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REGIONAL HIDES AND SKINS, LEATHER AND LEATHER
PRODUCTS IMPROVEMENT SCHEME

US/RAF/88/100/11-10

Technical report: effluent treatment and solid waste discharge
Sudan - Kenya - Somalia - Tanzania *

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INTRODUCTION

The purpose of the mission was to:

1. Appraise the existing situation of the effluent and solid wastes discharges in Sudan, Kenya, Somalia and Tanzania and suggest ad hoc measures to mitigate the negative impact of tannery operations.
2. Propose a tannery at which a "model" effluent treatment plant could be established.
3. Prepare a design for this plant with appropriate fluxgrams.
4. Prepare a list of equipments required for setting up such plant.
4. Assist in the preparations for organizing the seminar on effluent treatment.

At the same time, the expert had to assist in the other activities of the projects US/RAF/88/100 and the national associated projects as well as the rehabilitation project US/RAF/88/102 .

During the mission, the official value of:

| | | |
|------------------------------|-------------|---------|
| the Sudanese Pound Su.f was | 12.2 Su.f = | 1 US \$ |
| the Kenyan Shilling K.Sh | 21.8 K.Sh = | 1 US \$ |
| the Somalian Shilling So. Sh | 577 So.Sh = | 1 US \$ |
| The Tanzanian Shilling T.Sh | 144 T.Sh = | 1 US \$ |

1. Existing situation of effluent treatment and solid waste discharge

1.1. SUDAN

With exception for two large tanneries, all other mechanized tanneries in Sudan are under management of the Leather Industry Corporation and belong to the public sector.

During the mission and due to circumstances it was only possible to visit the tanneries in the area of Khartoum.

Two governmental tanneries, the White Nile and Khartoum Tannery are now under rehabilitation with assistance of Rumanian, Yougoslavian and Italian companies. The rehabilitation works are expected to be completed mid of 1990. After rehabilitation Khartoum Tannery is expected to produce daily 500 hides and 1,500 skins, 50% in wet blue and crust for export and 50% into finished leather for local market. White Nile will produce in a first phase 8.5 T dry salted hides and 3,000 skins per day, the production will be increased in a second phase up to 10.5 T dry salted hides and 6,000 skins in pickled, wet blue and crust for export and part into finished leather for local market.

As the two tanneries are in the same area, the effluents are collected and treated together at the waste water treatment plant of White Nile, which will obviously be too small if the tanneries are ever coming to full production. For the time being, the plant is a one treatment tank 36 m long, 12 m width and 2 m deep, 853 m³, divided into 3 sections: one homogenization part 4 x 12 x 2 m, one aeration tank, and one collecting tank where the aerated water overflows. The aerated effluent is sent to a municipal treatment plant. The sludges are pumped to drying beds. In the sewers between the factories and the treatment plant static screens are placed to retain solid waste and a rotary brush screen is placed at the entry of the homogenization tank. The production of the two tanneries being very low and as the system is based on overflow, the retention time is very long. It seems that the municipal plant accepts the treated effluent without difficulties.

A Japanese assistance programme is in implementation to reorganize the collection and treatment of the city waste waters with construction of new treatment plants on which the industrial zone where the tanneries are located will not be connected. When the new system will be operational the existing treatment plant will be used only for the industrial zone, therefore, the management of the tanneries is waiting to look into improvements or modifications of the existing treatment.

The solid wastes are spread in the fields behind the tanneries, because of dry air and heavy winds in Khartoum solid waste and sludge are drying very fast. The dry sludge is spread over the fields and the dry waste is stored behind the tanneries. Despite the low production during the last years it makes a mountain.

Because of the priority given to the rehabilitation of the tanneries and the availability, in a next future, of the existing municipal treatment plant that will be used only for industrial effluents, the management of the Leather Industry Corporation is not interested, for the time being, in assistance for waste water treatment.

For solid waste, it is planned to start a glue and leatherboard production after implementation of the tannery rehabilitation.

Afrotan is a private tannery located in an industrial zone south of Khartoum, producing daily 10 T of fresh hides coming straight from the slaughterhouse and 6,000 wet or dry salted skins. At the time of the visit the factory had to reduce production because of delay in the foreign currency allocation needed to pay the imported chemicals. The hides are exported in wet blue, except the very low grades that are finished for local market. Half of the skins are exported as pickled or wet blue, the other half as crust.

The effluent of the tannery is estimated (through the meters of the pumping/cooling station) to be 225 m³ beamhouse water, 16 m³ chrome waste bath and 35 m³ from the wet finishing or a total consumption of 276 m³ which seems rather low. Beamhouse and chrome are collected together in an aeration tank 10 x 5 x 5 m (liquid height 3 m) and aerated through a blower after addition of Manganese sulfate. The other waters are collected in a tank of same dimensions as the first one and also aerated. After 10 hours aeration, the sludge is allowed to settle in the first tank, usually overnight, and the slurry is pumped to drying beds at 2 to 300 meters far from the factory, the supernatant water will be pumped into the second tank after emptying part of the water through an irrigation system in the fields around the factory. The bottom of the tanks is flat and the technical manager is aware of the need to install a conical settling tank to concentrate the sludge, but a more compact sludge should be difficult to pump on a long distance and the field behind the treatment plant is used for drying solid waste.

Solid wastes - non-tanned trimmings, shavings, splits, tanned trimmings - are allowed to dry on the land behind the tannery, sun and heavy dry wind make the drying fast, the dry waste is then burnt.

For the time being, the tannery is almost alone in that industrial area but it is expected that other factories will be established and then there will be problems for dumping and discharging. Afrotan requested the assistance of project DP/SUD/885/011 and a short term consultant in the field of recycling, reutilization or treatment of solid waste from tannery. UNDP transmitted that demand to UNIDO (letter of 2 March 1989). The national project US/SUD/88/100 has one man/month consultant in effluent, it is recommended to concentrate the assistance on solid waste, the assistance of the sub-contractor is also recommended if his effluent treatment expert is specialized in solid waste.

The consultant should investigate the possibilities and viability of producing from solid waste: glue, gelatine, animal feeding, fertilizer, etc, taking into account that:

- production of glue is generating waste waters, high calories consuming, and not economically viable if in competition with chemical glues.
- production of edible gelatine or animal feeding are already a more complicated technology and in competition with other animal, vegetal and synthetic products.
- non-tanned waste is a good fertilizer, but has the inconvenient of a slow action and needs to be dug deep into the soil, furthermore transport, handling and storing are complicated and fertilizers are not needed all the time over the year but only periodically.

Like in many developing countries, the amount of non-tanned solid waste is high because of the poor preservation of hides and skins, having as result that part of the raw material cannot be processed and has to be wasted. In addition, hides and skins are not trimmed after slaughter and come to the tannery with long legs, heads, tails, etc.

The hides and skins improvement programme of the project will hopefully reduce the amount of non-tanned solid waste.

1.2. KENYA

All the tanneries in Kenya are private companies, many are sister companies or part from groups or holdings.

The main part of the production is semi-processed leather, wet blue or crust for export.

1.2.1. Sagana Tanneries Ltd

Sagana Tanneries Ltd started operation in 1975 with second hand machines coming from Norway and loans from the Kenya Industrial Estates. All those loans were repaid in 1986.

The production is 6,000 hides or 24,000 skins per month, the proportions of hides and skins varies from month to month according to the availability of raw material and the demand of leather. The main part of the production goes in wet blue for export. Around 90,000 sq.ft./year are sold in chrome or vegetable tanned and finished leather on the local market.

As there is increasing demand on export markets as well on local market, Sagana Tanneries plans to raise the daily production up to 600 hides and 2,000 skins.

For the time being, the effluent treatment is restricted to lagooning in successive ponds. Under pressure of the Water Developing Authority, the company has assigned a consultant engineer to propose a waste water treatment plant.

As there is enough space behind the tannery, the proposed treatment is based on an oxidation ditch (Pasveer of 650 m²). The waste chrome tanning baths will be treated separately by precipitation with lime. The other effluent will go after screening to the oxidation ditch (52 x 12 m) and then to a final clarifier. Mr. Clonfero, effluent consultant, suggested to place a 4 hours retention tank between screening and oxidation ditch to allow slow and constant discharge into the ditch and avoid shocks and disturbances. Waters in the retention tank have to be under constant mixing to avoid sedimentation.

It was also recommended to recycle part of the sludge from the final clarifier into the oxidation ditch, and to give a sloop of at least 16° at the bottom of the clarifier.

Later on, during a visit to the tannery, the distances between the factory and the proposed effluent treatment plant were better visualized, it appeared that the sewer between the beamhouse and the proposed effluent treatment plant would be around 130 meters long. In addition, the profile of the ground level allows only a gradient of 0.66% for the sewer (1:150). In this condition, the proposed sewer in PVC pipes of 200 mm diameter should be clogged in no time, even if a screen was placed at the entry of the sewer. On the other hand, an open sewer on such a distance and with such a low gradient should need constant cleaning.

As the company is considering a rehabilitation of the tannery, it was suggested and recommended to build a new beamhouse close to the projected effluent treatment plant. The present lay out of the tannery is with the beamhouse in front of the factory near the offices. (The first owners were indeed hides and skins traders with warehouses close to the offices and for them it was obvious that the beamhouse had to be located near the raw material warehouse). In addition to the inconvenience of the location, the roof of the existing building allows only installation of drums with diameter lower than 3 meters.

Taking into account the advantages of a new beamhouse and the fact that it is easier to transport raw hides and skins than waste water, we insisted strongly on the need for modification of the lay-out. The maintenance expert, Mr. Rongved, will go to study a new lay-out between 10 and 17 December 1989.

1.2.2. Alpharama Ltd

This tannery is located near the Athi river and very close to the National Park of Nairobi. It processes daily 1,200 hides and 6,000

skins in wet blue and crust for export. The company is part of the Excelsior Group of London, like Afrotan in Sudan.

The chrome waste baths are treated separately, after filtration they are recycled two times in pickling, and after that precipitated and partly reused after redissolving for tanning of split.

All the other waters are mixed without agitation in 4 rectangular settling tanks of 80 m³ (bottom with sloop). The sludge from the settling tanks is pumped to drying beds. The supernatant is treated under blowing with Manganese sulfate in an aeration tank and after that in an aerated oxidation ditch. The effluents are finally treated in five lagoons from which one is emptied and cleaned every month. The treated waters are used for irrigation on adjacent land belonging to the company, the chrome free sludges are also used as fertilizer in the sisal plantations of the company. Obviously the final water is not limpid and many fat rings can be observed on the surface of the water. The main problems are smell, absence of control of the treatment and unreliability of analysis results. Smell come probably from interruption of the aeration system or mistakes in the addition of catalyst.

Solid waste is partially incinerated with corrosion problems as soon wet or humid waste is burnt. Part of the solid waste is dumped.

1.2.3. Kamiti Tanners Ltd

This tannery, one of the most important in Kenya, processes only dry raw material, 8 to 9 T per day skins and hides equivalent to 16 to 20 T green weight.

The effluent treatment plant was conceived and installed by Heybroek b.v. Netherlands with assistance of TNO in 1986-87. The management claims that the total investment was over 20 million Kenyan Shillings (1 US \$ = 17.30 K.Sh. in 1987).

All the effluents enter the treatment plant through separate sewers. Soaking and liming waters are mixed and screened through a rotary brush filter, Manganese catalyst is introduced at the outlet of the screen by a metric pump. From the sulfide reduction tank, the waters are pumped into a mixing bassin "A" together with the septic tank waters and the supernatant of the chrome precipitation. From there they are pumped to an aeration ditch with 10 aerators (6 of 18.6 kW and 4 of 7.5 kW). The sludges from the aeration ditch are concentrated in a settling tank and then transferred to drying beds. A filter press was installed for treatment of sludge but was never used. If needed, a chlorine injection is possible between the ditch and a final storage pond from where the water is discharged to the Athi river.

The chrome waste baths are screened, balanced and mixed with lime and pumped into a settling tank from where the sludge is transferred to chrome sludge drying beds and the supernatant to the mixing basin ("A").

The water in the last pond is not limpid and results of analysis are inconsistent. Besides high cost of operation, the major problems are smell, big amounts of sludge to evacuate and dump, and foam in the aeration ditch. The foam layer can go over one meter height and when there is wind, foam is blown everywhere in the surrounding. It seems that different types of surfactants were tested for rewetting and degreasing hides and skins without improvement in the foam formation. Utilization of an antifoam agent is said to be too expensive.

1.2.4. Deras Tannery Ltd

This is a new tannery, installed to produce 2,500 skins per day. The owners P.N. Sarris are hides and skins traders and decided to produce wet blue because of the increasing demand for semi-processed leather on European markets. They install and start also a tannery in Zimbabwe at Kadoma along the road between Harare and Bulawayo.

The Deras Tannery Kenya is installed in the industrial zone of Nairobi in one of the warehouses of the Sarris Company.

One of the requirements of the Municipality to authorize the tanning activity and to accept the waste waters in the municipal sewer was the installation of an effluent treatment plant. As there is no land behind the tannery building, the effluent treatment plant was installed inside the building. Beamhouse and chrome tanning waters will be treated separately in underground tanks and biological treatment is not requested. The tanks are partially covered and tight but anyway, the physico-chemical treatment will give gases and smell. It was recommended to build a partition to separate the treatment plant from the rest of the building where grading and packing department will be installed and also to build chimneys on the open screens from the tanks. Aeration through the back wall is not possible because of the proximity of a railway line.

1.2.5. Lake Tanners Ltd

This tannery in Kisumu, near the Lake Victoria, belongs to important fish traders. It produces daily 3,000 skins and 600 hides in wet blue with small quantities of crust and finished leather.

The effluent treatment is lagooning without preliminary separation of beamhouse and tanning waters. The land around the tannery is flat without deleveling and the ground water table is high. Because of this, it is not possible to dig deep into the ground. The open sewer between the tannery and the first lagooning pond has no gradient and need to be cleaned constantly. The first pond was intended to be an homogenization pond and a paddle wheel was installed

to mix the effluents, this was not effective and sludge is accumulating in that first pond. To allow treatment in successive lagoons, the water and sludge from the first pond are pumped into an elevated tank from where the supernatant overflows in the successive lagoons. The water from the last lagoon is used for irrigation of a papaya plantation.

The Municipality of Kisumu plans to install a sewer in the road near the factory and the tannery requested authorization to discharge in that sewer. The first requirement of the Municipality and of the Ministry of Water Development was to treat separately the chrome containing effluent and the tannery is installing chrome precipitation and settling tanks. Other requirements will be communicated very soon, in the meantime the company is postponing any decision about the improvement of the waste water treatment.

1.2.6. Nakuru Tanneries Ltd

Chrome Tanning Co. and Nakuru Tanners are under same management and operating in the same tannery located in the city of Nakuru near the Nakuru Lake famous for its flamingos.

The two companies have a production of 5,000 to 6,000 skins per day all in wet blue for export and some 500 hides in wet blue and vegetable crust leather.

The effluent treatment is reduced to decantation in pits, and the overflowing effluent is discharged in the municipal sewers.

It seems that the tannery has no problems with effluents and the owners are not interested in any help or assistance in that field.

1.2.7. Kitale Tanneries Ltd

This tannery, processing daily 300 hides and 2,000 skins in wet blue is located in Kitale some 450 km from Nairobi.

The chrome containing effluent is treated separately by precipitation and sedimentation. The beamhouse and other waters are aerated with a blower, allow to settle and discharged in the municipal sewers.

1.2.8. Leather Industries of Kenya

L.I.K. is part of a consortium led by Industrial Promotion Services Ltd founded by Aga Khan. It produces over the 300,000 hides per year in wet blue and crust.

The effluent treatment plant was build under an assistance programme of USAID and was expected to be a model and to reach very high standards of depuration. In fact the plant has never worked efficiently.

1.2.9. Bulleys Tannery

Bulleys Tannery is the biggest leather producer in Kenya 840,000 hides and 1,800,000 skins yearly. It has a modern effluent treatment plant and it seems that there are no problems despite the high standards requested for the discharge in Thika river.

1.2.10 Bata Tannery

Bata Shoe Co. Ltd Kenya has a tannery located in Limuru near the shoe factory. The existing effluent treatment plant does not meet the requirements of the municipality. Because of the extension of the city of Limuru, the tannery is enclosed in the urban area and the requirements for environment protection are more severe. Improvement and extension of the existing plant are under study by a Bata consultant.

1.2.11 Babar Tannery

This is one of the big tanneries in Kenya, located near Nairobi on the Athi river. The tannery is in expansion to switch over from wet blue to crust and a new effluent plant is in construction under the supervision of a local consultant.

1.3. SOMALIA

Four industrial tanneries in Somalia are under management of the Somali Leather Agency and belong to the public sector.

As travel out of the capital city was not authorized only one of the tanneries was visited. It seems that with exception for the tannery in Kismayo, the tanneries in Burah and Hargeissa are not working or are working at a very low level of productivity.

The km 7 Tannery in Mogadiscio, established in 1972 and rehabilitated during 1975-79 has a daily production capacity of 300 hides and 2,500 skins per day. For the time being, the tannery is working only a few hides coming from the daily slaughter at the Mogadiscio's abattoir. The equipments are in very bad conditions despite an assistance and renovation programme in 1988.

There is no effluent treatment.

A new tannery, financed by the Italian Ministry of Foreign Affairs, was established recently by Italian companies in the compound of the km 7 tannery. It is completely equiped for the production of 2,000 skins per day in pickled or wet blue. The equipment include a Hydronova effluent treatment plant of 450 m³ per day. The system consists of the following main section:

- a primary treatment in a homogenization tank with air blowers and adjustment of the pH and a settling tank where the sludges are concentrated and sent to an accumulation tank, the supernatant is sent to a
- biological treatment consisting of a dosing tank into which the nutrients are metered, an intensive percolator with plastic support, a settling tank for precipitation of biological sludge that is sent to the accumulation tank where it is mixed to the chemical sludges
- the sludges in the accumulation tank are treated with polyelectrolysis and dehydrated on a belt press.

After treatment, the waste waters will be dispersed in the surrounding area by means of a network of irrigation channels.

The new tannery is not yet transferred to the Somali Leather Agency, it is expected that the tannery will be operational in 1990.

The management of km 7 tannery, having other priorities is not interested by effluent treatment and, at this moment, the authorities are not requesting it.

1.4. TANZANIA

Three industrialized tanneries and two footwear factories are controlled and operated by the Tanzanian Leather and Associated Industries (TLAI) and belong to the public sector. The capacity utilization of the tanneries is very low due mainly to lack of working capital and burden of financial cost on loans. Recently private tanneries intend to start tanning at least up to wet blue.

1.4.1. Morogoro Tanneries

Morogoro Tanneries has an important and complete effluent treatment plant build not only to treat the tannery effluent but also the waste waters from the other factories of TLAI, textile mill, leatherboard, shoe and lace factories. Only the textile mill is operational and the effluent treatment plant is not used, nevertheless the equipments are well maintained and the big aeration bassins are used for fish breeding.

1.4.2. Mwanza Tannery

Mwanza Tannery has an effluent treatment plant build to treat the waste waters from the tannery and from the nearby Leather Institute. The plant was never used and all the metal parts, scrapers, mixers pumps and aerators are completely destroyed. The Institute was never operational and the tannery is working at very low level of capacity. The tannery effluents were bypassed and discharged straight into the Victoria Lake. Since a few months the sewers being clogged, the waste baths are drained in the fields behind the tannery and despite the low

production of leather those fields are becoming from good grassland swamps.

The sewer are PVC pipes 200 mm diameter, this is small if the waters are not well screened at the entry, but, as there are enough man-holes the sewers could be easily cleaned.

1.4.3. Afro-Leather Industries Ltd

This is a new private tannery build recently in a industrial zone near Dar-es-Salaam. The tannery has a production of 500 hides and 1,000 skins per day up to wet blue. Extension to produce crust and finished leather is programmed for 1992-93.

The effluent treatment plant was installed on recommendation of a local consultant, it consists in 3 successive sedimentation tanks of 4 x 4 x 5 m and 2 aeration lagoons 30 x 20 x 5 m without any equipment for pumping, mixing or aeration, the flow through the system goes by gravity. After 2 months activity, the first sedimentation tank is already full of sludge and in addition there are problems of smell and flies.

This company request and needs assistance to solve the effluent treatment problems. It is recommended to put this on the effluent expert's programme and it was already suggested to construct a new sewer from the tannery to separate chrome and beamhouse waters.

1.4.4. Mercy Marealle and Dar Tanneries Ltd

Two hides and skins traders, Mercy Marealla and Dar Tanneries Ltd, intend to start tanning of wet blue and requested assistance for the treatment of effluent. A first questionary will be send through the national expert to have some basic information.

2. Selection of a tannery at which a "model" effluent treatment plant could be established

The criterias for selecting the tannery were:

- medium size industrial tannery,
- processing leather up to the finishing or at least up to crust,
- using mainly chrome for tanning,
- located in an easily accessible place,

- having a management willing to implement and finance the civil works for the "model" effluent treatment plant and this on instructions of the project management and experts,
- to start the works in the beginning of 1990.

Between the eight countries covered by the project, Ethiopia, Kenya and Zimbabwe have a high and constant activity in the tannery sector.

Because its central location in the region and the presence of the headquarters of the project in Nairobi, Kenya was recommended as country where the "model" effluent treatment plant had to be established. In addition, the Leather Development Centre LDC at KIRDI has an equipped laboratory for effluent analysis and a mini pilot plant for effluent treatment.

Among the Kenyan tanneries:

- Bulleys Tanneries and Leather Industries of Kenya are too big and not interested by the project,
- Bata Shoe tannery, Kamiti Tanners and Babar Tannery are also too big and despite their interest for assistance in effluent treatment, they are not willing to become a demonstration plant,
- Nakuru Tanneries are not interested,
- Kitale Tanneries are too far away from Nairobi and process only wet blue,
- Lake Tanners in Kisumu are also far away from Nairobi but the connections by air are easy, nevertheless, the management is not willing to invest in a near future and in addition he is in opposition with the Municipality,
- Despite of the rather big size of the factory, Alpharama could be a tannery for the "model" effluent plant. The civil works are already existing and the management accepts to invest in adaptation and improvement. Funds are available.

In addition, the tannery has a treatment of solid waste and is used to make chrome recycling, both straight in the pickling bath after filtration, and after precipitation and redissolving in the tanning of splits.

The factory is located near the National Park of Nairobi and improvement in effluent treatment and protection of environment could have a psychological impact.

Alpharama was apparently recommended by the effluent consultant of US/KEN/84/163 , unfortunately the company is a multinational and the main shareholders are not Kenyan.

- Sagana Tannery, on the other hand, is completely Kenyan, not too big, close to Nairobi and the owners are willing to invest rapidly in civil works, 600,000 K.Sh are available.

Unfortunately, the tannery needs rehabilitation and establishment of a "model" effluent treatment plant must be connected with renovation of at least the beamhouse. Here also the management is prepared to invest in the construction of a new building and funds will be made available. Stress must be laid on the fact that the first installation loans of Sagana Tannery were totally repaid in 10 years.

3. Recommendations

- 3.1. After discussion with the backstopping officers, CTA and sub-contractor, it is suggested and recommended to select Sagana Tanneries for the establishment of the "model" effluent treatment plant,
- 3.2. to give to the sub-contractor the implementation of the design for the Sagana effluent treatment plant,
- 3.3. to assist Sagana Tanneries in the implementation of the rehabilitation plans through the sub-contractor,
- 3.4. to assist Sagana Tanneries in the financing of two soaking/liming drums 3.5 x 3.5 , through the Rehabilitation Scheme US/RAF/88/102 (2 x 50,000 US \$).
- 3.5. to select the Alpharama tannery as second effluent treatment object under the Rehabilitation Scheme US/RAF/88/102,
- 3.6. to give to the effluent expert 11-10 of US/RAF/88/100 the following task:
 - 3.6.1. appraise the existing situation of the effluent treatment plant at Alpharama, Nairobi and at Afro-Leather Industries, Dar-es-Salaam and suggest ad hoc measures to improve the efficiency of the existing system;
 - 3.6.2. prepare a design for each of the treatment plant with appropriate fluxgrams;
 - 3.6.3. assist in the design and/or adaptation of the civil works for each of the plants and monitor the construction work to be carried out by a local company;
 - 3.6.4. prepare a list of equipment required for improving each of the effluent treatment plant;

- 3.6.5. assist in the evaluation of the quotations for equipment;
- 3.6.6. assist in the assembling of the components supplied and commission the improved effluent treatment plants.
- 3.7. The laboratory for effluent analysis at LDC is well and sufficiently equipped. The staff should be motivated to start conducting analysis and tests of parameters pertaining to tannery pollution control. Analysis and tests should be performed systematically on a daily basis.
- 3.8. The automatic sampler apparatus should be used at Sagana and Alpharama to take samples at different days and hours. The main parameters should be analyzed on those samples in view of giving comprehensive and reliable analytical data to the consultants and experts. The first consultant of Ewbank will be fielded in February 1990.

4. Other activities

4.1. US/RAF/88/100 and associated country projects

4.1.1. SUDAN

National Expert

The new Government, since July 1989, was not in agreement with the nomination of Mr. ElSheikh Tambal. UNDP has sent to UNIDO a telex confirming this. It was not possible to have a copy or the date of the telex (probably end September 1989). Very confused explanations were given about this from all contacted persons, only Mr. Tambal seemed not to worry.

The Leather Corporation has submitted three candidates (Mr. Abbo, Animal Resources, Mr. Gouda, Technical Manager, Leather Corporation and Mr. Tambal). The Minister of Industry, coming back from Libya, will take a decision not later than 15 October 1989. The CTA may call for news on 16 October at UNDP.

It seems that communications between the National Expert, the CTA and Vienna through UNDP were disturbed. Mr. Tambal gave answer to the following telexes : 09.08 to CTA, 05.09 to Ms. Taylor, 22.09 To Mr. Berg/Ms. Calabro' but cannot submit the copies.

Medical examination was sent end of June (copy in the file).
Nomination Letter received at UNDP the 30 July 1989 (copy in the file) was not transmitted to Vienna.

Leather Corporation

Mr. Mubarak and his staff requested a briefing on the RAF projects. The tanneries of the corporation are under a rehabilitation programme financed by the Government and supplied by Rumena, Italy and

Yugoslavia. It is expected that the two tanneries located at Khartoum will be operational mid of 1990, but this seems unrealistic.

Effluent and solid waste treatment are not included in the rehabilitation programme.

Private tannery

Afrotan (part of the Excelsior Margocian groupe, London, with Alpharama in Nairobi and one tannery in Kano, Nigeria) was working full capacity, partly in wet blue, partly into crust, the low grades being finished for local market. The tannery had to reduce production because of difficulties to obtain foreign currency allocations for chemicals.

With a daily production of 10 T fresh hides and 6,000 wet and dry salted skins, the tannery employs 270 workers, 125 of them are women (Women Development Programme).

The management does not seem interested by experts or equipment assistance by fear of reactions from the public sector, but is very interested in assistance for solid waste treatment. A request was done through project US/SUD/85/011 without follow-up.

Sudanese Leather Institute

Since the end of FAO assistance, the Institute stopped activities, except for production of a few pairs of shoes for disabled. Tannery, vegetable extract plant, laboratories are abandoned. The equipments are not maintained and in very poor conditions.

Hides and Skins section of Animal Products Administration

Mr. Abbo and his staff have activities in Khartoum area and in most parts of the country, they are very interested by the project.

Government inputs

The Ministry of Agriculture, through Animal Products Administration will provide the inputs in personnel, including the driver for the Toyota.

The Ministry of Industry and the Leather Corporation cannot provide office space, sundries and secretarial support. Mr. Mubarak requested office space at UNDP, no answer up to now. A driver for the National Expert will be assigned.

Itinerary - SUDAN

2 October 1989 Brussels - Paris - Khartoum

3 October 1989 Afrotan, Mr. Kobani, General Manager
Mr. Rau, Technical Manager

4 October 1989 Sudanese Industries Association,
Mr. F.H.Y. Kardofani, Deputy Director

Afrotan, Mr. Luge, President

5 October 1989 Leather Industries Corporation,
Mr. I.A. Mubarak, Managing Director
Mr. A.A. Gouga, Technical Manager

Khartoum Tannery,
Mr. Ibrahim Sidahmed, Technical Manager

White Nile tannery, Mr. I. Yagoub, General Manager

6 October 1989 Friday
Mr. Elshiekh Tambal

7 October 1989 Leather Industries Corporation,
Mr. M. Abdalah, General Manager of Gezirah Tannery

Ministry of Industry,
Mr. Sayed Gaffer Hussein, Manager of Public and
Private Industrial Sector

White Nile Tannery - Effluent Treatment

8 October 1989 Leather Institute,
Mr. G. El Elgabal, Director
Mr. Abelgadir Ournasir, Chief of Leather Laboratory
Mr. Farouk Mahmed, Chief of Leather Goods Section

Ministry of Agriculture Hides and Skins Administration
Mr. Abbo, Chief Animal Resources and Hides and Skins
Improvement Section

9 October 1989 Khartoum - Addis Ababa

4.1.2. ETHIOPIA

The work of Mr. Rongved was very much appreciated, they ask to have him back in 1990 when the ordered spare parts will be available.

Ethiopia has only 2 months for maintenance expert; months from another country could be transferred to Ethiopia but how will it be for DSA and travel expenses? BL 15 (same problem for Zimbabwe).

The CTA has sent Mr. Rongved's report to MM. Adamu and Hailu with request to send only sectional copies to each of the visited tanneries.

As there is no project car, Mr. Hailu is using the old SIDFA's car, but it must be sold end of October. The CTA requested from Mr. Gardelin to extend the use of the car and to postpone the sale up to mid December.

Plate registration : the CTA has sent a letter to the Resident Representative to ask UNIDO registration for the vehicles (except the pick-ups for the Ministry of Agriculture).

PTA Leather Fair 25-30 January 1990

Mr. Adamu is requesting (official letter to Vienna) a paper on UNIDO activities to be published in the catalogue of the Fair.

It is suggested to organize a National Experts' meeting in Addis Ababa during the Fair. Mr. Hailu has good connection for visas at the Ministry and is willing to make all the necessary formalities.

Mr. Hailu is requesting to be authorized to follow a computer course.

4.1.3. KENYA

Ewbank Preece Ltd

Discussion on work programme were held for effluent sub-contract to avoid confusion and overlapping with 11-10 and eventually with US/RAF/88/102.

For Kenya, Mr. Payne agreed to select Lake Tanners Kisumu, a possible financing of investments could be obtained from ODA. Visit to Lake Tanners Kisumu with Mr. Payne. The consultant met that afternoon the Municipal Engineer, difficulties from his part may be expected.

The CTA requested assistance for preparation and organization of the seminars. As this is not included in the contract, Mr. Payne will make a separate quotation.

Mr. Clonfero

Visits to Kamiti Tannery and Deras Tannery, participation to the workshop on effluent.

Discussion were held with the owner of Sagana about the effluent treatment project submitted by a Nairobi Engineering Company.

Sagana Tannery

The CTA would like to select this tannery for the model effluent plant because it is:

- completely in Kenyan hands,
- not too big,
- close to Nairobi,
- willing to invest in the civil works (600,000 K.Sh available),

but the tannery as such needs rehabilitation, the report of Mr. Rongved was rather negative. The owners are willing to invest in the rehabilitation of the buildings and therefore it is suggested to combine the rehabilitation of the beamhouse (2 drums 3.5 x 3.5) with the effluent treatment. Before going on leave, Mr. Rongved will suggest a lay-out.

Alpharana

Alpharana could be a tannery for the model effluent plant, close to Nairobi and the National Park recommended by Mr. Clonfero. The civil works are existing and the tannery has treatment of solid waste and recycling of chrome. The management accepts to invest. Unfortunately, the main share holders are not Kenyan and the tannery is rather big.

Mr. Machanga

Mr. Machanga (11-02), has his confirmation by FAO, and as he is not depending administratively from UNIDO, the CTA cancelled the briefing in Vienna.

Mr. Machanga will fly to Rome on 25 November 1989, will be briefed two days and will be back in Nairobi on 29 November 1989. He will start his duty in Mogadiscio the 3 December 1989.

Itinerary - KENYA

| | |
|--------------------|--|
| 10 October 1989 | Addis Ababa - Nairobi |
| 11 October 1989 | LDC, Mr. Payne from Ewbank Preece Ltd |
| 12 October 1989 | LDC |
| 13 October 1989 | Kamiti Tannery, with Mr. Clonfero Deras Tannery, Mr. P.N. Sarris, Manager |
| 16 October 1989 | LDC Meeting with Mr. Clonfero and Sagana Tannery |
| 17 October 1989 | Lake Tanners Kisumu with Mr. Payne |
| 18 October 1989 | Workshop on effluent treatment with Mr. Clonfero |
| 19 October 1989 | LDC |
| ----- | |
| 26 October 1989 | LDC |
| 27 October 1989 | Sagana Tannery with Mr. Felsner |
| ----- | |
| 6 November 1989 | LDC |
| 7-8 November 1989 | Alpharama |
| 9-10 November 1989 | LDC |

4.1.4. SOMALIA

UNDP

The Ministry of Industry and the Leather Agency cannot provide and pay for a driver and a secretary, including DSA. The Resident Representative will send a letter about this to Vienna and will request to include secretary, driver and DSA in UNIDO inputs and budget.

Office space is available at the Leather Agency.

Contrary to what is stated in the project document, the Somali Leather Agency is not depending from the Ministry of Industry but from the Ministry of Health.

km 7 Tannery and Footwear factory

Mr. Rongved is making a good work but complains about the lack of co-operation with the tannery.

The tannery is working at a very low level of capacity, equipment are not maintained and in very bad conditions.

Mr. Rongved will check the list of spare parts, evaluate if the machines can be repaired and select only the needed spares. Some spares are usual, and standard electrical equipment (switches, contactors) are available in the country, but there is no money to buy it. The same applies for the battery of the fork-lift.

A new shoe factory was established by the Italians in the km 7 compound with a production capacity of 250-300 pairs per day of very low quality footwear. The new machines are not properly maintained and start to rust.

New Italian Tannery

Financed by the Italian Ministry of Foreign Affairs for a production of 2,000 skins per day in pickled and wet blue. The equipment are fully installed including a waste water treatment plant Hydronova 450 m³ per day.

The Italians left the country a few months ago after locking all gates and doors so that nobody can enter the compound.

Rehabilitation of Salt Units

The Gezirah unit is restricted to a few ponds (salinas) in which a very low quality salt is produced by a small co-operative (see picture).

It seems that the Kismayu unit has a semi-industrial production, Kismayu is some 500 km from Mogadiscio along the coast, the roads are not safe, the only possibility to reach the town is by air. The Leather Agency has an agreement with the owners of the salt plant who are willing to give 50 T of salt per year in compensation for the rehabilitation works. Quotations from different contractors were submitted to the National Expert and they do not exceed the project budget. As soon they have the authorization, MM. Rongved and Ismail will go to Kismayu to inspect the plant and at the same time to look at the tannery.

Quotations for the rehabilitation of Kismayu Salt plant
(Hirad + Sons)

| | |
|--|----------------------|
| 01. Cleaning and repair of the lagoons and irrigation system | 5,500,000 So.Sh |
| 02. Digging of foundations | 7,000,000 So.Sh |
| 03. Digging of chanel | 4,200,000 So.Sh |
| 04. Construction of building | 2,600,000 So.Sh |
| 05. Transport of materials | 200,000 So.Sh |
| 06. Unforeseen | <u>100,000</u> So.Sh |
| | 19,600,000 So.Sh |

at rate 577 = 40,000 US \$

There is only one additional quotation from Naxar Construction Company: 24,700,000 So.Sh.

The salary of the National Expert was at the lowest salary scale of UNDP. The administrative officer, Mr. Niels, will request to raise it to two steps.

Itinerary - SOMALIA

22 October 1989 Nairobi - Mogadiscio

23 October 1989 UNDP, Mr. Niels Maagaard, JPO
km 7 Tannery and Footwear factory,
Mr. Abdullahi Hussein, Managing Director
Gesirah Salt plant

24 October 1989 UNDP, Mr. E. Harmann, Deputy Resident Representative
Somali Leather Agency,
Mr. H.A. Robeeh, Hides and Skins Improvement Officer
km 7 Tannery

25 October 1989 Mogadiscio - Nairobi

4.1.5. TANZANIANational Experts

1. Request for collection of legislation, by-laws, regulations on environment protection were asked on:

- national, regional and municipal level,
- for industrial waste and waste water,
- in general and particularly for tannery.

2. vehicles

- The Toyota 3.5 T truck is at Dar-es-Salaam harbour, clearing by UNDP and will go to Shinyanga. Reminder: incentive for driver.
- The Suzuki will be used by Mr. Massay in Dar-es-Salaam, under UN registration.
- One Toyota pick-up will remain in Dar-es-Salaam for international experts' travel (very bad roads in the country).
- The other Toyota will go to Shinyanga next January with MM. Muyinga and Leach.

private cars

In absence of project cars, Mr. Massay used his own car during the visit of the UNIDO consultant; as the mileage paid by UNDP is very low (0.16 US \$), it is suggested, in agreement with the JPO, to give or extra mileage or a lump sum.

3. MM. Massay and Muyinga will send their activity reports end of November 1989 with statistics and information as requested by the work plan of 6 September 1989.
4. The two experts are no more under the medicare scheme of TLAI and ask to look at the possibility of having an allowance of 7.5% of their gross salary to cover the medical insurance.
5. The terminal expenses for Nairobi meeting and the 20% for Philadelphia are still not paid.
6. Mbeya. The foreman of Morogoro Leathergoods started to prepare samples. The SIDO promised to give 200,000 Tz.Sh for purchase of leather. A skiving machine is badly needed.
7. Clearing of equipment. The manager of Morogoro Tannery and also the managers of Morogoro Leather Goods and Mwanza Tannery agree to pay costs related to clearing and transport from harbour

to site. However, it is suggested that the CTA should request confirmation of this through a letter of intention to send before release of the purchase order.

International Experts

Mr. Rongved (11-06). It is suggested to field him in Tanzania the 7 or 8 January 1990, Nairobi/Dar-es-salaam by air (no return ticket), and:

- 10.01.1989 to Morogoro :
- 15.01.1989 to Mwanza : by car
- 22.01.1989 to Moshi :
- 31.01.1989 back to Nairobi :

Mr. Leach (11-03). It is suggested to field him in Shinyanga during January/February.

Mr. Tracy (11-07). It is suggested to field him during July/August to Morogoro Leather Goods, to Twins Leather Works at Moshi and at Mbeya.

Effluent consultant (11-10). The services of an effluent consultant is required as soon as possible for one week for Afro-Leather, or eventually the sub-contractor.

Co-operation between development countries

For the training of stitchers at Morogoro Leather Goods, it is suggested to consider the fielding of trainers coming from another UNIDO project, as for example FLIC in the Philippines. This will have better results than sending fellows to a training centre. According to the JPO, funds are available at UNDP, Dar-es-Salaam, to cover DSA and some local expenses for trainers coming from other developing countries.

UNIDO inputs

BL 41-42

1. Tools and Literature for TILT 6,000 US \$

It is suggested to buy some books and to subscribe some periodical to be kept at the National Experts office as long as TILT is not operational.

Fleshing and riping knives are at the custom.

A skiving machine is needed for Mbeya.

Mr. Muyinga will send specifications and drawings for pulleys to be installed in the slaughterhouses for hanging the carcasses.

2. Chemicals: 1,000 US \$

The purchase of:

- 5 T Sodium fluoride or Sodium silicofluoride and
- 15 T Sodium pentachlorophenate of Zinc oxyde is recommended.

3. Plastic bags for transporting salt: 6,000 US \$
Mr. Muyinga will ask for quotations.

4. Audiovisual aids.

Video, slide and overhead projectors are under requisition. A phocopier should be welcome and is recommended.

BL 43

Construction of a salt store. Mr. Muyinga will ask for quotation with a least 3 contractors.

Government inputs

Ministry of Agriculture: due to financial difficulties, a request will be send at the begining of 1990 for extension on UNIDO Inputs of the operating costs for the second Toyota (375,000 + 30,000 Sh. n. 12 and 13).

Ministry of Industry: due to the financial difficulties of TLAI, only one office for experts could be provided.

Mwanza Tanneries Ltd

Like the other tanneries of TLAI, Mzanza is working at a very low level of capacity. In 1988, the average capacity utilization was only 8%. According to the management, this poor performance was caused by shortage of foreign exchange (export of wet blue was around the 26 million T.Sh), by frequent machinery breakdown due to lack of competent and qualified engineers and most of all inadequate working capital.

The tannery buildings and equipment are indeed in very poor conditions but rather because of negligence than lack of competent technicians. The machines are not maintained and even not cleaned. The waste water treatment plant was never used because it's easier to discharge straight in the lake. To open a clogged sewer there is no need for specialized engineers!

The new equipments requested are evaluated over 1 million US \$ FOB and the spare parts over 300,000 US \$.

The manager of Mwanza Tanneries was very surprised to hear about the Intersomer plans for rehabilitation of the tannery and the visit of Mr. Castelbolognesi at UNIDO Vienna. He had contacts with the Tanzanian branch of Intersomer, Incar Tanzania Ltd, in February 1989 and since no news.

Tanzanian Institute for Leather Technology TILT

Build five years ago, the Institute is still not operational. Furniture and windows are not yet installed and buildings and workshops are in very dirty and poor conditions. The experimental tannery has a small production for local small scale footwear and leather goods makers. The splitting machine and a shaving machine were lend to the Mwanza Tanneries where they were not maintained and now nearly out of order.

The equipment for the laboratories are still unpacked and stored in a small warehouse. The library has no windows and is a nest for all kind of insects and small animals. Some parts of the buildings start to have cracks and are not protected against the rain.

The Director of the Institute requests books, magazines and audiovisual aids through BL 41-42 of project US/URT/88/100. Taking into account the poor conditions of the buidings and the absence of any activity at TILT it is not recommended to purchase those items. Some reference books could be ordered and stored in the office of the National Experts in Dar-es-Salaam.

Liberty Shoes

This is a private company making with assistance of a German consultant 150 pairs of good quality shoes per day. The company is buiding a new factory for a daily production of 800/1,000 pairs, including canvas foctwear with injected soles.

Itinerary - TANZANIA

| | |
|-----------------|--|
| 29 October 1989 | Nairobi - Dar-es-Salaam |
| 30 October 1989 | UNDP TLAI, Mr. Y.Mwailolo, Director Liberty Shoes, Mr.R. Dasgupta, Manager Afro-Leather Industries Ltd, Mr. S. Mawji, Director |
| 31 October 1989 | K. Agency International, Mrs. M. Marealle, Export Director Dar-es-Salaam - Mwanza |
| 1 November 1989 | Mwanza Tanneries, Mr. S. Wakary, Director Vitanda Manufacturing Co Mr. V.M. Soni, Director Mwanza - Dar-es-Salam |
| 2 November 1989 | TILT, Mr. I. Nzawah, Director Mwanza - Dar-es-Salaam |
| 3 November 1989 | UNDP, Mr. J. Rasmussen, JPO Africa Trade Development Ltd, Mr. R. Skarii |
| 5 November 1989 | Dar-es-Salaam - Nairobi |

4.2. US/RAF/88/1024.1.1. SUDAN

As there is a rehabilitation scheme in implementation at White Nile and Khartoum Tanneries, additional participation to the UNIDO Rehabilitation Scheme is not required.

Fearing a negative reaction from the public sector, the private tannery, Afrotan, does not want to participate in the Rehabilitation Scheme.

4.1.2. ETHIOPIA

The requests for rehabilitation for the Ethiopian tanneries and footwear factories are in processing.

4.1.3. KENYA

To be combined with the assistance for the establishment of an effluent treatment plant, assistance in the rehabilitation of the beamhouse in Sagana Tannery is recommended. The minimum needs should be:

- two soaking liming drums 3.5 x 3.5m at 50,000 100,000 US \$

If funds are available, fleshing machines are recommended:

| | |
|-------------------------------------|--------------|
| - one fleshing machine 2800/3000 mm | 90,000 US \$ |
| - one fleshing machine 1800 mm | 70,000 US \$ |

The evaluation for the rehabilitation of the effluent treatment plant at Alpharama is 100,000 US \$, but this must be checked after submission of the report of the effluent expert in US/KEN/84/163.

After the visit of the consultant, a rehabilitation request was introduced by Kamiti Tanners.

4.2.4. SOMALIA

The maintenance expert, Mr. Rongved (11-06), will submit a list of essential spare parts and eventually machines for the km 7 Tannery.

4.2.5. TANZANIA

As long as the problem of working capital and that of burden of interest on loans is not solved at the TLAI tanneries, rehabilitation or delivery of equipment is not recommended.

According to the JPO, UNDP funds are available to assist private enterprises in financing equipment and overcoming foreign currency

difficulties. 30 to 70% of the cost of equipment can be paid by UNDP in hard currency and reimbursed by private companies in local currency.

4.3. Sub-contracts

It is recommended that the activities of the sub-contractor should be concentrated in first instance on the Sagana Tannery and in second line on Afro-Leather in Dar-es-Salaam.

For the solid waste treatment it is recommended that the sub-contractor should investigate the possibilities of valorization or treatment of waste at Afrotan Khartoum.

4.4. Women Development Programme

In Sudan, the private tannery Afrotan has a workforce of 270 workers from which 125 are women.

Such a high women employment is seldom in East Africa.

At Afrotan, women are mainly employed in grading of semi-processed hides and skins and in the wet and dry finishing sections where their work is well appreciated. Absenteeism for maternity leave is low because women stop working as soon as they get married (Moslem religion).

The public sector in Sudan is only employing a few women.

Skill upgrading is needed for current and prospective jobs for women in the leather goods sector at Morogoro and Mbeya in Tanzania.

UNDP Dar-es-Salaam has funds to pay DSA and some local cost for trainers or instructors coming from other developing countries.

Information on environment protection

The national experts in each of the country projects associated to US/RAF/88/100 were requested to check information on:

- legislation on environment protection, more specifically on waste water,
- laws by-laws on national level - regulations on regional or municipal level,
- name of the authority in charge with effluent control,
- existing standards or standards in preparation for effluent discharge,
- estimated volume of discharge for the local tanneries,
- analytical datas on effluent from local tanneries,
- requirements for atmospheric pollution, if any.