Salt Business in Africa, Trends and Opportunities

Paper classification: Salt production and trade

Abstract

The authors, Vladimir M. Sedivy and Debesh Sengupta devoted some 45 years of their lives to salt.

Vladimir M. Sedivy is the founder and President of Salt Partners Ltd, consultants and engineering contractors, active in the field of salt and chloralkali worldwide. Salt Partners emerged in 2003, consolidating the salt expertise gained since 1972 with Escher Wyss and Krebs Swiss. Salt Partners avail of experience building salt and chloralkali production facilities among others in Egypt, Nigeria, Namibia, Botswana, South Africa, etc. Vladimir M. Sedivy shares memories of his first contract as a salesman of a salt refinery in Nigeria, whose owners became the largest distributors of refined salt in Africa.

Debesh Sengupta gained his salt, chloralkali and bromine experience with Tata, Wimco, Ballarpur and GHCL in India. After acting for 13 years as CEO of Kensalt in Mombasa, Kenya, he now runs his independent salt consultancy. He describes how salt production in Kenya developed and how salt is being distributed in the Sub-Saharan Africa.

In this paper, the authors present the figures concerning salt production in the 30 (out of 54) African countries where relevant statistics exist. The authors show the development of the salt production figures over a period of 45 years, consider the overall economy, the population growth and compare the per capita salt production in Africa with the rest of the World. They describe the salt production in the leading salt producing African countries and list the main salt producers and distributors. The authors show the perspectives for expansion of existing salt production facilities and mention some sizeable salt projects that are under implementation. Africa is regarded by many as continent of the future. The authors offer their view on government policies and future development of the salt business on the African continent.

The paper compiles the facts and figures in tables and charts and is illustrated with photographs. Links to references mentioned in this paper are listed in Section 8. Website link http://salt-partners.com/salt_producers.htm leads to salt producers mentioned in this paper.

Keywords: Salt, Africa, Production, Trade, Development

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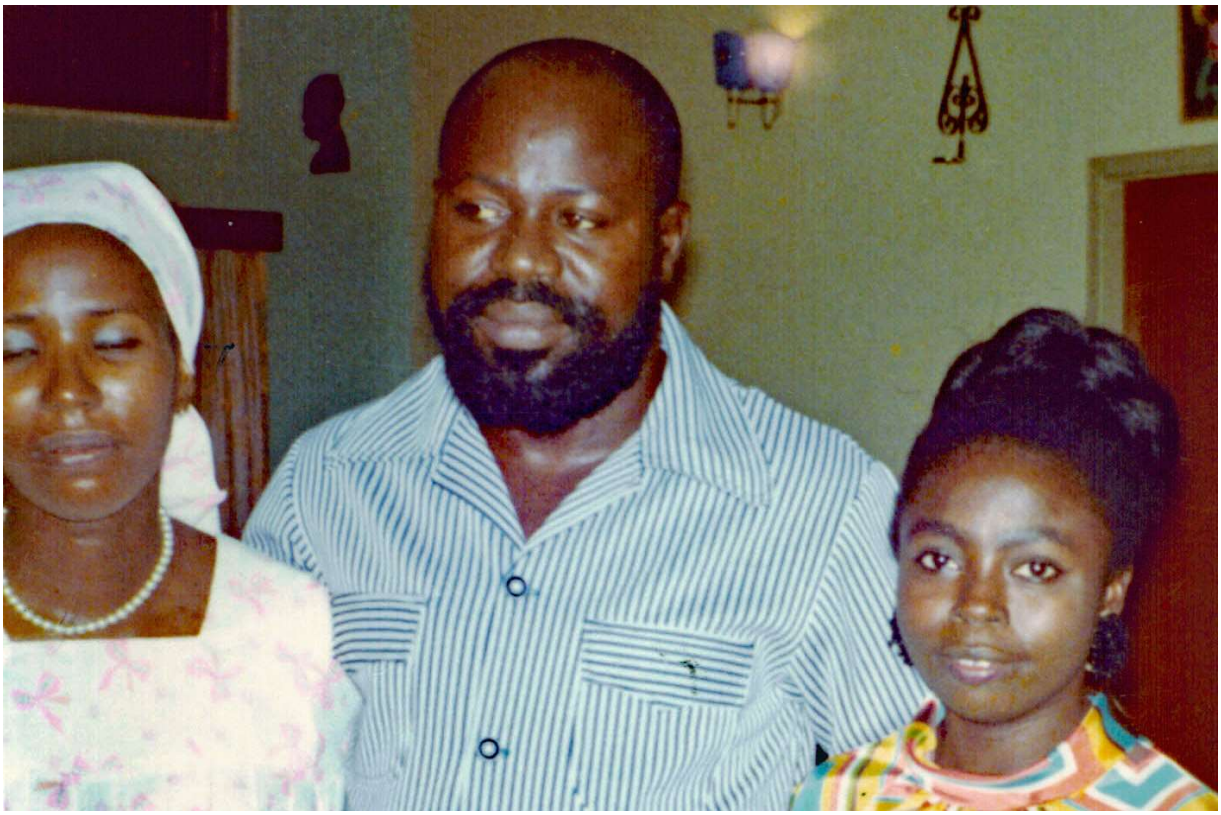


Picture 1 Chief Musa Babatunde Kannike-Martins with his wives in Zurich

1. First Experience

In late 1973, Chief Musa Babatunde Kannike-Martins, Managing Director of Atlantic Salt & Chemical Inc. of Los Angeles, California, USA, and his two Nigerian wives visited Escher Wyss, the manufacturer of turbines, centrifuges and evaporators in Zurich, Switzerland. He asked for a quotation for a 15 t/h centrifuge for salt. The next day, we gave him the quotation and a contract for 150'000 Swiss Francs, which he signed. I asked him: "How will you feed the centrifuge?" He said: "Oh, we'll put the salt in and when its dry, we'll take it out!". I said: "Well, that won't work. You have to feed the centrifuge continuously with salt slurry from a washing plant and after the centrifuge you need a drier!" He said: "Oh! So, make me an offer and I'll pick it up tomorrow!" We worked the whole night and the next day we gave him the offer and a contract for 600'000 Swiss Francs, which he signed. The following day, on the way to the airport, I asked him how will he screen, store and package the salt. He said: "Oh, we'll buy some bins and packaging machines and put it together". I said: "Well, that won't work. You have to plan it and it has to fit together!" He said: "Oh! So, make me an offer and bring it to Lagos!" I said: "OK". Within the next two months, in cooperation with the Swiss Saltworks, I prepared a beautiful proposal for a salt screening and packaging plant, with 10 silos and packaging machines, automatic cartonising, palletising, etc. The price was 4'000'000 Swiss Francs. When I arrived at his office in Lagos, he looked at the price and screamed: "But this is astronomic! We don't have that money!" So, I sat down, prepared a new proposal, just 5 silos and packaging machines, manual

bagging, etc. The price went down to 1'600'000 Swiss Francs. He said: "OK. Let's go to the ministry and get it signed." We spent the next weeks going to the ministry, from one advisor's office to the next. Finally, the Minister of Industries, Chairman of the National Salt Company of Nigeria (NASCON), signed the contract. During the next few months, we signed more contracts for steel structures, diesel generator, erection supervision, spare parts, etc. The total contract value grew to 5'000'000 Swiss Francs.

Table 1 NASCON contract values

Equipment	Year	Contract value
Centrifuge	1973	150'000
Washing plant + drier	1973	600'000
Silos + packaging plant	1974	1'600'000
Generator + structures	1975	2'000'000
Erection + spares	1976	650'000
Total contract value		**5'000'000**

Source: Private communication

Picture 2 NASCON salt factory in Ijoko, Nigeria, under construction in 1975

In August 1976, the 110'000 t/y NASCON salt refinery in Ijoko, north of Lagos in Ogun State, was commissioned. The refinery went through many ups and downs. In 1996, NASCON was acquired by the Dangote Group. In 2016, the NASCON Allied Industries' salt refineries in Apapa, Oregun and Port Harcourt reached a total production of 600'000 tons of refined salt per annum and expansion to 700'000 t/y is underway. (Ref. 8.1)

2. Salt Production in Africa since 1970

According to USGS (US Geological Survey, Ref. 8.2), since 1970 and every 5 - 10 years thereafter, the following quantities of salt were produced in Africa:

Table 2 Salt production in Africa 1970 - 2015

Country	1970	1975	1985	1995	2005	2015
Algeria	100’000	110'000	171'000	178'000	191'000	200'000
Angola	30’000	30'000	6'000	30'000	30'000	40'000
Benin	1'000	1'000	1'000	1'000	1'000	1'000
Botswana	1'000	1'000	1'000	208'000	244'000	525'000
Burkina Faso	1'000	1'000	1'000	7'000	5'000	5'000
Cape Verde	1'000	1'000	1'000	4'000	2'000	2'000
Djibouti	10’000	10'000	10'000	10'000	78'000	1'000
Egypt	420'000	621'000	923'000	1'990'000	1'200'000	2'200'000
Eritrea				255'000	6'000	28'000
Ethiopia	290'000	86'000	213'000	5'000	87'000	300'000
Ghana			50'000	50'000	250'000	100'000
Guinea				25'000	15'000	15'000
Kenya			101'000	71'000	27'000	20'000
Libya			12'000	30'000	40'000	30'000
Madagascar			40'000	51'000	65'000	85'000
Mali	5'000	5'000	5'000	5'000	6'000	6'000
Mauritania			5'000	6'000	1'000	1'000
Mauritius	6'000	6'000	6'000	6'000	8'000	4'000
Morocco	45'000	42'000	105'000	180'000	300'000	425'000
Mozambique			28'000	40'000	80'000	25'000
Namibia	110'000	210'000	154'000	304'000	759'000	650'000
Niger	3'000	3'000	3'000	3'000	1'000	1'000
Senegal	135'000	133'000	143'000	120'000	134'000	245'000
Sierra Leone	200'000	200'000	200'000	1'000	4'000	4'000
Somalia	30'000	30'000	30'000	1'000	1'000	1'000
South Africa	370'000	264'000	723'000	311'000	399'000	500'000
Sudan	70'000	70'000	65'000	75'000	30'000	15'000
Tanzania			22'000	105'000	135'000	55'000
Tunisia	330'000	420'000	405'000	481'000	1'130'000	700'000
Uganda	1'000	1'000	5'000	10'000	2'000	2'000
Total Africa	**2'159'000**	**2'245'000**	**3'429'000**	**4'563'000**	**5'231'000**	**6'186'000**

Source: USGS (Ref. 8.2)

For detailed African salt production records refer to Reference 8.3.

The African salt production compares with the world salt production since 1970 as follows:

Table 3 Salt production in the World and in Africa 1970 - 2015

	1970	1975	1985	1995	2005	2015
World total	146'600'000	150'700'000	176'400'000	196'000'000	252'500'000	294'900'000
Africa total	2'159'000	2'245'000	3'429'000	4'563'000	5'231'000	6'186'000

Source: USGS (Ref. 8.2)

The same figures, expressed in percentage terms and re-based to 1970, to visualise the salt production growth, are shown in the following table and chart:

Table 4 Salt production growth in the World and in Africa 1970 - 2015

	1970	1975	1985	1995	2005	2015
World growth	100%	102.8%	120.3%	133.7%	172.2%	201.2%
African growth	100%	104.0%	158.8%	211.3%	242.3%	286.5%

Source: USGS (Ref. 8.2)

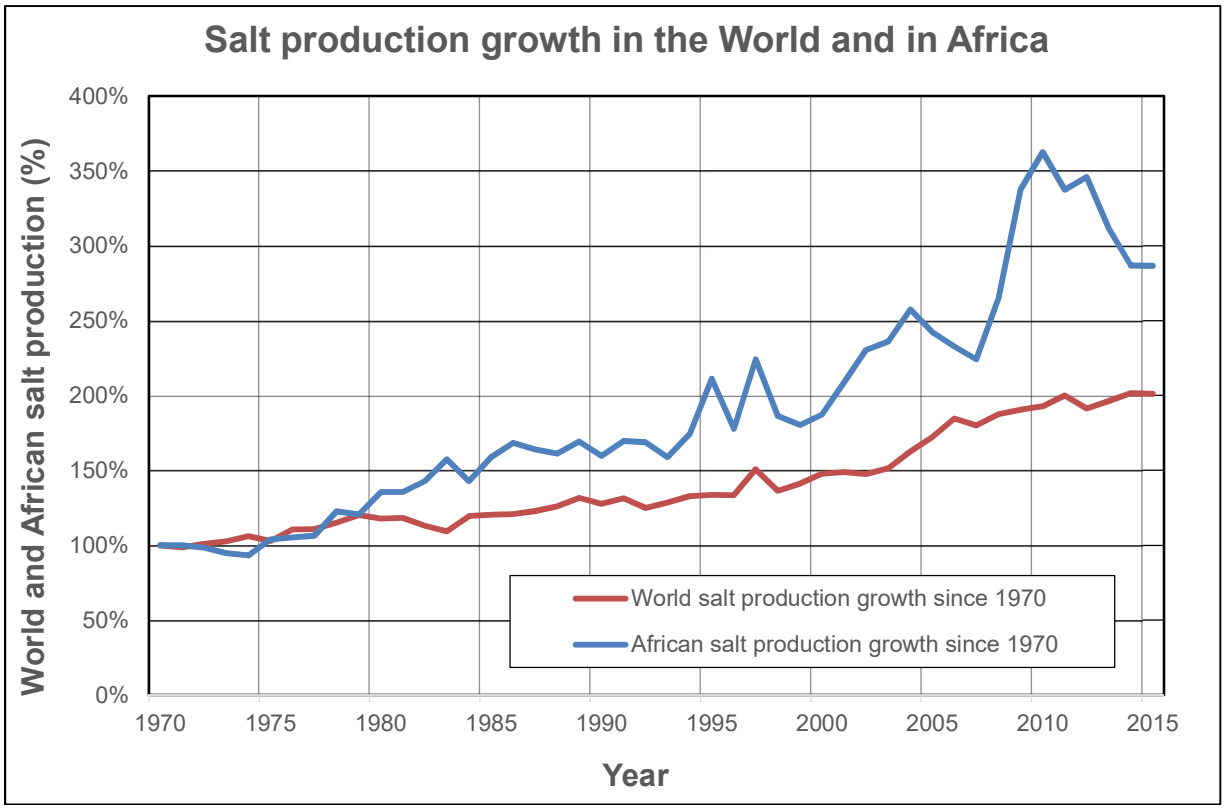


Chart 1 Salt production growth in the World and in Africa 1970 - 2015

Whereas in the 45 years between 1970 and 2015, the World salt production more than doubled, the African salt production almost tripled during the same period. However, as can be seen on the chart, salt production was even $3^1/_2$-times higher in the years 2010 – 2012. Between 1970

and 2015, the annual salt production growth rate in the World was 1.6% p.a. whereas in Africa it reached an impressive 2.4% per annum.

For better appreciation of the salt production growth figures, let us look at the development of human population in the World and in Africa during the same period. According to the United Nations, Department of Economic and Social Affairs, Population Division (Ref. 8.4), the World and African population developed as follows:

Table 5 Population and population growth in the World and in Africa

	1970	1975	1985	1995	2005	2015
World population growth	100%	110%	132%	155%	177%	200%
African population growth	100%	114%	151%	197%	252%	326%

Source: UN DESA Population Division (Ref. 8.4)

The exponential growth of the African population compared with the near-linear growth of the population in the World can be seen on the following chart:

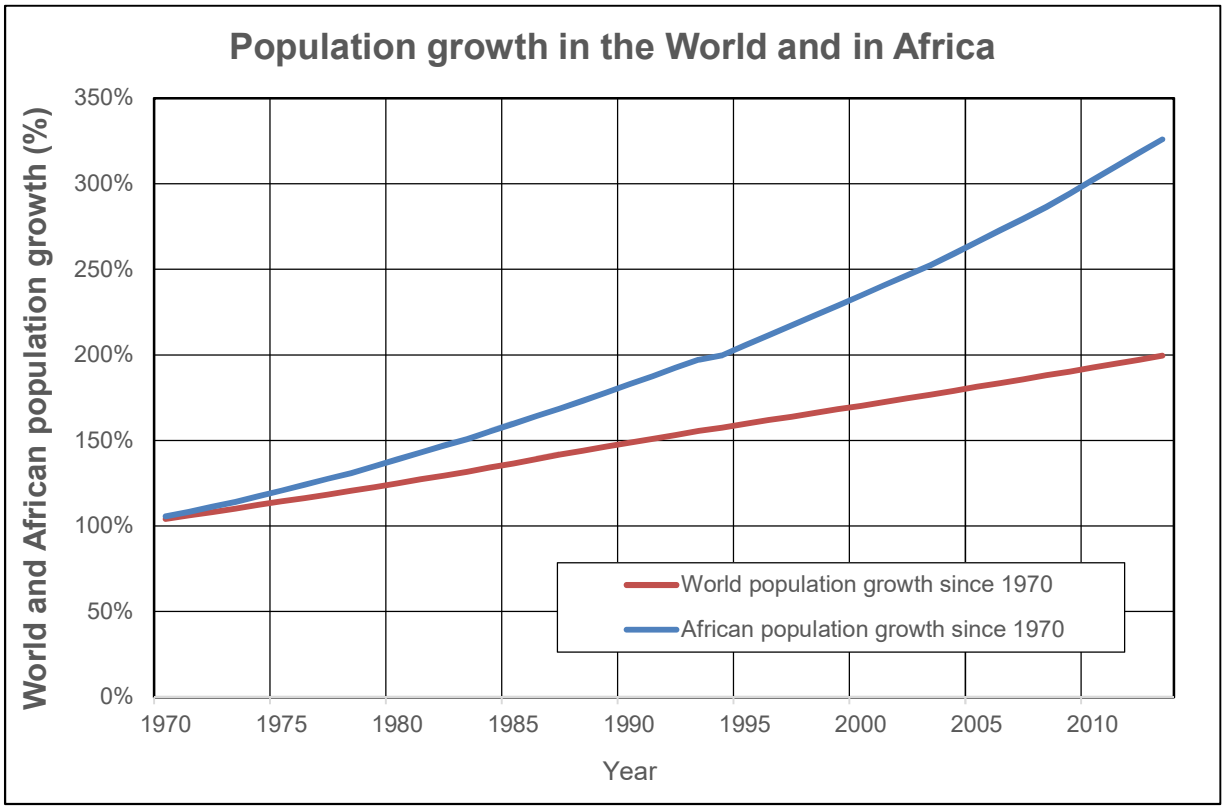


Chart 2 Population growth in the World and in Africa 1970 - 2015

When we adjust the salt production figures to grams per day and divide them by the number of people living in the World and in Africa, to obtain the salt production figures per capita, we get the following results:

Table 6 Per capita salt production in the World and in Africa

	1970	1975	1985	1995	2005	2015
World production (g/person/d)	109	101	99	93	106	109
African production (g/person/d)	16.1	14.7	17.0	17.3	15.5	14.2

Source: USGS (Ref. 8.2) and UN DESA Population Division (Ref. 8.4)

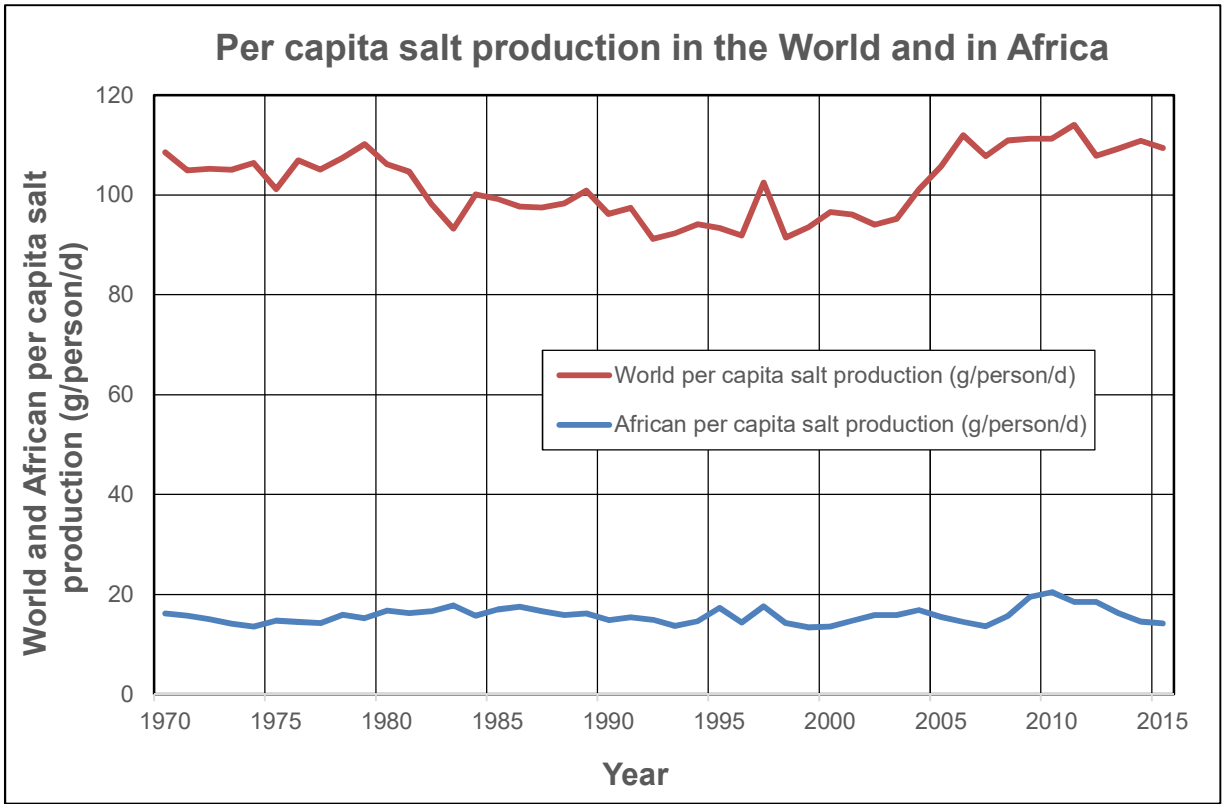


Chart 3 Per capita salt production in the World and in Africa

The chart shows that the World per capita salt production has been fluctuating between 90 and 110 gram / day and remained about constant over the whole period. In Africa, the per capita salt production fluctuated between 15 and 20 gram / day and has been declining. When interpreting these figures, the following should be considered:

- The minimum human physiological salt intake, required for bare survival, is somewhere between 5 and 10 gram NaCl / day. However, in the hot Africa it is higher;
- Salt is not only required for human consumption but also for essential industries, such as chloralkali production, leather and textile processing, etc.;
- The salt imports to Africa (to Nigeria, etc.) are approximately balanced with the salt exports from Egypt, Tunisia, etc., to countries outside Africa. Thus, the African salt production is approximately equal to the African salt consumption.

The figures show that the World salt production by far exceeds the minimum human physiological salt requirement and facilitates downstream production of materials that enhance comfort and standard of life. The per capita salt production in the World is stagnating, but on a

high level. The figures further show that the salt production in Africa, which just about facilitates survival, has been far behind the rest of the World and there are no signs of recovery. Whatever increase in production is achieved, it is absorbed by the fast-growing population. Consumption of salt, being an essential commodity, is an indicator of human economic progress. The African salt production / consumption figures show stagnation and even deterioration, perhaps not for all, but certainly for most people living in Africa.

3. Salt Production in Leading African Salt Producing Countries

Salt production in the 6 leading African salt producing countries is shown on the following chart:

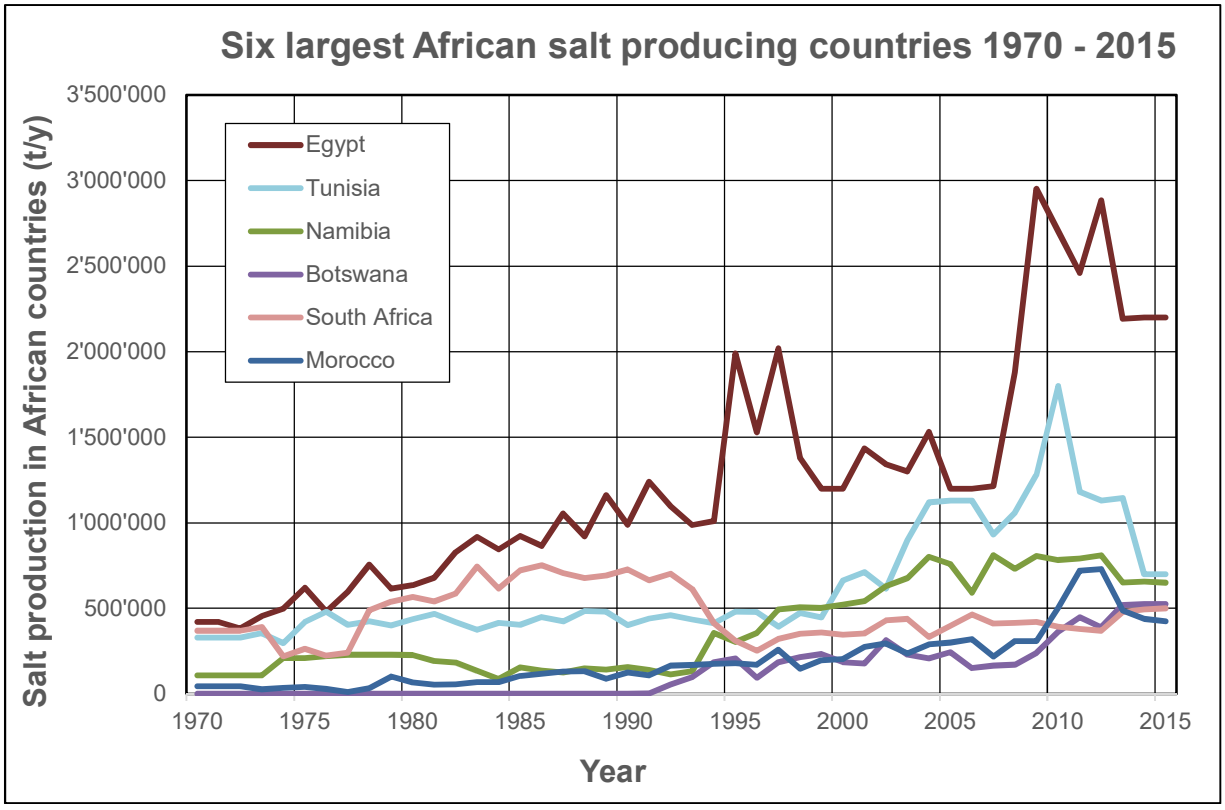


Chart 4 Six largest African salt producing countries 1970 - 2015

3.1. Egypt

Traditional solar sea salt producers in Egypt are the El Mex Salins and El Nasr Salins in Alexandria. In the nineties, EMISAL in El Faiyum started producing salt as a by-product of the sodium sulphate production from the Lake Qarun. At the beginning of 21st century, Egypt Salt started production in Damietta and El Arish in the North Sinai. However, it was Siwa Salt and several other operators who contributed to the coverage of sudden surges in demand for de-icing salt in the US and Europe. They are extracting salt from the sabkha located at the Siwa Oasis depression, about 20 meters below the sea level and about 250 km from the Mediterranean sea. Sea water percolates through the Sahara Desert from the Mediterranean,

evaporates in the depression and forms layers of sodium chloride. Only the sand and dust need to be removed to reach the salt that can be excavated from the brine with mechanical shovels and then transported 800 km to the Damietta port. As long as the diesel price remains low, millions of tons of salt can be excavated and exported at a short notice. This explains the sudden surge in Egyptian salt production during the harsh winters in the years 2010 – 2012.

3.2. Tunisia

Amalgamation of the French salt industry in the 1960th resulted in the Compagnie des Salins du Midi et des Salines de l'Est (Salins) becoming the largest French salt company with associated operations in the former French colonial territories in Africa. One of them is the Compagnie Generale des Salines de Tunisie (Cotusal), which operates three solar saltworks established on the salt marshes of Zarzis, Sfax and Sousse. The total production capacity of Cotusal is approx. 1'000'000 t/y, which represents about 2/3 of the total Tunisian salt production capacity. Other salt producers (Tunisel, Saida, Sotusel, etc.) operate solar saltworks on semi-dry lakes and sabkhas in Sebkhet Adhilbate (near Ben Gardane), Sebkhet Sidi El Hani and Sebkhet Tozeur. In the harsh winter of 2010, the Tunisian salt production reached approx. 1'800'000, out of which almost 1'600'000 tons were exported. This peak production and exports were possible by depleting the regular salt stockpiles and gearing up solar salt production in the sabkhas where the aquifers provide reserve source of near saturated brine for the solar crystallisers.

3.3. Namibia

Salt production in Namibia dates as far back as 1914 when brine found in the Panther Beacon salt pan, approx. 7 km north of Swakopmund, was used to produce salt in small ponds, still existing along the present Salt Company saltworks. Salt Company (Pty) Ltd is owned by the Klein family. It was established in 1936, to produce solar salt from subsoil brine. The brine was exhausted in 1951 and salt production from sea water started in 1952. The saltworks gained the reputation of being one of the best in Africa. In 1970, the salt production was 100'000 t/y. Together with their sabkha salt mining operations at Cape Cross, the salt production capacity of the Salt Company in 2016 was estimated at 150'000 t/y.

Solar salt field operation at Walvis Bay was established in 1964. The operators are Salt & Chemicals (Pty) Ltd, who produces the raw salt, and Walvis Bay Salt Refiners (Pty) Ltd, who process and market the salt. Both are wholly owned by Walvis Bay Salt Holdings (Pty) Ltd, which is owned by South African Chlor-Alkali Holdings (Pty) Ltd. Walvis Bay is one of the largest solar evaporation facilities in Africa.

Table 7 Quality of Walvis Bay salt

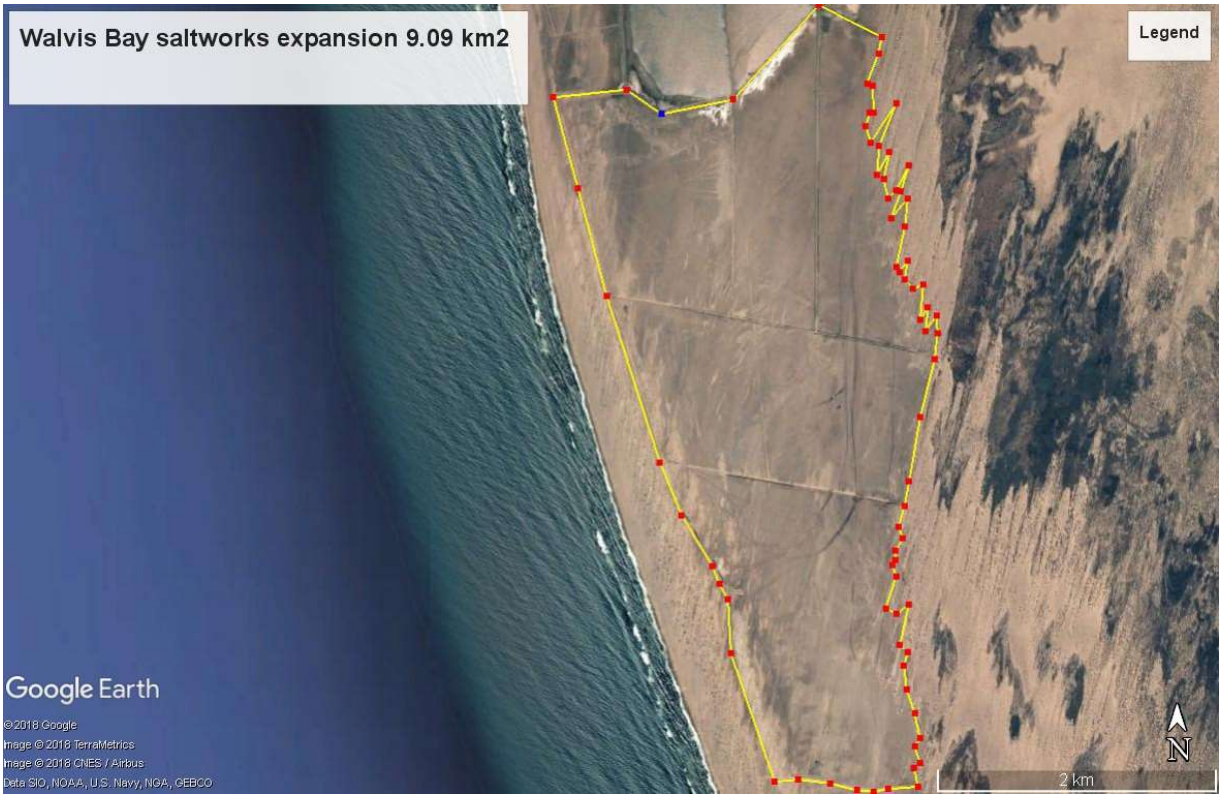
	Chemical Grade Salt (CGS)	General Purpose Salt (GPS)
Calcium	0.04% (Max. 0.06%)	0.07% (Max. 0.10%)
Magnesium	0.03% (Max. 0.04%)	0.04% (Max. 0.10%)
Sulphate	0.14% (Max. 0.23%)	0.19% (Max. 0.30%)
Insolubles	0.05% (Max. 0.10%)	0.03% (Max. 0.04%)
Moisture	2.5% (Max. 3.5%)	2.8% (Max. 3.0%)

Source: Private communication

The salt is pure. The crystals are clear and hard. Powerful Durrant salt harvesters (Ref. 8.5) harvest the salt. Industrial salt (CGS) is mainly exported to the chloralkali industry in South Africa. Salt for human consumption (GPS) is also exported to South Africa but increasingly to Nigeria, Angola, Cameroon, Congo, Gabon, Mauritius, etc. Walvis Bay is recognized as being one of the best operated solar saltworks in Africa.

Production at Walvis Bay was included in the South African salt statistics till 1993. Gaining independence in 1990, Namibia then recovered the Walvis Bay enclave from South Africa and since 1994, the Walvis Bay salt production has been reported as Namibian. This explains the sudden decline of South African and rise of Namibian salt production in 1994 (See chart 4).

In 2015, the Board of Walvis Bay Salt Holdings approved plans to expand capacity to 1'000'000 t/y. The expansion of the sea water evaporation ponds to the south of the existing saltworks is under construction.



Picture 3 Expansion of Walvis Bay saltworks, under construction

Other locations in Namibia, where salt and brine exist and where salt was produced in the past, include Ehrhans salt pan located approx. 15 km north of Swakopmund, Ugab salt pans and the Aminius salt pan, approx. 220 km north-east of Keetmanshoop in the Aminius Bantu reserve. The Otjivalunda salt and trona deposits in Northern Namibia were sampled and trial mined (approx. 6'000 t) by South West Africa Company until late 1970s.

The Cape Cross salt deposit is located approx. 120 km north-west of Swakopmund. It is estimated to contain approx. 350'000'000 tons of salt. Several companies have exploited the deposit in the past, such as White Lady Salt Works, Snow Salt (Namsalt), Salt Gossow, Atlantic Salt Co., Henties Soutwerke, Crystal Salt and Salt Company (Pty) Ltd of Swakopmund. Cape Cross Salt Mining (Pty) Ltd conducted a pre-feasibility study to produce 500'000 t/y of crystallised salt at Cape Cross. Most of these companies were inactive in 2016 when Henties Soutwerke were put up for sale.

Salt Partners conducted a techno-economic and marketing feasibility study for Gecko Salt, which showed that production of 1'000'000 – 3'000'000 t/y at Cape Cross would be viable. In 2016, Gecko Salt, owned by the Kobus Smit Family Trust, started production of high purity recrystallised salt at Cape Cross.

The combined active salt production capacity of Walvis Bay, Swakopmund and Cape Cross in 2016 was estimated at approx. 1'000'000 t/y. It is expected to rise to 1'200'000 t/y in 2020.

4. Kenya

Picture 4 Kensalt solar sea salt

In Kenya, Mombasa Salt Works has been operating since 1928 as the first organised saltworks, covering an area of about 10 km2 and capable of producing up to 80'000 t/y of solar sea salt in good years. Dr. Rossi, the famous founder of Saltec S.p.A. in Rom, Italy, established several solar saltworks in South Africa, Albania, Greece, Italy and in Kenya. Salt Manufacturers Kenya saltworks in Gongoni, also known as Kensalt, was built by Saltec in 1974. Covering an area of 22.65 km2, the Kensalt production capacity is above 200'000 t/y. The Saltec investment was followed in 1976 by Kurawa Industries (6 km2), in 1983 by Magadi Salt (2 km2), in 1984 by Malindi Salt Works (4 km2) and in 1985 by Krystalline Salt (18 km2). Since 1994 the total salt production capacity in Kenya has been estimated at 510'000 t/y. It is expected to expand to 600'000 t/y in 2020.

Entirely different picture emerges when reviewing the salt production records, issued by the US Geological Survey on the bases of information provided by the Permanent Secretary, Ministry of Environment and Natural Resources, Mines and Geological Department, Nairobi, Kenya (Ref. 8.2). For years, this authority declared salt production by Magadi Salt as being the total salt production of Kenya, although in some years and in other USGS publications, production by the other salt producers was also included.

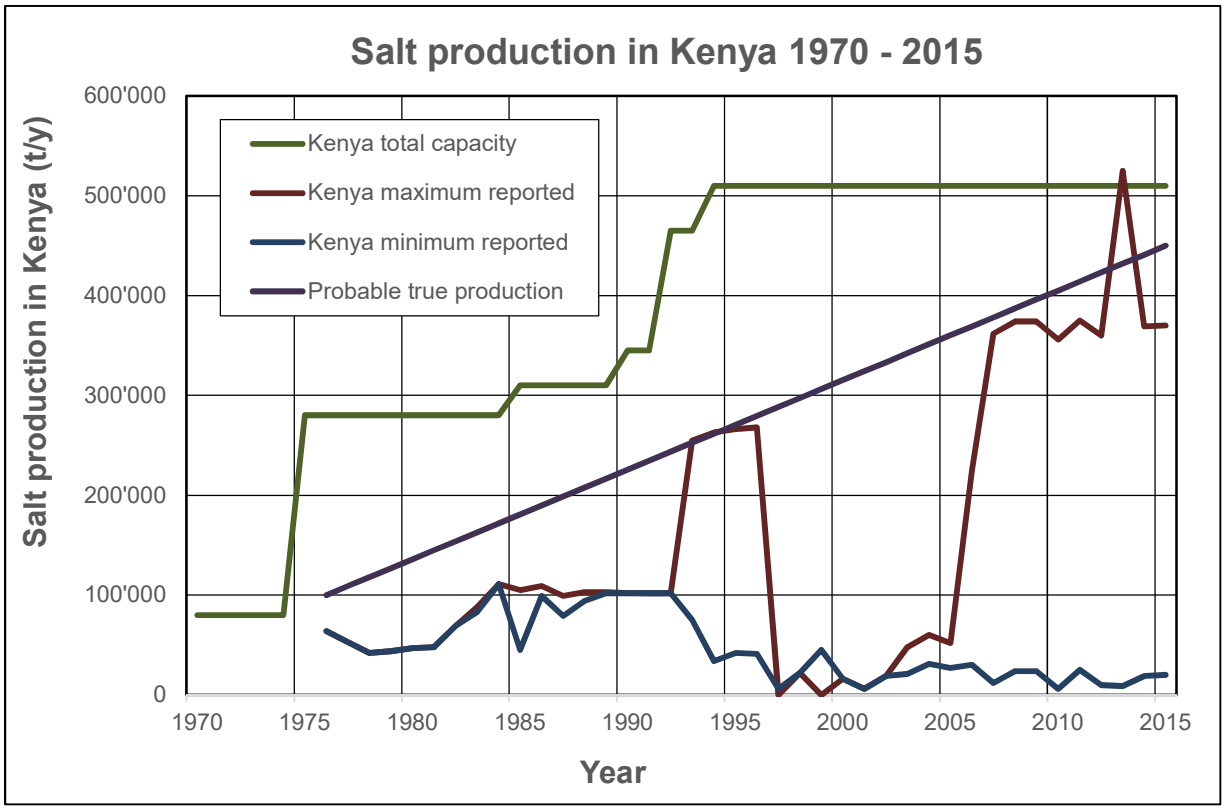


Chart 5 Reported and probable true salt production in Kenya 1970 - 2015

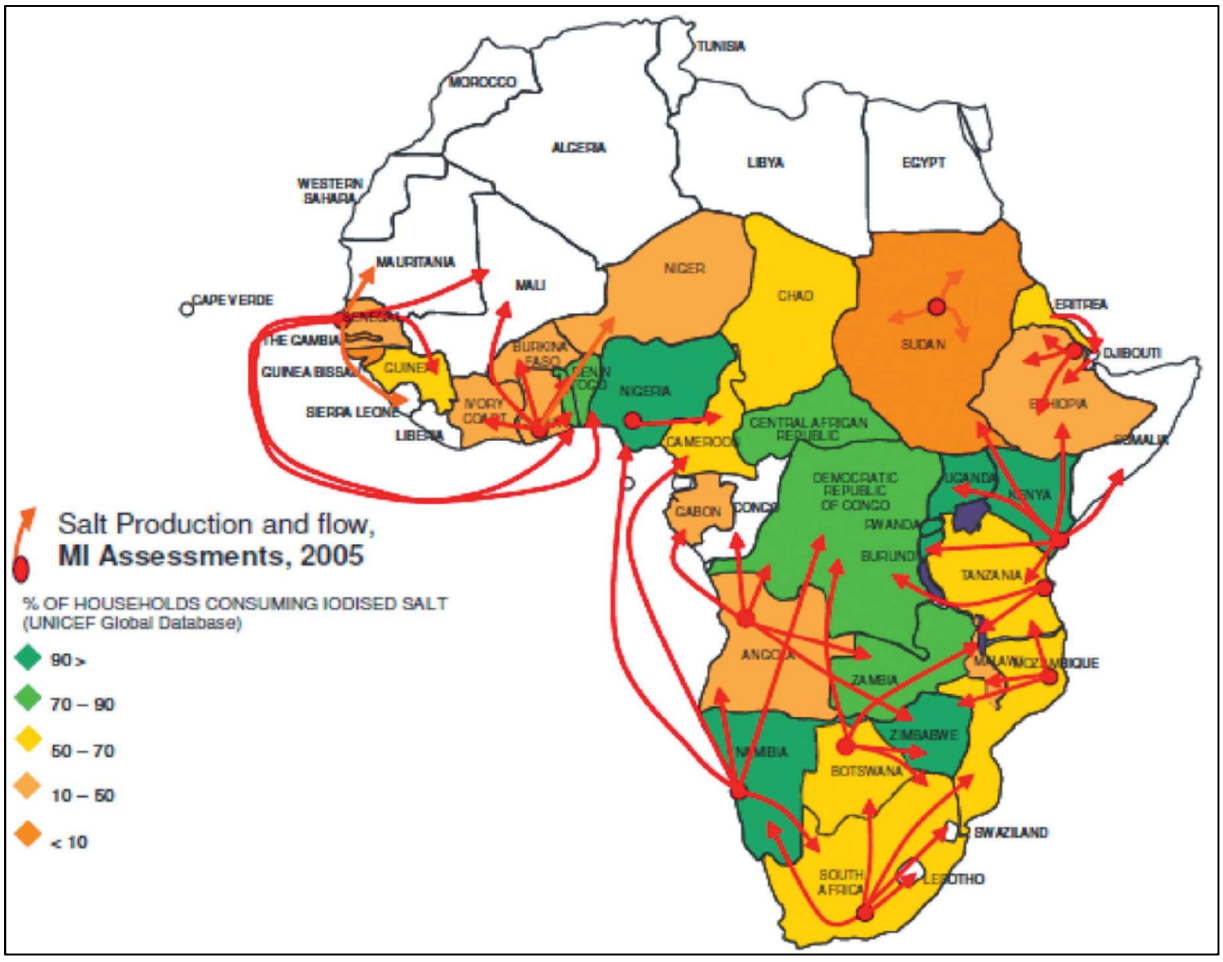
The official salt trade statistics show just a few thousand tons of salt imported and exported, but in fact, Kenya imports sizeable shipments of raw salt if local production is disrupted and it exports up to 250'000 t/y of salt to the neighbouring countries, including Tanzania, Burundi, Uganda, Sudan, Ethiopia and Somalia (Ref. 8.6), but also to South Sudan, Malawi and Zambia.

Finally, considering the population growth from 11'200'000 in 1970 to 45'400'000 in 2015, it is clear that the true production of salt in Kenya must have been substantially higher than the officially reported one.

This example illustrates the great difference between official reports and reality. Companies intending to invest in salt business in Africa are well advised not to rely on official data but to conduct their own research or entrust the research work to well-informed, reliable and reputed entities prior to making their investment decisions and committing funds to their salt projects.

5. Inter-African Salt Trade

Salt in Africa is supplied on delivered basis. It is transported by trucks on bad inland roads. The transport is expensive. As a result, the salt prices are high. Salt prices are also influenced by taxes and duties. Kenya, Tanzania. Uganda, Rwanda and Burundi are members of the East African Council (EAC). If the traded salt is produced in an EAC country and exported to another EAC country, the duty is zero. If the salt is imported from outside the EAC, import duty is 25%. On top of that, all EAC countries levy 16-18% VAT, which is added to the price.



Picture 5 African Sub-Saharan salt trade (Ref. 8.6)

Picture 6 Kensalt 3-effect, 5 tph vacuum salt refining plant in Mombasa

The following table shows the delivered prices of refined salt supplied from Kenya. It illustrates how the salt prices rise with the distance from the producer.

Table 8 Kenyan refined table salt prices (delivered, USD/t)

	Delivered from Mombasa to			
Ex-Works Mombasa	Tanzania	Uganda	Malawi	Zambia
170	200	250	337	350

Source: Private communication

6. Nigeria

With 181'182'000 inhabitants as of 1.7.2015, Nigeria is the most populated country in Africa. Nigeria represents a unique African salt business case. Nigeria imports raw solar sea salt, mainly from Brazil, Namibia and Senegal. The raw salt is refined in Nigeria locally. According to companies active in the Nigerian salt business, in 2015 the following companies were refining imported salt and supplying refined salt:

Table 9 Salt Refining Companies in Nigeria in 2015

Nigerian salt refining companies	Annual refining capacity (t/y)
NASCON (National Salt Co. of Nigeria Ltd / Dangote Salt)	600'000
Royal Salt Co. Ltd	400'000
Jumbee Ltd	100'000
Covenant Salt Co. Ltd	100'000
Others	150'000
Total	**1'350'000**

Source: Private communication

7. Trends and Opportunities

Africa is the world's poorest continent. The gross domestic product (GDP) is just USD 3'300 per capita. Although Africa has 140'000 USD millionaires, 36% Africans live on less than 1 USD per day. The African GDP growth rate, about 5% per annum, is high. However, as the population growth rate, about 2.5% per annum, is the highest in the World, the resulting GDP per capita growth rate of 2.5% is low. At this rate, a person earning USD 1 per day will earn USD 2 per day in 30 years! The resulting overall trend is an economic stagnation at a very low level.

However, economies are not developing evenly. There are clusters of relative wealth and growth. As far as salt is concerned, there are locations in Africa that are exceptionally well suited for solar salt production, with high evaporation rates and flat, impervious salt marshes on the sea and lake shores. Unfortunately, with rare exceptions, adverse political circumstances prevent entrepreneurs from committing tens of millions of US dollars to invest in modern, mechanised solar saltworks that would benefit from economy of scale, which starts somewhere around one million tons of salt per annum.

It lies in the hands of African political establishment to create economic conditions that would turn the existence of suitable locations into opportunities for sustainably profitable salt production.

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