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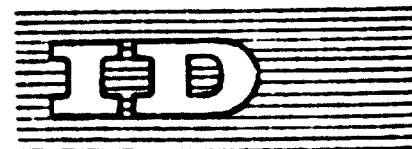
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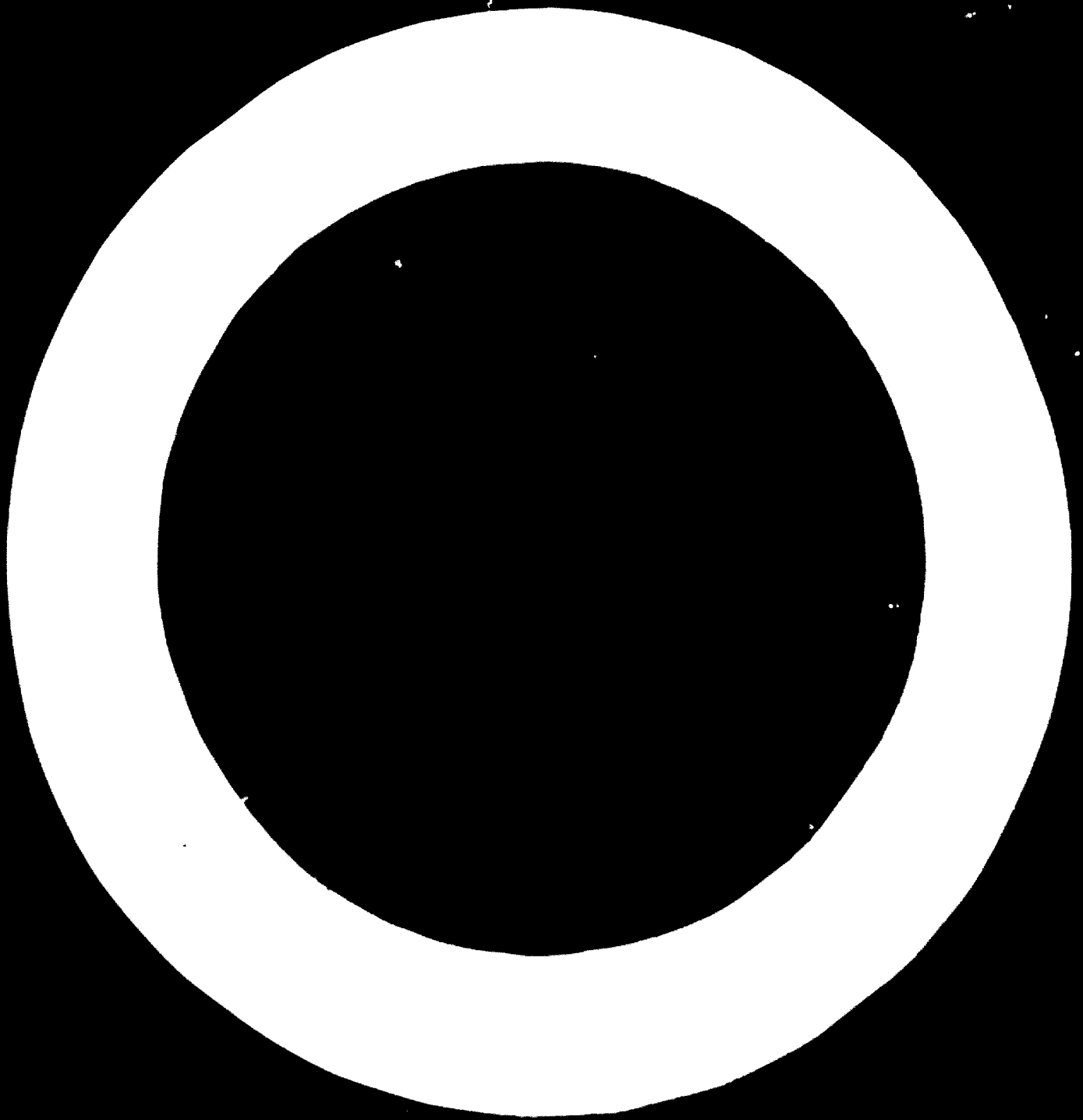
Expert Working Group Meeting
on Modernization and
Mechanization of the Salt Industries,
based on Sea Water in the Developing Countries
Rome, Italy - 25-29 September 1968

A SUMMARY OF THE SALT INDUSTRY
IN THE REPUBLIC OF THE SUDAN^{1/}

by

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^{1/} The views and opinions expressed in this paper are those of the author and do not necessarily reflect the views of the secretariat of UNIDO



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SUDAN SALT COMPANY

1. The industry of manufacturing salt by solar evaporation of sea-water in the Sudan started in 1929. The Sudan Salt Limited Company, a British company, was granted a concession for manufacturing salt in the area south of Port Sudan Town. The concession area was 1850 feddans^{1/} and the agreement between the Sudan Government and Sudan Salt Limited, was drawn on the first of January, 1929 for the manufacturing and production of salt and of gypsum and other by-products. The Government granted the company the full and exclusive right, at all time during the term of eighty years from the first day of January 1929. The Government agreed to give the company some facilities which are reasonable and necessary for the efficient working of the concession. These facilities were a light railway for transporting the salt from the concession area to storage and a private telephone line.
2. Before starting production, the company faced some financial difficulties. The company asked some Sudanese to become shareholders in the company. The company offered shares for £1 each. The Sudanese were reluctant to buy the shares as very few could. These few included El Sayed Mohammed, El Sayed El Barbari, who bought 500 shares. The experts were advising participants on the company that they were very sure of the production. So the company was planning for export.
3. At the end of 1929, the production started at a small rate. It was about 3000 tons of salt. After 1930, salt production increased and the company could cover most of its financial difficulties and it could recover the shares from the shareholders with a profit to them. The British company of Sudan Salt Limited started their plan for the concession area with 30 crystallization basins, each basin having an area of 60 x 70 square metres (one feddan). The depth of the crystallization basin is one foot, and the depth of the crystallized salt is half a foot in the basin. There are about 6 evaporation pans and 18 storage pans. The total area of both evaporation and storage pans is about 100 feddans. The canal carrying the sea water is about 4 km with a very low gradient of only 1 metre drop in 4 km. The concentration of sea-water is about 3½ per cent. Most of the impurity in the sea-water is eliminated by relative densities along the main canal due to the very sluggish movement of water in the low-gradient canal.

^{1/} The feddan is an Egyptian unit of area equivalent to 1.038 acres.

4. The sea-water is stored in the 16 storage pans till the salt concentration reaches 12 per cent. Then the water passes to the evaporation pans. At this stage the gypsum is deposited in the special evaporation pans. When the sea-water concentration reaches 25 per cent, the water passes from the evaporation pans to the crystallization basins. In the crystallization basins the salt starts to deposit. The concentration of the sea-water in the basins is between 25 per cent and 28 per cent with maximum of 29 per cent. When the concentration reaches 29 per cent, they add fresh sea-water to keep the concentration constant. They do not use any washing to the salt crop in the crystallization basin before collection. There are 3 salt crops per year. The first crop takes about five months, starting on 1 November to 3 March. The second and third crops take about 100 days only. The second starts from 3 April to 15 July. The third crop starts from 16 July to 1 November. The first crop takes a rather long period because it covers the winter rainy season. The low temperature and the annual rainfall, which is about 107 mm, delays the crop during the first period. The annual production of salt started with 3000 tons in 1929 and began to multiply until it reached 45,000 tons in 1951.

SUDAN SALT (1951) LIMITED

5. In 1951, the company was bought by Sayed Mohammed El Sayed El Barbari. It is registered in the Sudan as the Sudan Salt (1951) Limited.

6. After 1951, there was a very little expansion in the area under concession. The new company constructed only six basins of crystallization, three evaporation pans and only one storage pan. The new company is following the same routine of work in manufacturing the salt by solar evaporation of sea-water. The salt production reached its maximum, which is about 55-60 thousand tons per year in 1958, and afterwards. The details of production and sales are as follows:

<u>Date</u>	<u>Gathered Tons</u>	<u>Production Net (10 Per cent Deduction)</u>	<u>Sales despatches Tons</u>
31.1.57	53,436	48,092	70,177
31.1.58	53,254	47,929	61,916
31.1.59	53,937	48,568	61,325
31.1.60	53,417	48,076	39,889
31.1.61	53,106	47,796	36,768
31.1.62	58,000	52,085	55,903
31.1.63	37,002	33,307	38,112
31.3.64-65	63,000	60,253	41,760
31.3.66	53,000	51,888	43,540
31.3.66-67	45,000	43,173	44,489

7. The production of each crystallization basin per crop period is about 500 tons or 1500 tons per year. The general analysis of the salt is 94 per cent salt and 6 per cent weathering loss. There is no proper chemical analysis for the salt in any stage of concentration and even there is no chemical analysis for its final production. On October, 1958, when the Japan Monopoly Corporation was interested to buy salt for Soda Industry, they made an analysis for the final product of the Sudan Salt (1951) Limited. The percentage was as follows:

	H ₂ O	=	4.59
Insoluble matter		=	0.12
Total Chloride		=	56.60
50		=	1.20
Ω 4		=	0.22
M ^a		=	0.43
KG		=	0.18
Na		=	<u>36.13</u>
	Total		99.47
Na Cl			91.83

8. This percentage of contents will give rather a good idea about the quality of the salt produced. The sodium chloride content is nearly 92 per cent and the weathering loss is about 5 per cent. So sodium chloride content can be raised to over 95 per cent with very little natural processes.

9. Although production of gypsum was not steady, the average annual production is 3,000 tons. Every year Sudan Salt (1951) Ltd. has to keep about 20,000 tons of salt reserve in the store either from the preceding year or from the new crop which is expected within a month.

Manpower

10. There are about 50 constant semi-skilled labourers and 200 temporary contracted labourers for loading, sacking and so on.

Machines used

11. There are two power stations. One with a 150 hp engine and the other with a 300 hp engine.

12. There are also two pumps, each having a 60 hp engine with a rising main 2 ft in diameter. The pumping rate of sea-water is about 500 tons per hour. The two pumps working alternatively.

13. There is also a grinding mill with a 100 hp engine. The rate of grinding is about 6000 kg of salt per hour (480 sacks per 8 hours, each sack containing 100 kg).

Proposal for expansion

14. There is a very slight idea about further expansion. The idea was based on demand. The company is proposing to add six more crystallization basins, three evaporation pans and one storage pan.

Mechanization

15. There is no idea of introducing any mechanization in the process at least in the near future. The company believes that it is more profitable and less expensive to make use of solar evaporation in manufacture of salt from the seawater in the Sudan.

THE PRISON SALT OF SUAKIN

16. The prison salt concession area lies just north of Suakin Town which is about 38 miles south of Port Sudan. This prison salt concession area was granted by the Sudan Government to Suakin Prison on 1 September 1962, for the purpose of training the prisoners in salt works and to supply the prison department with its products.

17. The old plan of the prison salt concession of Suakin was fourteen crystallization basins. The area of each basin is 30 x 40 square metres. There are 21 evaporation pans. The area of each pan is 40 x 30 square metres. There are 7 storage pans. The area of each is 40 x 30 square metres. The length of the main canal linking between the water pump and the storage pans is 120 metres. There is one salt crop per year. The salt crop period runs from 1 April until 20 October. The annual salt production was only 1,000 tons. There is no gypsum or any other by-products. The annual production in the last two years of 1965-1966 and 1966-1967, was increased to 1,500 tons of salt.

Expansion

18. Last year the prison salt concession area was expanded to cover twelve more crystallization basins. Each basin has an area of 35 x 30 square metres in 24 evaporation pans. The area of each pan is 35 x 30 metres, and three storage pans. Each pan covers an area of 75 x 35 square metres.

19. More production is expected in the coming seasons due to the new expansion, but it might take time until the bases of the five basins and pans are properly fixed.
20. There is no chemical analysis for their production, but they take reading daily for the concentration in every pan and basin. They do not wash the crop before collection.
21. Some of the salt is sent to the Government and semi-governmental units, such as the Ministry of Animal Resources, the government tannery and the Department of Stores and Equipment. The prison salt concession lacks experience and technical advice.

THE NATIONAL SALT COMPANY AND
MUSTAFA SATTI AND SONS CO.

22. There are two more salt companies: the National Salt Company Limited was granted concession area for salt production from sea-water in the vicinity of the north boundary of Port Sudan town; and the Mustafa Satti Salt Company, was also granted a concession area for manufacturing salt from sea-water near the south boundary of Port Sudan town. The work on these two salt concession areas has not yet started but plans for constructions have been made.

NATURAL SALT LAGOONS

23. There are two natural salt lagoons.
- a) The salt lagoon of Larra, which is about forty miles north of Port Sudan. Its area is about 250 feddans.
- b) Rawai salt lagoon.
Dingonab Bay lies at about 160 miles north of Port Sudan. The area of the lagoon is about 470 feddans.

These two natural salt lagoons were exploited for some time, but work has stopped in both of them for a long time.

24. Nowadays both areas are applied for and about to be granted for some companies to re-start work. No mechanization is used in the process.

INLAND CONSUMPTION OF SALT

25. If we consider the individual average annual consumption of salt is 7 kg, then we come to the conclusion that the inland annual consumption of salt should rise up to 84 thousand tons of salt. The western provinces of the Sudan consume

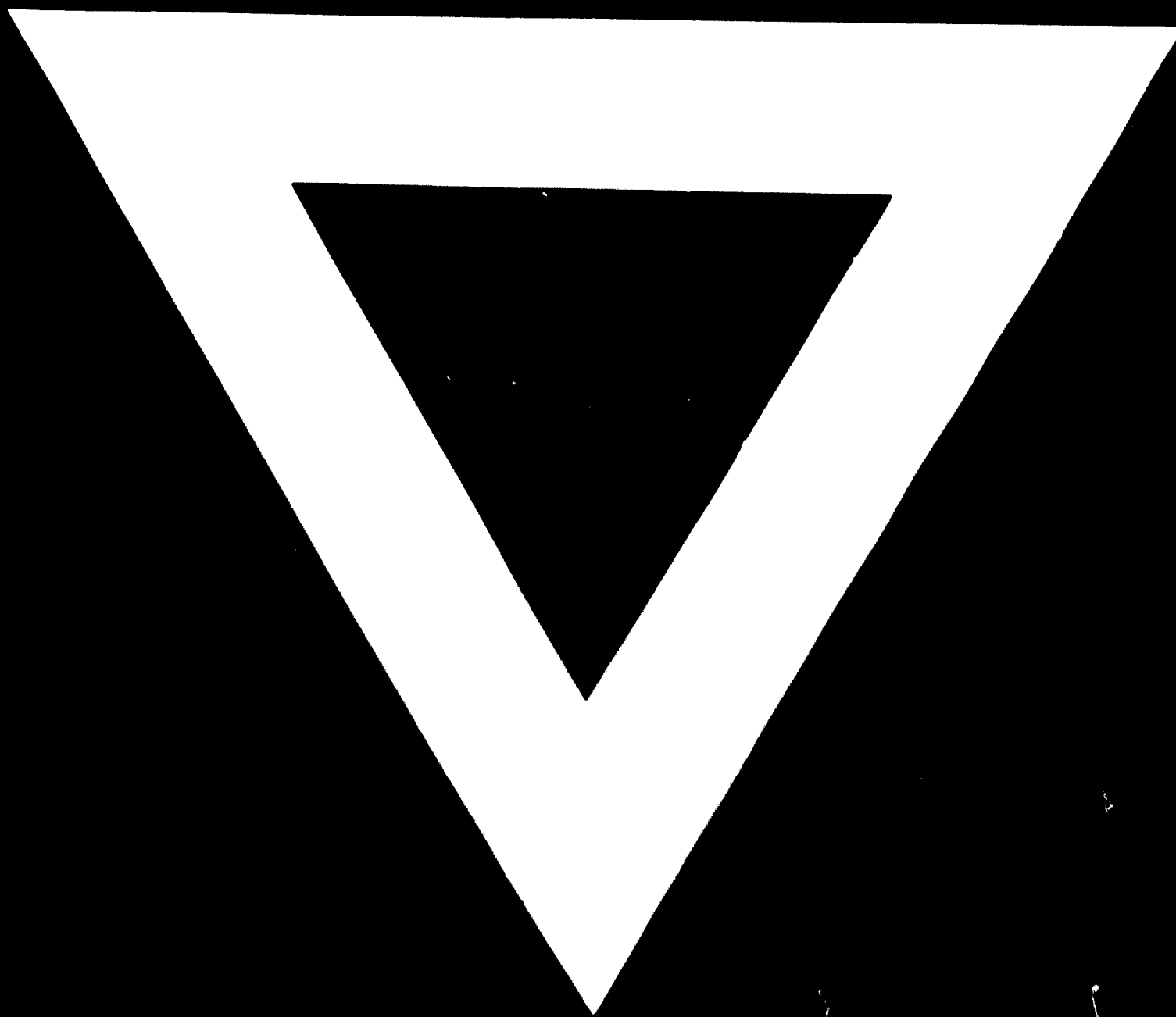
big quantity of salt for their animals. This additional consumption may raise the total consumption to over 100 thousand tons of salt.

EXPORT OF SALT PRODUCTIONS

26. Very small quantity of both coarse and fine salt is exported to Ethiopia and the Democratic Republic of the Congo and Uganda. Japan is a good market and it needs big quantities, but the high rail transport costs will stop our production from invading the world salt market.

27. This is just a brief history about the industry of manufacturing salt in the Sudan.





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