



**REGIONAL FISHERIES LIVELIHOODS PROGRAMME
FOR SOUTH AND SOUTHEAST ASIA (RFLP)
GCP/RAS/237/SPA**

TECHNICAL REPORT

Equipment specifications, and identification of the process for bidding, procurement and importation of ice production equipment for Timor Leste

For the Regional Fisheries Livelihoods Programme for South and Southeast Asia

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OUTLINE REPORT

1. INTRODUCTION

Based on the recent improvement of the utility systems especially the electricity supply the RFLP has considered it advantageous to implement option 5 in the 2010 Feasibility study report on Hygienic production of ice for the Small scale fisheries sector in TL. For this reason the management of the RFLP requires a technical report to assist with the selection of the proper equipment for the Lotas de Pesca¹ (LdP) in Atauro, Baucau, Bobonaro and Liquiça. These Lotas de Pesca have the common advantage they are located in the proximity of the major landing sites and therefore most likely to have the desired effect and impact.

2. SCOPE OF WORK

The scope of work is to provide RFLP management with options and recommendations to be able to select the most suitable equipment for the prevailing environment and conditions both with respect to equipment quality, ease of operation and maintenance to be able to produce ice to maintain the cold chain as well as expected hygienic standards starting with ice produced under hygienic conditions for the use in the TL small scale fisheries sector.

The scope of work will thus address the following key issues of concern to the RFLP management:

2.1 Evaluation of new versus second hand ice production equipment

Due to the relatively low total budget available for the 4 Lotas de Pesca to provide ice making equipment it was considered appropriate initially to investigate the possibility of purchasing second hand factory repaired equipment. It turned out that in general the savings made do not justify this option due to loss of warranty and the fact that the general wear and tear of available second hand machines would create a negative effect on all parties. The machine may perform as desired but will not look new.

If RFLP were to purchase second hand equipment, the equipment would need cleaning first and then checking by a certified and authorized technician at additional costs and transport lashings and supports would have to be purchased and inserted all at extra cost, thus narrowing the savings margin on these relatively small units.

The slightest malfunction of a second hand unit would generate a disproportional negative effect with fall out and negative consequences for RFLP and FAO.

The same negative ripple effect could also manifest itself in the case that factory new, but cheaper and less reliable machinery from China was selected in favor of more expensive but more reliable equipment manufactured in for example the EU.

¹ Lotas de Pesca is the Portuguese name for a "fish auction centre. In the case of Timor Leste, it refers to a fish landing centre constructed by the National Directorate of Fisheries and Aquaculture.

It is therefore the firm recommendation of the international Post harvest consultant that the selection of the machine must send a clear signal to the industry, as well as the NDFA that there exists no substitute for quality and therefore new ice machines should be selected for this investment.

2.2 Pre shipment check of the equipment

If the proposed concept of procurement of 4 new ice machines is followed by the RFLP management, the manufacturer will as per internal quality control procedures have conducted test runs and trials of the equipment prior to packing.

The standard packaging for more technically advanced machines comprise inserts of transport lashing and supports in order to protect the fragile machine components. These inserts and lashings must be removed, carefully following the manufacturer's instructions as described in the documentation supplied with the machine.

Therefore there is no need for any pre-shipment checks on behalf of the project if new machines are purchased.

As mentioned above if secondhand units are selected, there are additionally costs to be covered, thus making this option less advantageous to RFLP.

2.3 Ice machine comparison

In order to compare the ice machines, a dedicated table format is available under section 3 of this report as a reference to aid in the selection of the best alternative for RFLP management. This lists addresses and provides an indicative list of brands, and equipment suppliers, as well as country of origin.

2.4 Estimated costing for transport, customs clearance and import.

There are 3 ways in which the ice machines can be delivered to DILI, TIMOR – LESTE, namely by sea, road or air. Where possible the prices are included in the report under section 3 Machine comparison in table format. FAO and UN have their own project equipment import facilities in place with the competent authorities at TIMOR – LESTE customs.

2.5 Equipment installation and technical installations requirements on site

In general terms the Lotas de Pesca are prepared to receive any of the 3 selected ice making equipment options.

It is proposed that the machinery is installed inside the technical room, where the electrical switchboard is already located.

Requirements:

2.5.1 Potable water supply.

To connect to the BUUS SM 200ULT ice machine requires a 01 x ¾" pipe connection with a shut-off valve to the water connection on the ice machine with a minimum 1.0 and maximum pressure of 2.0 bar. If this pressure is not available from the public supply, an additional 01 x hydrophore pump, capable of yielding a minimum of 10 L per minute at a minimum 1.0 and maximum pressure of 2.0 bar must be additionally supplied. The pump acquisition cost locally in Dili, would be approximately USD 110.00 per unit.

NOTE:

It is absolutely imperative to carry out periodic monitoring and sampling of the incoming water to ensure it is of potable quality at all the sites. If the test results return positive results for coli forms and other pathogen waterborne bacterial activity, the NDFA must follow the directions and advice given by the local competent authorities regarding the need for chlorination etc.

2.5.2 Electrical connection

The machines selected in this report, the BUUS SM 200ULT and the vast majority of similar manufacture and brands will require the same installation as listed below:

- 01 x fused, earthed outlet for 1 x 240 VAC, 50 HZ, supplied through a 16 ampere automatic breaker switch.

2.5.3 Machinery installation requirements

All floors at the technical rooms at the Lotas de Pesca will be adequate for installation of the BUUS SM 200ULT ice machines and their harvest bins.

It might be necessary to add a floor drain to be able to clean the area periodically to comply with the cleaning program and maintain the hygienic standards at the LdP. Otherwise there is no need for additional preparation of the floor surfaces.

The BUUS SM 200ULT ice machine requires a set of brackets for wall mounting, which will be supplied with the machines.

Irrespective of the type and manufacture of the ice machines it is necessary to remove a few bricks from the solid LdP concrete wall immediately behind the condenser of the ice machine and to replace them with concrete breeze blocks, to ensure the machines can expel heat to the ambient air and to draw in cool air for the heat exchange process.

2.5.4 Ice storage facilities

During the peak fishing seasons most of the ice produced will be required to meet supply. At off peak fishing times there will be excess ice produced over market demand which will need storing. There are several ways in which the produced ice can be economically stored, irrespective of the type of ice to be stored. Any surplus produced ice can be stored in cooler boxes, although there will be some melt loss because of the higher ambient air temperature, wind and sun impact. Or alternatively domestic chest freezers can be used to store the ice produced, giving a buffer supply of ice that can be used when irregular large catches of pelagic species are taken.

2.6 NDFA staff skill requirements regarding equipment installation and maintenance

The Post harvest consultant has already trained key NDFA staff to the required skills level during the pilot project on centralized ice production. Irrespective of the machine type, the technicians can themselves, with only some assistance from an electrician and an air-conditioning technician successfully install any of the machines at any of the sites within 2 hours.

As the BUUS SM 200ULT machines are self-contained and in all respects ready to be operated, once the transport supports and lashings have been removed, and the water and electricity have been connected, there is no more commissioning work to be done.

It would however be advisable to train the local 4 operators together at the first selected installation site on:

- How to correctly start and stop the BUUS SM 200ULT machines and how to clean the condenser of dust and dirt on a regular basis,
- In the case of the BUUS SM 200ULT ice machine, in case that the conductivity is below 0,25 μ S, how to mix the saturated saline solution, and,
- In case of need of chlorination, how perform this task. The BUUS SM 200ULT machine is ideally suited, as the machine already has a dosage pump installed.

This training should be a joint training session conducted under the auspices and control of the NDFA, but with TA and support from RFLP.

3. TABLE OF MACHINERY COMPARISON

The table below is provided facilitate making a better direct comparison between the different machine options currently available to RFLP TIM for procurement. The data provides an insight into the advantages and disadvantages of the different available machine options.

Thus the reader of the report can form their own opinion, which may not necessarily be in agreement of the views and recommendations made by the international Post harvest consultant.

COMPARISON OF ICE MAKING MACHINES FOR THE TIMOR LESTE SMALL SCALE FISHERIES					
TECHNICAL PARAMETERS					
	Icematic N140	Scotsman MV300	Buus SM200ULT	Xingji XJ-350A/W	Xingji XJ-10K
Production capacity per 24 hrs at W/A + 32°C	98 kg	100 kg	2 -300 kg	(155) kg	(1,000) kg
Voltage ± 10 %	1 x 220 VAC, 50 HZ	3 x 380 VAC, 50 HZ			
Consumption Watt absorbed	950 W	780 W	(1100) W	820 W	4500W
Refrigerant	R – 404a				
Condensation	Air	Air	Air	Air/Water	Air
Water connection	¾" / 20 mm				
Water source	Fresh	Fresh	Fresh/saline	Fresh	Fresh
Ice collection	Bin	Bin	Container	Bin	Bin
Regular maintenance	90 days	90 days	180 days	90 days	180 days
Application	Non - industrial	Non - industrial	Industrial	Non - industrial	Industrial
Country of manufacture	Italy	Italy	Denmark	China	China

TABLE 01 – TECHNICAL COMPARISON OF VARIOUS ICE MACHINES

TRANSPORT REQUIREMENTS					
	Icematic N140	Scotsman MV300	Buus SM200ULT	Xingji XJ-350A/W	Xingji XJ-10K
Special requirements	None	None	None	None	None

TABLE 02 – TRANSPORT REQUIREMENTS FOR ICE MACHINES

INSTALLATION REQUIREMENTS					
REQUIREMENTS	Icematic N140	Scotsman MV300	Buus SM200ULT	Xingji XJ-350A/W	Xingji XJ-10K
Installation as per OEM catalogue and documentation	Removal of supports and lashings.	Removal of supports and lashings.	Wall mounting on supplied brackets.	Removal of supports and lashings.	Removal of supports and lashings.
	Mounting on bin.	Mounting on bin.	Alignment.	Mounting on bin.	Mounting on bin.
	Alignment.	Alignment.		Alignment.	Alignment.
Water connection	Mounting with ¾" BSP flexible hose.	Mounting with ¾" BSP flexible hose.			
Chlorination dosing equipment	Mounting with flexible hose.	Mounting with flexible hose.			
Salination dosing equipment	Not required	Not required	May be required	Not required	Not required
Electrical connection	Mounting of mono-phase plug with earth connection on supply cable to suit outlet.	Mounting of mono-phase plug with earth connection on supply cable to suit outlet.	Mounting of mono-phase plug with earth connection on supply cable to suit outlet.	Mounting of mono-phase plug with earth connection on supply cable to suit outlet.	Mounting of tri-phase plug with earth connection on supply cable to suit outlet.
Test	Operate for 4 hours and check production output	Operate for 4 hours and check production output	Operate for 4 hours and check production output	Operate for 4 hours and check production output	Operate for 4 hours and check production output

TABLE 03 – INSTALLATION REQUIREMENTS FOR ICE MACHINES

PERIODICAL OPERATION & MAINTENANCE SCHEDULE					
PARAMETERS	Icematic N140	Scotsman MV300	Buus SM200ULT	Xingji XJ-350A/W	Xingji XJ-10K
Internal water filter cleaning	90 days	90 days	Not required	90 days	90 days
Internal water tank cleaning	90 days				
Machine disinfection	90 days				
Machine decalcification	90 days	90 days	Not required	90 days	Not required
Chlorination	Daily, when required				
Salination	Not required	Not required	May be required	Not required	Not required

TABLE 04 – OPERATION AND MAINTENANCE REQUIREMENTS FOR ICE MACHINES

4. RECOMMENDATIONS

Based on the available information the international consultant recommends that RFLP TIM purchase the model SM 200ULT manufactured at BUUS KØLETEKNIK A/S in Frøslev, Denmark as this is a machine dedicated to the fishing industry and is versatile in its operational mode in that it can actually produce ice from saline water.

Additionally it is offered in a tropicalized version, which means that the components are designed and engineered to withstand the additional tropical heat loading on the machinery.

The BUUS SM 200ULT is simple in design and very rugged in its construction and contains only 2 moving parts, being the condenser fan and the horizontally positioned ice drum. The MANEUROPE hermetic compressor and control system is very simple and contains no electronic circuit boards.

5. LIST OF RECOMMENDED SUPPLIERS

The Post harvest consultant has identified the three (3) following companies as being capable of supplying the recommended machine to the project:

- MEC, Aeblevaenget 18, DK 6094 Hjels, Denmark, E-mail: kristan@lyngborg.dk;
- BUUS KOELETEKNIK A/S, Elsoevej 219, Froeslev, DK 7900, Nykoebing Mors, Denmark, E-mail: buus@buus.dk; and,

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