capacity and approved everything. This led to the unorganized mushrooming of different types of buildings all over the country with often dangerous constructions.

(Green) building construction

- The main regulating actor in the field of the environment was seen to be ZEMA. The Environment Management Act (enacted 2011) provided for the mandate of ZEMA which was to (i) advise on the formulation of environmental policies, (ii) develop and enforce measures aimed at pollution control, (iii) develop standards and guidelines for the protection of air, land, water and other natural resources, (iv) review environmental impact assessments, (v) mainstream environmental concerns in national planning, (vi) sponsor research on emerging topics and (vii) conduct environmental education and awareness. While the mandate was
powerful ZEMA was set up only last year and it needed to be seen how effective it would be.

- Often environmental regulations were enforced in city boundaries but not outside in local authorities’ areas, and in city boundaries only for big companies and not small activities.
- In the field of forestry the main actor was said to be the Forest Department which gave licences to hardwood companies and oversaw ZAFICO, a government-owned wood company. ZAFICO was mandated with exotic wood, notably pine wood and eucalyptus. The high value hardwood from the western and southern province was cut by illegal loggers and by locals who sold it to the large licenced wood companies. These companies did not care where the wood was logged and were exporting it or supplying it to local carpenters. ZDA was involved in the export of wood and would have more data. The challenges of logging were area-specific and related to high value trees which were not effectively protected. Lack of human and financial resources was the underlying cause. More supervision was needed. This was why the Ministry, after a visit to Brazil suspended all licences, before better monitoring systems were in place. While some companies tried to access certified forest labels, they failed due to the impossibility of monitoring and the administrative and scientific burden. A solution to deforestation by illegal logging was to bring back the traditional governance system, giving them rights and capacity through which they will manage the forest themselves.

- Despite the existence of illegal logging in non-managed forests contributing to deforestation, most wood was legally harvested. From the total of 300bn/m³ growing stock, 500 million/m³ per year was allowed to be cut. But only 5 per cent of the allowable cut was eventually harvested. From the total harvested wood it was estimated that 40 per cent was used in construction, notably for roofing, furniture, window and doorframes.

- Regarding forest plantation, ZAFICO owned land from the national forest reserves which was used for plantation. Wood from these plantations was sold to licenced wood mills. However, a change in government policy in 1991 slowed the replanting efforts by ZAFICO. Planting trees was seen as a major opportunity for income generation at household level and could be included in a green building concept. No fertilizers and maintenance were required for tree growing while wood energy was an important contribution to satisfy household energy needs.

- It was argued that the annual forest loss in Zambia was primarily driven by illegal charcoal producers supplying mainly urban and peri-urban households with cooking energy.

- A major solution would be to reintroduce improved cooking stoves in houses which reduced wood or charcoal consumption by half. Rhetorically having asked the question ‘Where did we go wrong?’ the answer was provided: ‘We started to use cook stoves that are not inbuilt in houses while our parents used more efficient in-built stoves!’

- Improved cooking stoves were a major solution to deforestation. However, attempts to introduce these stoves failed due to the inability to change the mindsets of womenfolk who would not use improved stoves. The problem was not necessarily the lack of sensitization but the entrenched habits of women. But by working with women groups, homeowners and the construction industry to introduce stoves into houses the problem could be solved. Such an undertaking should also cover areas with available electricity, as most people cooked still with charcoal due to a lack of or too expensive electricity.

- Regarding illegal charcoal production, Chiefs must play the major role. Chiefs had to be given the financial and human means to control their customary land by, for example, handing out and enforcing licences to avoid overexploitation.

- In addition to charcoal, infrastructure development such as roads, dams, electricity lines and housing, further drove deforestation. This was in the hand of local and district development councils, and where protected areas were concerned, in the hands of ZEMA. As infrastructure development was of much need the only importance was the application of the Environment Act when developing infrastructure. It stated that all land development projects had to involve ZEMA, and if applicable the specialized departments such as the forestry department. Further, shifting cultivation patterns and small mining for precious stones and large mining for copper and coal put additional pressure on forests.

- A new actor which could become interesting for the development of green buildings in Zambia was the African Carbon Credit Exchange (ACCE). Submitting a programme of activities instead of a full-fledged CDM project would allow for the incremental development of credits for green buildings.

- A major environmental problem caused by the construction industry was the illegal quarrying by the informal quarrying sector. Quarrying was happening on small plots of one to two hectares all over municipalities’ land, as well as outside council
boarders on customary land. Accordingly, the responsibility for quarrying within the municipality boundaries was with the city council. In the case of outside Lusaka’s administered land of 360 km² it was the regional planning authority regulating land and buildings. All activities were to be approved by the regional planning authority. The challenge municipal and regional authorities faced was the inability to control illegal quarrying, as most of it was happening on private land. Most owners had problems to stop quarrying as it was a highly political issue: many people earned through quarrying their primary income, and stones and aggregate were major inputs into the construction industry for block making and concrete mix. ZEMA was aware of the huge environmental and social problem and commissioned a joint paper with local authorities but so far little had changed.

- Most of the quarried land became waste land as it was then impossible to develop infrastructure, housing, or agriculture making an environmental problem a huge social problem. The mining holes were breading places for mosquitoes and other diseases causing health risks, and because of land scarcity people built houses in and around the quarrying sites, despite the inappropriate mining terrain. During the rainy season these houses regularly flooded causing loss of housing and increasing pressure for shelter.

- Stones quarried were processed into gravel and concrete stones/block mix and sold in small amounts piled onto heaps on the roadside. These selling points were very popular as smaller quantities were sold. At the legal quarrying mines only large quantities such as 10 tonne truck loads were sold. Only large construction sites sourced stone products from official mines, whereas individual house builders bought from the roadside. However, while stones from the roadside were more expensive than from the official mining sites, there were trucks going around Lusaka offloading small amounts on the roadside. These trucks were owned by individuals having bought a truckload of stone products from the quarries so as to sell it in Lusaka. Despite the fact that those stones were from legal mines this practice was illegal. This was further boosting small scale mining. Illegal small-scale mining was tolerated due to the it being a highly politicized topic. Many people were gaining their main income from quarrying and stone crushing as well as it being a key resource in construction.
There are two formal sand mines in Lusaka, one in Kafue and Chibombo. The authorization to mine sand in these two areas was given by the council and the Chief. As opposed to formal enterprises the licence is given to individuals working in the sand mine. To buy sand from the mines one need pay the council Kwacha 20,000 for a 10 tonne pick up. The workers on the site are paid Kwacha 75,000 for loading the trucks. The lorry owners/sand suppliers typically bear the transport cost at the mines but pass it on to the buyer. A 10 tonne load cost around Kwacha 450,000 when ordered in Lusaka but prices vary depending on the total load and distance. It is estimated that a total of 100 self-employed workers are working in both sites managing to load a total of 200 trucks a day. To load a 25 tonne truck takes two workers two hours.

Gravel as opposed to sand is not mined in one or two locations but quarrying is spread all over the Lusaka city council and the bordering district. There is however one official site which is operated by a Chinese company owning large machinery. The site is in Chilanga. This is because the Chinese are involved in most of the road construction in Zambia for which a massive amount of stones is needed. A mechanized stone crusher plant process rocks into concrete stones and gravel. A Caterpillar loads five 25 tons trucks in one hour working 12 hours a day. The price varies with transport distance but is around Kwacha 700,000 in Lusaka. This includes the city council fee of Kwacha 20,000. However, the gravel from the mine is mostly used for road construction whereas the majority of gravel and concrete stones for the building industry are sourced by illegal small scale mining. Typically, small plots of one or two hectares are exploited by informal workers living around the area. Once quarried, rocks are crushed on the sites by manual labor mostly by women and children, child labor being a major problem.

It is not easy to remove children from stone crushing as parents often depend on their incomes. Child labour campaigns are faced with slogans such as “Are you going to eat child labor!?” In Kawama, quarrying and stone crushing is a major activity involving around 4000 households and 1800 children. Children are deliberately sent to quarrying sites, and parents when confronted with campaigns to send them to school often find reasons for them not to attend and wanting them to continue in the mines.

Regarding the environmental impact from sand mining and quarrying, the ditches in the sand mines, when too deep, cause landslides, and soil and river bank erosion. However, quarrying, while illegal and widespread is by far the bigger environmental challenge. Not only because vast areas of land are transformed into a sort of moon landscape but the whole topography of mined areas change. Land can longer be developed. Agricultural cultivation, road and house construction and even passing through the area become impossible. In the rainy season, flooding is widespread and washes away houses which are built on the edges of the mines. While water is stagnating in the mining holes they become breeding places for mosquitos contributing to the spread of malaria.

The burnt brick and the tobacco industry were heavily criticized as their processing involved the use a lot of firewood which was leading to massive deforestation in the areas of their operation. Their industries created deserts around communities which suffered the loss of agriculture land, soil erosion, flooding, changing rain patterns and water and firewood scarcity. NCC was called to address this issue but so far nothing has been done.

Another interesting environmental factor influencing settlement patterns were said to be local air pollution. Due to east-west winds prevailing in Lusaka, air pollution in the form of dust, exhaust fumes and smoke went to the western side where informal settlements are concentrated. The most affluent settlements were in on the eastern side.

Environmental education was very low in Zambia and knowledge on green buildings even less widespread. Accordingly, even normal people needed to be sensitized because eventually it would be up to them to decide what house to construct. Often families coming from the rural areas were familiar with burnt earth bricks and if sensitized could opt for compressed earth blocks as these were similar to the burnt bricks. Rural families were used to decentralized systems providing cooking energy, lighting and water. One could build on these habits to introduce and market modern, high service equipment for water and energy.

Examples of decentralized systems existed. In the 1970s decentralized water systems were introduced to Kabwata estate. Around 50 flats of 28 units each were equipped with water pumps which, when there were floods, would pump water into water containers on the top of the flats. While this system worked well when under governmental control,
when operation and maintenance was given to the tenants they were no longer maintained, costs to run those systems were not borne by the tenants as they considered water to be a free resource. However, water was seen as very important by Zambians, and if cost could be reduced, such as through wind pumping, the systems might work.

- Key materials, in addition to locally produced cement (Lafarge) and timber (ZAFFICA), which was used in the building industry were imported aluminum and roofing sheets.
- Massive research was needed in green construction materials. For example, while the MoE alluded to the potential of finished hardwood for export it was not even known what type of techniques and treatment would allow the use of wood in the Zambian building industry. Today everyone wanted to use aluminum as technical regulations on timber were lacking. Another example would be to make use of the massive earth hips extracted from mining such as those found in Kitwe. Those could be used for compressed earth blocks if the earth was properly studied and deemed suitable. Further, other waste material such as the by-products of processed coal, fly ash for example, could be used for cement production.
- The promotion of Green Buildings in Zambia should bring together multiple actors to find integrated solutions. For example, roads were in bad shape due to often blocked drainage systems leading to the flooding of those. In most cases waste thrown or washed into the draining system, such as plastic, was the reason. Recycling plastic would have mutual benefits for the environment as this would not only diminish the damage to roads and the drainage system but could provide recycled materials for construction. In addition, environmental stress would be reduced such as the pollution of rivers which affects fish. Fish are a main resource but increasingly under stress due to pollution, notably from the mines.
- Main benefits of green buildings were the promotion of hygiene and a healthy and clean local environment. Decentralized water and energy services were improving the life of notably women and children and enable children to study at night. Further workers health was improved (e.g., reduction of cement dust), diseases reduced (e.g., collection of household waste) and overall productivity increased as health improves.
- Further challenges in introducing green buildings in Zambia were (i) finance; (ii) knowledge dissemination and management; (iii) the rollout at the district level as the country is huge, and a facility needed at every local authority; and (iv) the certification for green building materials and technologies.

### Finance

- The DBZ has not been working in the building industry. However, there was a small revolving energy fund related to housing which was granted by UNIDO in 2008. Off-grid projects in remote areas and the provision of isolated mini grids such as micro hydro stations or solar mini grids were financed. While the objective was to attract private players to operate the grids, there were no enterprises found willing to invest. One of the major hindrances for the involvement of the private sector were seen to be the uniform tariffs set by the Energy Regulation Board (ERB). Only in 2012 utilities were allowed to charge higher prices in rural areas. However, increasing tariffs to cost covering levels is a highly politicized topic, making ZESCO unsustainable. Even small increases lead to an outcry, forcing ZESCO to postpone increases. The Rural Electrification Agency (REA) worked hand in hand with ZESCO to promote the number of mini grids. In addition to pilot projects experimenting with micro hydro and solar mini grids one project was financed using Biomass from forestry offcuts. While ZESCO was supposed to run the project difficulties led to the temporary stoppage. It might have been taken up by some actors in the Copperbelt which were now finalizing the biomass electricity generating plant while sensitizing locals to plant trees to feed the plant. Part of the fund was towards financing income-generating activities such as agricultural solar pumping for irrigation. However, while the Development Bank of Zambia was increasing its portfolio, they were also interested in financing green buildings; and there were already activities to establish a new unit for construction financing.

### Training

- The National Construction Council Training School, a licenced training institution under TEVETA, provided training in construction trades. It was very much demand driven and included refresher courses about tendering, road works, contract management, brick laying, carpentry, contract management, etc. Formerly courses were not official but since 2004 NCC works with other TEVET institutions and TEVETA to develop syllabuses from 4 weeks to 12-month courses. Today NCC provides certified training for most building related trades. A certificate is issued under the Ministry of Education after a successful examination. The training happened in the construction school of the NCC. So far, the NCC offered no courses on green buildings. However, in
roads construction labor based technologies and alternatives to bitumen for road paving are part of the curricula.

- The demand for skilled labor from construction schools was notably coming from governmental agencies, as the tendering requires the justification of certificates. In the private building industry most often certificates were not asked for. And although it was the Government which was the most important client of the construction trade schools there was no communication between TEVETA and the MWS. This needed to be improved as the automatic link through the industry was not enough. Skills were changing, and today brick layers needed a separate crafts certificate such as a degree in compressed earth blocks including the knowledge on the use of the right soils. These needs needed to be directly communicated by Ministry of Works and Supply, in case a green building policy materialized. The Zambia Institute of Engineers and the regulations board needed to be closely involved.

- The NHA highlighted the lack of skilled bricklayers for its projects. Most workers had not been to any trade schools. Although it was wished to improve training of workers, there was no direct contact between NHA and TEVETA, or the curricula development and trade school overseeing authority. Informing TEVETA on skill gaps happened only indirectly through NCC. While compressed earth blocks were said to be an interesting technology the challenge in finding skilled workers would not improve, as there is already a shortage of skills.

### III.2.2.3. Meta-level actors

#### Perception and knowledge of green buildings

- In general, it was said that the public at large lacked information about green buildings and often perceived them as non-modern, rural poor mud houses. Further, materials such as mud blocks and technologies such as compost toilets would face resistance as they are considered poor and unhygienic.

- Regarding green education and curricula, the MOLSS pushed for green skills, which was the reason that TEVETA undertook a survey on green curricula. Research was undertaken whether in the current curricula there were elements of environmental-friendly practices and whether there was the need for green skills. The study concluded that there was in fact nothing on sustainability issues or green building techniques in any of the curricula of the education and training schools. The environment seemed not to be a priority as a cross cutting issue for training and education. Notably, it became clear that management did not see the need of environmental education, which led to the situation that the topic of environment was not on the agenda. The study concluded that the introduction of environmental management training – including finance management – was a key priority. In addition, there was a general need to revise all curricula and integrate sustainability issues, as well as to develop a trade-specific skills’ syllabus for emerging green technologies. It was said that independent from TEVETA some trade schools run by churches had been providing training on green materials such as compressed earth blocks and green technologies.

- In some of the primary and secondary schools, WWF was running wildlife clubs but such environmental movements were not run by public entities and did not exist in TEVET institutions. WWF clubs could be an example through which to create environmental units in TVET institutions.

- Asking whether there were any political barriers within TEVETA it was stated that on the contrary that TEVETA was very much interested in green skills development, had pushed for the agenda, and that the current Permanent Secretary of the Ministry had been the head of TEVETA for 10 years.

#### Actor network linkages – political, economic and social

- TEVETA was not seen by all actors as the regulating authority for technical and vocational education and training institutions (TEVET). However TEVETA’s mandate was to regulate, develop and monitor all public, private and charity run TVET institutions.

- All 310 TVET institutions were accredited and licenced by TEVETA, which also oversaw the registration and examination of construction trade schools. All TVET institutions were then classified into 3 grades with grades 2 and 3 indicating that the training quality was not to the aspired standard. Accordingly, Industry was keen to get skilled workers from grade 1 schools, and less so from grade 2 schools. Every two years there was a questionnaire and survey among the industry to find out what was needed in the Industry.

- The MST gave the political direction to TEVETA but it was the industry which had the strongest influence, as they decided what skills they wanted. If skills were not relevant to the industry then it was useless that TEVETA engaged in the development of curricula. Accordingly, the power flow is from the industry, up
to TEVETA, up to policy. TEVETA was advising the
Ministry of Science and Technology on the skills
development agenda.

- Regarding the perceived quality of the training it
  was very much dependent on the industry. The
  satisfaction with the engineering schools was very
  low because of quickly changing technology and
  equipment. This was why some businesses had
  built up their own training schools, such as was
  the case with Toyota, because of the inability of the
  institutions to keep pace. Companies such as Daves
  & Shirtliff also train their staff at their solar company.
  Other industries such as agriculture and construction
  seemed to be, from TEVETA's perspective, quite
  satisfied with the quality.

- A key challenge for TEVETA to work on green skills
  was that most actors did not see TEVETA as the
  authority to deal with environmental issues. This led
  to the situation that none of the key stakeholders,
  apart from MOLSS for the assessment part, had
  approached TEVETA regarding green skills. It added
  to the problem that TEVETA was under the MST and
  not under the Ministry of Education, and due to that
  fact the Ministry of Environment did not invite TEVETA
  when discussing issues pertaining to environmental
  education and training. Making the Ministry of
  Environment understand that TEVETA is an important
  and powerful player in education and training would
  be a first start in developing green skills.

- Another main challenge in the vocational training of
  the building industry was the demand by households
  for the cheapest way to build a house. This led to
  the widespread use of non-professionals, non-skilled
  workers and sub-standard construction. A way out
  of the informality was to provide work-based training.
  Programs were running which promoted the use of
  score sheets by formal builders employing informal
  workers. The person would have received a certificate
  based on a trade specific test. These project site
  based training was used massively in public road
  projects but was more of a challenge in private
  construction. This is due to the need to convince
  formal contractors to use the score sheet system.
  Often this is not done. However, these two types of
  certificates—a formal and informal one— existed, could
  be applied for the demo house construction with
  hydraform blocks (see the suggestion on rolling out
demo house construction in all municipalities).

**Training**

- Current skills’ needs were assessed in recurrent 2–3
  years reviews by TEVETA.
  Direct communication was sought with the
  industry, businesses, and other players such as the
  Engineering Institute Zambia. Campaigns on radio,
  Twitter and Facebook were used for sensitization
  and advocacy.

- Based on the review or on the direct request by
  stakeholders, such as an industry using a new
  technology, TEVETA developed new curricula and
  syllabus (curricula development unit) as well as
  certifing the standards. Typically, public institutions,
  policy, the industry and its chamber of mines,
  chamber of commerce, chamber of small enterprises,
  ZAFFICO, EIZ, NCC and all other players in the
  economy were to approach TEVETA to request the
  developing of new curricula and training certification
  for new technologies available in Zambia, but this did
  not often take place.

- Regarding energy technologies ZESCO’s Kafue
  Gorge training centre had already been training
  people in energy saving and geyser installations.
  Before the project was closed the idea came up to
  develop a syllabus jointly with the National Institute
  of Scientific Research. To the knowledge of TEVETA
  there was no syllabus on improved cooking stoves.

- In some industries, and notably construction,
  pressure was made to look into integrating
  environmental sustainable business practices into
  training. The burnt brick and the tobacco industry
  were heavily criticized, as their processing involved
  the use of a lot of firewood which was leading to
  massive deforestation in the areas of their operation.

- Regarding differences in green skills and in the
  training needs of men and women, women were still

**Green)** building construction

- On the practical side the introduction of green skills
  would require the involvement of the industry. The
  building industry could approach TEVETA for the
  development of a syllabus for specific green skills,
  such as for solar. Once the syllabus is developed the
  training of trainers can be organized.

- So as to roll out the courses there was the urgent
  need of modern equipment and the demonstration
  of green buildings. Often private and charity run
  training centres run by churches and NGOs were
  better equipped than the public ones. Public private
  partnerships were a solution for buying equipment.
  Institutions could in theory apply for equipment which
  would be financed by a training levy.
very much engaged in agriculture and household chores while men were more in industry, new technologies as well as in construction. However, while women are the responsible ones for ‘using and servicing the house’ once built technologies installed will add to or alleviate women’s work. For example, currently women were not sensitized on environmental issues. Women were using conventional charcoal stoves, inefficiently heating water, and discharging of waste water into fishing grounds, etc. Gender specific training in organic agriculture and green skills for housekeeping would be important for increasing eco efficiency.

- Further, as it is women who are responsible for water and energy services why not target women with training on decentralized technologies? This would not only increase supply and demand for these technologies due to increased awareness but would alleviate women’s household tasks by freeing up time.

III.2.3. Modifications to the actor network resulting from the field research

In a nutshell, the field consultations confirmed the structure of the people web underpinning economic interaction in the Zambian building industry; however, selected actors had to be added (like the Zambia Bureau of Standards), and the weight assigned to selected connectors had to be reviewed.

- The role NCC as macro-level network hub has been widely reconfirmed but the network hub status of the NHA was disputed during field consultations, in the view particularly of micro-level actors, the latter entity is only relevant for commercial-scale property development. The network hub status of NHA remains unchanged in the modified map but will need to be further queried in the stakeholder workshop.

- An actor population of non-registered architects has been added, estimated at around 300 architectural technicians.

- The Zambia Bureau of Standards has been added as a macro-level actor, with linkages to ZEMA and NCC.

- The Ministry of Local Government and Housing (MLGH) has been added as a macro-level actor due to its role as supervisory body for municipalities and councils and the NHA.

- From the field consultations it appears that the actual delivery capacity of the City Councils is very limited. This limited capacity was reflected by way of downgrading the weight of its connectors with MSME contractors.

Notably, the field consultations also revealed that there are already a few examples of green buildings in Zambia. In Lusaka, there was a school entirely built out of compressed earth blocks including classrooms, office buildings, and staff houses, covering an area of several thousand square metres. In Kitwe, a whole settlement of community buildings were planned and run by women utilizing compressed earth blocks. An architect and lecturer from the university built a compressed earth block Eco Hotel in Solwezi.

It also turned out that some macro-level actors like the Zambian Institute of Architects do also organize skills training (in their case Continuous Professional Education (CPE)) courses. These organizations thus execute both macro and micro level roles, but continue being registered as macro-level actor in the map since training is not perceived by actors to be their core role.

According to the field consultations, the only way to become an architect in Zambia is through the Copperbelt University. This information contradicts evidence from desk research and will need to be double-checked; for now, the linkage between the University of Zambia and the actor population of registered architects has been capped in the actor network map.
Consolidated actor network map of the Zambian (green) building construction industry
The field consultations again revealed that the term ‘green building’ sometimes carries negative connotations in Zambia (thought to be expensive; or associated with traditional building methods = poverty). Case in point is the fact that rural housing was seen as a synonym for green buildings. These attitudes might be partly explained by the fact that many actors seem to have a rough understanding of the subject, but often lack of any deeper knowledge.

Capacity profiling of NAMSCC might be required to probe the actual delivery capacity of the organization –this actor has a crucial role but there seems to be doubt among local actors about its capacity to perform.

The supposed pressure from foreign construction companies on grade 5-6 MSME contractors will need to be further investigated.

The actual linkages by ZDA and ZSCMBA with other actors in the building industry will need to be further investigated, and pending results these two actors might need to be added to the network map.

III.2.4. Amendments to the draft conclusions and recommendations

The following amendments were made to the draft conclusions and recommendations for final validation through local actors:

- ZBA and TEVETA have been added in the recommendations as potential actors to facilitate MSME specific development support –here skills training and regulatory reform– related to the promotion of green and decent jobs.
- The establishment of a national Green Building Council is proposed. In particular, the establishment of a Green Building Council within the NCC in partnership with ZEMA would be an important intervention to coordinate meta and macro-level interventions in support of green building practices. The council could also provide for a steering committee and certification board for green buildings which approve structures that are in compliance with green regulations. Such provision could be added under the public health and factory act.
- Further to the above, the idea of a Green Building Code or green building guidelines for Zambia is put forward. The development of such a green building code seems well received by all macro, meta and micro actors interviewed. In general, the green building code should include issues pertaining to (i) land planning and the optimization of land use; (ii) the encouragement of local natural but modern materials (supported by research); and (iii) the promotion of decentralized renewable water and energy technologies.
- Strengthen the municipal councils to carry out their mandate as regulatory watchdog. Within the municipal councils, focus the capacity building effort on the Plans Works Development Committees (PWD), which oversee and approve all building and construction plans and are therefore of paramount importance.
- Include traditional leaders as champion of green building practices that are aligned with local cultural practices and building traditions.
- Facilitate the registration of both non-registered contractors and non-registered architectural technicians with the NCC and the Zambian Institute of Architects, and where applicable also with sector associations like the NAMSSC; where required, provide capacity-building support and consider the introduction of a double skills certification system for formal and informal acquired skills –such as the one already developed by TEVETA.
- Consider the promotion of water harvesting technology, since this green technology met strongest interest with local actors during the field consultations.
- Education is of paramount importance so as to introduce the concept of sustainable buildings at an early stage.
- TEVETA might play a coordinating role in curricula development, and the introduction of those into the construction schools. In close cooperation with NCC the training of trainers could be located within the training school of NCC. With the different procurement offices of the Ministries create clear guidelines for green public procurement of buildings should be developed.
- A one stop shop and knowledge management centre in form of an internet website/platform might be created, possibly hosted by NCC or a university. The knowledge management centre might facilitate access to information on standards and methods of green construction and material specifications.
The business case underpinning water harvesting technology

It is estimated that the city of Lusaka will have a water supply deficit of 522,000 m³ per day in 2015 (based on 2012 figures). An ‘improved water’ service level of 82% is estimated in Lusaka despite the annual 300 million cubic metres of rainfall over the city as opposed to its 75 million cubic metres of piped water.

The installation of a 10m³ storage tank for a catchment of 120m² water harvesting structure would result in the supply of 60 litres a day for a six person household all around the year.

The economic cost of around USD 450 for a full water harvesting system is hard to recover as monthly water expenditures of households are relatively low and around USD 5–10 (the cost of water is between K20 and K50 for a 20-litre-bucket). A payback of 3–7 years is likely. However, experiences from other African countries show underground storage tanks constructed for USD 7–10 per m³, resulting in much cheaper systems. There seems to be a huge potential for this technology, as most of the households already regularly practice rainwater harvesting by placing buckets under the eaves during the rains. Regarding employment effects these can be significant as manual work and bricklaying is required.
III.3. Final validation of findings with local actors

III.3.1. Qualification of the validation mechanism

The stakeholder validation workshop was conducted on 10 January 2013 at the Government Complex Conference Centre in Lusaka. The objective of the validation workshop was to present the findings of research activities undertaken by the Green Jobs Programme as part of its Inception Phase and to have the research finding validated by industry stakeholders. The workshop attracted seventy-nine (79) participants from various segments of the industry. These included governmental agencies, the private sector, and NGOs.

The workshop proceedings started with an opening session with remarks from the ILO, ZFE and MCTI Permanent Secretary and Steering Committee Chair who then opened the Validation Workshop. ZCTU was represented at sectorial level by National Union of Building, Engineering and General Workers (NUBEGW) who participated in the panel and thematic discussions. Presentations were made by the ILO (Overview and Building Industry Analysis); UNEP (International best practices in Green Building); FAO (Building construction inputs with a focus on timber); ITC (Access to Green Finance) and UNCTAD (Market access and business linkages). These were then followed by feedback from the plenary. Additional inputs were then harnessed from thematic discussions on each of the above presentations the result of which was also subjected to plenary feedback. For a list of participants in the validation workshop refer to Annex D of this document.
III.3.2. Description of the actors’ feedback

**Introduction on the green jobs programme**

An overview of the whole programme was given by Ms Naomy Lintini, the Programme Coordinator on the UN Green Jobs Programme. The presentation highlighted some of the key aspects of the programme. Ms. Naomy Lintini explained that the emphasis for the programme was on the Micro, Small, and Medium-scale Enterprises in the building construction Industry. She presented the strategy which the Green Jobs programme intends to apply in supporting the development of sector. Ms Lintini also gave details of what the programme is all about, including the implementation programme time frame, implementing partners, programme objectives and expected outcomes. She further highlighted the programme activities undertaken during the current inception phase.

In response to the presentation

- Mr D Chakonta, the Director General of TEVETA, stated that the programme was much needed during this particular time in the country’s development; however, he indicated that in the overview, he noticed that there was no mention of skills training for the industry. Mr Chakonta took the opportunity to inform the meeting that TEVETA was currently working on construction industry’s training needs.

- The Permanent Secretary reiterated the importance of a trained cadre of artisans for the industry. He explained that buildings in Zambia are no longer constructed in an artistic, skilful and durable manner as was done in the past. He highlighted the importance of raising the level of skills among Zambian artisans so that they are brought to the level of competing neighboring countries.

**Presentation of the actor network analysis of the Zambian building construction industry**

Mr Tapera Muzira, the Chief Technical Advisor of the UN Green Jobs Programme, presented the findings of the analysis of the building construction industry. He explained that the analysis of the industry had established that MSMEs had a big role to play in the Zambia’s building construction industry. He noted that this could be attributed to the fact that the MSMEs account for a large percentage of building activities, especially for low cost housing. Mr. Muzira further illustrated through a consolidated actor network map how MSMEs would benefit from development support in green building. The illustration included the interlinkages among the various industry stakeholders. He noted that from the presented model, it was possible to focus on the key players in the industry. He also highlighted some of the challenges and opportunities for creation of environmentally-sustainable jobs through MSMEs in the construction industry.

In response to the presentation

- Mr Patrick Chalwe, one of the participants, noted that in addition to the issue of affordability and cost of materials as factors affecting demand, other factors such as geographic location also greatly affect demand. He pointed out that one of the major players in creation of jobs is the Government and that it had the capacity to spearhead green building through its housing development projects and that they should follow a standard when constructing housing units. He noted that currently the construction guidelines in use were not environmentally friendly. He suggested that the Ministry of Transport Works, Supply and Communication should work together with the programme to promote green construction.

- Ms Fiorina Mugione from UNCTAD pointed out that for a house owner, the maintenance and use of a building also has an impact on the total cost of a building in the long term and that this should be taken into consideration when discussing the cost of building construction.

- Mr Ian Banda of the School of Engineering University of Zambia emphasized the point that Government should play its role effectively as an active customer. He noted that local authorities need to be capacitated and made to understand, so that they are able to appreciate the philosophy of green building –as most of the building activities were under their jurisdiction.

- Another participant said it would be important for the programme to define green building in Zambia and what risks were involved. He gave an example of
opening up a building to the sun in an architectural design and how it might be considered green in that the occupants of the building would enjoy natural sunlight but it had risks in terms of their health.

Further to the above, the following comments were received from participants during the thematic sessions.

**Ultimate beneficiaries**

The ultimate beneficiaries were seen to be MSMEs along the value chain for green building goods and services, with an emphasis on businesses at selected points of the value chain. Further to the above, it was agreed to focus on the following three target groups:

- Small-scale contractors, within the actor population of NCC registered contractors listed in either Grade 5 or Grade 6 as well as contractors not registered with NCC but registered with PACRA.
- Small-scale producers of environmentally friendly building materials (sustainably produced timber and timber products; energy-saving and renewable energy technologies; and rain water conservation technologies).
- Building professional service providers (principally architects).

It was recommended that focus should be primarily on MSMEs that are already in business and that outreach quotas for women and youth should be set at all levels of interventions; for example, 40 per cent of enterprises the programme reaches should be owned or managed by women or youth. And further to that affirmative action to fast-track the inclusion of women and youth among both intermediate and ultimate beneficiaries should be emphasized.

**Geographical target market**

Based on the finding of the research and recommendations from the stakeholder validation workshop, the geographical target market of the programme was identified as being the national market in its totality. This is mindful of the fact that the value-adding activities in the industry take place across the entire country, with the production of raw material inputs typically located in specific rural provinces while the manufacturing of building materials, housing products, and the provision of actual building services are concentrated in urban areas. Pending the consolidation of intervention points for value chain upgrading at the outset of the programme, intervention initiatives will reach out to at least five provinces key to the development of the value chain including some provinces where timber production is concentrated and where demand for green goods and services potentially peak.

It was established that low hanging fruit could be in the peripherals of major cities such as Lusaka and Kitwe (demand for affordable and workplace convenient urban housing); developing towns Chipata (driven by trade), Livingstone (driven tourism), Solwezi (driven mining) and Choma (new provincial administrative centre for the Southern province). A number of new administrative districts such as Vubwi district in Chipata Province, have also been formed, raising the housing and infrastructure development demands even further in the 75 districts of Zambia.

**Technical and Vocational Skills**

The participants indicated that skills cannot be enhanced without a clear understanding of the relevance of the identified skills. It was therefore pointed out that there was a need to ensure that industry practitioners understand the practice of green building. It was recommended that the programme should undertake training of trainers in order to enhance outreach and to create a multiplier effect. Stakeholders noted that research was also cardinal and that the programme should emphasize the need to strengthen the existing research institutions. It was noted that more governmental intervention and support was required to for research into building construction in general, and green building in particular.

**Institutional Capacity Building**

Stakeholder agreed that there was need to select and work with aspects of green building that are relevant to the Zambian situation and which are practical to implement. It was therefore noted that capacity will need to be built in Institutions like ZIA, CBU, EIZ. It was further noted that the Programme should take cognizance of the fact that most of the training in the MSME realm takes place onsite, and that there was therefore need to develop strategies that address informal systems training. It was also noted that there is the need to develop a green building grading system and to give indicators of what constitute green building. The Stakeholders recommended that the programme should utilize the relevant government establishment as they were the main catalysts in the process of promoting green building practices. This includes aspects related to skills training, entrepreneurship, working conditions, innovation, research, private or public domain. It was noted that government has great influence hence the need to have government agencies fully integrated into the programme system. The stakeholders further emphasized the importance of active participation from all industry players who included the MSMEs and the general public.
Deepening architectural skills for contextual and affordable green building designs

It was also recommended that due consideration should be given in the promotion of green building from the design stage, the materials used, as well as the process of building the structure, so as to ensure sustainability at all levels. The recommendation acknowledges that design and material were interlinked in that the design of the building determines the materials to be used hence the designers need to be trained.

Promoting building standards

Stakeholders emphasized that the Zambia Bureau of Standards should play a key role in providing standards for material recommended for green building. Stakeholders further indicated that there was need for the country to have clear building standards as is the practice in other countries. During the discussion, the participants suggested that there should be a council specifically created to oversee the building of green structure. It was agreed that emphasis be on the need for a green council whose aim would be for the whole country to see the benefits of green building.

Green building materials and technology

It was noted that Institutions like the University of Zambia’s TDAU who are promoting use of environmentally-friendly building blocks made from stabilized soils should partner with institutions like the Institute of Architects so as to influence the way buildings are constructed.

MSME business management training and support

Stakeholders recommended that training to MSMEs in the building construction industry should include entrepreneurial competencies public relations, finance, labor management, and negotiation skills. It was noted that there was a need to clearly determine how many green jobs would be available to the Zambian population.

Documenting local current practices and traditional know-how on green building

It was further noted that villages have a lot of safe, environmentally-friendly traditional building technologies but that not much documentation exist on these. It was agreed that there was need to strengthen the already existing technologies. The participants also indicated that there were preconceived ideas related to green building on the part of the users in that users usually feel going green would be more expensive and can only be afforded by the wealthy.

Research and development

On issues concerning innovation and creativity, the participants indicated that recycling needs to be encouraged through research, in order to reduce the impact of waste on the environment. The stakeholders recommended the application of “same product, yet different use” principle in promoting recycling.

It was further discussed and agreed that there should be deliberate effort to make finances available for research in order to encourage innovation and creativity.

It was also suggested that traditional initiatives should be promoted including the use of anthill soil instead of cement between bricks because the use of anthill soil makes use of local building materials in an environmentally-friendly way.

Other aspects

After a lot of deliberations and plenary discussions, stakeholders provided suggestions on additional activities to improve the performance of the industry. Some of the recommendations provided included that:

- With regard to green building inputs it was noted that the starting point for green building timber was the identification of timber species to be planted. The stakeholders therefore recommended introduction of community based forest management systems in order to monitor and control the use of natural forests in order to ensure the greenness of building inputs.
- In relation to women’s participation in the industry, it was recommended that there should be a deliberate strategy to support change of mindset among in women in the industry in order to encourage them to take up key roles in green building construction and to set up outreach targets for promotions women’s participation in green building construction.
- Stakeholders also recommended that the Occupational Safety and Health Component should be enhanced in order to ensure that aspects of productivity and workers welfare are adequately addressed in the industry, improving MSME working conditions and productivity. Stakeholders indicated that issues of occupational health and safety were not being pursued seriously in the Zambian building construction industry. It was noted that the Government needs to take a stronger role and improve capacity to enforce much of the already existing regulations on health and safety.
- It was noted that employment in the building industry was very precarious and that often
workers and their families were left destitute upon conclusion of project-based employment. It was therefore recommended that the intervention activities to the industry should include introduction of a social protection system among building construction industry workers.

- Other recommendations of activities included that the access to finance component should focus not only on capacity building of MSMEs but also on the supply side of business financing. It was recommended that there was a need to look at diversified sources of financing including value chain financing and carbon credit financing among others. The Stakeholders also recommended that the access to finance component should consider facilitating establishment of a credit guarantee scheme for MSME in building construction.

### III.3.3. Final amendments to the research findings, conclusions and recommendations

As indicated above, the consolidated findings from the desk research and the field consultations were largely confirmed during the validation workshop. The discussions mainly centered on the conclusions and recommendations, including the choice of MSME target group, the geographical target market, and the concrete intervention mix.

The first major amendment to the conclusions and recommendations was the decision to strongly focus on architects as intermediate beneficiaries of programme support, in order to exert leverage over the (green) building construction practices of the ultimate programme beneficiaries, here grade 5–6 MSME contractors.

The second major amendment was the recommendation to specify MSME intervention points geographically, that is, to pinpoint selected urban areas to reach out for MSME contractors and selected rural areas to work with small-scale producers of environmentally-friendly building material inputs.

A third important qualification of the recommendations was the need to systematically assess the (green construction) skills development needs of MSME workers and to emphasize on onsite or in service training in reflection of the realities on the ground. In addition, the need to combine green construction specific skills training with generic small business management skills training was noted, and has been incorporated into the final set of recommendations. Furthermore, the request to systematically document traditional local know-how in environmentally friendly building construction has been prioritized as an intervention point, since it plays to the strengths of informal MSME contractors.

Furthermore, the OSH component of the proposed intervention mix has been significantly enhanced, to reflect the concern for workers’ welfare and to boost workplace productivity. Finally, in reflection of stakeholder feedback, a recommendation has been added to carry out research on the establishment of a basic social protection floor for the building industry.
Annex A: Bibliography of publications on the Zambian building industry, with emphasis on activities of MSMEs


Construction Sector Situation Analysis, 2010


NCC, 2004: Development of Contractor Registration Scheme with a Focus on Small Scale Civil Works Contractors-Final Report


Annex B: Templates of research tools

Micro level: Focus group discussion guidelines

1. Introduction: Ice-breakers

I would like to begin this discussion by asking you a few general questions about environmentally-friendly, known also as Green building.

? What do you understand environmentally-friendly building to be?

Please provide the following general working definition for environmentally friendly buildings in Zambia:

- Sustainable use of natural building materials in construction (notably sustainable wood and blocks)
- Installation of features, appliances and technologies into the building to:
  - improve sustainable fresh water supply
  - improve sanitation
  - improve electricity supply through renewable energy sources
  - provide clean cooking and improve cooking efficiency
  - increase water efficiency
  - increase energy efficiency
  - minimize, collect, treat and recycle household waste

? Do you think environmental friendly-building is appropriate for Zambia? Why?

2. Building in Zambia

Let’s talk about Building in Zambia, in particular building homes… most of you are involved in one way or another

? What role does the NHA play in the Zambian Building Industry?

? What role does the NCC play in the Zambian Building Industry?

? Not all contractors are registered with the NCC!

- How do the unregistered builders operate?
- Why do you think they are unregistered?

? Do MSME’s workers have labour rights? Do they enforce their rights?

- Are there workers (under the age of ___) in the building industry?
- Are there any OSH products in the building construction sector?

? What are the main building materials used in the Zambian building industry and where are they sourced? Are there any negative effects on the people and/or the natural environment by extracting and supplying the building materials? If yes, what kind of?

? Regarding wood and forest products, what are major challenges for the building industry and housing, if any?

? Regarding bricks, cement blocks and other walling material, what are major challenges for the building industry and housing, if any?
3. Finance for MSMEs in the Building Industry

Do MSMEs in the Building Industry use finance within their operations, such as revolving finance, credit finance, project finance?
- If yes: Who offers this finance? And how is it used?
- If no: Why not? And how are materials and operations financed?
- With what finance are materials purchased in the building construction industry?
- While there seems to be an apparent difficulty to access credit, how would you suggest to overcome the lack of credit?
- Do you think women and men have the same access to credit, if not why not?

4. Skills training for MSMEs in Zambia

There are many training institutions for the building industry in Zambia such as the NCC, Thornton School of Construction, Construction school and others!

- Are these training institutions and the training system appropriate for the building industry in Zambia to meet the needs of MSMEs and the market?
- Where do informal builders learn to build?
  - Is there a skills shortage in the building sector in Zambia? If yes, tell me more... is there a shortage of skilled labour, unskilled labour?
  - Are there any training institutions in Zambia that offer environmentally friendly construction techniques and technologies? If yes, who is providing it and what type of training? How much does it cost?

5. Green Building in Zambia

- Are there any actors using modern natural building design, materials or technologies? Who are they? What are materials and technologies that qualify as ‘modern’ environmentally-friendly already used in the Zambian building industry?
- Are there any champions of “green building” in Zambia? If yes, who are they? What do they do?
- Are there any institutions that research green building design in Zambia? If yes, who are they? What do they do?
- What is the current practice when a building gets demolished?
- Who breaks it down? What happens to the secondary building materials (sold, reused or dumped?) Is there a market for secondary building materials? Formal/informal
Game: Show the slides with examples of green building features (not more than 5 minutes!)

Ask the following questions:

? Which type of material and technology/feature has drawn most of your attention? Why?

? What do you think are the most sold (green) building materials and (green) technologies/features? Provide a hierarchy of the following:

- Modern compressed earth blocks,
- Sustainable wood and roofing,
- Solar electricity,
- Water harvesting,
- Sanitation, non-waterborne
- Water heating,
- Improved cooking,
- Waste collection and recycling.

? Who influences the decisions on the use of these technologies in households (men/women?) What are, in your opinion, the relevant purchasing criteria for customers?

? In your opinion, which type of material and technology would not be accepted by end-users? Why?

? In comparison to conventional buildings could these type of materials and technologies replace common ones? Why? And Why not?

? Would you be willing to sell these materials and technologies? Why? Why not?

? How many hours/days of training would you invest to get trained in (i) green building materials; and (ii) green technologies if the training had no cost to you.

? How much own money would you invest into getting training on green building materials and green technologies

? Which sales strategy would you apply in order to sell these materials and technologies? Which preconditions would you need in order to initiate the commercialization?

? Which kind of problems might occur?

6. Recommendations for Green Housing in Zambia

? Leap-frogging is a development concept that avoids outdated development practices and directly applies contemporary forms of development! Do you believe that leap frogging in Zambia to a modern green building is possible?

? Do you believe the views of homeowners, builders, NHA and MGLH held on traditional building in Zambia could be overcome when modern design and modern compressed earth blocks and modern technology are introduced?

? What are the main 3 barriers to an introduction of modern environmentally-friendly construction? What would be the 3 main actions needed to overcome barriers to modern environmentally friendly buildings?
Macro level: Focus group discussion guidelines

7. Introduction: Ice-breakers

I would like to begin this discussion by asking you a few general questions about environmentally-friendly, known also as Green building.

What do you understand environmentally-friendly building to be?

Please provide the following general working definition for environmentally friendly buildings in Zambia:

- Sustainable use of natural building materials in construction (notably sustainable wood and blocks)
- Installation of features, appliances and technologies into the building to:
  - improve sustainable fresh water supply
  - improve sanitation
  - improve electricity supply through renewable energy sources
  - provide clean cooking and improve cooking efficiency
  - increase water efficiency
  - increase energy efficiency
  - minimize, collect, treat and recycle household waste

Do you think environmental friendly-building is appropriate for Zambia? Why?

8. Building in Zambia

Let’s talk about Building in Zambia, in particular building homes… that most of you are involved in

Who regulates the Zambian Building Industry?

What are the most influential pieces of policy affecting the Zambian Building industry?
- Probe: construction policy, Citizen Economic Empowerment regulations…

How effective has Citizen Economic Empowerment (Preferential Procurement) Regulations been:
- Towards involving women and Zambians in the industry?

How effective are the Zambian building regulations in regulating the built environment?
- Regarding electricity supply? (e.g., ZESCO)
- Regarding cooking energy supply?
- Regarding water supply? (e.g., WSC)
- Regarding sanitation
- Regarding waste collection, sorting and recycling
- Regarding public transport

How effective are the Zambian building regulations in regulating the supply and use of resources, conventional and natural?
- Regarding the provision of wood, sustainable and unsustainable
- Regarding the provision of gravel and sand
- Regarding the provision of clay and soil for modern earth blocks

Are there any negative effects on the people and/or the natural environment by extracting and supplying the building materials? If yes, what kind?
Regarding wood and forest products;
Regarding bricks, cement blocks and other walling material;
Regarding aggregates, such as sand, gravel and stone

What is the role of the NCC?
How effective are they in fulfilling that role? What is the role of the NHA?
How effective are they in fulfilling that role?
What is the relationship with informal builders and the NHA? Does the MLGH interact with informal builders?
What are the 3 biggest barriers for the Zambian building sector?

9. Finance for MSMEs in the Building Industry

It is widely known that the financial market for housing is limited so there is very little credit used or available for financing formal housing, and hardly any financing for informal housing!
What is the reason?
Do some groups of Zambians have more trouble than others gaining credit for housing? What would you suggest in order to overcome the lack of credit?
Do you think financing green buildings might be an opportunity, would it add more challenges to financing housing?

10. Skills training for MSME’s in Zambia

There are many training institutions for the building industry in Zambia such as the NCC, Thornton School of Construction, Construction school, and others!
Is the Zambian training system appropriate for the building industry to meet the needs of MSMEs and the market?
What are the challenges in introducing new training requirements such as environmentally friendly construction techniques and technologies?

11. Green Building in Zambia

Regarding earth and wood being the main traditional building materials in Zambia there are opinions that say: “Internationally and regionally modern natural building techniques are emerging.” Compressed earth blocks are used in modern construction. Sustainable forestry is practiced generating economic benefits and a continuous supply of wood as a key input for construction, furniture, etc.!
What is your opinion on compressed earth blocks and sustainable forestry?
For those who believe there are opportunities, what kind of policy and regulations would be needed in Zambia to enable the modernization of traditional materials used in construction? What kind of political barriers do you see hindering the introduction of modern natural building materials?

Regarding the building environment and notably electricity provision, cooking energy, water and sanitation services, and waste collection and recycling there are modern decentralized technologies and practices implemented around the world. These include:

- Solar and renewable electricity generation
- Water harvesting
- Non-waterborne sanitation
- Solar water heating
- Improved cooking stoves
- Biogas production and cooking gas
- Waste collection and recycling.
12. Recommendations for Green Housing in Zambia

Leap-frogging is a development concept that avoids outdated and no longer future oriented development practices and directly applies modern forms of development! Do you believe leap-frogging in Zambia to a modern green building is possible?

Do you believe the views of homeowners, builders, NHA and MGLH held on traditional building in Zambia could be overcome when modern design and modern compressed earth blocks and modern technology are introduced?

What are the main 3 barriers to an introduction of modern environmentally friendly construction? What would be the 3 most important enabling conditions for modern environmentally friendly buildings to get traction?

Meta level: Focus group discussion guidelines

13. Introduction: Ice-breakers

I would like to begin this discussion by asking you a few general questions about environmentally-friendly, known also as Green building.

What do you understand environmentally-friendly building to be?

Please provide the following general working definition for environmentally friendly buildings in Zambia:

- Sustainable use of natural building materials in construction (notably sustainable wood and blocks)
- Installation of features, appliances and technologies into the building to:
  - improve sustainable fresh water supply
  - improve sanitation
  - improve electricity supply through renewable energy sources
  - provide clean cooking and improve cooking efficiency
  - increase water efficiency
  - increase energy efficiency
  - minimize, collect, treat and recycle household waste

Do you think environmental friendly-building is appropriate for Zambia? Why?
14. Building in Zambia
Let’s talk about Building in Zambia, in particular building homes… most of you are involved in one way or another…

? What is the perception of MSMEs and the general public about environmentally-friendly building? Who and what are the biggest influencers on Zambian building perceptions, and on what is considered modern building and what isn’t?

? Who and what are the biggest influencers on Zambian building norms?

? Who are the biggest influencers for registered and unregistered building MSMEs and is there a difference?

? What role does education in primary and secondary school play? What role does the University and vocational training institutions play?

? What role do TV, Social Media and associations play?

15. Research and Development for Green buildings

? Who / what influences the designs of emerging architects? Who / what influences the designs of emerging engineers?

? Is there an existing R&D unit dedicated to localized green building design?
  - If yes, give details? If no, where should this R&D unit be located? And what should it do?

16. Green Building in Zambia

Game: Show the slides with examples of green building features (not more than 5 minutes!)
Ask following questions:

? What do you think are the most selling (green) building materials and (green) technologies/features for Zambian public at large? Provide a hierarchy of the following:
  - Modern compressed earth blocks,
  - Sustainable wood and roofing,
  - Solar electricity,
  - Water harvesting,
  - Sanitation, non-waterborne
  - Water heating,
  - Improved cooking
  - Waste collection and recycling

? What are, in your opinion, the relevant purchasing criteria for customers?

? Who influences the decision s on use of these technologies in households (men/women)?

? In your opinion, which type of material and technology would not be accepted by end-users? Why? Which preconditions would you need in order to initiate the commercialization?

? Which kind of problems might occur?

? Are there any champions of “green building” in Zambia? If yes, who are they? What do they do? Who do you believe could become a ‘champion’ in green building which people would see as a role model to follow?

? Who are the most powerful actors in the conventional building industry likely to be opposing the transition towards a modern green building industry?

? What were solutions to convince opposing actors of the economic, social and environmental benefits of green buildings?
17. Recommendations for Green Housing in Zambia

Leap-frogging is a development concept that avoids outdated and no longer future oriented development practices and directly applies modern forms of development!

? Do you believe people’s perceptions, values and norms can be influenced to leap frog Zambia to a modern green building industry? If yes how?

? Do you believe the views of homeowners, builders, NHA and MGLH held on traditional building in Zambia could be overcome when modern green building design including modern compressed earth blocks and modern technology are introduced? If yes how?

? What are the main 3 barriers to an introduction of modern environmentally friendly construction? What would be the 3 main actions needed to overcome barriers to modern environmentally friendly buildings?

Semi-structured Interview Guidelines

<table>
<thead>
<tr>
<th>Name of interviewer</th>
<th>Ref:</th>
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</thead>
<tbody>
<tr>
<td>Name of interviewee</td>
<td>Date</td>
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<td>Actor</td>
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<td>Start time</td>
<td>End time</td>
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18. Introduction: Ice-breakers

I would like to begin this discussion by asking you a few general questions

? What is your organizational mandate?

? How effective do you think you have been in delivering your mandate?

? What are your biggest challenges in delivering your mandate?

Show interviewee the actor network (Annex 1) and ask where they think they are located on the map
19. Building in Zambia

Let’s talk about Building in Zambia, in particular building homes… that you are involved in one way or another… Who in your opinion are the main actors in the Zambian Building industry?

What are the most influential players in the Zambian Building industry? Why are they influential?

What are the biggest challenges in the building industry?

From our research, builders in the Zambian building industry seem to be divided into two categories, the first where builders are registered with the NCC and the other where they are informal and unregistered. Tell me more about this.

2. Training for MSMEs in Zambia

Which are the training institutions for the building industry in Zambia?


Do they serve formal and informal builders? Tell me more.. why do you say that?
3. Green Building in Zambia

? What do you understand green building to be?

? It may be likely that the interviewee will not understand what “Green Building” is, please provide an explanation…

Do you think green building is appropriate for Zambia? Yes/no, why?

? Who are the main actors in the Zambian Green Building industry? Tell me more.. why do you say that?

? What do you think will be the driver for green building in Zambia? Tell me more.. why do you say that?

? What kind of regulatory barriers do you see hindering the introduction of green buildings?

? What is the view of traditional building in Zambia? Who holds these views?
4. Recommendations for Green Housing in Zambia

? What in your opinion are the 3 biggest barriers to the introduction of green buildings in Zambia? Tell me more... why do you say that?

? What are the 3 biggest opportunities for green buildings to get movement in Zambia? Tell me more... why do you say that?
Annex C: Case study market development potential for Hydraform blocks

Hydraform Compressed Earth Blocks (CEB) versus cement blocks

Hydraform Compressed Earth Blocks (CEB) constitute an alternative to conventional cement blocks. Their thermal insulation is said to be 10 times that of cement blocks. As two thirds of urban households heat with charcoal stoves during winter, significant health and economic benefits can be expected when introducing earth blocks. The strength of the blocks, when finished with a cemented ring cornice on top of the wall, is said to be 7mpa which is stronger than concrete blocks, the strength of which is 0.5mpa.58 While this technology is quite recent, Zambia, like many other sub-Saharan countries, has a competitive advantage over European and Asian countries as it is endowed with natural earth that through compression can be turned into cement-like blocks.

It is estimated that 1.3 million new housing units might be built by 2030, with most of the houses being low-cost 80m2 structures. Building such an 80m2 house with cement needs 3000 blocks. To produce those blocks 60 days of manual labor are required when using hand molds. Building that very same house with Hydraform blocks needs 5500 blocks but 110 days of manual labour. A hand press machine costing USD 4,000 is also required. Assuming that half of the newly build houses (650,000) were used Hydraform blocks, 71.5 million days of work would be needed, as opposed to 39 million days using conventional cement blocks. This makes 32.5 million more days of work, or 104,166 full time jobs for one year, or 5208 jobs for the next 20 years (see Figure 1).59

Figure 1: Number of working days required to produce 3000 cement blocks, 5500 Hydraform blocks, and 4500 burnt bricks.

Regarding the energy content for an 80m2 house built of cement, around 6000 kWh are needed. This amount of energy is required to produce 75 cement bags of 50kg, which is sufficient for 3000 cement blocks. Cement blocks are then produced by hand shovelling and filling the molds. The burning of bricks requires external energy in the form of wood, equivalent to around 5000 kWh. No energy –apart from labour– is required for compacting Hydraform blocks when using a hand press. While the calorific intake of one day of work could be calculated, it is difficult to estimate the additional energy needed to the basic metabolic rate of around 3000 Kcl. In addition, it is impossible to calculate the additional calorific intake to compress earth blocks as opposed to mixing and filling cement into the molds. Accordingly, only external, non-labor related energy is calculated here and hence, is zero for hand-pressed earth blocks.

The energy content in building materials can either be expressed in costs, which is done by calculating the cost of cement in the next section, or expressed as an environmental impact in terms of CO2 emissions. However, while the majority of electricity in Zambia is from hydropower, CO2 emissions are minimal. Assuming that fossil fuels are used it is estimated that the resulting CO2 emissions from the blocks of one 80m2 house are around 6 tons CO2 when produced from coal and around

59 A full time job for one year in Zambia is estimated to consist of 6 working days a week for 52 weeks equalling to 312 days.
3 tons CO$_2$ when produced from natural gas. In that case carbon credits could be an interesting option to finance green buildings (see Figure 2).\textsuperscript{60}

Regarding the material cost for the production of 3000 cement blocks, 5500 Hydraform blocks or 4500 burnt bricks it is to no surprise that they are highest in the case of cement blocks, at around 8 million Kwacha. This includes 25 tons of block mix and 12 tons of sand for an 80m$^2$ house. For 5500 earth blocks around 66 cubic metres packed earth is required which is around 100 tons. While it is difficult to estimate the price of natural earth, as it is not yet fully commercialized in Zambia, a proxy for a 10 ton\textsuperscript{60} Not part of the calculation is the capital and the tools needed to produce the blocks. The upfront cost of the Hydraform press (USD 4000) need to be included, as well as the transport and storage coast for cement and maybe the earth lorry load is taken. At a cost of Kwacha 200,000 for a 10 ton lorry load the material cost for 5500 compact earth blocks is estimated at around 2 million Kwacha (see Figure 3).\textsuperscript{61}

\textsuperscript{60} Not part of the calculation is the capital and the tools needed to produce the blocks. The upfront cost of the Hydraform press (USD 4000) need to be included, as well as the transport and storage coast for cement and maybe the earth.

\textsuperscript{61} The calculation is based on the assumption that a cubic meter (1000 litres) of packed earth weighs 1.52 tonnes. A simple wheelbarrow is 90 litres, making it 11 for one cubic metre. For the superstructure blocks 10 wheelbarrows are needed for 75 blocks. This makes it 733 wheelbarrows, or 66 cubic metres, or around 100 tons (for the substructure blocks 6 wheelbarrows are needed for 45 blocks).
Annex D: List of conventions ratified by Zambia


A total of 43 Conventions:

- Fundamental Conventions: 8 of 8
- Governance Conventions (Priority): 2 of 4
- Technical Conventions: 33 of 177
- Out of 43 Conventions ratified by Zambia, 39 are in force, 4 Conventions have been denounced; none have been ratified in the past 12 months.

### Fundamental

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<tr>
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<td>C105 - Abolition of Forced Labour Convention, 1957 (No. 105)</td>
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<td>C111 - Discrimination (Employment and Occupation) Convention, 1958 (No. 111)</td>
<td>23 Oct 1979</td>
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<td>C138 - Minimum Age Convention, 1973 (No. 138) Minimum age specified: 15 years</td>
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### Governance (Priority)

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<td>C011 - Right of Association (Agriculture) Convention, 1921 (No. 11)</td>
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<td>C012 - Workmen’s Compensation (Agriculture) Convention, 1921 (No. 12)</td>
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<tr>
<td>C017 - Workmen’s Compensation (Accidents) Convention, 1925 (No. 17)</td>
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<td>C018 - Workmen’s Compensation (Occupational Diseases) Convention, 1925 (No. 18)</td>
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<td>Convention ID</td>
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<td>C019</td>
<td>Equality of Treatment (Accident Compensation) Convention, 1925 (No. 19)</td>
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<td>C026</td>
<td>Minimum Wage-Fixing Machinery Convention, 1928 (No. 26)</td>
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<td>Underground Work (Women) Convention, 1935 (No. 45)</td>
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<td>Recruiting of Indigenous Workers Convention, 1936 (No. 50)</td>
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<td>C095</td>
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<td>Maternity Protection Convention (Revised), 1952 (No. 103)</td>
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<td>Social Policy (Basic Aims and Standards) Convention, 1962 (No. 117)</td>
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<td>Minimum Age (Underground Work) Convention, 1965 (No. 123)</td>
<td>03 Apr 1967</td>
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<td>C124</td>
<td>Medical Examination of Young Persons (Underground Work) Convention, 1965 (No. 124)</td>
<td>10 Mar 1967</td>
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<td>C131</td>
<td>Minimum Wage Fixing Convention, 1970 (No. 131)</td>
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<td>C135</td>
<td>Workers’ Representatives Convention, 1971 (No. 135)</td>
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<td>C136</td>
<td>Benzene Convention, 1971 (No. 136)</td>
<td>24 May 1973</td>
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<td>C141</td>
<td>Rural Workers’ Organisations Convention, 1975 (No. 141)</td>
<td>04 Dec 1978</td>
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<td>C149</td>
<td>Nursing Personnel Convention, 1977 (No. 149)</td>
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<td>C150</td>
<td>Labour Administration Convention, 1978 (No. 150)</td>
<td>19 Aug 1980</td>
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<td>C151</td>
<td>Labour Relations (Public Service) Convention, 1978 (No. 151)</td>
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<td>C154</td>
<td>Collective Bargaining Convention, 1981 (No. 154)</td>
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<td>C158</td>
<td>Termination of Employment Convention, 1982 (No. 158)</td>
<td>09 Feb 1990</td>
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<td>C159</td>
<td>Vocational Rehabilitation and Employment (Disabled Persons) Convention, 1983 (No. 159)</td>
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<td>C173</td>
<td>Protection of Workers’ Claims (Employer’s Insolvency) Convention, 1992 (No. 173) Has accepted the obligations of Part II</td>
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<td>C176</td>
<td>Safety and Health in Mines Convention, 1995 (No. 176)</td>
<td>04 Jan 1999</td>
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Annex E: Stakeholder Validation Workshop Report

10th January, 2013: Government Complex Facilitated by: Mabel Mung’omba

United Nations Zambia Green Job Programme

List of acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tr>
<td>CBU</td>
<td>Copper belt University</td>
</tr>
<tr>
<td>CTA</td>
<td>Chief Technical Advisor</td>
</tr>
<tr>
<td>FAO</td>
<td>Food and Agricultural Organization</td>
</tr>
<tr>
<td>SNDP</td>
<td>Sixth National Development Plan</td>
</tr>
<tr>
<td>HIV and AIDS</td>
<td>Human Immune Deficiency / Acquired Immune Deficiency Syndrome</td>
</tr>
<tr>
<td>ILO</td>
<td>International Labor Organization</td>
</tr>
<tr>
<td>ITC</td>
<td>International Trade Center</td>
</tr>
<tr>
<td>MCTI</td>
<td>Ministry Of Commerce Trade and Industry</td>
</tr>
<tr>
<td>MLGH</td>
<td>Ministry Of Local Government and Housing</td>
</tr>
<tr>
<td>MoFNP</td>
<td>Ministry Of Finance and National Planning</td>
</tr>
<tr>
<td>MSME</td>
<td>Micro Small and Medium Scale Enterprise</td>
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<tr>
<td>NCC</td>
<td>National Council for Construction</td>
</tr>
<tr>
<td>UN</td>
<td>United Nations</td>
</tr>
<tr>
<td>UNEP</td>
<td>United Nations Environment Programme</td>
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<td>UNCTAD</td>
<td>United Nations Conference on Trade and Development</td>
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<tr>
<td>UNZA</td>
<td>University of Zambia</td>
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<tr>
<td>ZFE</td>
<td>Zambia Federation of Employers</td>
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</table>
1.0 Introduction and background

The building construction sector has been identified as one of the main enablers of economic growth by the Government of Zambia; it has experienced rapid growth in recent years, and is poised to expand further on the back of public sector-funded infrastructure development projects and strong demand in the residential housing and office retail market. The building construction industry in particular offers excellent potential for broad-based wealth and job creation due to its comparatively high labour intensity, low entry barriers for semi-skilled and unskilled labour, and high concentration of MSMEs.

The sector is an excellent conduit to promote the creation of green jobs that make a direct contribution to the preservation or restoration of environmental quality—including jobs that help to protect ecosystems and biodiversity, reduce energy, material and water consumption through high-efficiency strategies, decarbonize the economy and minimize or altogether avoid generation of all forms of waste and pollution.

Against this background, and within the framework of the United Nations Development Assistance to Zambia (UNDAF), five UN Agencies led by the International Labour Organization (ILO) have collaborated to provide technical and development assistance to enable MSMEs to improve their competitiveness and to enable the building construction industry in Zambia to shift towards more environmentally-sustainable business practices through a programme on enhancing the competitiveness and sustainable business among MSMEs in building construction (Green Jobs Programme). The programme seeks to unlock the job creation potential of the emerging green economy in Zambia. The programme focuses on the value creation process linked to eco-friendly building materials and services within the local building industry, from production of raw material inputs, processing into building materials, use of these materials in green building construction and maintenance, and where applicable reclaiming of secondary raw materials in building demolition. The overall programme objective of the programme is sustainable livelihoods, through the creation of green jobs in sustainable MSMEs operating in the Zambian building industry.

The Green Jobs Programme started with an inception phase in 2012 whose objective was to create an evidence base on the status of the building construction industry in Zambia and to consult widely with industry stakeholders with the view to get a better insight into the situation of the building construction industry as it relates to green building. In this regard, a number of research activities were undertaken which involved consultations with industry players and regulators. The ILO organized a stakeholder validation workshop at the new government complex on the 10 January 2013, its objective was to create awareness amongst the various stakeholders about the programme as well as to get stakeholder feedback on the findings of the various research efforts undertaken by the programme.

The workshop which was officially opened by the Permanent Secretary from the Ministry of Commerce, Trade and Industry, Mr Stephen Mwansa, was attended by stakeholders from various sectors of the economy both from the public as well as private sector. Among these were the Royal Highnesses Chief Singani, Chief Madzimawe and Chief Chimuka, representatives from the National Council for Construction and the Association of Medium and Small Scale Contractors. The Workshop was facilitated by a private development consultant, Mrs Mabel Mung’omba. A participant list has been attached to the appendix of this document as Appendix 1.

1.1 Introduction to the workshop

The facilitator, Mrs Mabel Mung’omba welcomed the participants to the validation workshop. She pointed out that the Green Jobs programme is a joint programme co-hosted by five UN agencies and that all five agencies would be making a presentation to the meeting.

She gave special recognition to the several dignitaries present, who included the guest of honour Mr Steven Mwansa, Permanent secretary, Ministry of Commerce Trade and Industry, The representative of the International Labour Organization, Ms Belinda Chanda, representatives from United Nations Trade and development, Ms Fiorina Mugione, Food and Agriculture Organization (FAO); Farayi Zimadzi and Mr Jukka Tissari, His royal highness Chief Madzimawe, His royal highness Chief Singani, His Royal Highness Chief Chamuka; the representative from the Zambia Federation of Employers, Mr Hilary Hazele, Chief Technical Advisor of the United Nations Green Jobs Programme, Mr Tapera Muzira.

Other dignitaries recognized included senior government officials, chief executives of Private Sector Companies, and the representatives of business associations and workers’ unions who were present at the workshop. Mrs Mung’omba then went on to give the objective of the one day meeting and to present the outline of the day’s programme.
1.2 Welcoming remarks and speeches

1.2.1 Welcoming remarks by Ms Belinda Chanda, ILO representative

Ms Chanda, the ILO representative welcomed the participants to the workshop on behalf of the ILO Director. She thanked all the participants for coming. She went on to inform the meeting that the Green Jobs joint programme responds to the needs of the Zambian building construction industry. The key points raised in her speech were:

- The recognition that unemployment levels are very high in Zambia and yet there has been reported economic expansion and the population has grown.
- That five United Nations (UN) agencies namely; the International Labour Organization (ILO), United Nations Environmental Programme (UNEP), Food and Agriculture Organization (FAO), United Nations Conference on Trade and Development (UNCTAD), International Trade Centre were all collaborating to deliver development support towards greening the building construction industry in Zambia.
- That there is a link between poverty reduction and climate change.
- That the United Nations is supporting the creation of sustainable jobs among MSMEs in the Zambian building construction industry.

She concluded by thanking the Zambia Government, the private sector, and the cooperating partners for their support and encouraged the participants to engage in fruitful deliberations.

1.2.2 Remarks by Mr Hilary Hazele ZFE representative

Mr Hilary Hazele observed all protocol and noted that the Zambia Federation of Employers was greatly humbled to be invited to the workshop. He further stated that development meant more than just economic growth and that in the face of climate change, there was need to now grow with an eye for the future. He emphasized the need for balance between today’s needs and the needs of future generations. He explained that Zambia had embraced the spirit of entrepreneurship and that Government had increased spending in the building and construction sector.

It was of great concern that the element of sustainability might be ignored. He further noted that ZFE was pleased that the UN has taken into account the above concerns by focusing on sustainable growth. He noted that there was the need to tackle outstanding issues of casual employment since the construction industry brings a lot of contract jobs. Skilled workers are essential for green and sustainable development programs, as they further promoted social dialogue. He said that any business has many facets, and needs to benefit employees, employers, society, and the environment. Mr Hazele, acknowledged that eco-friendly building materials have the potential to enhance business for MSMEs.

1.2.3 Official opening by guest of honor

The Permanent Secretary, Mr Stephen Mwansa urged everyone to loosen up as the occasion was a happy one. He started by wishing everyone a happy new year.

Mr Mwansa commended the organizers of the workshop for a job well done and for bringing together the wide range of stakeholders and industry experts to participate in the workshop.

Key points highlighted by the Permanent Secretary (PS) included the following:

- A reminder that the construction industry has the ability to influence other sectors of the economy.
- Emphasis that the Green Jobs Programme was in line with government policies. The Permanent Secretary explained that the Ministry was aware that development of the Green Jobs Programme had undergone a long consultative process and that the workshop was part of that process in that it created an opportunity for industry players to further contribute to the project document.
- He noted that the Ministry of Commerce Trade and Industry was hopeful that the consultative research conducted was going to provide a clearer picture of the status of the building construction industry. The PS also noted that the workshop would accord stakeholders an opportunity to reach consensus on the best way forward for MSMEs in the building construction industry in Zambia.
- Mr Mwansa gave the assurance that the government was committed to supporting the Green Jobs Programme. He thanked the 5 UN Agencies for their work in Zambia and their tireless efforts to contribute to the country’s development.
1.3 Presentations

1.3.1 Presentation: overview of un green jobs programme

An overview of the whole programme was given by Ms Naomy Lintini, the Programme Coordinator for the UN Green Jobs Programme. The presentation highlighted some of the key aspects of the programme. Ms Lintini explained that the emphasis for the programme was on the Micro Small and Medium scale Enterprise in the building construction Industry. She presented the strategy which the Green Jobs programme will apply in supporting the development of sector. Ms Lintini also gave details of what the programme is all about, including the implementation programme time frame, implementing partners, programme objectives, and the expected outcomes. She further highlighted the programme activities undertaken during the current inception phase.

Comments and queries on presentation

Mr D Chakonta, the Director General of TEVETA, stated that the programme was much needed during this particular time in the country's development. He however indicated that in the overview, he noticed had that there was no mention of skills training for the industry. Mr Chakonta took the opportunity to inform the meeting that TEVETA was currently working on construction industry training needs.

Ms Susan Mulenga from Ministry of Finance and National Planning wanted to find out if the Green Jobs Programme had set any targets for the private sector and how these would be met.

The Permanent Secretary agreed with Mr Chakonta and reiterated the importance of a trained cadre of artisans for the industry. He explained that buildings in Zambia are no longer constructed in an artistic, skillful and durable manner as was done in the past. He highlighted the importance of raising the level of skills among Zambian artisans so that they are brought to the level of competing neighboring countries.

Response to comments and queries

Mrs Lintini fully agreed with the comments and thanked the participants for their contributions. She explained that the specific issues that the programme will address would be discussed in subsequent presentations. She noted that the Programme will design intervention measures based on the research findings. She explained that her presentation was a summary of the Programme to give participants a general understanding of what the programme was all about.

1.3.2 Presentation: building construction industry analysis-focus on MSMEs

Mr Tapera Muzira, the chief Technical Advisor of the UN Green Jobs Programme gave a presentation on the findings of the analysis of the building construction industry. He explained that the analysis of the industry had established that MSMEs had a big role to play in the Zambia's building construction industry. He noted that this could be attributed to the fact that the MSMEs account for a large percentage of building activities, especially for low cost housing.

Mr Muzira further illustrated through a consolidated actor network map of the Zambian green building construction industry how MSMEs would benefit from development support green building. The illustration included the inter-linkages among the various industry stakeholders. He noted that from the presented model, it was possible to zero in on the key players in the industry. He also highlighted some of the challenges and opportunities for creation of environmentally sustainable jobs through MSMEs in the construction industry.

Comments and queries on presentation

Mr Patrick Chalwe, one of the participants, queried the issue of location as a factor of price. He stated that in addition to the issue of affordability and cost of materials as factors affecting demand, other important ones such as geographic location also greatly affect demand. He pointed out that one of the major players in creation of jobs is the Government and that it had the capacity to spearhead green building through its housing development projects and that they should follow a standard when constructing housing units. He noted that the construction guidelines in use currently were not environmentally-friendly. He suggested that the Ministry of Transport Works, Supply and Communication should work together with the programme to promote green construction.

Ms Fiorina Mugione from UNCTAD pointed out that for a house owner, maintenance and use of the building also has an impact on the total cost of a building in the long term and that this should be taken into consideration when discussing the cost of building construction.

Mr Ian Banda of the School of Engineering at the University of Zambia emphasized the point that the Government should play its role effectively as an active customer. He noted that local authorities need to be capacitated and made to understand so that they are able to appreciate the philosophy of green building because most of the building activities were under their jurisdiction.
Another participant said it would be important for the programme to define green building in Zambia and what risks were involved. He gave an example of opening up a building to the sun in an architectural design and that it might be considered green in that the occupants of the building would enjoy natural sunlight but it had risks in terms of their health.

Response To Comments And Queries

Mr Muzira acknowledged that local authorities play a key role in building construction in that they demarcate housing development and have plans of where development is going. With regards to cost of housing maintenance he agreed with the idea and indicated that the programme approach was really looking at the whole picture in order to deal with potential problems before they emerge during the maintenance phase of the building. He agreed that the government was indeed very important, both as a customer and as an incentive for green building. Mr Muzira reconfirmed that location was a key factor in building construction and that the research showed that first time movers normally build in carefully selected locations.

He explained that the research was building on existing knowledge and that there are always risks in construction but that, part of the mandate of the programme was to ensure that risks are minimized and benefits increased. Mr Muzira further noted that green building areas that the programme will focus on will in the end come up with working definitions.

1.3.3 Presentation: International Best Practice In Green Building

Dr Patrick Mwesigye, UNEP’s Africa Regional Coordinator for Resource Efficiency presented on International Best Practice in Green Building. He explained in his presentation that many African countries already have best practices which are not well documented. He explained that South Africa was an example of a country which has documented its best practices on environment and technology. He outlined a number of practices that would promote sustainable use of water, energy and materials in as far as buildings were concerned. He informed the meeting that these practices were at different levels including during the design stage of the building, in the materials used for construction as well as how they are sourced, that is, in use during the whole process of construction of the building and during the use of it. He gave a few practical examples at each of these stages such as the use of power saving light bulbs, turning off power in offices and on billboards at night, having fewer lights in buildings.

Comments And Queries On Presentation

Micheal Daka (Zambia Institute of Architects external consultant) said such a presentation was very relevant to architects. He requested that the organizers arrange to make a presentation to the architects at ZIA.

Ms Sabera Khan the Chief Executive Officer of ACCE noted that both Mr Muzira and Dr Mwesigye, had pointed out the need to change “business as usual” practices. Tapera mentioned that architects are important but in as much as the industry could drive the process, the Government was supposed to spearhead policy related to implementation and to ensure that this kind of sustainable development takes place. She explained that the effective approach to be taken by the programme was that of seeking for a permanent behavioral change among industry stakeholders. Mr Chimuka Nyanga, Deputy Secretary at the Building Contractors and Engineering Consultants added that it was disappointing that the Local Authorities took so long to approve even simple conventional building. He explained that the Green Jobs Programme will have to support capacity building at the Local Council level since green building was a new way of doing things.

Response To Comments

Dr Mwesigye emphasized the need to have a pyramid approach which will tone down the message to a level where various levels of government can easily appreciate. He explained that awareness needs to go down to all levels of the industry. Dr Mwesigye was in full agreement that the Ministry of Local Government and Housing needs to understand and appreciate the concept of green building so that they are able to effectively interact with industry players at all levels.

1.3.4 Presentation: Analysis Of Building Construction Inputs-Focus On Timber

The presentation on the analysis of Building Inputs was jointly presented by Mr Jukka Tissari and Mr Abraham Makano. The presentation was focused mainly on timber and forests and detailed the status of the forestry sector in Zambia, particularly with reference to natural forests and plantation forests. The presentation also discussed the timber processing industry with regard to primary processor, who in this case were largely the small scale saw millers.

The presentation further gave a market analysis on the production and demand of timber products. Other issues discussed included the supply of round wood, approaches to forest management in Zambia, the need for private sector driven plantations, the need for fast-
Comments And Questions
In contributing to the presentation, Chief Chamuka explained that Charcoal burning and the use of wood to cure tobacco in Zambia was putting the forest at risk. He wanted to know if there were other methods of curing tobacco. He informed the workshop that his chiefdom has moved from cutting trees to using maize cobs to make charcoal briquettes. He further explained that his chiefdom had undergone training by American Peace cops and encouraged other chiefs to come to his area and learn.

Responses From Mr Makano And Mr Tissari
The two presenters said land tenure was an issue in Zambia and that to grow trees for timber one needed to own land because plantation growing was a very long term investment.

They explained that Chiefs were important in this regard because they owned most of the land in Zambia.

The presenters urged the Chiefs to encourage their communities to start private plantations. Mr Makano informed the meeting that the invited chiefs were very passionate about forestry, hence their presence in the workshop. He further urged the Chiefs to empower their people through creation of green jobs in forestry related businesses.

1.3.5 Presentation: Analysis Of Opportunities For Access To Finance For MSMEs
The presentation on Analysis of Opportunities for Access to Finance for MSMEs was made by Mr Sebastian Kapalu, Coordinator for the ITC Access to Finance Component. In his presentation, Mr Kapalu, acknowledged the fact that financial institutions were not able to lend business finance to most MSMEs because MSMEs were unable to articulate their financial business needs. He informed the meeting that in addition, MSMEs did not have proper business records and could not be trusted by Financing Institutions. He said there was need for continuous capacity building programmes for MSMEs. He then went on to discuss activities conducted by ITC during the programme’s inception phase. He presented potential areas for green financing in Zambia such as financing for installation and retro fitting of running water harvesting technologies. Mr Kapalu also highlighted MSMEs constraints in accessing finance and the concerns of Financial Services Providers.

1.3.6 Presentation: Market Access And Business Linkage Opportunity For MSMEs
Ms Fiorina Mugione, UNCTD’s Chief of Entrepreneurship Section presented the analysis of market access and business linkage opportunities for MSMEs. She started by explaining why business linkages are important. She gave an illustration concerning the role that policy plays in facilitating business linkages. Ms Mugione then presented a holistic view of the integrated real estate value chains and the current status of integrated real estate value chains in Zambia. She went on to discuss the opportunities in building construction which can unlock local business linkage opportunities and which can attract foreign direct investment and promote public private partnerships. Ms Mugione outlined the constraints faced by MSME contractors in Zambia and proposed that green building standards could be pioneered through business linkages.

Comments And Queries On Presentations
Dr Patrick Musigye informed the meeting that technologies for rain water harvesting are also available and should be encouraged.

One of the participants wanted to know from Mr Abraham Makano if there was an opportunity for SMEs involved in plantation development to be certified and whether there was rationing for the timber by ZAFFICO for SMEs involved in forestry development in order to ensure sustainability of forests, and also whether ZAFFICO cuts trees alternatively as they do in some European countries.

There was also a follow up question to the ILO by the same participants on whether SMEs involved in forestry would be trained on how to make good business plans so as to enable agencies to lend them money for these green building projects, and if available, would the training be easily accessible? Mr David Chewe, the CEO of the Bankers Association of Zambia commented that the people responsible for the access to finance component should collaborate with the Bankers’ Association because that Association was already working on some of the issues raised in the presentation. He further explained that the Bankers’ Association had been working closely with commercial banks and the central bank to enhance the level of financing to SMEs.

Chief Chamuka suggested that the programme should also engage commercial farmers as they were among the parties who have been extensively cutting down trees for curing tobacco. He further suggested that the programme should team up with America Peace Corps to train people in making charcoal briquettes out of maize.
cobs, as the chief is doing in his own chiefdom as a way of preventing deforestation.

One of participants noted that it is important people know and understand exactly what green building was and the risks involved. He encouraged the programme team to promote building for beauty as well as safety.

Responses From Ms Fiorina Mugione, Mr Sabestian Kapalu, and Mr Makano

On the issue of funds from ILO for SMEs, Ms Mugione informed the meeting that ITC is working with selected banks and MFI on providing finances to SMEs. As for marketing, UNCTAD will work with promising SMEs to link them to big corporations for supply of goods and services. Ms Mugione added that they would also provide support to MSMEs to prepare business plans and help them to be more precise about their definitions. Funds for the Programme will be used in a strategic way to ensure that the targets for the programme are met and all stakeholders benefit.

On tree planting, Mr Makano informed the meeting that each tree species under plantation management requires different treatment. In Zambia when thinning pines (in order to stimulate growth) the thinning regime is 5 for every 9 trees. This density changes as the forest stand gets older. Eucalyptus has a different treatment as well.

Forest certification was one of the concepts used in order ensuring that timber being used in Green jobs comes from forests that practice sustainable forest management. Such forests and processors will need to be certified. According to Dr Patrick Musigye, certification is currently conducted by the Forest Stewardship Council of the USA. There is a certification facility being developed for Africa’s forests and supported by UNEP in Nairobi, which is developing an African certification standard called Eco Africa Mark (Eco Africa will be a certifying body).

For SMEs working with ZAFFICO, the meeting was informed that ZAFFICO, though an Important stakeholder, could not be funded as the programme focuses on working with MSMEs and ZAFFICO is a parastatal. There was also a welcome move by GRZ to cap interest rates charged by MFI to a maximum of 45 per cent. The green jobs program aims to stimulate private participation in the forestry value chain; from seedling production to marketing of finished goods and training should be focused on SMEs. On timber rationing, ZAFFICO is rationing timber from plantations to SME saw millers at an average of 100 cubic meters per month for purposes of preserving forests.

It was agreed that land tenure was indeed an issue in Zambia and that growing of timber requires ownership of land.

1.4 Afternoon Session

The purpose of the afternoon session was to create space for further exploration of thematic research areas. Participants were preassigned in teams in the thematic research areas of interest and all the five presenters acted as resource to the groups according to the research subject. This was a further opportunity to get more feedback and contributions to the findings. Each group self-organized and chose their own rapporteur and presenter to then provide feedback the entire group in the plenary session.

1.4.0 Plenary Presentations By Groups

1.4.1 Group 1 Discussion: Building Construction Industry Analysis- Focus On MSMEs

The group focused on four main issues and a summary was presented in plenary by Mr Museba from Ministry of Local Government on:

- Technical and vocational skills.
- Entrepreneurship (small business management and support). Working conditions (Safety and Health).
- Innovation and creativity.

Technical And Vocational Skills

Mr Imasiku commented that one cannot plan to enhance skills without understanding what those skills will be relevant for. There was therefore need to ensure the practitioners understood the practice of green building and there was need to train the trainers. He said in as much as training was available, research was still cardinal and there was need to strengthen the existing research institutions.

He explained that research was not active because it was not adequately funded and that there was no monitoring and support from the Government. He noted that the existing research schools need also maximize and specialize in research.

Mr Ian Banda, UNZA School of Engineering, said green building is a very wide concept. It is practiced in different countries in different ways and at different levels. There was therefore need to select those aspects of green building that will be practical to implement in Zambia. He added that there was need to identify the intervention points for training trainers. Also all stakeholders need to be empowered in terms of knowledge including ZIA, CBU, Engineers, architects ,and the National Council for Construction.
Mr Nick O’Conner of Rainlands Timber LTD said that most of the training in the MSME realm is onsite, hence the need to upgrade training from informal training to formal training. He also noted that there was need to grade buildings on what is green and how much of it is green, and that there should be an understanding of which building materials are green. He explained that the programme should highlight why it was promoting timber and use of earth blocks for green building.

He also wanted to find out at what stage of the building the green aspect comes in and what the cost benefits of building green were. Mr O’Conner explained that there was need for a lot of education and awareness about the concept of green building among industry players and also the ordinary citizen.

Mr Chibale Phiri noted that to determine how green something is we can take a zero environmental footprint as a standard. He further noted that green building promotion should deal with the issues of the design, materials and the process of building the structure, as all of them have to be sustainable. He explained that design and materials were interlinked, as the design of the building will determine the materials to be used; thus the designers need to be trained. He also emphasized that the Zambia bureau of standards should play a role in testing the strength of recommended materials such as timber and compressed earth blocks. He noted that all countries have a standard when it comes to building and that Zambia too should have pride in having specific building standards.

The representative from TDAU pointed out that his company has been advertising environmental-friendly building blocks made from stabilized soils for ten years but that the organization had not been in touch with the various stakeholders, such as ZIA, who could help to promote the product.

Entrepreneurship (Basic Business Management And Business Development Support)

The group tackled the issue under different topics. The group agreed that this support should be in form of training in basic business management principles including public relations, finance, labor management, and other areas of business management. The group also agreed that it was important to set targets on how many of these green jobs the programme would facilitate.

Working Conditions (Safety And Health)

Mr Imasiku noted that the aspect of occupational safety and health was not prioritized except in the mines or in companies dealing with chemicals. It was agreed that the Government needs to start enforcing the already existing regulations on health and safety.

The representative from UNZA pointed out that sometime back an occupancy license was only given upon inspection of the building by ZESCO, Buildings department, Fire brigade, and the council.

One of the participants suggested there should be a council specifically created to oversee the promotion and building of green structures so that the whole country could see and appreciate the benefits of green building.

Another participant added that villages have a lot of safe, environmentally friendly technologies but not much documentation exists on these and that not much has been done to strengthen the already existing technologies.

Mr Danny Mwamba added that the issue of HIV and AIDS should also be imbedded into the health aspect. Mr Patrick Chalwe said that stigma on the part of the customers of green buildings needed to be reduced in that they usually feel going green would be more expensive.

Innovation And Creativity

Mr Micheal Museba pointed out that recycling of building materials and other waste products must be encouraged in order to reduce the impact of waste on the environment and that the programme should promote the principle of “same product, different use”.

Mr Imasiku added that there should be deliberate effort to make finances available for green building research.

Mr Nick O’connor suggested that the programme should promote traditional initiatives such as the use of anthill soil instead of cement between bricks.

1.4.2 Group 2 Discussion: Analysis Of Building Construction Inputs-

Focus On Timber

The group noted that the starting point for green building inputs was the identification of timber species to be planted. The group also noted that it would be fundamental to introduce community-based forest management systems in order to monitor and control the use of natural forests. Another aspect which the group highlighted was the importance of enhancing monitoring and utilization of forestry reserves through a well thought out monitoring mechanism.

The group indicated that government intervention was very important in this particular development process and that the enacting and enforcing of laws that govern forestry management was critical. It was also suggested that chiefs should have specific powers to regulate the
use of forests within their chiefdoms. Other prime issues discussed by the group were:

- Increased knowledge and understanding of the importance of inventory of resources among communities.
- Deliberate policy to support a change of mindset among in women in the industry in order to encourage them to take up key roles in green building construction.
- Improve upon existing green building methods, technologies, and materials.
- Establishment of demonstration centers on green building where MSMEs and communities can learn from.
- Documentation of existing green building materials and technologies which should be published in local languages.
- Decentralizing institutions that promote green building construction.
- Adoption and adaptation of green building technologies from other countries.

1.4.3 Group 3 Discussion: Opportunities For Access To Finance For MSMEs

The group identified a number of factors that posed a hindrance to MSMEs accessing financing from banks and other lending institutions. To these challenges, they outlined some possible solutions that could assist in supporting these MSMEs with regards to business financing.

**Challenges:**

- High levels of informality; e.g., unregistered women groups and MSMEs
- High collateral requirements
- Limited access to (accurate) information
- Poor attitude toward the search for information
- Corruption in financial institutions as credit officers demanded top ups
- Unsuitable financing packages for MSMEs

**Solutions:**

- Creation of a bank specifically for MSMEs
- Create reliable electronic data base of citizens essential for tracing resources
- Promoting a culture of savings
- Banks should start recognizing occupancy certificates as collateral
- Speed up the legal process for defaulters for loan recovery to ensure increased money circulation – this is a governmental task
- Sensitize financial institutions to tap from international funds for green building
- Creation of government guarantees fund for green building
- Sensitize MSMEs to change the culture regarding defaulting
- Stiff punishment for defaulters
- Forming and strengthening savings credit schemes, essential to address the issue of informality, poor saving attitude, etc.
- Setting up credit guarantee funds for MSMEs.

1.4.4 Group 4 Discussion: Market Access & Business Linkages – MSMEs’ Opportunities

This group discussed the various linkages necessary to promote, complement and encourage the participation of MSMEs in the building construction value chain. The group noted that business linkages are what will make Green Jobs Programme a success. The group organized discussion under categories: private sector, public sector, challenges and recommendations. Under each of these categories, the main issues discussed were as follows:

**Public Sector**

The group identified the following opportunities for business linkages:

- Housing project/policy service for MSMEs to participate in building 6,200 housing units for the police force
- The creation of new provinces or districts where construction is needed
- Multi-facility economic zones (MFEZs) for MSMEs to participate in building construction related activities.

**Private Sector**

- Multi Facility Economic Zones
- Settlements around large investments; e.g., mines, farming
- Commercial residential housing
- Individual housing (Linked to availability of bank loans)
Challenges
- Limited awareness of “green” construction concept.
- Limited access to finance
- Lack of policy guidelines on building green.
- Lack of public procurement procedures that support green construction
- Cost of Business Development Services
- Costs and procedures involved in tendering processes
- Lack of willingness by Transnational Companies to partner with MSMEs.

Recommendations
- Create awareness (Supply and demand)
- Redesign policies and make them green compliant
- Strengthen credit guarantee schemes
- Simplify procedures for MSMEs
- Implement Fiscal incentives for both MSMEs and large companies
- Introduce conditions for partnerships with foreign investors
- Promote membership to business associations and its benefits
- Promote skills farming.

1.4.5 Group 5 Discussion: International Best Practices In Green Building
The group listed a number of ways in which the green job programme can be supported by practices that are sustainable in nature. These relate to water, energy and materials used in construction. Most of these practices are already being practiced and are working well in other countries. Some of the suggestions made were:
- Enforcing prohibition of unsustainable practices and products (bulbs, TV, fridges, Asbestos)
- Enacting and enforcing energy and water policies/legislation that promote energy and water efficiency practices and uptake of renewable resources (solar water heating, efficient cooking stoves)
- Promotion of retrofitting of existing houses and buildings
- Introduction of incentives and promotion of public awareness by policy-makers

- Strengthening development and enforcement of green building standards/codes
- Linking green building principles with the concepts for disaster risk reduction and climate adaptation and mitigation
- Development and promotion of sustainable procurement system
- Incorporating green building concepts in the curriculum in all school levels
- Retraining, retooling, re-skilling of stakeholders in the building and construction industry
- Developing and implementing behavioral change programmes at all levels
- Coordination of regulatory bodies (NHA, NCC, ZEMA, EIZ, ZIA, MLOGH, Council, ZRA, ZABS, TEVETA)
- Promoting Research and development of local sustainable building materials.

1.5 Closing Remarks
Mr Taper Muzira thanked the participants for their time. He informed the participants that the following day the team would sit down and come up with the first revised draft. On Monday they would agree on the agreed outputs. United Nations agencies would meet on the coming Monday to give feedback on revisions in their area of research. The agreed draft document would then be submitted to Finland (the Finnish Embassy in Zambia).

Towards the end of the inception phase the document will be ready and it will encompass all the issues, leaving a trail of concrete results where the participants will be able to appreciate what has been achieved. He further urged the participants to email the ILO any further questions and comments they may later have and pledged his availability with regards the programme.

The facilitator, Ms Mabel Mung’omba said the participants had been valuable and appealed to them to make the document into what they wanted to see. She thanked everybody and said she looked forward to a time when they would meet again concerning the development of the green jobs programme.
Appendix 1: Stakeholder Validation Workshop Agenda (10 January 2013)

<table>
<thead>
<tr>
<th>TIME (hours)</th>
<th>ACTIVITY</th>
<th>FACILITATOR</th>
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<tbody>
<tr>
<td>08:00- 08:45</td>
<td>Registration and Morning Tea</td>
<td>Barbara Malambo</td>
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<tr>
<td>08:45- 09:30</td>
<td>Introductions and Workshop Objective</td>
<td>Workshop Facilitator</td>
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<tr>
<td>09:30- 09:45</td>
<td>Welcome Remarks by ILO Representative – Ms Belinda Chanda</td>
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<td>09:45 – 10:00</td>
<td>Remarks by ZFE Representative: Mr Hilary Hazele</td>
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<td>10:00 – 10:15</td>
<td>Speech by Guest of Honor: Permanent Secretary: Ministry of Commerce Trade and Industry; Mr Stephen Mwansa</td>
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<tr>
<td>10:15 -10:30</td>
<td>Overview of UN Green Jobs Programme – Programme Coordinator, Ms Naomy Lintini</td>
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<td>10:30hrs</td>
<td>Health Break</td>
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<tr>
<td>11:00 – 11:25</td>
<td>Presentation on Building Construction Industry Analysis – focus on MSMEs – Chief Technical Adviser, UN Green Jobs Programme , Mr Tapera Muzira (ILO)</td>
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<tr>
<td>11:25 – 11:40</td>
<td>Presentation on int. Best Practice in Green Building - Africa Regional Coordinator, Resource Efficiency (UNEP) Dr Patrick Mwesigye and Mr Danny Mwango</td>
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<tr>
<td>11:40 – 11:55</td>
<td>Analysis of Building Construction Inputs Focus on timber - Forestry Officer (FAO) – Mr Jukka Tissari</td>
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<td>11:55 – 12:10</td>
<td>Analysis of Opportunities for Access to Finance for MSMEs – Component Coordinator (ITC)-Mr Sebastian Kapalu</td>
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<tr>
<td>12:10 – 12:35</td>
<td>Market Access and Business Linkages Opportunities for MSMEs – Chief, Entrepreneurship Section (UNCTAD) - Ms Fiorina Mugione</td>
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<tr>
<td>12:35 – 12:40</td>
<td>Group formation and briefing Workshop Facilitator</td>
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<tr>
<td>12:40hrs</td>
<td>Lunch Break</td>
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<tr>
<td>13:40- 14:20</td>
<td>Group Discussions (5 groups)</td>
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<tr>
<td>14:20 – 15:10</td>
<td>Plenary Presentations by Groups Workshop Facilitator</td>
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<tr>
<td>15:10- 15:20</td>
<td>Health Break</td>
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<tr>
<td>15:20-16:00</td>
<td>Presentation of Validated Recommendations for Revised Programme Document – Mr. Tapera Muzira</td>
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<tr>
<td>16:00- 16:30</td>
<td>Conclusions and Way Forward</td>
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<tr>
<td>17:00hrs</td>
<td>End of Workshop</td>
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## Appendix 2: Stakeholder Validation Workshop

10 January 2013: Government Complex

### List of Participants

<table>
<thead>
<tr>
<th>NAME</th>
<th>ORGANISATION &amp; ADDRESS</th>
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