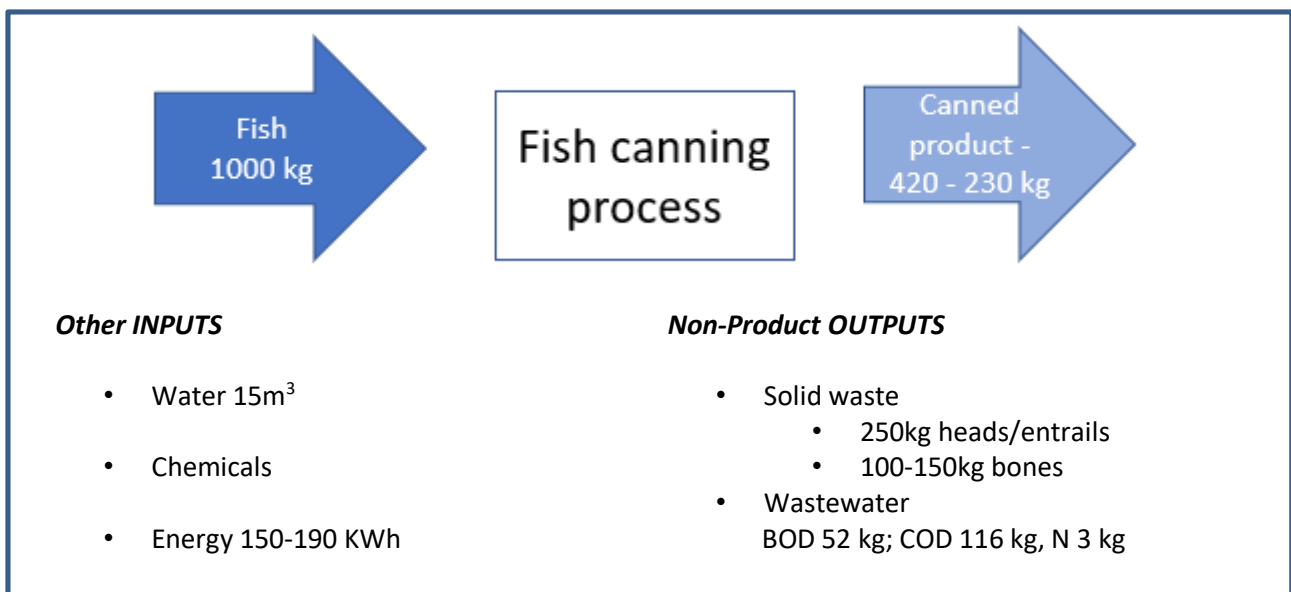




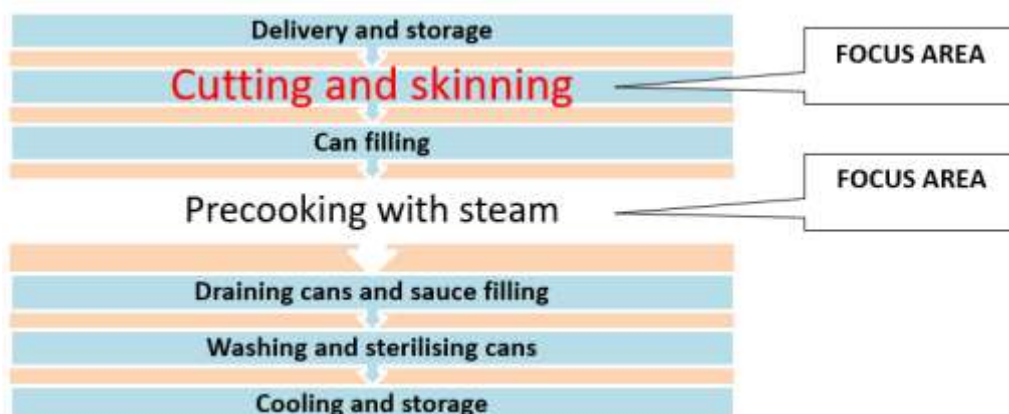
Exercise - Cause analysis and option generation for canned fish production¹

1. Background Information

The following graphic shows major inputs and outputs at company system boundary for the fish canning process (per 1t of fish). Energy and water inputs are also shown; water input in this process is considered an auxiliary material as it is needed in contact with the main raw material for producing the canned product.



2. Process flow diagram



¹ This exercise is extracted from the compilation of exercises used for the UNIDO TEST training developed under the project Switchmed. This particular exercise was prepared using the „Cleaner Production in Fish Processing (UNEP manual)“



Following the material flow analysis, major losses are associated to raw material (fish) and two focus areas have been identified: pre-cooking of fish and cutting/skinning. These areas are also relevant users of energy in the form of steam. Pre-cooking is done by steam in open cans. Cooking equipment is open and it is not well insulated (there are visible high losses of steam).

The liquid generated from the cooking process contains dissolved proteins and fat (there is processed fat fish with 7 g of oil per kilogram of fish). Cooking liquours are discharged into the wastewater (there is an effective drainage within the cooking room which collects all wastewater with high oil content, the fat is regularly removed by stream of water and manually). There is no wastewater treatment facility except screen. There was recorded often off specification of product (probably due to overcooking and/or low quality of input fish).

TASKS

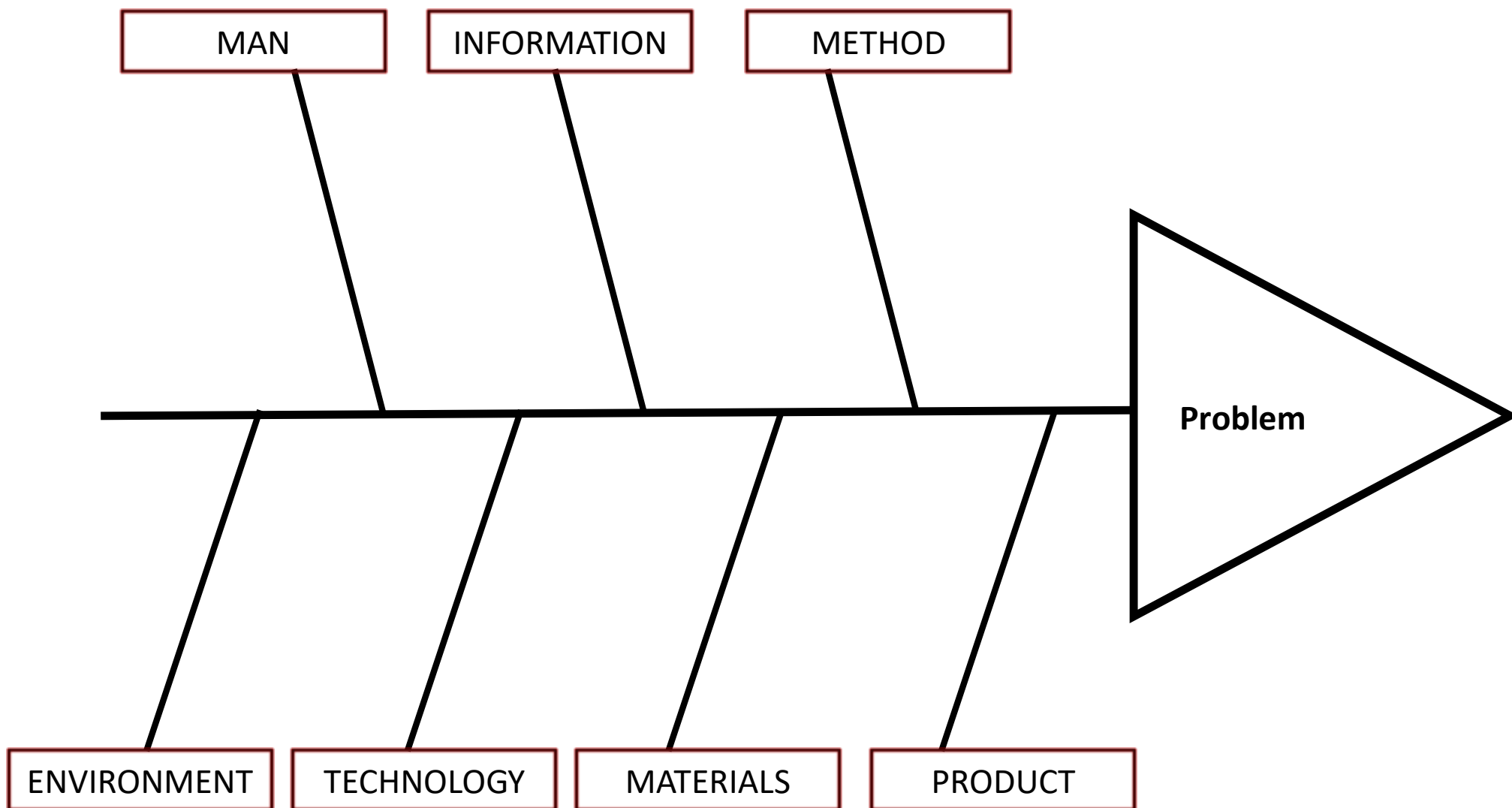
- **Split into groups**
- **Identify causes of losses within the focus areas (cutting/skinning and pre-cooking processes)** with focus on material (fish). Include energy flows. Utilize the fish bone template.
- **Generate options for reduction of losses for each cause identified in the previous step, within the focus area.** YOUR GOAL AT THIS STAGE IS NOT TO FIND FEASIBLE MEASURES BUT TO GENERATE AS MANY OPTIONS AS POSSIBLE
- Discuss your experience in a plenary



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