



Clay Brick Production Survey

Southern African Development Community (SADC)



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This report gives the overall findings of the SADC Clay Brick Survey, undertaken in 2016 by Swisscontact, in collaboration with the CBA (Clay Brick Association of Southern Africa). The report was funded by the Swiss Agency for Development and Cooperation (SDC) as part of the Energy Efficient Clay Brick (EECB) project implemented in South Africa by Swisscontact.

SADC COUNTRIES – CLAY BRICK PRODUCTION SURVEY

Report prepared by Swisscontact

December 2016

INTRODUCTION

The Southern African Development Community (SADC) is a regional organisation consisting of 15 Member Countries, with the goal of promoting socio-economic cooperation and integration. This report gives the overall findings of the SADC Clay Brick Survey, undertaken in 2016 by Swisscontact, in collaboration with the CBA (Clay Brick Association of Southern Africa).

The SADC Clay Brick Survey sought to gather intelligence around clay brick production in the SADC (Southern African Development Community) region. With a deeper understanding of the industry and the relevant stakeholders in each country, we are better positioned to identify possible areas of intervention and support.

At Coetzee was appointed to head up the Survey. As former Executive Director of the CBA, he is well-known in the industry and has wide knowledge of clay brick production.

Methods used to gather information included extensive internet research, as well as emails, questionnaires and telephone calls to producers and various other stakeholders.



Countries in the Southern African Development Community

Due to limited opportunities for qualified information, we omitted The Democratic Republic of the Congo (DRC) from our survey and focused on the following 14 countries.



Production Volumes

Overall Clay Brick Production

5 billion bricks per annum

Informal Clay Brick Production

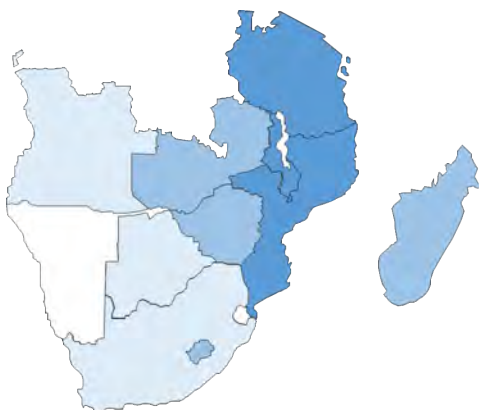
400 million bricks per annum ($\pm 8\%$)

Formal Clay Brick Manufacturers

± 150 factories

Informal Clay Brick Makers

Thousands



INFORMAL SECTOR %

0%

<10%

10-30%

>30%

FINDINGS

By reviewing the production in each country, the survey estimates that the overall production in the SADC region is of approximately 5 billion bricks per annum. Of this, less than 10% is manufactured by informal clay brick producers. The formal sector is represented by 150 companies where each one is producing more than 6 million bricks per year as per definition of a formal brick maker, few of them are however massive with production figures above 10 million per month. Informal manufacturers are however in the thousands and are present in all the region (with few exceptions like Namibia and Swaziland).

Cross border movements of clay bricks are a common practice in various countries, especially when factories are located near the borders. For example, between South Africa, Botswana and Zimbabwe are high in both directions. Zimbabwe exports also a lot into Zambia. Swaziland and South Africa is also exporting into Mozambique. The face brick market has a much higher export nature, where for example South Africa's face bricks are exported to most of the other SADC Countries.

South Africa is by far the largest producer of Clay Bricks. The country contributes with more than 70% of the overall manufacturing capacity of the region. 3.6 billion bricks per annum are manufactured in the country, with the remaining 1.4 billion is made up of the rest of the SADC region. Of the 150 formal clay brick factories, 100 alone are located in South Africa.

Neither Seychelles nor Mauritius have clay brick production due to their lack of clay as raw material. Both import clay face bricks.

While it is generally difficult to identify and classify the informal sector, the survey has tried to quantify it. The size and relevance of the informal sector in each country varies considerably in the various countries. The survey has indicated that Lesotho, Malawi, Mozambique, Tanzania and Madagascar have an informal sector that produces more than 25% of the total production of clay bricks in each country. In general their production is relatively small with individual production figures of up to 60 000 bricks per month. These informal brick makers are normally close to a water source and use a wide range of materials, production processes and firing and drying methods, with varying success.

SHARE OF WALLING MARKET

Based on information received, the following estimations have been made with regards to the clay brick sector's share of the walling market in each SADC country.

Please note that these data are mainly indicative and not scientifically accurate. Information are generally based on few literature and research available and generally from the engagement with the local manufactures and supplier information and perception.

PRODUCTION PROCESSES

METHODS

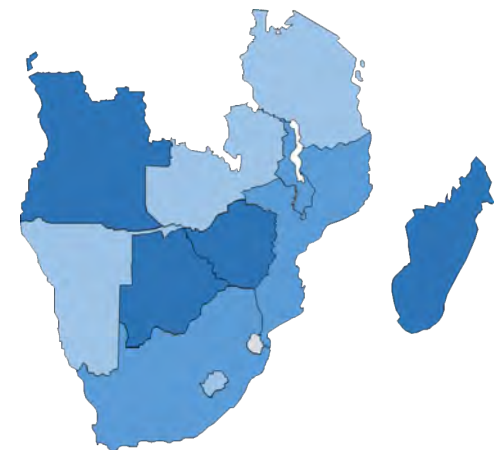
The Survey found that the formal brick makers use mechanical production methods with kiln drying processes or open air drying in hack lines, whereas informal bricks makers use hand molding and open air drying.

FUEL SOURCES

The research has shown that coal is generally the dominant fuel source used in the firing of clay bricks. However most of the countries use many additional or alternative type of fuel both from fossil fuel sources (gas and oil), biomass sources (wood, charcoal) and waste (fly ash, saw dust, rice husk, macadamia nuts, sewerage)

The larger manufacturing countries and the formal sector generally makes use of fossil fuel to fire the bricks. The main fuel source varies from the main availability in the country. For example the Southern Countries have large presence of coal making this the favorite fuel source. In Angola oil is the predominant fuel source because of the abundant presence in the country.

Farm wastes, (like cotton residues, macadamia nuts etc.) Rice husks, wood, charcoal, sawdust, fly-ash are used in the North-Eastern countries.



WALLING MARKET - CLAY BRICK %

<10%
10-30%
30-50%
>50%

FIRING TECHNOLOGY

In both the informal and formal sector, in large and small companies, the majority of brick makers use clamp kilns for firing.

Tier 1: The survey has shown that there are Tunnel kiln technologies in South Africa, Angola, Botswana and Lesotho, which utilise gas, oil or coal as a fuel.

Tier 2: These include Hoffman, VSBK, Zig Zag kilns, TVA and Bulls Trench kilns are in use in Namibia, Swaziland, South Africa, Mozambique, Madagascar, Zimbabwe, Zambia and Malawi. These kilns predominantly use coal, with just one or two using gas for firing.

Tier 3: The third tier of kilns are Clamp kilns, as well as the Scove and variations thereof. These are found in all of the countries, and use farm waste, coal, wood and charcoal as fuel.



Informal clay brick making in South Africa's Eastern Cape.

CHALLENGES FACED BY BRICK MAKERS

Good quality clay is an ongoing challenge for brick makers, as they do not have access to heavy mining equipment or access to financing to purchase the necessary equipment. In some countries especially Zimbabwe, large termite mounds are used as clay bricks raw material, although these clay bricks are normally produced by owner-builders.

The survey has highlighted that deforestation is a concern due to the extensive use of charcoal or wood in some counties.

Lack of transport was mentioned as a major stumbling block in getting bricks produced in the informal sector to the more lucrative formal sector markets.

In addition providing products for home building, the informal clay brick makers play an important role in economic sustainability for many communities as they provide regular employment. The survey shows that there are thousands of informal clay brick producers in the SADC countries, and each employs at least a few people who would otherwise have no income..

Countries like South Africa, Botswana and Malawi have expressed concerns about the lack of regulation in the informal brick making sector, but these entrepreneurs fulfil a community need and no solution has been identified.

The challenges the formal clay brick makers face are similar across the SADC region. All countries have strict laws relating to the environment, water, mining and energy use.

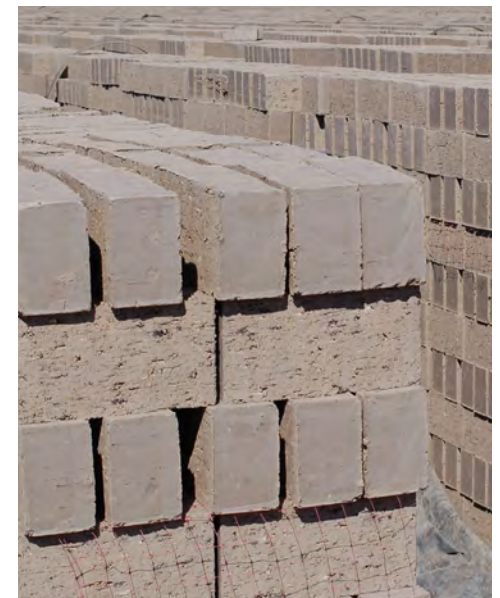
What we have discovered is that the implementation, application and enforcement of these laws differs hugely from country to country. In South Africa strict enforcement encourages technology advances and the protection of resources, but can result in crippling costs to factories in a competitive and evolving building materials market.

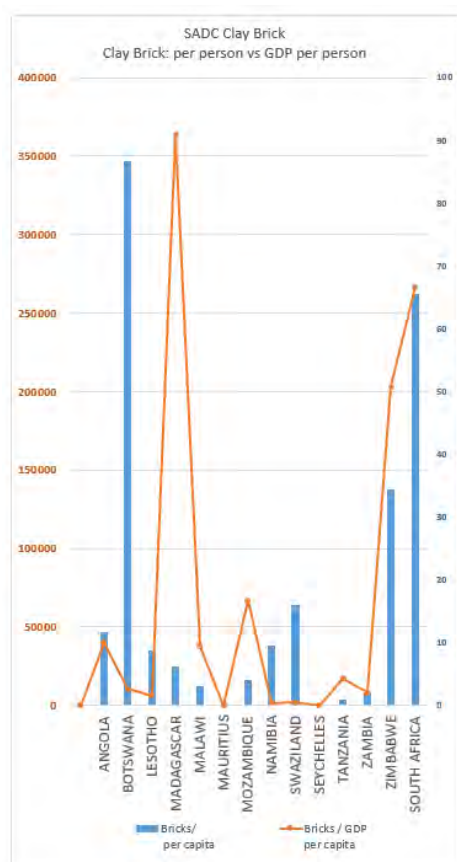
LEGISLATION

Brick production in all the countries researched is governed by Mining, Energy and/or Environmental legislation, which falls under the jurisdiction of various Ministries depending on the countries.

1. Angola: Mining Licence
2. Botswana: Minister of Minerals, Energy and Water Resources. Ministry of Environment, Wildlife and Tourism.
3. Lesotho: Environment Act 10 of 2008; Mines and Minerals Act of 2005
4. Madagascar: Ministry of Mines; Ministry of Environment; Water, Forestry and Tourism.
5. Malawi: Environmental Act, Mining and Mineral Act.
6. Mozambique: Ministry of Mineral Resources and Energy; Ministry Coordination of Environmental Affairs
7. Namibia: Ministry of Mines and Energy; Environmental Management Plan (EMP), Mining License
8. Sawziland: Ministry of Natural Resources and Energy; Ministry of Mineral and Mines, Environmental Management Plan (EMP), Mining License
9. Tanzania: Ministry of Mineral and Mines; Ministry of Natural Resources and Tourism
10. Zambia: Ministry of Tourism, Environment and Natural Resources
11. Zimbabwe: Ministry of Mines and Mining Development; Environment Management Act, Emission License, Mining License “
12. South Africa: Department of Mineral Resources; Department of Environmental Affairs; Department of Energy

The implementation, the application and enforcement of these laws differs hugely from country to country,. In South Africa strict enforcement encourages technology advances, but can result in crippling costs to factories in a competitive and evolving building materials market





SUMMARY OF FINDINGS - PRODUCTION

Countries	Bricks per year	Population	GDP (PPP) billion	Bricks per capita	Bricks/GDP per capita
Angola	300 000 000	25 789 024	194 055	12	39 869
Botswana	187 000 000	2 155 784	38 819	87	10 385
Lesotho	18 000 000	2 067 000	6 017	9	6 183
Madagascar	150 000 000	24 200 000	9 981	6	363 691
Malawi	50 000 000	16 407 000	21 843	3	37 557
Mauritius	-	1 348 242	23 322	-	-
Mozambique	100 000 000	24 692 144	36 925	4	66 871
Namibia	20 000 000	2 113 077	26 399	9	1 601
Swaziland	18 000 000	1 119 000	11 077	16	1 818
Seychelles	-	92 000	2 657	-	-
Tanzania	50 000 000	51 820 000	150 633	1	17 201
Zambia	33 000 000	16 212 000	65 493	2	8 169
Zimbabwe	450 000 000	13 061 000	28 918	34	203 245
South Africa	3 600 000 000	54 956 900	742 461	66	266 472
Total	4 976 000 000	417 109 442			

	FORMAL SECTOR			INFORMAL SECTOR		BUILDING MATERIALS		
Countries	Factories	Main Technologies	Primary Fuels	Market	Primary Fuels	Clay	Cement	Other
Angola	10	Tunnel, Hoffman	Oil, Coal	10%	Wood, Charcoal	60%	30%	10%
Botswana	4	Tunnel, Clamp kiln	Oil, Coal	5%	Fly Ash	69%	30%	1%
Lesotho	1	Tunnel	Oil & Coal	25%	Coal, Fly Ash	20%	75%	5%
Madagascar	10	Tunnel, Scove, Hoffman, Clamp, Zig Zag, BTK	Rice Husk, Wood Peat, Agricultural waste, Coal, Ash	25%	Farm Waste, Wood Peat, Peat, Ash, Coal, Rice Husks	60%	20%	20%
Malawi	4	VSBK, Clamp, Tunnel, Scove, BTK	Wood, Coal, Saw Dust, Rice Husk, Agricultural waste,	50%	Charcoal, & Wood	40%	5%	55%
Mauritius	0			0%		0%	100%	0%
Mozambique	2	Hoffman & Clamp	Coal	50%	Charcoal, Wood, Farm waste	40%	40%	20%
Namibia	3	Clamp, Hoffman	Coal, Charcoal, Fly Ash, Wood	0%	-	20%	78%	2%
Swaziland	1	TVA	Coal & Fly ash	0%	-	5%	90%	5%
Seychelles	0			0%		0%	100%	0%
Tanzania	0			100%	Wood, Charcoal, Farm waste, rice Husk, Cotton Wastes	20%	60%	20%
Zambia	2	Tunnel, Clamp	Saw dust, Fly Ash & Charcoal	10%	Wood, Charcoal & fly Ash	10%	80%	10%
Zimbabwe	9	Clamp, TVA, DDK, Hoffman, Beehive	Coal	15%	Coal, Charcoal, Wood Fly Ash	70%	25%	5%
South Africa	105	Clamp, Tunnel, Hoffman	Coal, Fly ash, Oil, Diesel, Gas	5%	Coal, Wood & Fly Ash	45%	45%	10%

ABOUT THE SURVEY

METHODOLOGY USED

The following methods were used to gather information:

1. A letter explaining our intent - as well as a questionnaire with an invitation to participate in the research - was sent to all brick makers in the SADC countries, where we had contact details. This excluded the South African brick makers, due to previous in-depth surveys undertaken in the South African market.
2. Follow-up phone calls to further explain the reason for the survey and the processes to be used to complete the survey. (Confidentiality was high on the agenda. In order to ensure full understanding and our commitment to this aspect of the survey, confidentiality was discussed in depth during phone calls and further confirmed with a follow-up letter.)
3. Some brick makers supplied us with valuable contact information of other factories in their region, who we then contacted via email and telephone.
4. In some countries, we made use of our own Swisscontact co-workers, who supplied us with valuable information about brick making in the countries within which they operate.
5. Where possible, we also contacted Clay Brick Equipment Suppliers for assistance; two responded with good feedback that could be used.
6. In some of these countries, clay face bricks are imported from South Africa. In these instances, we made use of the exporters' knowledge and gleaned useful information.
7. For countries where we had no contact details, we were entirely dependent on the information sourced from the internet. More than 600 searches were done, with valuable information gathered. the internet also provided an opportunity to verify written and telephonic information.



SURVEY CHALLENGES

Confidentiality in this competitive industry is always a major issue. We had to guarantee the anonymity of brick makers' data, and find ways to encourage them to participate and share their local knowledge about brick making and the clay brick market in their country.

Due to the inaccessibility of informal brickmakers, research on the informal sector was often based on information provided from formal brick makers in the area, supplemented by online research. Identifying colleagues, consultants and exporters willing to share their knowledge of a specific country proved challenging. Although contact information was often inaccurate, and communications infrastructure limited, every effort was made to make direct contact with role players.

In the SADC region, the internet is not an quick and universal source of research statistics. To achieve relative accuracy, we supplemented key search terms with architectural designs and cultural housing.

Good relationships, persistence and Swisscontact's reputation went a long way towards solving these issues and helped us to gather the quality of information we needed from the relevant parties.

CONCLUSION

The SADC Clay Brick Survey has helped to form a better view of both the formal and informal sectors in clay brick making in the 14 countries we surveyed. More information of each individual country can be found in their specific report.

We have reliable figures, and a host of information around production methods, fuel sources and technologies used. We were also able to pinpoint issues faced by brick makers in each of the country's as well as environmental issues stemming from informal operations.

To gain an even deeper understanding of the production, locations of producers, fuel sources used and so on, local visits to these countries are recommended. Country Information

ACCURACY

The level of information available varies considerably between the various countries, with higher level of accuracy with the most southern countries and decreasing while going north. We manage to improve the accuracy by cross-checking online information with information gleaned from questionnaires, emails and telephone interviews. We however cannot guarantee or take any responsibility of any wrong information provided in this report and their use thereof.

Due to concerns about quality, deforestation and erosion, there are ongoing projects in many of the countries, with the purpose of upgrading the sector. Because of these projects, we were fortunately able to find critical information about the informal sector in each of these countries.

ANGOLA

The Republic of Angola is the 7th largest country in Africa, and the 23rd largest in the world. It is bordered by Namibia in the south, the Democratic Republic of the Congo to the north and east, Zambia to the east, with the Atlantic Ocean to the west.

Angola has a population of just fewer than 26 million, with more than 50% living in rural areas and classified as poor.

The economy is driven largely by diamond mining and oil exploitation, followed by Gold and copper mining and agriculture, which is showing a steady increase.

When oil prices were very high, the Angolan economy was one of the fastest growing economies in the world; this recently slowed down following the reduction in the oil price.



INDUSTRIAL SECTOR

Total Annual Production:	300 million
Number of Factories:	Approximately 10
Average Factory Production per month:	750 000 to 11 million
Technologies	Tunnel Kilns; Hoffman Kilns
Fuel Sources	Oil

Since 2009, there has been investment into six new tunnel kiln production plants, producing European-type hollow block clay bricks.

According to thorough internet research, investment figures range from USD 12 million to USD 35 million, with the total production capacity of these plants estimated at around 247 million clay bricks per annum.

Approximately half of the factories are located near the capital Luanda. The remaining are in the vicinity of the major cities.

Population	25 789 024
GDP/PPP	\$194 055 billion
HDI	0.532
Gini Coefficient	42.7
Bricks per year	330 million
Bricks per person	13
Bricks/GDP/Person	773

Due to Portuguese influence in building during the Colonial times, one can assume there are also some older tunnel and Hoffman kiln factories producing clay building blocks. True volumes could therefore be as high as 300 million per annum.

ENVIRONMENTAL LEGISLATION

- Ministry of Geology, Mines and Industry
- Ministry of Environment and Tourism

INFORMAL SECTOR

Market share of Clay Brick Approximately 10%

Main Fuel Sources Wood, Fly Ash

The estimation is that in the poorer areas close to the main cities, one will find informal brick makers, producing a standard solid brick. (Market share is merely an estimation.)

BUILDING MATERIAL

The split in walling assumed in the survey is as follows:

Clay Brick	Adobe/Raw Bricks	Cement Bricks	Prefabricated	Others
60%	-%	30%	- %	10%

About the Survey

Accuracy: 60%

Due to a lack of direct contact in this country, all research was done exclusively via the internet. Despite receiving some contact details, we have had no responses to our emails.



Luanda - Capital City of Angola

BOTSWANA

Botswana is a land-locked country in Southern Africa. The country is topographically flat, with up to 70% of the territory made up of the Kalahari Desert. It is bordered by South Africa to the south and southeast, Namibia to the west and north, and Zimbabwe to the north-east. The country also shares a small undefined border of a few hundred metres with Zambia in the north.

Botswana is the least densely populated nation in the world, with a population of just over two million people, around 10% of whom live in the Capital city of Gaborone. The economy is dominated by mining, cattle farming and tourism.

Clay brick manufacturers are present near the main, most-populated cities and close to the South African border; some of the products manufactured in these cities are exported into South Africa. Further away, towards the sparsely populated western parts of the country, cement bricks are manufactured, rather than clay. This is largely due to the high cost of transport, the lack of clay in the desert area, and by contrast – the availability of sand.



Population	2 155 784
GDP/PPP	\$ 38.82 billion
HDI	0.689
Gini Coefficient	60.5
Bricks per year	187 million
Bricks per person	87
Bricks/GDP/Person	3091

INDUSTRIAL SECTOR

Total Annual Production:	181 million
Number of Factories:	4
Average Factory Production per month:	2-6 million
Technologies	Tunnel Kilns; Clamp Kilns
Fuel Sources	Coal; Oil

The four clay brick manufacturers - located in Lobatse, Gaborone, and Palapye - produce a mix of high quality clay face bricks, as well as good quality stock bricks. The products are an imperial size of 220 x 110 x 75. All clay bricks produced in the tunnel kiln are perforated, while those produced in the clamp kilns are solid; the perforated bricks are slightly lighter than the average 3kg solid bricks.

There are two tunnel kilns in operation, one uses coal for firing and drying, and the other uses oil.

The two clamp kilns both use open air drying, coal duff in the body of the brick, with small coal nuts for firing in the clamp. Both the coal and oil usage figures are comparable with similar operations in South Africa.

ENVIRONMENTAL LEGISLATION

- Ministry of Environment, Wildlife and Tourism (with a dedicated Department of Environment, and the Environmental Impact Assessment Act of 2005);
- Ministry of Mining, Energy and Water Resources (with a dedicated Department for each sector, and the Environmental Assessment Act of 2011 and Mines and Minerals Act of 1999.

INFORMAL SECTOR

Market share of Clay Brick 5%

Main Fuel Sources Fly Ash

The informal sector is relatively small in comparison to the large volume of clay bricks manufactured. Their total production per annum is less than 5% of the market. The survey has indicated that the majority of these informal clay brick makers are located at the foot of the Gaborone Dam, with a few at Lobatse and Kanye.

A study published in September 2013 on the Impact Analysis of Informal Brick Production on the Environment in the Gaborone Dam Area revealed that there are about 15 manufacturers, some manufacture full-time, and some only part-time, to supplement their income. They produce around 6 million brick per annum and the ash for firing is purchased from a local hospital. They are not adhering to any legislation.

BUILDING MATERIAL

The split in walling assumed in the survey is as follows:

Clay Brick	Adobe/Raw Bricks	Cement Bricks	Prefabricated	Others
69%	0%	30%	0%	1%

About the Survey

Accuracy: 90-100%

The information about clay brick manufacturing was collected via a questionnaire sent out to the formal manufacturers. Information received was then verified by telephone or email.

Being that the area of production and construction is relatively small and well-defined, the accuracy of the information provided in this survey is expected to be quite high.



Gaborone - Capital City of Botswana

LESOTHO

The Kingdom of Lesotho is an enclaved, landlocked country, completely surrounded by South Africa, and divided into 10 districts. With an area of just over 30 000km², Lesotho has a population of roughly 2 million, 75% of whom live in rural areas. The majority of households practice subsistence farming.

Rainfall is more predominant in the summer, with some snowfall occurring in winter. Over 80% of the country lies above 1,800 metres, and it is criss-crossed by a network of rivers and mountain ranges making access to many rural areas difficult.

The country's income is mainly derived from diamond mining, water (sold to South Africa), migrant workers from Lesotho working in South Africa, and donations and income from the SA Customs Union. Lesotho's geographic location makes it extremely vulnerable to political and economic developments in South Africa.



INDUSTRIAL SECTOR

Total Annual Production: 13.2 million

Number of Factories: 1

Average Factory Production per month: 1.1 million

Technologies Tunnel Kiln

Fuel Sources Oil; Coal

There is one clay brick manufacturer producing about 13.2 million high quality clay face bricks per annum. The product is of an imperial size of 220 x 110 x 75, with a weight of 3kg. All clay bricks produced have a 33% perforation.

The production is through a fully automated tunnel kiln with a standalone dryer, and takes place 12 months of the year.

There are no coal mines or oil refineries in Lesotho; all firing energy has to be imported from South Africa for clay brick production.

Population	2 067 000
GDP/PPP	\$2.23 billion
HDI	0.489
Gini Coefficient	43.9
Bricks per year	18 million
Bricks per person	6
Bricks/GDP/Person	4466

ENVIRONMENTAL LEGISLATION

There are two acts in place in Lesotho (although exact details proved difficult to find):

- Environmental Act 10 of 2008
- A Mining Act

INFORMAL SECTOR

Market share of Clay Brick 25%

Main Fuel Sources Coal and Ash

According to our internet research, as well as discussions with the major Industrial manufacturer, there are a few small-scale manufacturers, who use no mechanical processes whatsoever, use open air drying, and use ash and coal for firing.

Total production is thought to be around 5 million clay bricks. In the more remote areas, raw bricks are produced and used as building material, because of the lack of fired bricks. The main concerns for this sector include transportation of fired bricks and a lack of government support.

BUILDING MATERIAL

The split in walling assumed in the survey is as follows:

Clay Brick	Adobe/Raw Bricks	Cement Bricks	Prefabricated	Others
20%	4%	75%	0%	1%

Due to the country location, bricks manufactured in the Lesotho are also exported and sold in South Africa. The same would also happen in the opposite direction.

About the Survey

Accuracy: 90-100%

The information about clay brick manufacturing in Lesotho was gathered through a questionnaire sent out to relevant parties. From responses, we were then able to verify information by telephone or email.



Maseru - Capital City of Lesotho

MADAGASCAR

The Republic of Madagascar is located off the eastern coast of Africa, along the Mozambique Channel. The Island is the 4th largest in the world, and has a tropical climate. The population was estimated in 2012 to be 24 million, with 90% of the people living on less than USD 2 a day.

The economy is heavily dependent on agriculture, with exports amounting to 28% of GDP. Mining is becoming a big player in the economy, with discoveries of nickel and heavy mineral sands as well as large deposits of offshore heavy oil.



INDUSTRIAL SECTOR

From what can be found on the internet, one can assume that any factory producing more than a million brick per annum falls under this sector

Total Annual Production:	120 million
Number of Factories:	10
Average Factory Production per month:	Approximately 200 000 to 500 000
Technologies	Tunnel , Scove, Hoffman, ZigZag and Bulls Trench Kilns
Fuel Sources	Rice husks, wood, peat, agricultural waste and ash.

Clay Brick production was introduced into Madagascar after 1820 by Brit James Cameron, with a major shift to brick building starting around 1868. Modernisation has seen more foreign building materials used in the construction of new buildings, e.g. clay bricks, concrete, steel and glass. Clay brick production therefore increased, and - due to the various cultural influences - various firing techniques have been used.

Our research shows that rice husks, wood, peat, agricultural wastes and ash are used as fuel. Coal as a fuel was not mentioned during our research but as coal is present on the island, one can assume that it is also used. Bricks are hand-moulded and the majority of drying is done in the open in lines, except where you find Hoffmann kilns; the quantity of Hoffman and other kilns that use internal drying could not be established, although it was mentioned.

Population	24 200 000
GDP/PPP	\$ 9 981 billion
HDI	0.51
Gini Coefficient	44.1
Bricks per year	150 million
Bricks per person	6
Bricks/GDP/Person	363 691

The research found that there are hundreds of small factories scattered all over Madagascar with very basic bigger operations close the major cities. We also found that a brick yard was constructing next to a school building project, and once the school project was finished, the brick yard was demolished. During the research we also found that farmers substitute their income in the off seasons by making clay bricks using agricultural waste.

ENVIRONMENTAL LEGISLATION

- Ministry of Mines
- Ministry of Environment, Water, Forestry and Tourism

INFORMAL SECTOR

Market share of Clay Brick 25%

Main Fuel Sources Rice husks, agricultural wastes, peat, coal, ash, wood

From the information gathered, we could make a reasonable assumption that operations with less than a million bricks fall under this section. The informal sector uses hand-molding, open air drying and various types of clamp kilns. One also finds that hybrid materials were developed using cob and sticks - wood as a construction material has declined since deforestation.

BUILDING MATERIAL

Clay Brick	Adobe/Raw Bricks	Cement Bricks	Prefabricated	Others
60%	5%	20%	0%	15%

The research has shown that clay brick is the dominant building material, with additional materials like concrete, glass and steel used in the bigger cities, and traditional material like wood, sticks, raffia, bamboo, grass, mud and cob used in the more remote areas.

The architecture of Madagascar is unique in Africa, bearing strong resemblance to the construction norms and methods of the Southern Region of Borneo. Local plant materials were the earliest materials used, and remain common.

About the Survey

Accuracy: 50%

The information gathered was mainly via internet. Unfortunately no information from local contact allowed us to verify the information.

During the survey it was very difficult to distinguish between formal and informal brick makers, as no figures are available.

We were unable to find any figures for certain production methods or firing techniques used, while on some of the photos one can identify bigger and smaller operations.



Antananarivo, Madagascar

MALAWI

The Republic of Malawi is a landlocked country in south-west Africa, bordered by Zambia to the north-west, Tanzania to the north-east and Mozambique to the south-east and west. Covering just over 118 000km² and with a population of 16.4 million, Malawi is considered to be quite densely populated. It is also one of the world's least-developed countries, and depends heavily on agricultural and international development funding.

While the population is predominantly rural, there is a trend towards urbanisation and therefore, a growing need for housing. The Centre for Community Organisation and Development (CCODE) has stated in a paper entitled 'Clean Brick Production' that Malawi will need in the region of 1.7 billion bricks per annum, to build the 21 000 houses currently needed per year (equivalent to roughly 85 000 bricks per house).

CCODE has also entered into an agreement with Indian Institution TARA (Technology and Action for Rural Advancement), to transfer energy-efficiency and environmentally-friendly technical know-how to Malawi.



Population	16 407 000
GDP/PPP	\$21 843 billion
HDI	0.414
Gini Coefficient	43.9
Bricks per year	50 million
Bricks per person	3
Bricks/GDP/Person	916

INDUSTRIAL SECTOR

It is assumed that any factory producing more than a million brick per annum falls under this sector

Total Annual Production:	25 million
Number of Factories:	Approximately 4
Average Factory Production per month:	Approximately 300 000 to 1 minion
Technologies	Sofianos VSBK, Clamp, Rice Husk Clamp, Tunnel and Scove Kilns
Fuel Sources	Wood, coal, saw dust, rice husks & agricultural waste

There is one clay brick manufacturer producing around 4 million clay bricks per annum, in a Sofianos-type VSBK. Bricks produced in this VSBK are an imperial size of 230 x 110 x 70, with a weight of 2.8 kg and – as with all clay bricks – 5% perforation.

In the industrial sector, only one factory uses mechanical clay and brick preparation, while the others use a hand-moulding process. Drying is done in open air by all factories. Due to the high rainfall figures, brick preparation (moulding) takes place for around eight months of the year, while firing takes place for 11 months.

The survey response has also shown that there are other Industrial-type clay brick manufacturers using the Bulls Trench firing technique, and one clamp kiln manufacturer making use of rice husks for firing.

In a follow-up on the questionnaire, another two factories were mentioned; one is a ceramic factory in Blantyre that uses wood-fired clamp kilns, and the other a pottery company that also produces clay bricks using a tunnel kiln and (most likely) sawdust. Unfortunately, additional information on this production hasn't been found.

ENVIRONMENTAL LEGISLATION

There are two environmental acts in place in Malawi that are relevant for clay brick production:

- Environmental Act
- Mining and Mineral Act

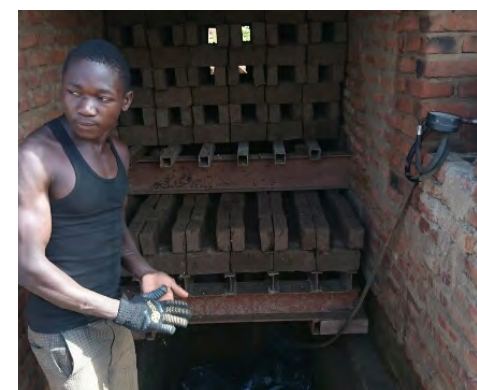
INFORMAL SECTOR

Market share of Clay Brick 50%

Main Fuel Sources Charcoal, & wood, dry leaves

According to a report by TARA, as well as feedback from one brick maker, that there are thousands of small informal clay brick manufacturers spread throughout the country, with a concentration around the main cities of Lilongwe, Blantyre and Mzuzu. This is where the major urbanisation is taking place and where there is high demand for a proper burnt brick.

Individual production ranges between 10 000 and 50 000 bricks, which could possibly contribute more than 50% of the clay produced in Malawi. There is however a concern that the majority of burnt bricks produced are of a substandard quality.



VSBK Pilot kiln in Malawi

About the Survey

Accuracy: 60-80%

The survey was conducted by sending out a questionnaire, which received one response. This was followed up with phone calls, where we received contact details for other formal brick makers. No feedback was forthcoming from the emails sent, and the rest of the information came from extensive internet research.



Blantyre, Malawi

The clay is sourced either through mining from clay deposits or by demolishing ant heaps, and mixing these with sand and water. The bricks are hand-moulded and sun dried, and the firing is done in small clamps, using wood or charcoal. This unfortunately contributes considerably to deforestation - a major concern by the Government.

BUILDING MATERIAL

Clay Brick	Adobe/Raw Bricks	Cement Bricks	Prefabricated	Mud	Others
38%	38.5%	0.6%	0%	19.9%	2.1%

According to information taken from a 2008 housing census, clay brick is still the main choice for building in whatever form, with a fairly equal split between raw (adobes) and fired bricks.

MAURITIUS

The Republic of Mauritius is an Indian Ocean Island Nation off the south-east coast of the African Continent and includes the islands Mauritius and Rodrigues, as well as the outer Islands. The Island was created by volcanic activity some 8 million years ago, making it a very young country. The highest mountain is about 800m above sea level and the Island nation receives rainfall of about 500cm per annum.

Mauritius has a small population of just 1.3 million people, and an economy based on tourism, textiles, (has one of the largest EPZ zones in the world) sugar and financial services. There are no exploitable natural resources, and the country depends heavily on imported petroleum products.

INDUSTRIAL SECTOR

During the British domain, clay bricks were imported from England. There is no clay brick production (nor cement production) in the country; clay bricks are imported and cement is imported through an annual tender process.

The cement is used for brick manufacturing and construction, and, due to the humid tropical climate, large cement hollow blocks are used.

BUILDING MATERIAL

According to the survey, the split in walling is as follows:

Clay Brick	Adobe/Raw Bricks	Cement Bricks	Prefabricated	Others
0%	0%	99%	0%	1%

About the Survey

Accuracy: 80-90%

The research was done via the internet, as well as through discussions with a South African clay brick exporter who confirmed that there are no clay brick producers in the Mauritius.



Population	1 300 000
GDP/PPP	\$18.585 billion
HDI	0.777
Gini Coefficient	35.8
Bricks per year	120 million
Bricks per person	56
Bricks/GDP/Person	3091

MOZAMBIQUE

The Republic of Mozambique is in Southern Africa, bordered by the Indian Ocean in the east, Tanzania and Malawi to the north, Zimbabwe to the west and South Africa and Swaziland to the south-east. The population was estimated in 2014 to be in the region of 24.6 million, with almost half living in the northern Zambesia and Nampula provinces.

Despite being endowed with rich and extensive natural sources, Mozambique is one of the poorest countries in the world. The economy is largely based on agriculture, with 80% of the population engaged in the agricultural sector – mostly in small-scale subsistence farming (according to a 2013 report).

It is important to note however, that it is believed that 90% of the land is not properly cultivated. Tourism is growing slightly, and the discovery of natural gas in 2012 has and is still expected to boost the economy somewhat.



Population	24 692 144
GDP/PPP	\$ 36.925 billion
HDI	0.416
Gini Coefficient	45.7
Bricks per year	100 million
Bricks per person	10
Bricks/GDP/Person	6871

INDUSTRIAL SECTOR

From what can be found on the internet, one can assume that any factory producing more than a million brick per annum falls under this sector

Total Annual Production:	50 million
Number of Factories:	2
Average Factory Production per month:	Approximately 2-12 million
Technologies	Tunnel and Clamp Kilns
Fuel Sources	Coal

Through our survey, we were informed that there is one factory in Maputo using mechanical extrusion and a Hoffman kiln for firing, and which also produces clay roof tiles. One can assume that coal is used. The resource was also aware of another factory closer to Beira, although he was unsure as to whether or not it was still operating.

ENVIRONMENTAL LEGISLATION

- Mozambican Ministry of Mineral and Resources and Energy
- Mozambican Ministry of Coordination of Environmental Action

INFORMAL SECTOR

Market share of Clay Brick 50%

Main Fuel Sources Coal, ash, charcoal, wood, farm waste

The information received via our survey indicated that there are hundreds of informal operators all over in Mozambique producing imperial-sized bricks. Manufacturing consists of hand molding for the preparation, open air drying and firing in a clamp using coal, ash, charcoal, wood and farm waste.

BUILDING MATERIAL

According to the survey, the split in walling is as follows:

Clay Brick	Adobe/Raw Bricks	Cement Bricks	Prefabricated	Others
40%	0%	40%	0%	20%

It is estimated that in the region of 100 million bricks are produced – this due to three facts: 1) brick making is an old tradition amongst the rural people of Mozambique; 2) informal brick makers seem to be located close to the main corridors and around the urban areas; and 3) we have reason to believe there are two factories.

About the Survey

Accuracy: <50%

Due to the fact that we had no contacts in Mozambique, we had to revert to different sources to attempt to grasp the current clay brick situation.

The information we received came from four different resources, each with relatively good knowledge on clay brick production in the country.



Maputo, capital city of Mozambique

NAMIBIA

Namibia is a semi-arid country, with very scarce water resources, no coal, scarce combustion materials (such as wood) and no known clay deposits close to the major cities. Large-scale clay brick production is not an option, as there are always one or two (or more) of the main elements missing for making clay brick manufacturing economical.

Even though there are a few growth hubs in Namibia, their geographical spread, along with the high cost of transport, means they are not able to make a major positive impact on the walling market.

As there is no coal in Namibia, all coal is imported from South Africa.

INDUSTRIAL SECTOR

From what can be found on the internet, one can assume that any factory producing more than a million brick per annum falls under this sector

Total Annual Production:	20 million
Number of Factories:	3
Average Factory Production per month:	300 000 to 1,2 million
Technologies	Hoffman and Clamp Kilns
Fuel Sources	Coal, charcoal, fly-ash.

There are three clay brick manufacturers in Namibia, producing a total of around 20 million bricks per year. One of them produces a very high quality brick, with materials from a mine dump, while the other two use normal mining techniques for extracting clay.

Production ranges from 2 million to 12 million or more per annum; one brick maker has seasonal production, while the other two produce for 11 months of the year.

All production is mechanical with open air drying (hack lines).



Population	2 113 077
GDP/PPP	\$26 399 billion
HDI	0.628
Gini Coefficient	59.7
Bricks per year	20 million
Bricks per person	9
Bricks/GDP/Person	1601

The firing is made either with a Hoffman or Clamp. The fuel is general charcoal and coal with some addition of ash and coal duff in some cases.

The bricks range from 220 x 100 x 50, weighing 1.6 kg, up to an imperial size of 220 x 110 x 75, with a weight of 3kg; all clay bricks produced are solid; some are good quality face bricks and the rest are plaster bricks.

ENVIRONMENTAL LEGISLATION

As per feedback received, there is an Environment Management Plan, which needs to be conformed to, and which falls under the jurisdiction of the Minister of Environment and Tourism. Additionally, the carbon and dust emissions have to be reported to the same department.

Mining is controlled by the Ministry of Mines and Energy.

INFORMAL SECTOR

According to the survey, as well as geographical knowledge of Namibia, there are no small clay brick makers. However, due to the availability of good quality sand, there are many small-scale cement brick manufacturers in rural areas

BUILDING MATERIAL

According to the survey, the split in walling is as follows:

Clay Brick	Adobe/Raw Bricks	Cement Bricks	Prefabricated	Others
20%	0%	78%	0%	2%

In the remote rural areas, one will find wood and grass housing structures, with some covered by mud (if near a river bed). This sector does not however cover even 1% of the market.

About the Survey

Accuracy: 90-100%

The information about clay brick manufacturing was collated from responses to a questionnaire, where information was then verified by telephone or email.

We received extremely valuable responses, with further information received by phone, where we contacted and interviewed people in the area who have contact with the manufacturer. The researcher also had local knowledge of the area and was able to elicit good information that guaranteed high accuracy of the information.



Windhoek, capital city of Namibia

REPUBLIC OF SOUTH AFRICA

The Republic of South Africa is the southernmost sovereign state in Africa. It is bounded on the South by 2798 kilometres of coastline, stretching along the South Atlantic and Indian Oceans, on the north by neighbouring countries Namibia, Botswana and Zimbabwe, on the east and north-east by Mozambique and Swaziland, and surrounding the Kingdom of Lesotho.

South Africa generally has a temperate climate, due to being surrounded by the Atlantic and Indian oceans on three sides, its location in the climatic milder Southern Hemisphere and the average elevation rising steadily towards the north and further Inland. Due to this varied topography and ocean influence, a great variety of climate zones exist, ranging from the extreme desert of the Southern Namib in the north-west to the subtropical climate in the east, along the Mozambique border.

South Africa has a mixed economy - the largest in Africa - with a relatively high GDP per capita compared to other countries in Sub Saharan Africa.

Clay Brick History in South Africa

- First clay bricks were kiln-fired within the first year of Jan van Riebeeck’s arrival in the Cape;
- August 1654: first house constructed from hard, red, fired Cape bricks;
- Mass production began in 1655;
- By the time of British occupation in 1795, the clay brick tradition was well-established in the country;
- Clay bricks helped to meet the growing need for housing in mining towns across the Witwatersrand after 1900.

INDUSTRIAL SECTOR

For this survey, we have used the number of bricks produced in South Africa as an average, based on the last couple of years. In peak economic situations, volumes of bricks produced can be higher, and obviously lower during economic down turns.



Population	54 956 900
GDP/PPP	742 461
HDI	0.666
Gini Coefficient	63.1
Bricks per year	3 600 million
Bricks per person	64
Bricks/GDP/Person	259 070

Total Annual Production:	3 500 million
Number of Factories:	105
Average Factory Production per month:	0.5 to 25 million
Technologies	Clamp, Tunnel, Hoffman, VSBK, TVA, ZigZag and Scove Kilns
Fuel Sources	Coal, oil, gas, fly ash.

During 2007, the Department of Environmental Affairs approached the Clay Brick Association of Southern Africa (CBA) to do an audit on the 250 clay brick manufactures they had on their books. It was established that there were only 147 in operation. At this time there are now only 105 Industrial-level clay brick manufacturers left in the country.

The most modern techniques in clay brick production are used from modern mining methods proper clay preparation (like soring in of the crushed clay), fully automatic production lines and state-of-the-art tunnel kiln drying and firing zones, using gas as a fuel.

The rest of the industry also applies modern mining methods, different grades of clay preparations and mechanical extrusion, with manual labour or robots as offset belt pallet packers. These bricks are dried in hack lines for the clamp kiln and VSBK firing processes. In the case where more advanced firing technologies are in place (such as oil or coal-fired tunnel kilns, the Hofmann kilns, TVA and zig zag kilns), the raw brick will go directly into the drying zone and then the firing zone. Once the clay brick is fired, it is then sorted into various grades and packed for distribution to customers.

Due to market demands, Clay Brick South Africa responded by producing different sized bricks for specific markets. In the coastal areas, where cavity walling is a must, the Maxi and Super Maxi were developed, giving the end user a product cheaper per m2, an increase in bricklaying production and a saving on mortar. For the inland low-cost housing, the Gem and Quantum were developed to meet the demands for a brick size with 150 mm through the wall.

Due to ever-increasing energy costs, environmental laws, and the demand for environmentally-friendly products, the CBA (with the assistance of Swisscontact) has embarked on various energy-efficiency projects, with the aim of reducing energy input in brick making. This includes an Environmental, Social and Economic Life Cycle Assessment (LCA), and a set of Energy Efficiency Manufacturing and Finance Guidelines .



Automated industrial brick production in South Africa



Informal brickmaking sector

ENVIRONMENTAL LEGISLATION

- Department of Mineral Resources – Mining regulation
- Department of Environmental Affairs – Climate Change and Air Emissions
- Department of Energy – Energy Management Regulation
- National Treasury – Carbon Tax

Extensive information on the regulatory environment as it applies to brick manufacturing can be found on the Clay Brick Association of Southern Africa website (www.claybrick.org)

INFORMAL SECTOR

Market share of Clay Brick

50%

Main Fuel Sources

Fly ash, coal wood and agricultural wastes

In a study conducted in 2013 in the Eastern Cape amongst the informal clay brick makers, it was found that in that province alone there were more than 1000 informal brick makers employing over 5000 people. It is also known that there are quite a few informal clay brick makers scattered throughout Kwazulu Natal, with a few in the northern parts of the Country, especially Limpopo.

The influx of migrant brick makers from neighbouring countries into the northern parts of South Africa also brings different firing techniques like the Scove, using wood and farm waste as fuel.

Bricks are all hand moulded, drying takes place in the sun and firing in a clamp or (rarely) a Scove. Fuel sources are generally fly ash or coal, used as internal and external fuel. In Limpopo, near Thoyandou, wood and farm waste (macadamia husks) is used for firing in Scove kilns.

Bricks produced are close to the standard South African sizes, but with major quality variation and the strength not always reaching the regulation standards.

No Legislation is enforced on them.

BUILDING MATERIAL

According to the survey, the split in walling is as follows:

Clay Brick	Adobe/Raw Bricks	Cement Bricks	Prefabricated	Others
45%	2%	45%	2%	6%

During the past couple of years, the Clay Brick Association has done various studies to promote the features and benefits of clay brick as an environmentally-friendly product, as well as a way to assist climate control in the building when clay brick is used. They have however found that alternative building methods through technology and clever marketing has got a foothold into the building market.

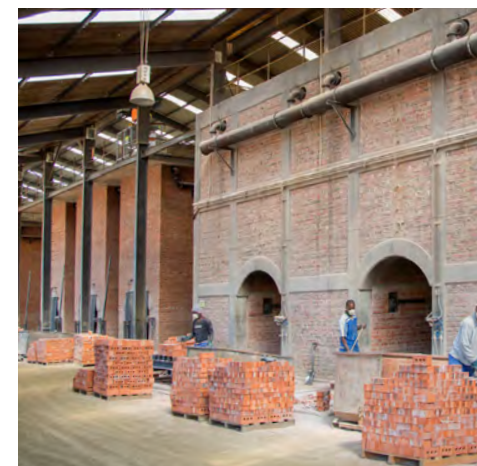
About the Survey

Accuracy: 90-100%

Since 2007, various studies have been done for Clay Brick South Africa, resulting in a high level of accuracy expected in this report.



Habla (zigzag) Kiln in South Africa



VSBK Kiln in South Africa

About the Survey

Accuracy: 80-100%%

The information was gathered via extensive internet research, as well as through discussions with a South African manufacturer. According to all our research, there are no clay brick manufacturers in the Seychelles.



Population	96 858
GDP/PPP	\$ 14 818 billion
HDI	0.772
Gini Coefficient	43.9
Bricks per year	0
Bricks per person	0
Bricks/GDP/Person	0

SEYCHELLES

The Republic of Seychelles is an archipelago of 115 islands in the Indian Ocean, situated 1500km east of the mainland East Africa. The majority of the islands are uninhabited, with many dedicated natural reserves.

The Seychelles have a population of about 93 000, many of whom are considered multiracial. African, Asian and European descendents have created a true modern Creole culture.

Since Independence in 1976, growth has been achieved largely through tourism, which employs about 30% of the labour force, compared to agriculture, which today employs a mere 3% of the labour force.

INDUSTRIAL SECTOR

During our extensive research, we found no evidence that clay bricks are manufactured on the islands. Studying the architecture, as well as the architectural culture, we cannot identify the use of clay bricks – either raw or fired – other than high quality clay face bricks, which are imported from South Africa. Our assumption of no clay brick manufacturing in the Seychelles was confirmed by the South African exporter who regularly ships huge quantities of clay face bricks to the Seychelles; these bricks are used for cladding and special features in the architectural designs.

SWAZILAND

The Kingdom of Swaziland is one of the smallest countries in Africa, covering an area of 17 364 km². It is neighbored by Mozambique and South Africa. The population is 1.1 million people, of whom 25% are engaged in subsistence agriculture. Government Income received from the South Africa Customs Union is as high as 70%; migrant workers in South Africa supplement the domestically-earned income. The country is an absolute monarchy with a King as Head of State.

INDUSTRIAL SECTOR

Total Annual Production:	18 million
Number of Factories:	1
Average Factory Production per month:	1,6 million
Technologies	TVA Kiln
Fuel Sources	Coal and fly ash.

There is one clay brick manufacturer producing around 18 million very high quality face bricks per annum. Production is all year round. The bricks produced are of an imperial size of 228 x 110 x 76, with a weight of just under 3kg; 95% are perforated and 5% solid. All production is mechanical, open air drying is used and firing takes place in a TVA.

ENVIRONMENTAL LEGISLATION

- Ministry of Natural Resources and Energy
- Mineral and Mines Act

INFORMAL SECTOR

Feedback received indicated that there is no informal brick making sector in Swaziland

BUILDING MATERIAL

Clay Brick	Adobe/Raw Bricks	Cement Bricks	Prefabricated	Others
5%	2%	90%	0%	2%

About the Survey

Accuracy: 90-100%

We had an extremely useful response from the Industrial clay brick manufacturer, who – along with our own research – provided valuable market intelligence. Our researcher has personal knowledge of Swaziland.



Population	1 119 000
GDP/PPP	\$11 077 billion
HDI	0.531
Gini Coefficient	49.5
Bricks per year	18 million
Bricks per person	16
Bricks/GDP/Person	1818

TANZANIA

Tanzania is formally part of the SADC community, however it is frequently also considered part of the East-African region. It is bordered by Kenya and Uganda to the north, Rwanda, Burundi and the Democratic Republic of the Congo to the west; Zambia, Malawi and Mozambique to the south, and the Indian Ocean to the east. One of the world’s poorest countries, Tanzania has a population of around 51.8 million (2014).

INDUSTRIAL SECTOR

We were unable to establish whether or not a formal sector exists.

INFORMAL SECTOR

Total Annual Production:	Approximately 50 million
Number of Factories:	Approximately 60
Average Factory Production per month:	10 000 to 100 000
Technologies	Clamp Kilns
Fuel Sources	Rice husks, cotton waste, other agricultural waste and wood

We have come across videos demonstrating how to make mud bricks; these appear to be up to sizes of 220 X 150 X 75.

Hand moulding, open air drying and firing in a sort of clamp are the processes used, with a very basic roof structure erected over the types of clamp kilns (due to high rainfall figures).

The brick sizes are very similar to the South African Imperial size, and according to pictures on the web, stock bricks and quality face bricks are made. Farm waste material like rice husks, cotton wastes etc., are used.

60 clay brick manufacturers are trained and established as independent brick makers. 151 000 houses and schools were built with these bricks according to the survey, this due to the short life of poorly made mud bricks and the problems experienced with poorly fired bricks.



Population	51 800 000
GDP/PPP	\$ 2.591 billion
HDI	0.521
Gini Coefficient	37.8
Bricks per year	50 million
Bricks per person	9
Bricks/GDP/Person	1601

The survey also established that Newton Trust, and DJM Production Group are involved in training people in the making of clay bricks. Unfortunately, we were unable to communicate with them directly.

ENVIRONMENTAL LEGISLATION

- Ministry Energy and Minerals
- Environment falls under the Ministry of Natural Resources

BUILDING MATERIAL

According to the survey, the split in walling is as follows:

Clay Brick	Adobe/Raw Bricks	Cement Bricks	Prefabricated	Others
20%	0%	60%	0%	20%

In the remote rural areas, one will find wood and grass housing structures, with some covered by mud (if near a river bed). This sector does not however cover even 1% of the market.

About the Survey

Accuracy: 50%

As we had no contact in Tanzania, the research was done mainly online. Research and fact-checking was however extensive, and we therefore estimate an accuracy of around 50%.



Dar-es-Salaam, capital city of Tanzania

ZAMBIA

The Republic of Zambia is a landlocked country in Southern Africa, neighbouring the Democratic Republic of Congo to the north, Tanzania to the north-east, Malawi to the east, Mozambique, Zimbabwe, Botswana and Namibia to the south, and Angola to the west.

Zambia covers an area of 752 618km2 and has a population of 16.2 million, making it one of the most urbanised Sub-Saharan countries in Africa. The population is concentrated mainly around the capital, Lusaka, which is located in the south-central part of Zambia, and the Copperbelt Province to the north-west; these are the core economic hubs of the country. The rural areas are sparsely populated.



INDUSTRIAL SECTOR

Total Annual Production:	30 million
Number of Factories:	2
Average Factory Production per month:	500 000 to 2 million
Technologies	Clamp and Tunnel Kilns
Fuel Sources	Straw dust in tunnel and Charcoal in Clamp

There are two clay brick manufacturers producing a total of around 30 million clay bricks per annum.

The bricks produced are of an imperial size of 220 x 110 x 75, with a weight of 3Kg. Those produced by the tunnel kiln manufacturers are all perforated, while the clamp manufacturer produces solid bricks. Charcoal and wood is used in the clamp kiln.

ENVIRONMENTAL LEGISLATION

- Environmental Protection Control Act
- Ministry of Environment and Tourism
- Mines and Mineral Act

Population	16 212 000
GDP/PPP	\$ 65 493 billion
HDI	0.586
Gini Coefficient	57.5
Bricks per year	33 million
Bricks per person	12
Bricks/GDP/Person	49 508

INFORMAL SECTOR

Market share of Clay Brick	10%
Main Fuel Sources	Wood, Charcoal

The informal sector is spread along the main transport corridors. Massive ant heaps are used as raw material, fired mainly by wood or charcoal. In this way, a large amount of clay bricks is produced for local consumption, as well for the market.

BUILDING MATERIAL

According to the survey, the split in walling is as follows:

Clay Brick	Adobe/Raw Bricks	Cement Bricks	Prefabricated	Others
9%	0%	90%	0%	1%

An interesting point is that a mine has built a township using Australian technology of Light Steel Frame Building. This was not a success, as mine workers are demanding air conditioners for climate control in the houses.

About the Survey

Accuracy: 60-80%

The information about clay brick manufacturing was acquired via a questionnaire sent out. From the responses, we were able to then verify information via telephone or email.

We had one very good response from an industrial clay brick producer, while further market intelligence was received through phone calls to the Works Director of the clay brick manufacturer. Unfortunately, internet research returned very few results.



Lusaka, capital city of Zambia

ZIMBABWE

The Republic of Zimbabwe is a sovereign country, landlocked in Southern Africa, between the Zambesi and Limpopo rivers. It borders South Africa in the south, Botswana in the west, Zambia in the north-west and Mozambique in the east and north-east. Most of the country is elevated, consisting of a central plateau, with altitudes of between 1000m and 1600m, and the Eastern Highlands, with altitudes up to 2592m. The southern parts are extremely hot and dry.

The population of Zimbabwe is around 13 million and the capital city is Harare. Mineral exports, gold, agricultural and tourism are the main foreign currency earners, and mining remains very lucrative, with Zimbabwe being home to some of the world’s largest Platinum reserves. The Maranga diamond fields discovered in 2006 are considered the biggest diamond find in over a century.

Despite this, the country is plagued by unemployment levels of around 80%. Largely due to the political and economic climate, tourism has declined by 75% over the years, with hotels reporting a mere 20% occupancy rate.

Due to a desperate need for food, small farmers have increased from 5000 to over 150 000 farmers.



Population	13 016 000
GDP/PPP	\$ 28 918 billion
HDI	0.506
Gini Coefficient	50.1
Bricks per year	450 million
Bricks per person	34
Bricks/GDP/Person	203 070

INDUSTRIAL SECTOR

Total Annual Production:	400 million
Number of Factories:	9
Average Factory Production per month:	2-11 million
Technologies	Clamp, TVA, DDK & Hoffman, Beehive Kilns
Fuel Sources	Coal and Coal Dust

Industrial Manufacturers above 12 million per annum make up 75% of the market, those below the 12 million mark make up 12, 5%, while the other 12, 5% is made up of informal clay brick makers.

The survey has indicated that there are approximately nine formal clay brick manufacturers, although we could only clearly identify seven.

The clay bricks produced are of the same imperial size as for South Africa - 220 x 110 x 75, with minor size variations. Weights vary from 2.8kg for perforated bricks to 3.4kg for solid bricks, although the majority of bricks produced are solid.

ENVIRONMENTAL LEGISLATION

- Ministry of Mines
- All the brick makers need to comply with the EMA
- In one instance, it was mentioned that on the mining side the Local Council is the authorising body

INFORMAL SECTOR

Market share of Clay Brick 12.5%

Main Fuel Sources Coal, charcoal, and wood and fly ash

According to the feedback from the participants, 75% of informal brick makers are in the northern areas of the country, and the remaining 25% in the southern areas. According to the information received, there are several operating in the areas mentioned, all using hand molding processes, open air drying and clamp kiln firing using coal.

BUILDING MATERIAL

According to the survey, the split in walling is as follows:

Clay Brick	Adobe/Raw Bricks	Cement Bricks	Prefabricated	Others
70%	0%	25%	0%	5%

An interesting point is that a mine has built a township using Australian technology of Light Steel Frame Building. This was not a success, as mine workers are demanding air conditioners for climate control in the houses.

About the Survey

Accuracy: 80-90%

The information about clay brick manufacturing was acquired through a questionnaire sent out to three known clay brick manufacturers. Information was then verified by telephone or email. We then established that there are six more industrial clay brick manufacturers. We were able to make contact with three of these, and made use of research and other market intelligence to fill in the gaps in information.



Harare, capital city of Zimbabwe

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This report gives the overall findings of the SADC Clay Brick Survey, undertaken in 2016 by Swisscontact, in collaboration with the CBA (Clay Brick Association of Southern Africa).

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