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COMMITTEE ON FISHERIES
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Agenda Item 7
TRACEABILITY AND LABELLING IN FISH TRADE

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SUGGESTED ACTION BY THE SUB-COMMITTEE

TRACEABILITY, CONCEPT ELEMENTS AND DEFINITIONS

1. Traceability is defined by the International Organization for Standardization (ISO 9000: 2000) as: *“the ability to trace the history, application or location of that which is under consideration. Note 1 When considering product (3.4.2.), traceability can relate to the origin of materials and parts, the processing history, and the distribution and location of the product after delivery”*. The current ISO definition of traceability is considered by a number of experts (e.g. at Codex Committee meetings) as being too broad in scope for use in the specific context of the food chain.

2. Food traceability is an important issue being discussed by different Codex Alimentarius Committees. While the Codex Committee on General Principles (CCGP) is developing a wide definition of food traceability, specific Codex Committees have adopted interim definitions to advance their deliberations on the subject. Thus, the Codex Committee on Food Import and Export Inspection and Certification Systems (CCFICS) describes traceability as *“the ability to identify a food (product identification), how it was changed (if appropriate), where it came from and where it was sent (one step backward and one step forward) (product information) and the linkages between product identification and product information, while also noting that the applicability of these elements will depend on the objectives being pursued by the individual texts”*¹. Access to information (e.g. by competent authorities) is also considered by a number of experts as one of the essential components of a traceability system. The CCFICS distinguishes *“traceability”* and *“product tracing”* in the context of the Proposed Draft Code of Practice for Fish and Fishery Products and the Proposed Draft Standard for Live and Processed Bivalve Molluscs. The CCFICP had agreed to use the term *“product tracing”* in section 3.7 of the draft Code of practice adopted by the Codex Commission. Nevertheless, the final use and definition either of *“traceability”* or *“product tracing”* is pending the outcome of discussions at the CCGP².

3. The EU Commission defines traceability as: *“the possibility to find and follow the trace, throughout all the stages of production, processing and distribution of a foodstuff, feedstuff, an animal destined for food production or a substance destined to be incorporated in foodstuff or feedstuff or with a probability of being used as such”*.³

4. The previous examples point to the fact that an internationally-accepted definition of *“traceability”* (or *“product tracing”*) for food products, and in particular fish and fish products, does not yet exist. The discussions surrounding the definition of traceability are an indication of the difficulties in dealing with this concept, both in theoretical and practical terms. Some of the difficulties in achieving an agreed-upon definition of *“traceability”*⁴ are due to the different contexts, purposes and scopes under which this term is utilized. However, even if an international definition of the term does not exist, there seem to be sufficient elements for a working understanding on which to develop a primary analysis of traceability of fish and fish products, and in particular to build compliance with importing requirements and practical schemes to achieve such compliance.

¹ CCFICS, 11th Session, Adelaide, Australia, 2-6 December 2002, Agenda Item 7, CX/FICS/ 02/11/7 paragraph 7

² It is scheduled that the draft definition will be discussed at the 19th Session of the CCGP (April 2004).

³ Art. 3. Regulation (EU) No 178/ 2002 of the European Parliament and the Council of 28 January 2002.

⁴ It should be noted that when the term *“traceability”* appears in this paper, it also represents *“product tracing”*, much as same or similar concepts are used in other languages (e.g. in Spanish *“trazabilidad”* and *“rastreadabilidad”*). The problem related to the accurate translation of the word *“traceability”* in different languages has been discussed in a number of Codex Committees, and without doubt represents an additional problem, as has occurred with terms like *“hazard”* and *“risk”* in the context of HACCP.

5. Traceability systems are not foreign to the fishery industry. Many fishery industries around the world already have in place systems that in full or in part are related to traceability (e.g. raw material, intermediate and final products stock management, denomination of origin).

6. Traceability cannot increase any safety or intrinsic quality aspect of fish and fishery products. Traceability is therefore not an end in itself but should be taken as a means “to protect the health of consumers and ensure fair practices in the food trade”⁵. All Codex Committee discussions list consumer protection as the primary objective of any traceability system.

SCOPE AND FIELD OF APPLICATION OF TRACEABILITY

7. According to different studies, traceability could be utilized in the food chain with the following scopes:

- Safety (risk management)
- Quality
- Biosecurity
- Business management

8. Traceability as a risk management tool is perhaps the objective most generally accepted to support a possible regulatory system. Two aspects are usually related to this objective; one is the possibility to recall unsafe products once defective units are identified, and the second is post-market monitoring of aspects related to food safety (e.g. storage temperature at retail posts, actual way of consumption). Traceability may also be a key risk management tool in the extreme case of food outbreaks due to hazards not included for some reason in HACCP plans (e.g. as occurred in the EU chicken dioxin crisis), and likely in the case of epidemics transmitted by food (e.g. due to the sudden appearance of particularly virulent strains of pathogenic bacteria). Traceability does not assure the appropriate level of consumer protection *per se* and it is not a stand-alone activity. It is a tool that should be applied within a broader food control system (e.g. already operating under a HACCP and Hygiene – GHP and GMP- system). In this context regulatory traceability could be interpreted as a WTO SPS Agreement measure. This also further explains the difficulties faced in Codex Committees at reaching an agreement on the definition of traceability (the same difficulty for a possible Codex guideline on traceability).

9. Traceability as a quality management tool is a possibility with manifold alternatives. From a regulatory point of view, prevention of fraudulent practices and consumer deception (e.g. inferior quality, weight shortages, misleading packaging, fish species substitution), are perhaps the clearer possibilities to utilize traceability to ensure fair practices in the food and fish trade. From this perspective, and for specific regulatory attributes, traceability could be interpreted as a legitimate WTO TBT Agreement measure. Nutritive and medicinal claims (e.g. ω 3 organic acids) could also within certain regulations be subject to traceability. Within certain regulations traceability could also be utilized to ensure some product claims such as “antibiotic-free aquaculture fish”, “organic production” or “halal”. However, there is less general agreement in these cases on the use of regulatory traceability to ensure consumer confidence. In addition, there are a large number of quality attributes that could be subject to traceability, but most of them would not qualify as legitimate WTO TBT Agreement measures. Regardless of whether traceability could eventually be feasible and convenient from a trade or production point of view, it should in such cases be completely voluntary.

10. Traceability as a biosecurity management tool is a recent possibility not yet fully discussed on an international level. Food and fish can be maliciously tampered or contaminated (e.g. with pathogens or poisons) due to terrorist actions. This possibility is being seriously

⁵ CCFICS, CX/FICS 02/INF.2 (2002).

considered⁶, and food and fish traceability with this purpose is being required under the US Bio-terrorism Act⁷. This situation could be assimilated to the extreme case of food outbreaks (e.g. epidemics). However, the purpose of traceability in this case exceeds that of the normal one, since in addition to the remedial action of the food outbreak and the determination of eventual liabilities, there would be police/military implications. For this reason, traceability for biosecurity purposes exceeds the mere framework of traceability for food safety. Current fish and food inspection services in many countries may not have the competence to legally cover such an additional security aspect⁸.

11. Traceability as a business management system could be very useful to the industry for a number of reasons, among which might be the following:

- Maintain contractual quality
- Maintain – develop commercial partnerships
- Production / distribution / marketing optimization
- Horizontal and vertical industrial integration

A number of techniques that are, or contain elements related to traceability, are generally utilized at industrial level (e.g. FIFO: First In First Out). In particular, systematic stock management (raw and intermediate materials and final products) within an industry is at the basis of traceability. Some traceability systems like TRACEFISH (see para. 22) have introduced the concept of “chain traceability”, i.e. the possibility of tracing a product all along the food/fish chain. A “chain traceability” system requires that a continuous record of all relevant information for tracing be maintained on a central database through the voluntary agreement of all industry and commercial parties involved in the chain. Whereas this type of system *may* eventually be utilized to fulfill regulatory requirements, it would be *independent* of regulatory bodies. Requirements and costs of this system to the single industry exceed those of regulatory traceability, though business management advantages may be realised in some cases. It has been argued that once a traceability system has been implemented it could be used for various purposes. Industry could therefore utilize regulatory (mandatory) traceability to improve internal production management. However, in implementing a traceability system within a plant there would be cost limits dictated, for instance, by the number of attributes (safety and quality) that need to be traced, as well as by the time interval between operational (coded) batches.

TRACEABILITY, REGULATORY REQUIREMENTS

12. Detailed traceability requirements depend on specific regulations. In general, however, main traceability requirements seem to evolve to the general scheme of record-keeping known as “one step forward and one step back” as the primary means of establishing traceability for food safety and other food control.

⁶ See for instance “Terrorist Threats to Food. Guidance for Establishing and Strengthening Prevention and Response Systems” WHO Food Safety Issues Series, 46 p (2002).

⁷ Public Health Security and Bioterrorism Preparedness and Response Act of 2002, commonly known as the Bioterrorism Act.

⁸ The FDA (USA) has been empowered with such additional capabilities, as reflected in the 21 CFR Parts 1 and 20 Registration of Food Facilities Under the Public Health Security and Bioterrorism Preparedness and Response Act of 2002; Interim Rule

Prior Notice of Imported Food Under the Public Health Security and Bioterrorism Preparedness and Response Act of 2002; Interim Rule

Risk Assessment for Food Terrorism and Other Food Safety Concerns; Availability; Notice

Federal Register, Vol. 68, No. 197, Friday, October 10, 2003.

13. Using a hypothetical example that the Inspection Service of a given country finds that a product on the market does not comply with sanitary and hygienic regulations, and since the faulty product poses a serious risk to consumers it is decided to recall the product and all the associated products that may present the same hazard/risk, the basic questions in this example might be:

- Which products?
- How many of the products?
- From where?
- Based on which elements? (documentation; regulatory and scientific information on hazards/risks)
- How can we accomplish this in a quick and systematic way while avoiding panic?

A traceability system should, in principle, enable fish inspection services to provide valid answers to such questions.

14. The “one step forward and one step back” scheme implies the maintenance of purchasing and distribution records, as well as of internal records regarding changes in the raw and intermediate materials and/or final products. The common name “one step forward one step back” is perhaps misleading, because it is actually a three-point scheme, where the central point - that of the processor - is the key point, to assure the *internal* traceability of fish and fish products. Whereas the central point may not receive or give all the traceability information (e.g. HACCP system records), such specific fish safety records should be readily available at that station, as well as in the previous or following stations.

15. These records must be readily available for use by the fish inspection services (competent authorities) when active product tracing is required, particularly for recall and post-marketing monitoring purposes. The complete picture of the chain should be fully- identifiable documentation (paper or electronic) provided to the fish inspection service, thus ensuring that they will be in a position to trace the faulty product back and forward, and recall it if necessary.

16. These records should also be readily available for use by fish inspection services when passive product tracing might be required (e.g. validation and monitoring of the full system). From this point of view the traceability system (and its companion, the recall programme) could be subject to audit and inspection by competent authorities (e.g. in a similar way as to regulatory HACCP audits).

17. The industry may also wish to regularly verify its own traceability system, regardless of regulatory checks, and take corrective actions if necessary. A number of food recalls in developed countries are actually initiated by the industries that have detected a fault in their food control system, including the traceability system. Large food industries have found self-initiated recalls less damaging for the firm than a recall that was due to a finding by consumers or food inspection services. Consumers in general appreciate companies who initiate their own recalls, because it is an indication of care *after* the product has been distributed and eventually sold.

18. Whereas regulations are not explicit on this point, regulatory traceability systems could eventually be utilized as part of a general risk communication framework. Recalls and withdraws are elements belonging to risk communication, but refer to crisis situations. In ordinary situations tested and monitored recall systems should be a further element to assure consumer safety, and could eventually be part of or linked to post-market risk communication.

TRACEABILITY TECHNIQUES

19. From a generally-accepted theoretical point of view, the minimum requirement for traceability is that *each traceable unit* is able to be uniquely labelled to allow identification. If the unit can be univocally identified, then it should be tied to records, documents or other similar units. Whereas this minimum condition for traceability is undoubtedly the basis for current

successful traceability systems, such as in the mechanical and electronic industries, it raises practical and economic problems in the fishery industry. The concept of *each traceable unit* could be initially interpreted as a single fish, single shrimp or lobster or single mussel or oyster. This concept, regardless of its obvious practical difficulties for the fishery industry, is much supported by advocates of applied systems for the traceability of farmed terrestrial food animals where each animal (e.g. cow, sheep or pig) could be tagged for life at birth.

20. Capture fish presents the first practical problem to this minimum requirement. In addition to the obvious fact that it is impossible to tag wild fish at birth, there are a number of aspects which cannot be ascertained; for instance, information on capture area is important, but fish stocks are very often on the move and therefore some possible public health aspects (e.g. parasites or Cd contamination) can only be put within a *possibility* framework. Even proper monitoring of capture zones and/or direct analysis will provide distribution functions with a probability of prevalence and contamination level of each haul (for a specific hazard such as parasites), but not on the *specific traceable unit*. Since it is not practical or logical, for example, to imagine an analysis of each possible safety attribute on each fish captured (among other things because very often analyses are destructive), the concept of “batch” coding is utilized *de facto* in current wild fish traceability systems.

21. Certainly after capture (on board and after landing) each *specific traceable unit* could in principle be either labelled individually or as part of an initial batch, the latter being more common. Whereas tagging of individual wild fish is theoretically possible after capture, and is sometimes done (e.g. in the case of tuna, sole, or large cod), it does not necessarily provide advantageous information in addition to proper initial batch box coding and handling. Once *each traceable unit* is appropriately labelled to allow for univocal identification, the traceability system should provide for the production, storage and recovery of data on the selected attributes chosen for the *specific unit* all along the food chain. It should be borne in mind that until the appropriate labelling of *each traceable unit*, or appropriate “batch” coding⁹, is defined and implemented, the entire traceability system could in practice represent no more than an expensive paper trail.

22. A number of systems have been proposed both in literature and in commerce to this end, from relatively simple paper records to rather sophisticated computer-based and IT (Information Technology) methods. Different projects related to fish traceability were briefly reported on during the 8th Session of the COFI Sub-Committee on Fish Trade¹⁰; in particular the European Commission-funded Concerted Action QLK1-2000-00164 “Traceability of Fish Products” (TRACEFISH), which concluded in 2002 and was mainly centred on the development of an electronic system for traceability of fish. The results of this project have been transferred to EAN International and can be found on their website¹¹. The focus of the TRACEFISH project was “chain traceability”, i.e. what information should accompany the product from one point of the chain to the next, and in particular what data is transmitted and received, and how. Internal traceability is mainly assumed to exist within plants adopting the traceability system. The TRACEFISH project did not deal with the traceability control mechanisms, i.e. the instruments, tools and methods used for authentication and testing which verify that the product received is actually the product indicated on the incoming labels and accompanying documentation.

TRACEABILITY OF AQUACULTURE FISH PRODUCTS

23. Aquaculture presents a situation where, in theory, *each traceable unit* could be labelled and therefore subject to a traceability system from the very beginning. Most of the developments on labelling individual fish, crustaceans, etc. are actually related to aquaculture fish. In addition to

⁹ E.g. including mechanisms to verify when necessary that a given unit (i.e. fish) belongs to a declared batch.

¹⁰ Traceability of Products from Fisheries and Aquaculture COFI: FT/VIII/2002/7.

¹¹ www.ean-int.org

fish safety aspects, traceability is also important in other areas of aquaculture, for instance having the ability to look into the management problem of wild/farmed/escapee fish species. In particular, intensive aquaculture finfish producers have demonstrated considerable interest in the possibilities of traceability beyond those of regulations.

24. A noticeable portion of aquaculture fresh fish sold in Europe (e.g. salmon, trout, sea bream and sea bass) reach consumers already “tagged”. However, solid metallic or plastic tags that consumers find on farmed fish at retail points are normally added to the animal carcass *after* slaughtering. Such tags produce a clear link, for instance of fresh fish sold at a retail point, with the primary producer (e.g. country and/or region of origin). In some cases tags are also presented as a quality assurance seal. Whereas tags usually contain some essential information for tracing (e.g. official number of the establishment, date of slaughter, aquaculture as primary production, commercial name, etc.), they do not necessarily contain all traceability information (e.g. the temperature at which fish has been stored before reaching the consumer), or information referring to the entire life of the animal. Traceability information can be completed with additional information included on the individual package or in the box (in the case of unpacked fish) and on additional documentation (e.g. temperature variation in transport and storage logs). Information on the package or box is usually constituted by labels containing both direct readable information (words and figures) and bar code information. Direct readable information usually completes the regulatory label requirements for the specific type of product, whereas barcode information provides additional traceability and commercial information such as production and handling batch codes and price.

25. The possibility of labelling aquaculture fish *before* slaughtering has been subject to a large number of studies and discussions. Live fish tagging, in particular with external tags (e.g. Carlin, Floy or Petersen tags) have been used for research purposes, however, in addition to the increase in handling in the case of massive aquaculture production, it has been found that external tags give rise to lesions in the fish skin and musculature, thus causing secondary fungal infections and algal attachments in the wounds. When comparing the possible benefits of such a practice in traceability to the additional risks to fish and consumers, it becomes clear that external tags cannot be considered suitable for fish farming purposes.

26. In addition to external tagging, a number of methods have been proposed and tested, including physical tagging (thermal marking – hot or freezing-); chemical tagging (pigment tagging – tattooing-, and chemical marking); internal tagging (VIT – Visible Implant Tags-, VIF – Visible Implant Fluorescent Filaments-, VIE –Visible Implant Fluorescent Elastomers-, CWTs - Coded wire-tags – and electronic tags usually in the form of PIT – Passive integrated transponders-); and biological tagging (natural parasites, genetic markers – DNA profiling-). Such methods have been applied not only to fish but also to molluscs and crustaceans, though at present there is not a single method that could provide satisfactory results in terms of fish mortality, positive recovery of information, practical applicability and costs.

27. Since no individual is identical to another individual except for identical twins, DNA profiling can allow for the distinguishing of families and strains at a statistically significant level, and can also assign individuals to, or exclude them from, a family or strain. Application of DNA profiling depends on the development and maintenance of genetic profile databases and the existence of a sufficient number of genetic systems (e.g. chip-friendly markers such as single nucleotide polymorphisms [SNPs]) available for testing in order to ensure sufficient statistical significance. The inclusion of DNA profiling in regulations has been suggested as a method to check for fish specie identification, one of the basic attributes to trace. Developments can be expected in this specific field.

28. The use of electronic tags in the form of PIT or also as radio-frequency identification devices (RFID) seems to have some advantages over the others. PITs are already utilized to mark and trace brood stocks and therefore also allow for the development of more robust batch coding

in aquaculture¹². While cost continues to be the main limitation, the cost of PITs and radio chips are continuously going down¹³. Both DNA profiling and electronic tags will surely play a role in the near future in the refinement of the “batch” traceability concept (e.g. through labelled brood stocks), as well as a broader role in traceability in general in the medium term. In the meantime, traceability of most aquaculture fish products would continue to be based on the classic “batch” concept.

29. Pressure for improved traceability in aquaculture fish is also linked and related to regulations. Most of the labelling methods for live fish tested have been studied with purposes other than that of traceability for fish safety purposes (e.g. environmental issues, or commercial protection of improved fish strains). Current regulations on aquaculture fish around the world *do not enforce*, for instance, HACCP (Hazard Analysis and Critical Control Point) in farm production, or the application of Good Hygiene and Good Manufacturing (Production) Practices (GHP and GMP) in aquaculture. Fish feed production is almost outside any type of control related to fish as food safety. Therefore, even if an ideal appropriate labelling of each fish could be developed, the “attached” information that could be traced on the records regarding such specific fish would depend largely on the voluntary decision of who has implemented the system, and would not necessarily contain the required information in a given situation.

30. Once fish is converted to human food, regulations are much more explicit and demanding. However, if proper traceability is implemented from that point onwards it does not mean that such “traceability” could account for aspects *before* slaughter. In this sense it would be advisable not to repeat the conceptual mistake existing with HACCP systems which are asked to provide controls for situations that occur in the food chain *before* the portion of the chain where the HACCP system actually applies. In the current regulatory situation it does not seem, for instance, that costly one-by-one fish labelling coupled to a sophisticated IT system could *per se* assure the aquaculture fish consumer.

TRACEABILITY AND LABELLING

31. There is a direct relationship between a traceability system and food labelling. For instance, traceability could be used for product identification (e.g. fish species or origin of the product) that usually is information appearing on labels. Labelling, or parts of it, in addition to other aspects, is an essential part of the risk communication exercise between risk managers (producers and fish inspection services) and consumers. Whereas companies are devoted to building consumer trust in a number of ways including labelling, consumers also want to know, in particular, that any safety claim is being monitored by a government sanitary police/ inspection service.

32. Nevertheless, it is clear that in most cases it is neither feasible nor necessary to provide all possible information related to a traceability system through labelling. Currently, some essential information for traceability should be on the label (e.g. name of the final seller and sanitary code of the producing company), while some additional information should be in accompanying documents (e.g. who transported the food to the retail shop or supermarket) and some information should be recorded at handling and processing stations (e.g. HACCP records at the fish processing plant).

33. Proper labelling of the final product at the end of the food chain is aimed at assuring consumers through the information conveyed on the label or tag; however, traceability systems should generally go *beyond* this labelling information in order to be effective. In some situations

¹² The possibility of following batches originating in identifiable brood stocks is an enormous advance in many aspects including that of fish safety. Clearly identifiable and “clean” brood stocks would mean, for instance, more healthy populations and lowered requirements for veterinary drugs.

¹³ The cost of a commercial RFID (not necessarily directly applicable to fish) is of about US \$ 0.30 each. The New York Times “A Radio Chip in Every Consumer Product”, February 25, 2003.

the same initial batch of fish may be sold under different labels; for instance, as headed and gutted, as filleted, as processed, etc., and also under different fish common names if the product has been caught, processed and sold in different countries. It should therefore be possible to trace the food chain from the defective product *back* to the raw material, and then *forward* to the different types of products in the various locations they might be found, if necessary, even if under different labelling. This requires that some elements of the label or the accompanying documents are permanent and internationally- recognized in order to keep intact information all along the chain; e.g. the name of the fish which should be linked to a universal reference (scientific name).

POSSIBLE LIMITATIONS

34. A number of limitations and questions have been mentioned by different Codex Committees and in the literature regarding practical implementation of traceability. Some of these aspects are cost-benefit, efficiency and effectiveness, practical marking and other technical difficulties (e.g. tagging of fish for traceability purposes), increased record keeping, access to sensible information by 3rd parties (confidentiality), possible liability of traceability services (contracted 3rd parties), liability for components of the chain, eventual use of the traceability system for redressing and the use of equivalent measures (or systems) by exporting countries. Whether or not answers or solutions can be found to these or similar limitations and questions, it could be said that some transitory period can be expected before traceability systems become a truly operative reality.

35. Discussions in relevant Codex Committees have addressed the possible difficulties of developing countries in coping with this new requirement, particularly in terms of technical assistance (to set up proper traceability systems) and training of competent authorities and industry. This would include the development and implementation of the system in itself as well as the drafting of recall plans.

36. There is a need to address all these and similar concerns in order to have efficient and effective traceability systems that would work at both national and international levels, thus avoiding that traceability could become just a paper exercise. At the same time, there is a need for simple and flexible systems for implementation at plant level which could increase consumer protection without becoming more trade-restrictive than what is absolutely necessary in terms of WTO SPS Agreement and legitimate WTO TBT Agreement measures.

SUGGESTED ACTION BY THE SUB-COMMITTEE

37. The Sub-Committee is requested to comment on the experience of individual countries with fish and fish product traceability, with respect to both positive aspects and difficulties encountered. Members are requested to discuss the potential and foreseen impact of traceability on international trade of fish and fish products, and provide guidance to FAO on future actions to be undertaken.