Access to improved sanitation is still a major challenge in the 21 countries of the Eastern and Southern Africa Region (ESAR): nearly a quarter of the population practices open defecation and 40% use unimproved latrines. The challenge is twofold: changing behaviours towards adopting improved sanitation practices, and providing a supply chain of services and materials for building latrines for the rural population.

Community Approaches to Sanitation (CATS) has been used to trigger behaviour change from open defecation to the use of latrines. These approaches can rapidly support increased demand for sanitation, with over 6 million new users attributed to this approach over the last seven years. The supply side of sanitation including regional supply chains and opportunities to strengthen business models has received comparatively less attention.

This technical brief is based on the main findings of a report commissioned by UNICEF entitled “Regional Supply Chains for Sanitation in Eastern and Southern Africa”. The objectives of this study were:

- To provide an in-depth review of sanitation commodity/raw material pricing across the Region.
- To review availability of sanitation products/materials from a regional perspective.
- To review opportunities and barriers to inter-country trade in the Region.
- To review access to appropriate services and products from a rural user’s perspective.

Data was collected from existing literature and market assessments conducted in the Region, Internet research, key expert interviews and information from 27 suppliers in the Region. The research focused on the following materials and products for latrine construction in rural areas: cement, iron bars (rebar), wire mesh and PVC pipes, as well as certain pre-fabricated ‘rural appropriate’ (i.e. for dry latrines, below USD 40, easily transportable/installed) sanitation products. The study focused on the trade relationships between the 21 countries, with focus on regional trade agreements and countries with active ports and production hubs.

The report focused primarily on eight of these countries with regards to commodity pricing: Ethiopia, Kenya, Malawi, Zambia, Mozambique, South Africa, Tanzania and Uganda. These countries were chosen on the basis of availability of relatively recent (last five years) market and product data.

**KEY LEARNING POINTS**

- *While capacity and materials to provide sanitation services are generally available at district levels, provision of services to households at the community level remains fragmented.*

- *Prices for basic sanitation materials differ significantly between countries impacting product options and business models.*

- *Innovation in sanitation product design and availability is taking place but there remains room for more.*
The Joint Monitoring Programme defines an improved latrine as one that separates excreta from human contact with the most basic level of improved sanitation defined as having a smooth cleanable slab. The majority of rural households in Eastern and Southern Africa use a very limited range of latrine options and technologies which more often than not do not meet this standard. Indeed, across ESAR, 40% of the regional population falls into the ‘unimproved’ category, ranging from 20% to 80% amongst countries and varying even more dramatically within countries.

Studies from Uganda, Malawi and Zambia confirm that a very limited range of latrine technologies have been adopted, with the traditional pit latrine the most commonly used. A cover for the holes of the traditional pit latrines is often necessary to prevent flies from entering and exiting the pit, and also to control smells from the pit. Yet within the Region there is typically very low or non-existent use of covers suggesting poor levels of satisfaction with the performance of these basic latrines as well as high levels of contact with faeces from flies moving in and out of the latrines.

In areas with rocky or sandy soils, pit stability is a challenge as pits may collapse as often as every six months due to rains, lack of local know-how in durable designs and the costs for annual for reconstruction can be out of reach for most households. These recurring expenses can often trigger reversion to open defecation practices.

Upgrading sanitation facilities, whether it be the slab or the pit remains a distinct challenge in ESAR, where capacity, availability of appropriate designs and products and the isolation of rural communities confound basic service delivery or self-supply options. The disproportionate cost and burden to consumers to access basic sanitation solutions needs to be unpacked at various levels to unlock potential solutions including at the: community level – existing behaviours and know-how; to the national level – supply chains, business models; to the regional level – innovations, products and trade options that might enable access to appropriate solutions/production capacity.
KEY FINDINGS

1 While capacity and materials to provide sanitation services are generally available at district levels, provision of services remains fragmented.

Unlike spare parts for handpumps, materials for latrine construction - cement, wire mesh, iron bars and PVC pipes - are generally available in the district centres of many countries, principally because they are used for a variety of other purposes including home construction. However, missing are the skills and activities to transform these materials into a product or service for the rural poor. Actors in the supply chain tend to work in isolation, with informal or short term relationships. This makes stocks unpredictable, increases prices and lowers the quality of services and products. Even with a willing buyer and available materials, the challenge of transport and installation presents another barrier to the rural customer.

Poorer countries with sparsely populated areas (such as Ethiopia, Malawi, Zambia and Mozambique) face particular challenges when transporting materials long distances: the last few kilometers from the district town to the village household can cost as much as 100% of the purchase price.

2 Prices for basic sanitation materials differ significantly between countries impacting product options and business models.

Price information on materials and products (cement, wire mesh, rebar, PVC pipes and prefabricated products) was collected from 27 suppliers in 8 countries. The findings show that cement is cheapest in Ethiopia, where the state limits imports and regulates prices. Cement is most expensive in Malawi and Zambia. Malawi has no local production of cement; relying on imports from Tanzania and Mozambique, See Fig 1.

Cost makes cement-based latrine options impractical for the rural poor and necessitates innovations in design using local materials. Zambia has some local production, but the survey found prices vary greatly between rural and urban areas. Cement can cost up to 40% more in rural areas possibly due to high transport costs. Wire mesh, rebar and PVC pipes are generally cheaper in East Africa than in Southern Africa, for example wire mesh cost almost 20USD more per sheet in Mozambique than in Kenya.

Southern African countries are often reliant on imports from South Africa to supplement local production. Theoretically, prices in South Africa should be low, due to better infrastructure and a more skilled workforce. Yet prices are comparatively high, possibly due to more expensive labour, higher taxes and quality requirements, meaning that South Africa may be losing out to China and India for trade in manufactured goods in some cases. Accordingly, there could be an opportunity for East African producers to become the major players in the distribution of sanitation products and services in the Region.
Innovation in low-cost latrine design and low-cost sanitation products is still at an early stage in the Region. The innovations considered in this study evolved to meet rural consumers’ needs; they are easy to transport, low cost and based on readily available materials. High cement costs (i.e. Malawi, Zambia) can incentivise design using local materials whereas standardised cement costs (i.e. Ethiopia) is more likely to promote decentralised production, leverage existing capacity for cement mixing at the district levels and business models based on cement slabs.

These innovations fall broadly into the following three categories:

Cement based innovations: Concrete is generally considered the gold standard for latrine construction across the Region (hence the logo ‘strong as cement’ used by entrepreneurs marketing the cement-free pit lining in Malawi). Innovations in concrete products include the domed slab in Mozambique, the Sungura slab in Tanzania and the various permutations of heavy to light weight concrete slabs.

Plastic based innovations: Consumer products produced centrally and distributed to users is a second area for innovation. A key example are models of plastic slabs developed in the Region, where there is the necessary machinery and skills capacity to produce them. In Kenya, producers of polyethylene products, with the support of WSP/IFC, have designed light and affordable plastic slabs together with a “collar”, a small plastic lid and rim that can be inserted into a pit latrine to prevent flies from entering the pit. This line of products ranges from 5-130USD retail. In Mozambique, the SaniPlast slab is light and low-cost - at 14USD - and while designed for rural households, demand from humanitarian organisations keeps the business viable. American Standard, the global supplier of toilet products and designs are currently testing plastic prototypes of the SaTo® pan across the Region – including in Zambia, Malawi, Rwanda, Uganda and Kenya. These products will likely retail between 5-15USD and be produced in conjunction with local manufacturers in the Region.

Innovations based on local materials and local design: Interesting innovations with materials and design are taking place with UNICEF in Zambia and Malawi. In Zambia, prototypes for pit lining are currently undergoing sales testing while in Malawi cement-free latrine pit linings, using mud fired bricks, have been developed in collaboration with local authorities and communities. The process, known as participatory design, shows promise in meeting consumer price points and accessibility in rural settings. These pit linings are being also tested in conjunction with plastic latrine slab options, such as the SaTo® pan to assess the correct product mix and consumer demand. With the right product and a strategy for last mile distribution, there is an opportunity to serve the domestic market in the Region. With a relatively high number of producers of polyethylene products across the Region, especially in East Africa, further emphasis on distribution is required to ensure that the products that do exist can find their way to the intended population.

Production hubs exist that could serve as multi-country innovation hubs

Three main production hubs were identified through the study; these hubs have between 14 and 27 producers of cement, wire mesh, rebar, PVC pipes and polyethylene products. The largest ‘hub’ is not surprisingly in South Africa, located around Johannesburg and Pretoria. Second is Kenya, which hosts almost as many manufacturers, located in and around Nairobi. The third is in Dar es Salaam, Tanzania located within access to one of East Africa’s busiest ports. The advantage of these hubs is that they concentrate skills and technology within a geographical area, have better access to finance and competition and provide economies of scale. There is potential for these hubs to become regional innovation hubs, serving as a clearinghouse for a range of innovative plastic latrine slabs and products, benefitting several manufacturers.
Regional trade is limited largely due to non-tariff barriers

Tariff barriers on manufactured goods in the sanitation supply chain are theoretically low across the Region, although Ethiopia and Angola are exceptions, protecting local production with high tariffs on construction materials. Yet non-tariff barriers to exporting goods – complying with lengthy bureaucratic procedures, poor road infrastructure and security – are often high, meaning that regional trade agreements can have a limited effect in reality. Poor road infrastructure accounts for a quarter of all delays in cross-border trade. Combined with large distances and frequent natural hazards, infrastructure plays an important role in facilitating cross-border trade in the Region.

The exception is international transport corridors - roads accessing international ports – such as the main highway from Kigali to Kampala to Nairobi to the port of Mombasa - which have seen significant improvements over the last 10 years. Major highways that might facilitate intra-regional trade however, such as those between Uganda and Tanzania, are still highly under-developed.

Poor road conditions further confound transport of pre-fabricated concrete products such as concrete slabs, due to the high risk of breakage on the way.

Figure 2 provides a matrix of inter-country trade in ESAR suggesting where healthy amounts of trade (green) exist between two countries, where moderate levels exist (yellow) and where very little to no trade exists (red) in Eastern Southern Africa.

The analysis of countries was based on relative trade volumes, existence of trade agreements and ease of access. The analysis suggested that current inter-country regional trade is dictated by a few key factors:

1. Proximity or accessibility of countries to each other.
2. Trade agreements (i.e. SADC, EAC) easing bureaucratic requirements.
3. Access to international ports.

Reflected in the scorecard are the following insights:

- Uganda and Kenya have some of the highest intra-regional trade and this can be explained by: a well-developed Kampala-Mombasa road network; the fact that Mombasa provides access to international markets for Uganda; and the East African Community trade agreement;
- South Africa trades well with Kenya, Uganda and Tanzania which have functional ports (or good access to) but less so with Rwanda or Burundi that are landlocked;
- African countries’ highest trade volumes are currently directed towards large global markets such as the EU, USA, Russia and China. China and India are increasingly providing manufactured goods to Africa, often at a cheaper price than local production or neighboring countries.

Regional sanitation supply chains make sense

Greater regional trade in sanitation commodities is likely to positively impact the financial sustainability of manufacturers who would be able to increase volume of sales and scale of production. Increased trade amongst neighbouring countries could increase the availability of appropriate options, bring down prices and provide higher quality goods particularly in countries which have lower production capacity.

There are also tax benefits for companies that produce goods for export in a number of countries, which can also improve financial sustainability.
AVAILABILITY OF PRODUCTS AND MATERIALS FOR RURAL SANITATION IN EASTERN AND SOUTHERN AFRICA

How to use this map:
This map attempts to show broad patterns of availability of sanitation related construction materials and products across Eastern and Southern Africa. While the majority of trade in the region still occurs with countries outside of the continent (i.e. EU, USA, China and India) the map suggests leveraging existing products, know-how and availability within the region to support national sanitation strategies.

Arrows show the main direction and volumes of trade, based on total trade volumes in USD.

The Logistics Performance Index on World Bank 2009 data and considers import/export processing time, efficiency of border procedures etc.

Icons depict countries as producers of:
- Steel
- Cement
- PVC
- Polyethylene products
- Production hubs

Callout boxes in the map are examples of sanitation products and designs that were specifically developed for rural communities.

POOR - GOOD
Low cost plastic latrine slabs & covers
Sungura slab low cost concrete slabs
SaniPlast Privé low cost plastic latrine slabs, covers & moulds
Corbelled mud brick pit design
Sungura slab
Low cost plastic latrine slabs

Angola
Luanda

Botswana
Gabarone

Burundi
Bujumbura

Comoros

Eritrea
Asmara

Ethiopia
Addis Ababa

Kenya
Nairobi

Lesotho
Maseru

Madagascar
Antananarivo

Malawi
Lilongwe

Mozambique
Harare

Namibia
Windhoek

Rwanda
Kigali

Somalia
Mogadishu

South Africa
Pretoria / Johannesburg

South Sudan
Juba

Tanzania
Dar es Salaam

Uganda
Kampala

Zambia
Lusaka

Zimbabwe
Lusaka
availability of products and materials for rural sanitation in eastern and southern Africa

How to use this map:
This map attempts to show broad patterns of availability of sanitation related construction materials and products across eastern and southern Africa. It highlights the types of products and materials available, indicates production hubs and showcases examples of sanitation products and designs specifically developed for rural communities. Arrows show the main direction and volumes of trade, based on total trade volumes in USD. Icons depict countries as producers of steel, cement, PVCPolyethylene products. Production hubs are indicated by circles of varying sizes based on the number of producers of the above mentioned products and materials concentrated in a certain location. Callout boxes in the map are examples of sanitation products and designs that were specifically developed for rural communities.

Production hubs:
- Steel
- Cement
- PVCPolyethylene products

Production hubs are indicated by circles of varying sizes based on the number of producers of the above mentioned products and materials concentrated in a certain location.

Callout boxes in the map are examples of sanitation products and designs that were specifically developed for rural communities.

Production hubs:
- Cement
- PVCPolyethylene products
- Steel

Callout boxes in the map are examples of sanitation products and designs that were specifically developed for rural communities.
Figure 2: The Trade Matrix

Rwanda relies on most consumer goods as well as steel and other construction materials from Kenya.


1/4 of all Zimbabwe’s trade is with South Africa, which is more than any other country in Africa.
GOING FORWARD

This report highlights the high cost of acquiring basic sanitation in the rural areas of countries within the Eastern and Southern Africa Region.

**Key conclusions from the study include:**

1. There are very few options available on the market to meet the needs of rural consumers in terms of cost, transport and durability.
2. Capacity to innovate alternative designs at the rural level is low.
3. High volume sales are needed to drive down variable costs of sanitation businesses.
4. Studies on sanitation markets tend to focus at the household level technology types rather than the viability of businesses (i.e. models, margins, profits and business plans).
5. Most of the trade in ESAR is directed globally rather than regionally.
6. Landlocked countries have much to gain from regional trade since it is generally more expensive to trade globally.
7. Regional trade is limited by non-tariff barriers such as poor road conditions, bureaucratic processes and security/natural disaster considerations.
Based on the conclusions, the following are the main recommendations:

**At national level:**

1. Sanitation business models must be based on low margin, high volume sales. Sanitation business models should consider regional opportunities to increase sales of products and improve financial sustainability.

2. Reducing transport costs and bundling of services and products would reduce the cost of the final product and service for the rural consumer.

3. Stable, predictable and long-term relationships between traders, masons and other actors, would greatly improve the business environment and benefit consumers.

4. Making products and information about products and services more available and accessible to rural communities requires special focus on the last link of the supply chain, between the end-user and the district town.

5. National WASH programmes should support companies with sanitation products to venture into new markets and to overcome cross-border issues and develop strategies for last mile distribution (where rural markets are involved) including testing, marketing and promotion.

**At global and regional levels:**

6. Innovation in latrine design and development of off-the shelf products in ESAR should continue and be expanded to meet the rural demand for affordable, accessible sanitation solutions.

7. Regional innovation hubs in sanitation are an option where there are high manufacturing and infrastructural capacities to develop and deliver sanitation products and business models.

8. Innovations in latrine designs should be shared widely across the Region; plastic product manufacturers in East Africa and their subsidiaries can be used to promote the rapid spread of innovations.

9. Innovative business models and research on last mile distribution are needed to connect product innovations with sustainable business models in order to increase access to sanitation in rural areas.
FURTHER READING AND RESOURCES:


AUTHORS

Ann Thomas, based on the study ‘Regional level sanitation supply chain analysis in the Eastern and Southern Africa Region” by Fontes International.

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The documents in this series cover the following topics:

- CLTS in fragile contexts
- CLTS at-scale
- Small towns sanitation
- Mobile-enabled sanitation and hygiene programming
- Regional supply chains for sanitation
- Sanitation marketing
- Handwashing with soap

For more information on the series please email Ann Thomas: anthomas@unicef.org