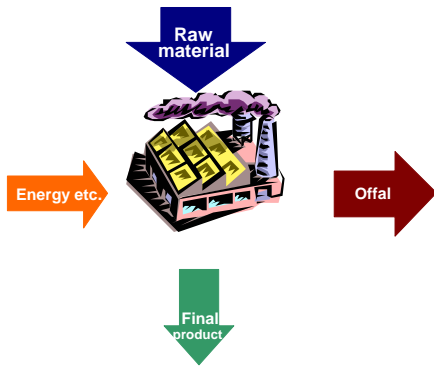


## Optimised utilisation of resources through cleaner technology.

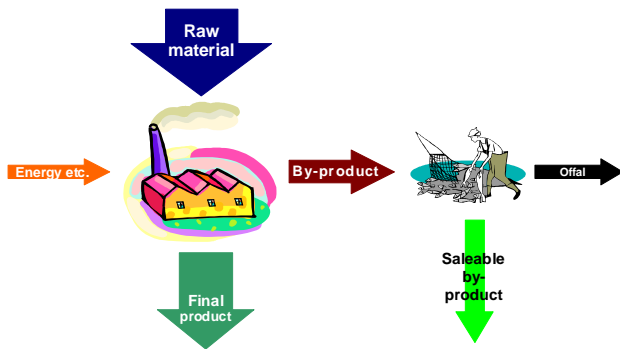
Any production, including fish processing, can be illustrated as follows:



By introducing cleaner technologies, the process is changed and the following could for example be achieved:

- Better exploitation of the raw material, leading to increased amounts of final products with the same amount of raw material used.
- The part of the raw materials, which cannot be made into primary final products, can be taken advantage of in producing other types of saleable products. Such secondary production can take place in the factory or elsewhere.
- The consumption of energy, water and other materials are reduced.

After introduction of the cleaner technologies, the above production can be illustrated as follows:



**The effect: Improved environment and improved economic result.**

For more information visit [www.larell.dk](http://www.larell.dk)

## Typical examples of cleaner & low waste technology components for fishing industries are:

- Improved utilisation of the raw material through introduction of modern production control systems.
- Dry and decentralised collection of offal.
- Filtration of waste water
- Water saving measures and equipment.
- Various improvements of existing equipment, technical installations and processes.
- Motivation, training and introduction of environmental management.

## Investments and operating economy.

The investments required to introduce cleaner technology in the fishing industry is very much depending on the type of processing industry, the present technological level and the environmental impacts to be achieved.

**Please ask LarEII to analyse your production and facilities in order to draft your potential savings and economical benefits from introducing cleaner technologies.**

The resulting major economic advantages normally derive from:

- Higher income because of increased amounts of saleable products and of saleable by-products.
- Reduced consumption and costs of water.
- Reduced investment in waste and waste water treatment, which can be scaled down as a result of the implementation of cleaner technologies.
- Reduced operating costs of waste water treatment.
- Reduced energy consumption.

Based on our many years of experience from the fish processing industry worldwide have the following results from introduction of cleaner technologies been achieved:

- Savings from 50-90% on the water consumption
- Reduction of the environmental load of the effluents from 50-80%
- Increase of production yields from 1-5% on the primary product (very depending on the type of products and processing methods)
- Significant improved workers environment, resulting in higher productivities and less sickness leave.

## Selected references from environmental projects within fish processing.

**Vietnam – SEAQIP – DANIDA, HAVICO** - Developing the 2<sup>nd</sup> generation MSP line for production of value added products. The MSP lines are designed with the highest concern on being environmental friendly. For more details see below. 2004.

**Vietnam – SEAQIP – DANIDA** – Design and implementation of computerised production control system for the MSP lines in CASEAFOOD. The production control system is mainly introduced in order to further increase on the individual operator's productivity and yield. In addition to the already obtained results from implementation of the MSP lines the year before have the productivity been increased with additional 25-50% and the yield with totally 2-4%.

The production control system enables the production management and the workers to get an instant result of the performance for the lines as well as for each individual worker in order to continuously optimising the production yield and productivity. The system is directly linked to the salary payment system and calculates automatically the salary and individual bonus for each worker. 2003 - 2004



**Vietnam – SEAQIP – DANIDA** – Design, implementation and testing of new Multipurpose Seafood Processing Lines. As mentioned above the intention with the MSP lines have been to improve on the environmental impact from the seafood processing industry. The environmental approaches have also included the workers environment. Four new MSP lines for a total of 128 operators have been installed in June 2003 and the production have now been running for more than a year at CASEAFOOD in Cam Ranh, Vietnam. The obtained results show:

1. Increased productivity - 2 to 4 times higher than on existing tables
2. Shorter processing time - faster flow - improved product quality.
3. Reduced water consumption - reduced with more than 90%
4. Reduced amount of waste water.
5. Higher production yield - increase 2 - 4 %
6. Reduced consumption of ice.
7. Improved workers environment.

Calculations based on the achieved results at CASEAFOOD shows an annual increase of the contribution margin with USD. 500.000. The total investment in the MSP lines, raw material feeding system, baskets and misc. equipment was approx. USD. 140.000 giving a pay-back time on the investment of a little more than 3 months. 2003.



**Lithuania– Fisheries Department & UAB Krevete – Environmental Impact Assessment.** Improved environmental awareness by training in cleaner technology, introduction of environmental management and implementation of clean technologies in the Lithuanian fish processing industry. Design of new equipment for reuse of salt brine for pre-treatment of raw material before final marinating, smoking or drying. Combined with new injection technology. 2001 - 2003.



**Vietnam – Implementation of cleaner technology** - An analysis of the current situation with respect to environmental impact and environmental management in the seafood processing industry. Included proposals for new efficient wastewater treatment plants. 99

**Denmark – Amanda Konserves 555 A/S-** Establishing a tailored concept for environmental protection management for the industry based on ISO 14001. 1997- 2000

**Poland - Danish Environmental Protection Agency – Introduction & implementation of cleaner technology concepts in utilisation of Baltic fish resources.** Technical assistance to establish sorting of catches directly from vessels, set-up silage processing plant & marketing of the silage as animal food. 1999– 2001.



**Latvia - Roja Fish Cannery A/S, introduction of clean/low waste technologies** - Analysis of the cannery and preparation of a proposal for implementation of clean and low waste technologies. 1996.

**Denmark – Abba Seafood A/S** - Environmental protection & funding for plant extension. 1995 – 1997

**Denmark – LimfjordsKompagniet A/S** - Environmental protection & funding for plant extension. 1995 – 1997

**Estonia - Salmo, Implementation of clean/low waste technology in a cannery.** 1995 – 1996

**Latvia - Auda, Implementation of clean/low waste technology in production of smoked canned sprats.** The project included the design, manufacturing & implementation of a new efficient rodding table & the installation of a new modern smoking kiln. Offal from the production was turned into silage for animal feed which was introduced

to the Latvian farmers. The environmental results obtained included reduced water consumption, reduced energy & wood consumption for smoking, reduced outlet of smoke to environment & reduced amount of the highly polluted tar water from the smoke generators. 1994-1996.

**Poland, Szkuner, clean/low waste technology within herring filleting** - Establishment of an environmentally compatible Polish fishing industry on economically feasible conditions.



Pictures from before (left) & after introduction of environmental friendly technologies. The major environmental technologies implemented were: dry collection of offal, water saving measures, reduced suspension of proteins in wastewater, micro filtration of wastewater & silage production. The major results achieved were: increased production capacity & filleting yield (5%), reduced water consumption (40%) & reduced environmental load of wastewater (upto 88%), severe energy savings from replacing of fish meal production with silage production & increased earnings from the sale of silage to local farmers. 1991 – 1995.

**Latvia, Auda, clean/low technology** - Establishment of an environmentally compatible Latvian fishing industry on economically feasible conditions. Analysis of the production plant & presentation of possible environmental initiatives to be done & the estimated effects and savings. 1992

**Denmark, food database on clean technology** - Including fish, shellfish, dairy & meat products. .1990-1991.

**For further information please contact:**

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**LarEII** was founded in 2000 by the International Fisheries Consultant Mr Johnny Haupt Larsen having very large experience in assisting the fishing industry. In addition to environmental projects **LarEII** offers comprehensive consulting services within: Sector planning, feasibility studies, layouts, design of processes and processing equipment, technology for exploitation of new species, construction and installation of machinery, start-up production, staff training programmes for managers & operators, rationalisation & economy & quality control systems, international sales & marketing of consumer goods all and exclusively related to the fishery sector.

**ENVIRONMENTAL FRIENDLY AND SUSTAINABLE PRODUCTION**

**CLEAN TECHNOLOGY**

**Assistance to the Food and Fishery Sector**



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