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UNIDO TECHNICAL ASSISTANCE ACTIVITIES IN THE FISHERIES INDUSTRY*

Prepared by
the UNIDO Secretariat

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Introduction

1. In order to better understand UNIDO's activities and their relevance to the development of the fisheries industry in developing countries, it would be useful to review the importance of the support industry, manufacturing various inputs, and the role an organization dealing with industrial development may play in this respect. Other aspects to be touched upon, would be industrial scale operations utilizing (processing), directly or indirectly, raw materials coming from fisheries. Development of the fish processing industry is in many respects closely connected with overall industrialization of developing countries and should not be looked at in isolation. Since other marine based industries, such as salt, various chemicals, oil drilling, etc. are not the subject to be dealt with by this Consultation, no UNIDO activities in these fields are to be mentioned here.

2. In principle, from the industry point of view, there is a considerable difference between small coastal, artisanal (primarily continental shelf) fisheries and large off-shore operations up to the level of factory ships. The larger the operation the more it depends on support industry and industrial inputs.

3. Small, artisanal fisheries are characterized by the following:

- fishing gear is in principle simple, mostly made locally on a non-industrial scale (by hand, using simple tools), but often using materials produced on an industrial scale, such as synthetic fibre (for twine, lines, nets and cordage);
- fishing boats are made of wood, built individually or in small shipyards on a village level, they are equipped with oars, sails and sometimes with outboard engines; their total number in developing countries is considerable (several millions);
- infrastructure requirements are very limited, there is no need for large port facilities with ship repairs, freezing and cold storage plants (except for ice-making in some cases); there are places where a large number of small boats may bring rather large catches for which storage, processing and transport facilities may be required;

- fish is consumed mostly within the coastal area and if it processed, with some exceptions, this is done by simple salting, smoking, sun-drying or making fish sauces, mostly on a non- or semi-industrial scale;

- since handling of small fishing vessels and gears is rather simple, training requirements are limited; fishermen learn their skill within the community through practical fishing and short courses if these are organized, there are no specialized educational institutions.

4. Large scale and off-shore operations, up to the factory ship (mother ship) level, have different requirements:

- fishing gear is in principle large requiring mechanized handling, made practically only from synthetic fibre (purse seines, tuna seines, trawler nets, long-lines, large trap nets, etc.);

- fishing vessels are built and maintained in large shipyards using various industrial inputs coming from metallurgical, engineering, electronic, wood working, petrochemical and other industries providing metal sheets, various engines, electricity generators, pumps, winches, power blocks, fish finders, navigation equipment, radars, insulation materials, etc.; they may have freezing and cold storage facilities, fish processing facilities (for heading, gutting, filleting up to the fish meal and oil production), etc.; to this, one may add crew accommodation facilities with all requirements which are normally needed for a crew staying aboard and away from home for several days up to several months or even a year; shipyards building large fishing vessels are often using their capacities for building other types of vessels as well (cargo ships, navy, research, patrol boats);

- infrastructure requirements for handling large fishing vessels, or a fleet of them at the same time, with their catches which can be in the range of several hundred tonnes or more per vessel, may be considerable; these requirements may include various supplies for vessels and their crew, from fuel, spare parts to water, food, etc., repair facilities as well as facilities for handling the catches, such as receiving (auction) halls, cold storage, transport vehicles (refrigerated and non-refrigerated), etc.;

- since large catches are hardly all consumed fresh locally, with some exceptions in the case of fishing harbours adjacent to large cities, fish processing is considered an integral part of large scale fisheries; fish may be processed partly on board fishing vessels (heading, gutting, filleting, freezing) however, this is mostly done in processing facilities (factories) ashore; fish may be processed into a large variety of products, such as frozen fillets (sticks, fingers; battered and breaded), marinated (pickled) in glass jars, canned in brine, oil and sauces, fish meal and oil, etc.; design, construction and operation of processing plants and its equipment, sometimes quite large, represents by itself a complex subject;

- there is a number of other industrial inputs which are required for the operation of the fish processing industry, such as fuel, packaging materials and packages (tin plate, cartons, glass jars, plastics), testing and quality control equipment and instruments, ancillary materials (salt, oil, spices), etc.;

- training requirements for personnel operating large fishing vessels or processing plants, not to mention other relevant industries and shore facilities (including shipyards) are very diversified and at a much migher level than that which is normally required for small scale operations; this may include mechanical and electrical engineers, deck officers, radio, navigation and radar operators, fisheries and food technologist, refrigeration engineers, boiler operators and many others; some of them have to obtain a recognized diploma, degree, grade or license before they are allowed to take full responsibility in their jobs; some of the skills are obtained in special fisheries and merchant navy educational institutions while the others, in regular secondary schools, trade colleges and universities (or through special courses) which educate (train) people for other sectors of industry as well.

5. Between the levels of operation described above, in a way extreme, there are also various levels in-between. A relatively large portion of the fishery activities in developing countries represent small artisanal fisheries requiring very limited industrial inputs and infrastructure. However, there are also large-scale operations similar to those common in highly

developed fishery nations, sometimes involving foreign companies. Any further expansion of the fisheries industry, including within the new EEZ, for developing countries, will no doubt mean off-shore, medium to large-scale operations. This expansion may be possible only if adequate industrial inputs are provided both for fishing (gears and vessels) and for handling and processing fish catch on board and on land.

UNIDO activities

6. UNIDO, as an industrial development organization, with its mandate to promote and accelerate the industrialization of the developing countries, is not directly involved in the exploration of fisheries resources, fishing, aquaculture or training of fishermen. However, the fisheries industry, particularly large-scale, depends very much on industrial inputs which are manufactured by support industries. The following examples refer to the relevant sectors of activity according to various organizational units of UNIDO:

- metallurgical industries: steel sheets and alloys (for boat building), foundry products for engineering industry, tinplate or aluminium (for cans), etc.;
- engineering industries: shipyards (boat|vessel building), shipyard equipment, engines, electricity generators, various deck equipment (winches, power blocks, hydraulics), navigation and electronic equipment, refrigeration and cold storage equipment, boilers, pumps, fish processing equipment, transport vehicles, maintenance and repair, etc.;
- chemical industries (including petrochemical): synthetic fibre (for fishing nets), plastics, insulation material, protective paints, petrochemical products (fuel, lubricants, solvents, gasses), packaging materials (paper, glass, plastics), tinplate coatings, chemical additives, various resins, etc.;
- agro-based industries: industrial processing of fish (freezing, canning, fish meal and oil, etc.), package design and packaging, testing and quality control of raw materials, semi- and finished products (including ancillary materials and packages), products development, selection of technology and unit operations, utilization

of by-products (e.g. fish oil in margarine production), elaboration of technical parts of techno-economic (investment) feasibility studies, etc.

7. There are also non-technical activities in which UNIDO is involved, from industrial planning (industry as a whole as well as individual sub-sectors) to the preparation of investment feasibility studies, factory establishment and general management, institution building and training. This sequence of activities represents a certain logic which if not followed may lead to wrong investments and low capacity utilization. There are known cases that a large fish processing plant was established but without adequate fishing harbour infrastructure able to handle large fishing vessels, or a plant expected to produce products, for which there was a very limited market interest. Of course, there are also problems which are difficult to predict, such as anchoveta running away from the common fishing grounds creating a lot of difficulties for the fish meal and oil industry established on the basis of an expected regular supply of anchoveta.

8. Taking the above into consideration, it is evident that the development of the fisheries industry, particularly large scale, represents a complex operation which is depending on a number of industrial inputs. They may not all be produced in the country itself, more sophisticated equipment is very often imported even by very advanced countries. Also, some equipment may be used both for fishing vessels and for shore installations, such as refrigeration and freezing equipment, radio communication systems, electricity generators, processing equipment, etc. There are other components which are very specific and in practice can be used only on fishing vessels of specific type, size and method of fishing.

9. Most advances which have been achieved relate primarily to the design, construction and size of fishing vessels, to fish handling and processing techniques (new products development), to the construction of land facilities and utilization of new materials. Fiber-glass and ferro-cement boats, fish finders, underwater TV cameras, pitch propellers, synthetic fibres, new packaging materials, fish de-boning machines, are only some examples. At the same time however, many fishing methods and to some extent fishing gear, have remained traditional. This does not mean of course, that there has been no progress in this field as well.