

REGULATORY ALTERNATIVES FOR EUROPEAN UNION MARKET ACCESS

[ALTERNATIVES RÉGLEMENTAIRES POUR L'ACCÈS AU MARCHÉ DE L'UNION EUROPÉENNE]

by/par

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Abstract

Market access to the European Union (EU) has consistently been a problematic issue for non-EU member countries exporting (*or intending to export*) seafood there. The range of problems faced relate to “*how*” official guarantees are offered, as well as “*what*” are the particulars of these required guarantees. This paper presents and discusses two complementary regulatory strategies to confront these difficulties: an initial strategy of swift application, based on an administrative avenue covering only those commercial operators engaged with the EU destined production chain, plus a further more encompassing regulatory model option, based on a business-like environment, and the application of management theory, including the separation of the provider, the purchaser, and policy, regulatory and service delivery functions within government.

Key words: *Seafood, Exports, EU market access, Regulatory models*

Résumé

L'accès au marché de l'Union européenne (UE) a été toujours une question problématique pour les pays membres de l'UE non exportateurs (ou ayant l'intention d'exporter) des produits de la pêche. Les problèmes rencontrés se rapportent au “comment” les garanties officielles sont données, de même que “quels” sont les détails de ces garanties requises. Ce papier présente et discute deux stratégies réglementaires complémentaires pour faire face à ces difficultés: une stratégie initiale d'application rapide, basée sur une allée administrative couvrant seulement ces opérateurs commerciaux engagés dans la chaîne de production destinée à l'UE, et une seconde comprenant une option réglementaire modèle, basée sur un environnement de type business, et l'application d'une théorie de gestion, y compris la séparation du fournisseur, acheteur, et les fonctions de politique, réglementaires et de livraison du gouvernement.

Mots clés: *Produits de la mer, Exportations, Accès au marché de l'UE, Modèles réglementaires*

1. INTRODUCTION

International fish trade has been increasing very rapidly in recent decades. An estimated 45% of the world catch is now traded internationally.

The value of the international fish trade increased from US\$15.5 billion in 1980 to over US\$71 billion in 2004, according to FAO figures².

Developing countries have particularly benefited from this boom, with their net earnings (exports minus imports) increasing from US\$3.4 billion to over US\$20 billion during the same period. This income exceeds the net foreign exchange revenue they earn from any other food commodity, including coffee and tea.

Currently, around 77% of fish consumed worldwide as food is supplied by developing countries.

The EU is the biggest single market for fish and fishery products worldwide, as a consequence of an increased consumption per capita and its enlargement to 27 member states.

Spain, for example, is the world's third largest single importer (US\$5.2 billion), followed by France (US\$4.2 billion), Italy (US\$3.9 billion), Germany (US\$2.8 billion) and the United Kingdom (US\$2.8 billion).

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² <http://www.fao.org/Newsroom/en/news/2006/1000301/index.html>

These figures are particularly important, because all EU Member Countries share the same market access rules for seafood products.

2. THE PROBLEM

Exporting to the EU is not an obligation, and it requires an equal amount of effort by the government authorities and by the private sector.

While listing all that the EU requires to accept seafood from a non-member country would be quite difficult, it is safe to say that the local system corresponds (or is equal) to what is established for the EU Member Countries by Regulations (EC) No 178/2002, (EC) No 882/2004, and (EC) No 854/2004¹.

The EU requires that the *official guarantees* in terms of compliance of seafood exports from a third country² should be given by a *competent authority (CA)* which means the “...*central authority of a State competent for the organization of official control...*”³. This statement has to be read in terms of the *official controls* as required in terms of food safety, production standards and others, as specified for seafood in the relevant EU legislation.

And it emphasizes that...“*The competent authorities for performing official controls should meet a number of operational criteria so as to ensure their impartiality and effectiveness. They should have a sufficient number of suitably qualified and experienced staff and possess adequate facilities and equipment to carry out their duties properly*”⁴...

The CA is required to comply with a lengthy series of requirements, but roughly summarized, the CA needs to assure compliance with three types of obligations:

- **Obligations of resources:** i.e. Instruments of production, Conditions of handling/processing, Hazard Analysis Critical Control Point (HACCP) and Pre-requisite programmes, Traceability, etc.
- **Obligations of results:** i.e. Safety levels of the products (i.e. Histamine, Contaminants, Microbiological levels), etc.
- **Obligations of control:** i.e. Regulatory verification effectively implemented by the CA, data storage and management, administrative procedures, legal support, strict control of product certification, etc.

As the legislation is made for the EU member countries, many developing countries find that compliance with these obligations is expensive, complicated and requires mobilizations of resources that may not be easily available.

3. THE POTENTIAL SOLUTIONS

This is not a “new” problem for those involved in the EU exporting sector; most countries facing market access problems have identified the constraints in their regulatory framework, and have evaluated some suggested changes for “alignment” with the EU law.

Generally, these proposed changes can be sorted in three options, which we could call for the purpose of this paper:

The Colonial

A total reform of the country’s regulatory framework, in order to harmonize it with the EU directives by adopting and transposing the EU legislation.

This is perhaps the most suggested option and while very simple in principle, it does not take into consideration the alternative markets that do not need the same level of controls, hence affecting producers who are not interested in exporting to the EU.

¹ For a detailed publication on the subject see “How to export seafood to the EU”. April 2008. Commissioned by ITC (WTO/UNCTAD) available at <http://www.intracen.org/tdc/Export%20Quality%20Bulletins/EQM84eng.pdf>

² A third country is a *non member* country of the EU.

³ Regulation (EC) No 882/2004 of the European Parliament and of the Council of 29 April 2004 on official controls performed to ensure the verification of compliance with feed and food law, animal health and animal welfare rules. *Article 2. Definitions.*

⁴ Regulation (EC) No 882/2004. 1.(6).

The Long Term

Redevelopment of the regulatory framework harmonizing with the agreed Codex guidelines under the WTO agreements, to which later add on specific market access requirements (such as the EU, US, etc), and then negotiate with the EU the “equivalence” of regulations.

This is a good option worth pursuing, but it again requires time and resources, which normally are scarce. But let us come to this option later on the paper.

There is, however, a further option seldom proposed which will be discussed further in this paper.

The Practical

This option is based on the setting up of a specific administrative avenue under the present regulatory framework of the CA, but only for those interested to be in the production chain destined for exports to the EU. This approach does not require law changes or “restructuring”, and can be swiftly implemented, thus increasing competitiveness as a key condition for trade.

The principle behind this reasoning is that all food producers are required to comply with the present national standards as a legal requirement in the first place. However, as exporting to the EU is a voluntary act on the part of a few operators, the recognized CA can impose (as an administrative measure) additional production and compliance standards, as well as inspection frequency variations, only for those involved in the EU product chain, and so limit the scope of its “EU official assurance capacity” to those able to comply.

The seafood business operators recognize that maintaining registration and certification privileges, as part of the listing of companies allowed to provide raw material or to export directly to the EU, is dependent on regulatory compliance and ongoing performance against standards laid down under the prevalent EU legislation, and controlled by the CA under administrative procedures, in addition to the general national requirements.

If an establishment is not in compliance with the EU requirements, then their EU market access is suspended or removed, as necessary.

Nevertheless, none of the options considers the realities of domestic markets, and the true capacity of monitoring and controlling production with limited governmental resources.

The control plan

The key element for this latest option is the CA’s endorsement (at least at administrative level) of a National Control Plan (NCP), which is defined as a *documented description established by the CA containing all the information on the structure and organization of its official control systems.*

The NCP containing all methods, procedures and regulatory instruments to be used for conformity assessment and regulatory verification, is presented in turn to the EU as the legal binding document that represents the “way” in which the country deals with exports to its market.

While “technically” only EU member countries are obliged to present an NCP, there are provisions in the legislation that contemplate that the control plans are to be proportionate and technically feasible taking into account the specific situation of the third countries and the nature of the products exported. Common sense says that if this is the way they assess the plans of the member countries, it can be assumed that this is how they expect to see the required information.

An NCP should describe the organization and procedures of the CA with regard (for example) to:

- Formal and legal framework of the CA;
- Listing protocol, including, types of lists, listing mechanisms, suspension and reinstatement of certification by the CA, formal delisting, procedure for updating the EU list, exports to other countries from EU listed establishment, separation and identification of non-EU products;

- Certification protocol, preparation of the EU Health Certificate, additional exporter declarations, endorsements, etc., issue of export certificates, numbering of export certificates, date stamping of export certificates, allocation of signatory stamp, certification of imported products, reissue of export certificates, certification of integrity standards, conditions for certifying officers, language considerations, traceability of certificates, internal auditing;
- Rapid alerts and crisis management protocol, organization of the system's rapid alerts, response procedures;
- Follow-up and crisis management, product withdrawal and recall, traceability guidelines;
- Official controls protocol, monitoring plans, regulatory verification, types of regulatory verification, documentary check, full verification for approval, full verification for renewal of the approval, partial verification, random checks;
- "Checklists" for regulatory verification, infrastructure condition, verification of prerequisites and support programmes, documental verification of HACCP, verification of HACCP plan performance, verification of conditions on ice plants, verification of conditions on cold stores, verification of conditions and systems on offshore vessels, verification of conditions for coastal vessels, verification of conditions of landing sites;
- Verification of conditions for transporters, verification of traceability, corrective actions request, follow-up/closing of corrective actions, frequency of verification;
- Specifications clarification and appeals procedures;
- Approval of official testing laboratories; and
- Public reports protocol.

While an NCP that covers all those issues goes a long way in terms of "how" and "what" is to be done by the CA, there are other supportive elements that need to be taken into considerations as well.

CA staffing

It is critical that an NCP is effectively implemented and that verifiers are adequately trained and familiar with the processing and products being verified, even if the verification activities are aimed only at a few companies.

Presently the staffing situation of some CAs does not cover the requirements in terms of knowledge or number of inspectors, particularly as regulatory verification needs to include vessels.

Design and implementation of a certification IT database

The process of certification could be greatly improved by the development and use of a very simple certification database.

Such a tool would offer the immediate status in terms of compliance of any establishment listed in the production chain for EU-destined consignments, thereby strengthening the validity of the certificate as well as the traceability of its contents.

An extra benefit, much appreciated by the industry, is that it would enable immediate certification of consignments to be air freighted.

This would make it possible to have certification officers at the airport at weekends and for dispatches at short notice, as long as those officers had web access to the database.

4. THE REGULATORY MODEL

While the presented "split" system can be very "cost effective" and "fast responsive", it takes care of the food safety issues related to the access of one market (even if it is the biggest) leaving the rest of the markets to a system that may also need to be improved. Nevertheless, the practical option can be used as a model to follow in other sectors under the framework of a better overall regulatory model.

In any case, it should be the aim of any organization responsible for seafood safety to look at long-term "effectiveness", and at the generalization of the domestic and export markets under the best international practices.

Although it has been changing over the last decade, this "effectiveness" has been hindered by the philosophy of "command and control" traditionally placed over regulatory activities, where government officers and inspectors deliver the instructions on *what* is to be achieved and, more often than not, *how* it is to be achieved.

This “command and control” form of governmental intervention has fostered an “*us and them*” mentality where food business operators tend to be automatically regarded as not trustworthy; therefore they need to be “controlled”. In a parallel sense, customers and consumers come to assume that a “licence” or “approval certificate” on the wall of a business means they are “safe”.

Under this form of official controls, enforcement activities have developed into a game of “*catch me if you can*”, where regulators need to prove non-compliance, rather than industry being required to demonstrate compliance.

Moreover, the costs of maintaining the inspectorate necessary to ensure compliance across the whole sector and to find prevent and punish non-compliance also falls on government. Thus, the bigger and more complex a sector becomes, the bigger the control system needs to become and the rules and regulations become bigger and more complex, as every eventuality needs to be catered for. Hardly a sustainable approach in today’s world of ever-changing standards.

Under this model, government regulations tend to become recipe books, standards or instruction manuals without which businesses cannot operate.

Thus, if a business wants to do something different, new or innovative, it needs to get approval or, in many instances, have the regulations or standards changed. This is often a lengthy process and it can take years before any new product, or variation of an existing product, can be legally marketed.

In synthesis, this traditional model of cluttered, fragmented and protectionist regulatory structure has five key disadvantages:

- It limits the power of recognition for a CA as defined by the authorities in market countries;
- It exposes the regulatory bodies to potential legal challenges by producers;
- It increases compliance costs towards industry, diminishing their international competitiveness;
- It affects government efficiency, transparency and credibility; and
- It burdens innovation, a key component of trade success.

An optimal regulatory model (ORM)

As mentioned, under the long-term option an all-encompassing restructuring of the regulatory framework under internationally recognized principles needs to be considered as well, since better official control methodologies can increase competitiveness if they can reduce the cost to industry and government in complying with regulatory measures.

The real challenge of this option is the need for political commitment to achieve the required change in skills, resources, organizations and policy reform.

Under this option, the role of a CA is to be identified as “*the nation’s risk manager*” in respect of the risks related to food in general, more than just giving official assurances to export markets. It needs to be so in two ways:

- By providing a regulatory framework for the management of the risks associated with food safety, pest and disease control, and the welfare of animals; and
- By being accountable for official assurances that food products meet the standards required by domestic law or that of importing countries.

Worldwide, the onus for producing safe food has been shifting to the producer, processor, manufacturer and retailer, while the onus on government is to assure safety, rather than act as the quality controller.

This approach to food safety regulation reduces direct government intervention, and places the responsibility for systems management on industry. As such, it provides greater flexibility and economic control for individual business and allows government to allocate its resources to other development goals.

To further elaborate this concept, we should agree that (in its most general form), there are three key players within any ORM: the regulator, the verifier and the industry operator.

These three participants assume complementary roles and responsibilities which, when combined, enable the Regulatory Model to function as a robust and effective tool to protect and enhance the country's position as a trusted supplier of safe, "fit for purpose" and truthfully-labelled food for domestic and international consumers.

The key roles and responsibilities of the three participants in this type of model can be defined as follows:

The Regulator

- Monitors the overall food safety system for effectiveness and efficiency;
- Develops, negotiates and sets standards (including technical and operational standards for domestic requirements; generic export standards and specific standards relating to bilateral trade access agreements and international standards, such as those set by the Codex Alimentarius Commission);
- Provides official assurances, including export certificates, where these are required as a condition of overseas market access;
- Provides technical and policy inputs to laws and regulations;
- Defines competency criteria for, and approves or recognizes, the verifier. Also approves, recognizes or appoints other essential components in the food safety system, such as laboratories, by using internationally recognized accreditation in assessing conformity with competency criteria;
- Monitors and audits the performance of the verifier;
- May provide advice, and promote or foster initiatives, related to increasing the capability of the verifier. (An example could be the regulator running information or calibration workshops for verifiers);
- Develops resources that may assist the industry operator to develop and to implement risk-based management plans. (Resources can include templates for plans, codes of practice and other guidance material);
- Approves and registers food safety plans or risk-based management programmes adopted by the industry operator;
- Ensures that compliance costs for industry are minimized, by setting standards and other requirements that are commensurate with the risk(s) and robust enough to deliver the appropriate level of control;
- Undertakes compliance, surveillance and enforcement roles to remedy non-compliance issues; and
- Responds to food emergencies and recalls.

The Verifier

The Verifiers' group is made up of individuals or agencies accredited by government to perform specified functions, such as:

- Carry out inspections/audits/analyses and otherwise assess that the requirements set out in standards, specifications, risk-based management and compliance programmes are being met and are still valid;
- Take action under the risk-based management and compliance programmes when legal and/or regulatory requirements are not being met;
- May support authorization for government certification that product is produced in accordance with risk based management plans;
- Reports to the regulator. The verifier has a prime obligation to the regulator;
- Must satisfy competency requirements set by the regulator. It is possible that the regulator may set varying requirements for verifiers working with different risk categories of industry operators or sectors;
- Must also operate independently of industry operators and free from conflicts of interest;
- Wherever possible, verifier services will be provided on a contestable basis. Ideally and in theory, an industry operator would be able to select from a choice of verifiers; and
- If a single entity fulfils the role of both regulator and verifier, it is essential that robust principles and procedures are in place to ensure adequate separation between the regulatory and verification roles.

The Industry Operator

- Industry operators can be defined as those food business operators involved in the value chain of raw materials, products (and sometimes services) destined to be food;
- Has responsibility for developing and/or implementing risk-based management programmes and compliance programmes that meet the requirements of relevant laws, regulations and standards;
- Has input into the selection of methods and processes used to meet regulatory standards;
- Maintains and demonstrates compliance with risk-based management programmes;
- Engages and pays for verifiers;
- Produces food that is safe and fit for domestic and international consumers; and
- Engages in advisory co-participation in the regulatory decision-making process.

Roles and relationships within the ORM

Within the ORM, the government remains in overall control. It retains the right to set the legal framework within which the compliance systems and standards operate. It also retains the right to approve (directly or via the verifiers) the programmes developed by industry to demonstrate their compliance with those standards. Finally, it retains the right to approve or register the independent verifiers or auditors of those programmes.

This government activity also defines the relationships with the other key players in the model.

The independent verifiers or auditors are aligned closer to the regulator than to the various businesses they provide services to. They must be registered or approved by government to undertake their work and the threat of cancellation can be an effective "bonding mechanism". To gain such registration or approval, they must not only be able to demonstrate their technical competence to undertake their work, but they are also bound to remain free of any conflict of interest. They cannot, for example, be the verifier or auditor of a programme that they were commissioned to design.

The independent verifier or auditor may not have any "seizure power" but there should be in-built mechanisms that allow prompt action to be taken to prevent serious risks or hazards going unchecked or being hidden by the unscrupulous operator. Thus, it is the system itself and the legislative requirements, in particular, that give an element of authority to the independent verifier or auditor that an industry self regulated system cannot provide.

The ORM maintains the relationship between consumers and government. The control of the overall regulatory framework by government provides consumers with a baseline assurance that appropriate safety levels are in place through the setting of appropriate outcome specifications or standards.

Consumers, along with other interested parties, are able to participate in the standards-setting process, thus providing a mechanism to increase the acceptability of such standards.

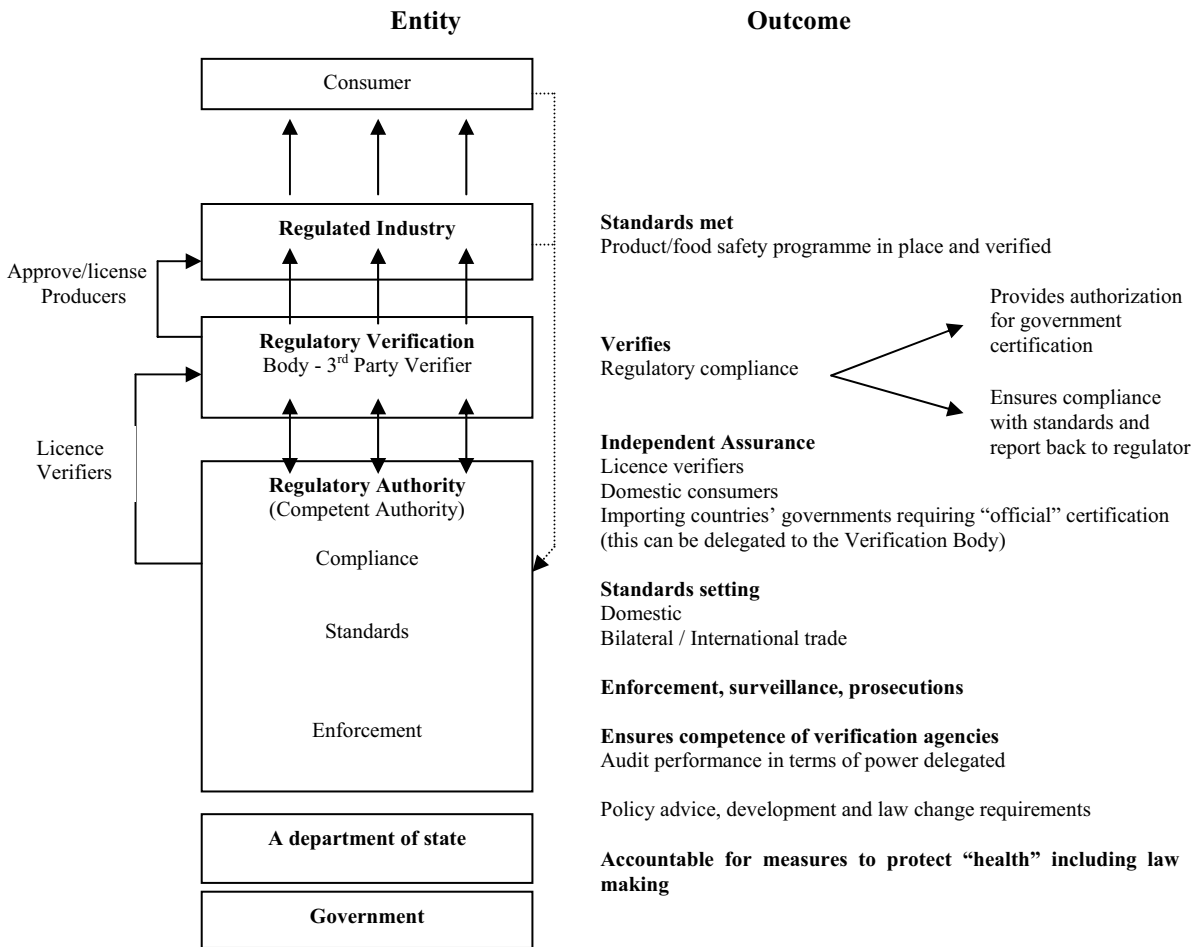
The relationship between industry and consumers continues to be regulated by market forces. However, it is important to note that the market place is not without rules and there are options available to those who believe they have been unfairly dealt with or harmed.

This approach also applies to the way in which the legislative and regulatory framework is set. Standards (or regulations) are no longer detailed prescriptive instructions; rather they are outcome-focused, generic and enabling. For example, in respect of food, the standards for composition and labelling are expected to focus on those aspects necessary to ensure safety, prevent fraud and deception, and allow for consumers to make informed choices in the products they purchase.

The mechanisms used by government and government agencies to arrive at the standards or regulations that will apply to a particular sector encourage industry and consumers to participate in, or contribute to, the development of standards or specifications.

When standards or outcome specifications are set by, or on behalf of, government, judgements about what is an acceptable level of risk will be influenced by the social, economic and political environment as well as the other obligations government has entered into. However, it is also essential that such judgements be based on scientific analysis and the best information available.

The entities, outcomes and interactions in the ORM can be seen in the following figure where solid lines represent regulatory interaction and dotted lines represent consumer and private sector feedback and involvement.



Laboratories

Undoubtedly, in order to effectively implement an official assurances policy, there *must* exist adequate laboratory facilities, including trained personnel, who would perform the necessary product testing to determine if it meets the established standards.

For an analytical result to have "official" validity, it must come from a laboratory accredited to an internationally traceable standard, normally done by means of requesting accreditation against ISO/IEC 17025 in the parameters to be determined.

The accreditation is what allows the CA to "trust" the impartiality and accuracy of the results and, thereby, "approve" the laboratory for its results to be considered "official". As a consequence, the status of "approved" can only be maintained as long as the laboratory hold the accreditation.

These requirements apply equally to government and private laboratories: in fact, private sector laboratories are increasingly becoming more used worldwide for regulatory purposes.

There is a need to improve current analytical testing capabilities in many countries. Besides minimizing duplication of testing activities, government faces the daunting task of finding ways to respond to the complex analytical testing requirements of contaminants.

However, the establishment of laboratories requires considerable capital investment as such laboratories are expensive to maintain and operate. Careful planning is therefore necessary to achieve sustainability of the investment. The number and location of the laboratories should be determined in relation to the objectives of the system and the volume of work that exists and is anticipated.

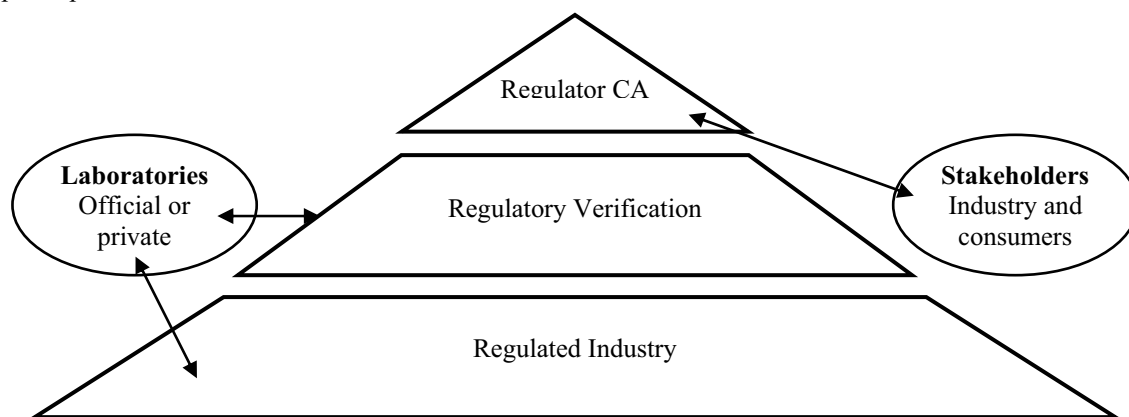
The big picture

To ensure that the full potential of the benefits of the ORM are achieved, it is critical that the various players participate in the system, particularly the standard setting.

Such participation, coupled with the maintenance of transparency of decision making, ensures that all the players feel a sense of ownership and responsibility for the outcomes, both in terms of the standards or regulation set at government level and the “fit for purpose” products produced by the regulated industries.

The government, or more particularly all those agencies and office holders with specific roles or responsibilities in respect of the range of functions undertaken by the government, should make sure that the lines of communication are kept open and that elements of the overall system do not fall into the traps of “client capture” and/or “ivory tower” policy making.

Taking all the players into consideration (regulators, verifiers, industry, laboratories and stakeholders), the overall interactions among them are presented below in a simplified way, in order to strengthen the highly dynamic nature of the model and to show why its best performance requires dialogue and interaction among its participants.



5. CONCLUSIONS

The application of this model is adaptable to the realities of different country scenarios, and can be consistently applied across all sectors of the food industry, regardless of whether products are sold domestically or exported.

It benefits the operations of the food sector by:

Refocusing the role of the regulator: The Model enables the government, as the regulator, to be relieved of the responsibility for delivering inspection services, allowing it instead to focus on managing the overall food safety system, while being more cost-efficient. The Model also enables the regulator to devolve some responsibilities to others and to largely separate its policy and regulatory functions from service delivery.

Giving industry responsibility for food safety: The Model strengthens the capability for industry operators to assume an appropriate level of responsibility for the quality control, safety, suitability and labelling of their products. This is a significant change from the former reliance on government inspection under the old “command and control” regime. This is enhanced substantially when verification frequencies are linked to performance.

Providing clear and transparent delineation of roles: The Model clarifies and makes transparent the roles and accountabilities of each of the participants in the food safety framework. Purchasers and providers of services become distinguishable and independent.

Facilitating the use of HACCP methodologies: Under the Model, standards are outcome-based rather than prescriptive recipe books, and the Model provides for verification systems rather than rely on inspection-based checking. The establishment of a food safety framework compatible with an HACCP-based approach helps to secure the position of a country as a trusted supplier of safe and suitable food on international markets.

6. REFERENCES

This paper draws its contents and philosophy from the author's experience on the subject and from three main publications:

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EVALUATING THE OPPORTUNITIES, CONSTRAINTS AND IMPLICATIONS OF ECO AND ETHICAL FISH LABELLING ON THE OCTOPUS VALUE CHAIN IN SENEGAL

ÉVALUER LES OPPORTUNITÉS, CONTRAINTES ET IMPLICATIONS DE L'ÉTIQUETAGE ÉCO ET ÉTHIQUE DU POISSON SUR LA CHAÎNE DE VALEUR AU SÉNÉGAL

by/par

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Abstract

This paper provides an overview of ongoing work undertaken in Senegal to understand the implications of fisheries certification on the value chain. The paper analyses the opportunities of increasing social and economic benefits for poorer groups and for more gender sensitivity in the eco labelling through the implementation of upgrading strategies addressing equity gaps. It will describe the octopus value chain and give details on how the introduction of certification, such as an ecolabel and ethical fish labelling, may affect the numbers of people in the chain and their ability to capture benefits. Over the past few years there has been a large increase in the interest for eco and fair trade labelled produce, and while very few developing country fisheries have been certified to date there is increasing interest both by the fisheries themselves to gain market access and by international buyers who are keen to protect their reputation on responsible sourcing. While there are a number of potential benefits of certification including a promotion of sustainable fisheries management and increased investment in development, there are also a number of challenges, potential unintended consequences and elements that will not be addressed by certification. Octopus certification is constrained by the limited number of countries exported to and the interest of buyers to produce certified and ethical labelled octopus. This research provides an analysis of the key issues in Senegal related to the proposed octopus certification. It also proposes responses to encourage a pro-poor and gender sensitive approach to certification through supporting upgrading strategies that will be explored within the ongoing project.

Key Words: Value chain, Senegal, Octopus, Certification, Ecolabels, Ethical procurement, Upgrading

Résumé

Ce papier donne une vue d'ensemble du travail en cours entrepris au Sénégal pour comprendre les implications de la certification des pêches sur la chaîne de valeur. Il analyse les opportunités d'augmenter les bénéfices sociaux et économiques des groupes plus pauvres et pour plus sensibilité genre/parité hommes femmes dans l'étiquetage écologique (éco-étiquetage) à travers la mise en place de stratégies d'amélioration comblant les déficits paritaires. Il décrira la chaîne des valeurs de la poulpe et donnera des détails sur la façon dont l'introduction de la certification, par exemple l'étiquetage éco et éthique du poisson, peut affecter de nombreuses personnes dans la chaîne et leurs habilités à tirer les bénéfices. Au cours des dernières années il y a eu une forte augmentation de l'intérêt d'un étiquetage éco et équitable des produits et quoique un nombre réduit de pays en voie de développement aient été certifiés jusqu'à présent, il y a un intérêt accru et de la part des pêcheurs pour accéder aux marchés et de la part des acheteurs internationaux très portés sur la protection de leur réputation d'un approvisionnement responsable. Bien qu'il y ait une quantité d'avantages potentiels de certification y compris la promotion de la gestion durable des pêches et une augmentation des investissements en développement, il y a aussi beaucoup de défis, des conséquences potentielles imprévues et des éléments qui ne seront pas réglés par la certification. La certification des poulpes est limitée par un nombre réduit de pays importateurs et l'intérêt des acheteurs pour la production de poulpes certifiés et étiquetés éthiques. Cette recherche fait une analyse des questions clés au Sénégal en ce qui concerne la certification proposée du poulpe. Elle propose aussi des réponses qui encouragent une approche pro pauvre et genre sensible pour la certification à travers une amélioration des stratégies qui seront explorées/examinées dans le projet en cours.

Mots clés: Chaîne de valeur, Sénégal, Poulpe, Certification, Éco-étiquetage, Approvisionnement éthique, Amélioration

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1. INTRODUCTION

The intention of certification is to use market power and consumer demand as an economic incentive to introduce more sustainable fishery practices – by rewarding good practices through creation of better and more attractive market access and product valorization. This approach, combined with specific focus on value chain promotion, shall be applied and introduced in the Octopus and Cuttlefish Fishery of the Nianing and Pointe Sarrene area of Senegal. Today, the concept of certification is widely acknowledged as a valuable tool to provide market based incentives for fisheries to improve their management towards more sustainable exploitation practices. Since its establishment in 1997, over 20 fisheries have been certified worldwide by the leading and internationally well accepted certification program of the Marine Stewardship Council (MSC).

However, until today, only few fisheries from developing countries have achieved MSC certification.

Despite the importance of fishery products export revenues for many developing countries and the fact that more than 50% of the world's trade volume in fish and fishery products stems from developing countries' fisheries, ecolabelling in developing countries does remain a challenge that needs to be addressed by both policy makers, institutional and governmental bodies as well as the private industry. The increasing market demand for certified sustainable fish and seafood products in attractive consumer markets in the EU and the US may even impose a threat in the form of market exclusion for some commodities. At the same time, this consumer-awareness driven development also offers an opportunity for higher valorization and better product differentiation on increasingly competitive international markets. There may be many reasons why only few developing countries' fisheries have been applying for certification by the MSC so far; the predominant small-scale multi-gear and multispecies fisheries, the general lack of data and organizational structure, lack of fishery management and regulation and insufficient capacity and capability for efficient enforcement, to name only a few of them.

In order to create learning grounds and practical experiences with ecolabelling in developing countries, specific and well suited fisheries should be identified and guided towards achieving certification.

A feasibility study on ecolabelling of small-scale fisheries in Senegal, elaborated by Blueyou and ENDA/REPAO Senegal in June 2007 for GTZ, has identified the main constraints, opportunities and the most appropriate ways to approach ecolabelling in Senegal.

Based on the study's outcome and in the realm of a workshop on MSC - fishery certification in May 2007 in Dakar, the Senegalese fishery stakeholders decided to establish a Steering Committee for Ecolabelling. This newly created body, consisting of governmental representatives, fishery stakeholders, local NGO's and research institutions, has been appointed to coordinate and lead all activities and initiatives of ecolabelling in Senegal. The Senegalese Steering Committee has then identified and selected the Cephalopod Fisheries of *Nianing* and *Pointe Sarrene* as suitable candidate fisheries for ecolabelling and has decided to develop an implementation plan and a proposal for funding in collaboration with Blueyou. This project proposal is based on the experiences and lessons learned in the realm of MSC certification of small-scale and data-deficient fisheries worldwide. It does, therefore, take into account actual consensus and expertise on how to best approach fisheries of developing countries that do exploit resources mainly destined to export markets such as cephalopods. The Cephalopod Fisheries of Nianing and Pointe Sarrène are such candidates. Octopus and Cuttlefish are exploited by small-scale fishermen using traditional means and gear. Following factors and conditions to favour the proposed programme of MSC-certification of the Cephalopod fishery in Nianing and Pointe Sarrene:

- The two fisheries are geographically limited in their operational range. Therefore, a functional organization structure of the fisheries can be established, and a fishery management plan as well as local enforcement procedures can be implemented within a realistic time frame of 3–5 years;
- Cephalopods are highly reproductive species and, therefore, are less prone to over-exploitation of stocks once a meaningful fishery management is being established and enforced; and
- The cephalopod fisheries are entirely destined to high value export markets and therefore offer market incentives for the introduction of better practices not only in the fishery management, but also for food safety and quality procedures.

A proposal has been developed and elaborated by ENDA/REPAO and WWF (WAMER) with the collaboration of BLUEYOU in Senegal for a pilot programme of ecolabelling Octopus in the area of Pointe Sarrene and Nianing.

This proposal has two main components which are critical for the overall success of the programme:

- First, the proposed objectives and activities are defined in such manner that they do adequately address and above all take into account local realities of the stakeholders and targeted interest groups of the Cephalopod fishery in the Nianing and Pointe Sarrene area; and
- Second, the programme is strongly oriented towards creation of market-based incentives to facilitate and support changes in economic responsibilities, dependencies and performance of job for daily subsistence.

The proposed linking of eco-labelling, as a market-based incentive and practical tool to guide producers towards sustainability, with the methodology of value chain promotion along the products' supply chain has been proven successful in a number of other initiatives in other sectors, such as small-scale aquaculture and organic farming.

The basic underlying question is: How to break the vicious circle of vulnerability and dependency of small scale primary producers towards traders and processing companies that are having complete control on pricing and, therefore, do directly exert pressure on natural resource exploitation? Taking into account the needs of smallholders for daily subsistence, such a combination often leads to resource over-exploitation, especially, as in Senegal's case, if there are no fishery management and enforcement procedures in place.

The ecolabelling proposal programme in Senegal intends to use the organizational capacity and cooperation amongst fishermen not only to provide the required framework for implementation of a fishery management but also to combine fishermen's purchasing power to increase the flow of information amongst group members and to eventually create a strong position for negotiating with traders and factories. In addition, the processing factories will be playing a central role in this programme. The local private industry has the financial means and the capacity to directly support and enable the ecolabelling initiative by implementing a new strategy for procurement of raw material from the fishermen.

Sustainability can only be achieved if all actors along the supply chain start to feel and behave as professional business partners, negotiating and communicating transparently the issues at stake and, therefore, taking and sharing responsibilities for the economic, social and environmental issues at stake. The strong market orientation of the project and the strived direct collaboration with European market actors that are taking the issue of joint responsibility seriously, combined with the pragmatic tools of ecolabelling and fair-trade models, shall be the practical framework that offers incentives for a successful implementation of this programme.

Throughout the world, fisheries stand out as natural resources that remain difficult to manage. New approaches to promote and improve sustainability of fisheries include the implementation of market-oriented certification and eco-labelling schemes for fisheries as well as fisheries co-management efforts. Both these approaches are based on stakeholders' active involvement and participation in fisheries management decisions as well as orientation towards the markets and related supply and value chains. The programme does specifically focus on market-based incentives as valuable tools and practical means for providing incentives to adopt changes along the supply chain of production.

The proposed programme, working with smallholder fisheries' communities along the coast in the Nianing and Pointe Sarrene area, will use the concept of value chain promotion in addition and in combination with all activities related to fisheries co-management, ecolabelling and fair trade models to create synergies and to maximize benefits and long term sustainability of the Cephalopod fishery.

Basically, the value chain approach, as an intervention and participatory management tool for shaping single business sectors, as well as local economies, systematically analyses and takes into consideration all steps of a production process, analyses the links, information and product flows, reveals the strengths and weaknesses of each stakeholder along the supply chain, identifies losses of value in the process and provides a methodical framework to increase the valorization of products along the chain, taking into account the requirements and conditions of international markets that define the overall economic environment.

Since chances of small-scale producers for significant economic benefits increase with the number of value chain operators involved, the formation of fishermen into management sectors and the organization of a fishermen cooperative will be essential elements of the programme. Experiences have shown that the degree of horizontal collaboration and bargaining power within the value chain operators is crucial for income increase.

National Senegalese fisheries authorities have identified a range of measures and defined nationwide programmes that specifically address the countries predominant small-scale fishery sector:

- Organization of the small scale fishery into distinct fishery management sectors;
- Registration of all fishermen and vessels being active in the fishery;
- Improvement of fishery regulation enforcement by local fishery surveillance bodies;
- Introduction of fisheries co-management; and
- Improvement of food-safety and quality measures all along the supply chain.

The proposed programme of eco-labelling and value chain promotion of Nianing and Pointe Sarène Cephalopod fishery does offer a valuable framework of guidance and assistance for all local fishery stakeholders and institutions since it does exactly deal with the issues being promoted by the governmental initiatives mentioned above. It does, therefore, not negatively interfere with governmental measures and processes, but positively enhance and support the successful implementation of the stated national programmes by providing practical incentives and rewards to the stakeholders.

In this regard the proposed programme shall be a practical learning ground for improving sustainability of Senegalese fisheries, securing long term food security for local people as well as safeguarding access to international markets for high-value products. The certification of octopus offers a number of benefits, such as (i) priority market access requiring certified products, (ii) improving the management of the resource, and the possibility of producing more in the future; and (iii) support and investment potential of NGOs and donors (and local government).

Approach to value chain study of Senegal's octopus fishery

This paper provides an example of these issues by drawing on a project that is currently being undertaken in Senegal (in the department of Mbour) by ENDA Repao, MRAG Ltd and SFLP-FAO with support from IDRC (International Development Research Centre) and ODI (Overseas Development Institute), working with the octopus export value chain. The objectives of the project are to: (i) support pro-poor and gender sensitive 'upgrading' strategies to improve the value chain; and (ii) support an approach to certification that addresses social and economic issues within the value chain. The first step of this project has been to understand the current value chain, the inequalities within it, and how it can be improved through upgrading as well as the implications of certification. Upgrading refers to improving the value and efficiency of a supply chain and can refer to: (i) vertical upgrading: which means doing better with the same product through negotiations throughout the chain; or (ii) horizontal upgrading where improvements are made at one level e.g. management capacities at the production level. Fisheries certification of the octopus fishery has been put forward recently by an independently conducted review (Ndiaye *et al.*, 2008) which determined that out of all the fisheries in Senegal the octopus fishery had potential given its: (i) orientation towards export; and (ii) relatively simple fishery with a defined production area. There is also potential for Senegal to achieve MSC certification of one of its products through the planned improvements in management of the resource through local fishing committees (Conseils locaux de pêche artisanale, CLPAs). Another review of the World Bank supported fisheries management initiatives (the Girmac project) in four communities along the coast of Senegal (Ndiaye *et al.*, 2008) recommended that all cephalopods (i.e. octopus, squid and cuttlefish) within the department of Mbour should form the unit of certification because of the similarity in: i) the artisanal fleets targeting the stocks; (ii) their zone; and (iii) the supply chain to export. However, there are a number of important questions that arise. For instance, can the octopus fishery be considered sustainable, and can a management area be defined when the stock is targeted by both artisanal and industrial fisheries? Further to this, is there sufficient incentive and demand for an ecolabel for octopus products? It is likely that there will be no price premium for certified octopus and without significant demand from buyers there may not be sufficient short-term incentives for actors in the supply chain to invest in certification. There may be other important ways of upgrading the supply chain that will be more effective in adding value for producers, although these will always need to take into account management of the resource for the long-term sustainability of the industry. This paper focuses on the initial results of the project related to the opportunities and constraints of certification and ecolabels. It will also describe how certain upgrading strategies may be effective in providing more benefits to the poor and vulnerable within supply chains, and which ones of these are compatible or mutually reinforcing with certification.

2. OCTOPUS VALUE CHAIN

The octopus fishery in Senegal is one of the important parts of the artisanal fisheries sector which overall employs around 600,000 people and provides more than US\$17,000,000 export revenue (Dème, 2002). Octopus contributes to these revenues, since 90% is exported. As well as being important for the national economy, fisheries also provide a livelihood of last resort involving established fishing communities but also new entrants who have left agricultural areas following successive droughts. The largely “open-access” of the artisanal fishery as well as fishing agreements signed with foreign fleets (licenses given in return for budget contributions) have been put forward as key reasons for the over-exploitation of Senegal’s coastal resources. The FAO fishery sub-committee for the Eastern Central Atlantic have reported that the status of Octopus and Cuttlefish are critical (FAO, 2005).

Description of the value chain

Octopus production

Production of octopus in Senegal varies from year to year. There were very high quantities of octopus caught in 1999 reaching 37,257 tonnes (seven times higher than during the years 1996–1998) but these quantities have not been seen since. Production declined to 1,795 tonnes in 2001 but reached 8,148 tonnes in 2004, 7,472 in 2005 and 8,814 in 2006 (See Table 1). This is approximately 2.4% of global production. However, there is a discrepancy between declared catches and declared exports, with exports exceeding catches in recent years apart from 2006. Octopus forms 65–75% of the overall cephalopod catch, which also includes squid and cuttlefish.

Table 1: Octopus production and export provided from different data sources

Years	1999	2000	2001	2002	2003	2004	2005	2006
Octopus production (tonnes)	37,257	6,057	1,795	12,796	10,861	8,148	7,472	8,814
Octopus export (tonnes)	32,180	12,567	4,351	14,237	13,010	10,039	8,560	6,030
Commercial value (million FCFA)	no data	no data	no data	19,206	20,377	13,805	9,332	10,504
Euros (million)				29.28	31.06	21.05	14.23	16.01

Source: DPM (Direction des Pêches Maritimes)

This production is relatively small compared to that within other countries of the region such as Mauritania and Morocco. For example, Morocco catches were 20,840 tonnes in 2007 (Josupeit, 2008). Around 25,297 tonnes of octopus are landed in Mauritania per year, although this does not include octopus caught in Mauritanian waters by foreign fleets which may not be landed in-country. Octopus production is concentrated around the regions of Dakar (42%) and Thies (56%). Production takes place all year round, although there is a peak in production during the rainy season from July to October. There are three important ports for octopus landings: Mbour, Joal and Kayar. The value chain described below focuses on the trade surrounding Mbour. This area accounts for around 12–30% of national production depending on the year.

Octopus value chain

A simple view of the value chain involves the fishers, traders and the factories that process and export the product. A more detailed view of the value chain reveals that there are a number of actors at each level (Figure 1). For instance, at the fishery level there is a distinction between boat owners who own the catch and engage in trade; and the boat crew, porters and boat haulers who receive a wage or a proportion of the catch for their work. There is also an important distinction between the artisanal fishers that target octopus and the industrial fishery. Both of these categories of fishers will also target other fish species, including other cephalopods (such as squid and cuttlefish). The artisanal fleet generally fish up to 400m, while the industrial fleet fishes at depths of more than 500m and are restricted by law to fish beyond 12 nautical miles of the coast.

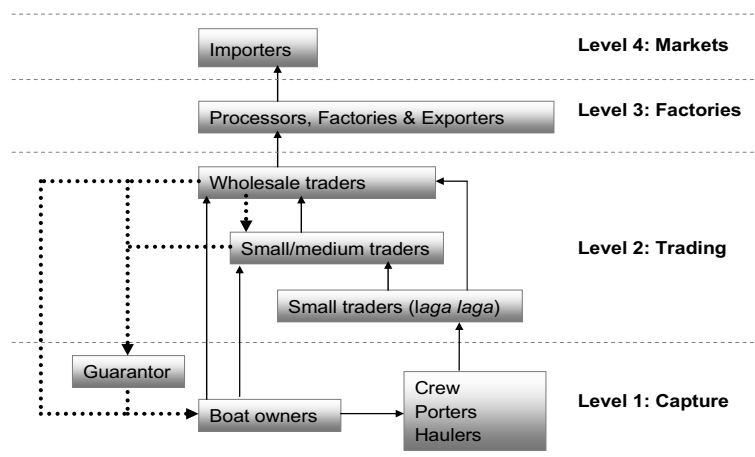


Figure 1. Schematic diagram of the octopus value chain in Senegal

The main export countries are Italy, Spain and Greece in Europe and Japan. Historically Italy has been the main destination and Senegal exported around 3,700 tonnes and 4,200 tonnes here in 2006 and 2007, respectively. Japan has been a regular export market with around 1,800 tonnes exported in 2005 and 1,000 tonnes in 2006. Exports to Spain were around 500 tonnes in both 2006 and 2007 (Table 2) (Josupeit, 2008).

Table 2. Quantities of exports of octopus from Senegal to different countries

Years	1999	2000	2001	2002	2003	2004	2005	2006	2007
Italy	22027.5	7029.5	2639.3	10189.3	8299.0	5855.5	4744.1	3666.5	4200
Japan	1174.8	1216.1	324.7	1787.1	1558.4	1905.2	1776.8	930.8	nd
Spain	5130.4	100.5	769.5	1255.1	1979.9	1447.4	738.6	522.5	500
Greece	1765.8	1539.7	87.0	423.5	711.5	255.9	730.0	336.3	nd
Thailand	664.4	606.6	213.7	133.8	70.3	85.8	116.0	172.5	nd
China	0.0	307.6	0.0	115.9	219.5	299.5	103.9	142.7	nd
Others	1417.5	867.0	316.6	332.1	171.6	190.5	350.1	258.1	nd
Grand Total	32180.4	12566.9	4350.8	12436.6	13010.2	10039.7	8559.6	6029.5	

Source: COMTRADE plus national statistics for 2006, as cited in the GRP 94: The World Octopus Market, 2008. Note: Nd = no data available

The most important factories for octopus include Ikagel (based in Mbour), Africa Fish and Blue Fish (all based in Dakar). There are a number of other factories that deal in a range of different fish species but also deal with octopus. Different factories sell to different markets, for example Ikagel has links to importers in France (Ikagel-France), while Blue Fish sells mainly to the Italian market. Other factories such as Senegal Pêche export to Japan and have Japanese investment.

Between the fishery level and the factories, there are a number of different categories of traders: The wholesale traders (often based in regional centres such as Mbour) often have contracts directly with factories and either buy directly from fishermen (that they often finance at the beginning of the season), other large traders, or from smaller traders either based at the fish landing sites or in town. In addition to the wholesale traders, there are also large traders that will also buy from fishermen and sell on to factories. In some cases traders are employed directly by the factories. Lastly there are the small traders (often women) known as '*laga laga*' that buy small quantities of octopus from fishers or porters and haulers and sell these on to the larger traders. The traders are instrumental in financing the fishing activities, and will often give credit at the beginning of the fishing season and maintain an outstanding credit in order to assure regularity of supply. Often these funds are managed by an independent guarantor (e.g. a retired fisher) who assures that the fisher will honour their agreements to exclusively supply the trader. The distinctions between these different categories and the value chain can often be blurred, for instance, some boat owners also take part in trading if they have the financial means and while it is mainly the larger traders based in the regional centre (Mbour) that have contracts with the factory, some traders based at smaller landing sites (e.g. Pointe Sarene) have also negotiated contracts. The trade in octopus in Senegal is not independent from that taking place in Mauritania and Morocco. In some cases Senegalese factories may buy product from Mauritania to process, or Mauritanian traders may buy in Senegal and process

and export this in Mauritania. The quantities produced in these other two important countries also affect the price on the European and Japanese markets.

Octopus price

The price of octopus in Senegal is partly a function of the supply and demand. While current factory purchase prices are between FCFA 1,000–2,000/kg (€1.5–3/US\$2.4–3.8), the amount paid to fishers dropped to FCFA 100/kg (€0.15/US\$0.2) in 1999 during the explosion of octopus production. However, it is also a function of the size and the final market where it is sold (Table 3). Sizes of 300–500 g per piece fetch around US\$10–12/kg (€6.4–7.7/kg) in the Japanese market, whereas sizes of 2–3 kg are sold for US\$6–8/kg (€3.8–5.1/kg). In Europe (Italy and France) prices are around €8/kg for pieces between 800 g and 2 kg. The type of processing will also affect the price, for example ‘hand-flowered’ octopus where the tentacles are arranged around the body fetch very good prices on the European market.

Table 3. Examples of prices for different sizes on different markets (for 2006)

Country	Size kg/pc	Price/kg	
		US\$	€
Italy	Average	5	3.2
Spain	1–1.5	11	7
	3–4	19	12
Japan	Average	5	3.2
	0.3–0.5	10–12	6.4–7.7
	2–3	7	3.8–5.1
France	0.8–2.0	12.6	8

Source: 2007–2008 from Globefish website Octopus Market Report – June 2008 (Josupeit, 2008), and interviews with importers

In Senegal, the factories have a monopoly over the price because there is no local market for the product and only a few fish exporters trade in octopus. If the factories fix the price at FCFA 1,000/kg, larger traders will buy from the smaller traders for FCFA 900/kg and pay FCFA 800 to the “*laga laga*” who may offer FCFA 750 to the fisherman (Table 4). This practice often causes problems for the traders if the factories change the price they will buy at towards the end of the day after trading at the beach level has already taken place. This situation also illustrates the lack of negotiating power of the traders, which equally translates into the low negotiating power of fishermen.

Table 4. Average price of octopus as it moves along the value chain

	Fishers	Traders	Processors/Export	EU market
FCFA/kg	750	800–900	1,000	-
€/kg	1.1	1.2–1.4	1.5	3–12 (depending on size and market)

Current inequalities within the value chain

There are a number of existing inequalities and social issues within the value chain. One of the key aspects that determine the benefits reaped by producers and the poor in the chain is the ability of the processing and exporting factories to fix the price at which they buy the octopus. As discussed earlier, one of the reasons for this is the lack of competition between exporting companies, but it also reflects the low negotiating capacity of actors lower in the chain which is likely to be related to lack of information on international markets and prices. Access to independent credit is likely to affect the negotiating capacity of fishers, and this is often reported to be difficult given the centralization of credit organizations, the rigid criteria for accessing credit, and lack of flexibility in repayments as well as the modest amounts loaned (Coulibaly, Dème, Diop and Kane, 2003). The fact that exclusively “day caught octopus” is bought also limits the fishermen’s negotiating capacity. Another key concern for the value chain is related to quality issues. The quality of octopus from Senegal and reaching European markets is considered to be relatively high and it is possible for factories to use specific processing techniques to improve the texture of poorer quality produce. However, traders will receive lower prices for poorer quality octopus. In many cases the factories will collect directly from landing sites with their own lorries thereby assuring the quality, but octopus that goes via other routes (e.g. via fishermen to “*laga lags*” to traders and then to factories) has more potential for deterioration. The actors in the value chain that are considered to be the poorest and most vulnerable include the fisher crew, artisanal processors (women), small-scale traders (women), and a large number of migrants. Medium poor groups include fishers that own some fishing equipment, traders that have some means of transport, traders and processors that benefit from family support or credit, and fishers involved in the industrial fishery; while well-off groups include boat owners (owning many

units), traders and processors that have financial support of partners (e.g. factories or foreign exporters) or their own significant fund (Coulibaly, Dème, Diop and Kane, 2003).

3. IMPLICATION OF CERTIFICATION

Opportunities of certification

As discussed above, there are a number of different options for certification schemes. Awareness-building workshops on the MSC scheme have already taken place in Senegal, and recent review reports (BlueYou, ENDA/REPAO and WWF, 2007) have recommended MSC certification. Other options include Friends of the Sea, which at first glance looks like an attractive proposition given its strengths in markets such as Italy and Spain where a high proportion of Senegalese octopus is destined. However, the Friend of the Sea scheme does not have the additional benefits of NGO support (e.g. WWF and Greenpeace) or criteria on fisheries management that ensure sustainability of the stock into the future. While Fair-Fish proved to be an interesting approach when trialled in Southern Senegal, it lacks the market presence of other labels. Naturland may also be an interesting approach in the future although the market is currently focused on Switzerland and Germany where octopus is not consumed in large quantities, and there are still issues related to the draft criteria to iron out. Fairtrade certification, possibly in partnership with MSC, could be an option in the future as it provides for direct benefits to the producers. One of the main benefits of certification is securing market access. However, while this is true for some products such as white fish (where there is a very high demand for certified produce) this is not yet currently the case for Octopus where market access to Spain and Italy is governed more by the quality and price than environmental or social issues. There may, however, be increasing interest in MSC certification of octopus in Japan where the use of MSC is growing in popularity. Current estimates suggest that up to 20% of Japanese fish imports are from fisheries certified under the MSC standard or fisheries currently in assessment. It is still important to bear in mind that octopus imports into Japan have been declining over recent years, which could affect demand for certified product. Price premiums for the product are not guaranteed, although this was achieved briefly under the fair-fish pilot and would be a characteristic of any fairtrade labelling. Another key benefit of certification, such as MSC, is the requirement to have effective or improved fisheries management in place. It is clear that there is a need to improve the management of the octopus fishery, and a potential for improved yields if certain management measures such as biological rest periods and minimum landing sizes were effectively implemented. The strengthening of co-management bodies (i.e. the CLPAs) to achieve effective fisheries management could also have a number of knock-on benefits of a better organization of actors in the value chain. Lastly, it may be possible for Senegal to benefit from investment of donors into the fishery in preparation for certification. There has already been interest from GTZ and the World Bank in strengthening management capacity to support the certification process, but as of July 2008 neither of these programmes has yet been approved.

Constraints of certification

Despite the potential benefits of fisheries certification, there are a number of constraints. One of the key issues is the high cost and time required to improve management and achieve certification. For instance, a proposal to the GTZ to support the certification process estimated a four-year programme costing €682,631 which would in the first two years build up and establish co-management structures and in the second phase implement certification as well as improving the produce valorization along the value chain (BlueYou, ENDA/REPAO and WWF, 2007). The challenge in Senegal is the currently low capacity for management. For instance, co-management structures are not yet fully established and those that have been supported by JICA and Girmac funding have key differences in structure. There are also a number of on-going policy initiatives that need to be coordinated, such as the revision of the Fisheries Code, and the management plan for octopus. Current estimates consider that the octopus is already over-exploited and there would, therefore, need to be a dramatic improvement in management to turn this situation around. The “unit of certification” is also problematic, as both artisanal and industrial fleets target the same stock, and the octopus fishery is spread down a significant proportion of the Senegalese coast. While it is possible to define a unit of certification that only targets a proportion of the overall stock, it is necessary for the status of the overall stock to be sustainable. This allows for only the artisanal fishery (and possibly only specific areas) to be targeted for certification, but means that they will be reliant on responsible fishing practices of those outside of the scheme and over which they may have limited control. This also presents challenges for traceability, where it would be necessary to guarantee that the octopus could be traced back to the artisanal fishery rather than being a produce from industrial vessels or from Mauritania. However, the main economic constraint for certification of the Senegalese octopus is the current lack of interest by European buyers in Italy, Spain and France. While there is some consciousness on the importance of sustainability, buyers in France are not familiar with MSC certification and do not find that customers are asking

for this type of product differentiation. There is similarly a lack of interest in certification among the actors in the value chain within Senegal, unless it can guarantee a price premium. This looks unlikely in the current market, although it could be possible in the future.

Specific social issues associated with certification

The main ‘social impact’ of certification is related to the need to define access rights to the fishery and then restrict access (i.e. issue and enforce permits). Although this is likely to provide benefits into the future increasing value of the resource, improving management and securing livelihoods, there is a short-term social cost where some actors will not receive permits and will be excluded from the fishery. The extent of the social cost will depend on how equitably and transparent the process is. It is obviously a difficult and political process illustrated by the delay already experienced in introducing such a system. It is also clear that certification will not address a number of current inequality issues, such as the ability of factories to fix prices, the low negotiating power of traders with factories and also of fishers with traders, and the lower quality of some octopus that gives producers or traders a lower price. Pro-poor upgrading strategies (where the value of the product is increased throughout the value chain) have the potential to: a) address current inequalities in the chain; b) mitigate social impacts of certification; and c) reinforce environmental or social objectives of certification (Figure 3). Some of these can be addressed at the same time, for instance improving the organization of community groups can promote the negotiation power of producers, give them a greater voice in resource allocations and assist in improved resource management. However, other upgrading strategies may be more orientated towards providing addressing current inequalities or moving towards the objectives of social certification (such as Fairtrade). For example, improving the quality of the product can improve the price paid to producers and traders, and increasing the transparency of the market can prevent factories fixing prices.

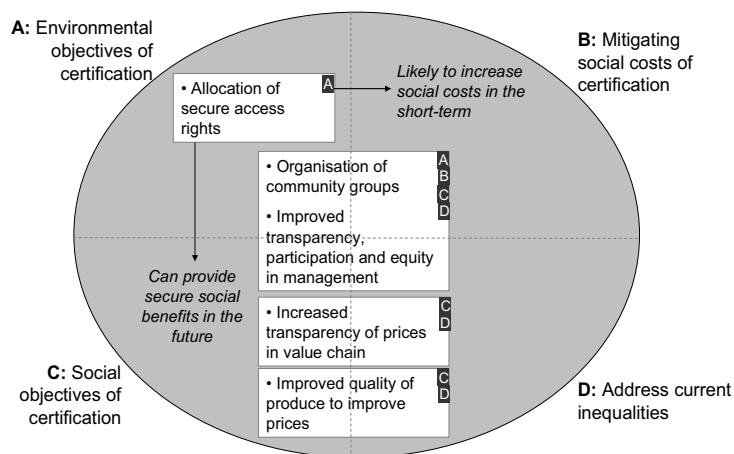


Figure 2. An illustration of upgrading actions and their contributions to different outcomes (A, B, C and D)

4. CONCLUSIONS

Before considering benefits or constraints of certification for developing countries it is necessary to consider whether importing countries are demanding certified product or are likely in the future. If there is limited demand from the market, it is important to consider what the motivations for certification are (and by who) and whether these are likely to be realized. This also includes a consideration of the cost of certification and how it will be covered and by whom in the long term (as most of the certification schemes in developing countries are donor supported during the set up period). It is important to analyse the required functions that need to be taken up by government institutions and to understand if the willingness and commitment is there to sustain the initiative. A value chain analysis is instructive as it allows the implications for different actors (and relations between them) to be assessed, rather than focusing only on the implications of certification on the state of the resource.

In the case of the Senegal octopus export value chain, there is no immediate demand for certified product from importing countries, although this may change in the future. There are also relatively high costs of achieving certification and an effective management regime, which is one of the reasons why donor agencies have been involved in discussions to assist with covering the costs. There are a number of longer-term benefits of achieving environmental certification, including improved management and a more sustainable fishery.

However, in the short-term there may be social costs including the need to reduce access to the fishery and set up a system of permits. Actors in the value chain appear to be more aware of the short-term costs than the long-term benefits, and want to see short-term incentives such as a price premium to make it worth their while. Social certification (such as fairtrade) could deliver such a premium but current developments are moving towards dual certification with an environmental standard to ensure that the stock sustainability is not undermined.

Certification schemes can have a number of benefits, but also constraints and potential social impacts as discussed above. They may also be unable to address all the current inequalities in the value chain but should at least not increase them. For instance, environmental certification would not be able to address value chain issues such as fairness of the pricing system. Social standards (such as Fairtrade) could address pricing issues, but would not be able to address quality issues and may not be able to directly influence the allocation of access rights. It is clear, however, that a combination of social and environmental certification could have the most overall benefits, although there may be additional areas that have to be considered that still fall out of the remit of both, such as the equitable distribution of access rights and potential short-term compensation for those negatively affected. Issues still remain however, such as limiting the burden of certification (which could become more complex with the introduction of social issues) and determining whether certification is in fact the best route for tackling these issues.

Certification can be considered as one type of upgrading strategy, but there are other strategies that can also be used to improve the value chain and provide more benefits to poorer groups. Some of these strategies can be in line with certification requirements, but others, such as quality upgrading and organization capacity of actors, are worthwhile achieving, even without certification, and can be used to address current inequalities and inefficiencies within the chain. Examples have been given here, and through the case study in Senegal selected strategies will be piloted following the full analysis of the value chain.

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**APPROCHE PLATEFORME TECHNOLOGIQUE POST-CAPTURE DU POISSON:
POINT D'ENTRÉE POUR LA RÉOLUTION DES QUESTIONS TECHNOLOGIQUES
ET SOCIOCULTURELLES EN PÊCHE ARTISANALE**

***[POST-HARVEST FISHERIES TECHNOLOGICAL PLATFORM APPROACH:
ENTRY POINT TO ADDRESSING TECHNOLOGICAL AND
SOCIOCULTURAL ISSUES IN ARTISANAL FISHERIES]***

by/par

Oumoulkhairy Ndiaye¹ and Yvette Diei-Ouadi

Résumé

Cette contribution porte sur l'approche "Plateforme technologique" mise en œuvre de 2005 à 2006 le long du lac Tchad et du fleuve Chari Logone en République du Tchad, dans le cadre du Programme de Coopération Technique de la FAO, TCP/CHD/3003 (A) "*Renforcement des capacités nationales en inspection et amélioration de la qualité des produits halieutiques du lac Tchad et du fleuve Chari*".

Une plateforme technologique est avant tout un concept, matérialisé par une aire aménagée et équipée en technologies améliorées post capture. C'est un point d'entrée, un cadre favorisant des échanges, un forum où sont traités tant les obstacles d'ordre technique/technologique post capture que sociaux et économique au développement des communautés de pêche.

L'approche pluridisciplinaire appliquée est spécifique, elle diffère du schéma classique d'acquisition d'équipements techniques où les populations ne sont pas associées et leur environnement socioculturel souvent ignoré lors de la conception de solutions aux problèmes rencontrés dans leurs activités.

La conception et la mise en œuvre de la plateforme varient d'un site d'intervention à l'autre selon le type d'opérations post-capture, les problèmes de technologies, les aspects socioculturels et, les enjeux économiques.

Les bénéficiaires, en majorité des femmes, organisés en groupement d'intérêt économique se sont appropriés la plateforme et ont démontré leurs capacités à assurer la poursuite des activités ainsi que la gestion, la maintenance des installations et des équipements réalisés avec la mise en place d'un organe de gestion.

L'ancrage de l'approche plateforme technologique contribuera significativement à la réduction des pertes post-capture, à l'amélioration de la qualité, au renforcement de la cohésion sociale et à la protection de l'environnement. Par conséquent, cette approche holistique, de par sa pertinence devrait être disséminée dans les autres communautés de pêche en Afrique.

Mots clés: Pêche à petite échelle, Plateforme technologique post-capture du poisson, Qualité

Abstract

This contribution deals with technological platform approach which took place from 2005 to 2006 along Lake Chad and river Chari Logone in the Republic of Chad, within the framework of FAO Technical Cooperation project, TCP/CHD/3003(A) "*Strengthening national capacity in inspection, quality improvement of fish products of Lake Chad and river Chari*".

A technological platform is, above all, a concept materialized in a laid out area and equipped with improved post-harvest technologies. It is an entry point, a framework where exchanges are made, a forum where technological and technical post-harvest as well as socio-economic obstacles to the development of fishing communities are addressed.

The multi-disciplinary approach applied is specific, different from the classic scheme of acquisition of technical equipment in which the population was not involved and their sociocultural environment often ignored in the design of solutions of the problems encountered in their activities.

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The design and implementation of a platform vary from one intervention site to another according to the type of post-harvest operations, technological problems, sociocultural aspects and economic challenges.

The beneficiaries, in great majority women organized in economic interest groups with the establishment of a management body or committee, developed a sense of ownership of the platform and demonstrated their capacity to assure the follow-up, as well as the management and maintenance of the facilities and equipment.

The anchorage of the technological platform approach will contribute significantly to the reduction of post-capture losses, to improve quality, to strengthen social cohesion and to protect the environment. Hence, this holistic approach by virtue of its pertinence should be disseminated in other fishing communities in Africa.

Keywords: *Small-scale fisheries, Post-harvest fisheries technological platform, Quality*

1. INTRODUCTION

L'approche plateforme technologique développée dans le cadre du projet TCP/CHD/3003(A) a été guidée par l'étude sur le profil de pauvreté menée en 2003 par la FAO, dans le cadre des activités du Programme pour des moyens d'existence durables dans la pêche (PMEDP).

L'étude a montré que 80-95% des communautés de pêche du lac Tchad et du fleuve Chari en majorité des femmes, sont frappés par la pauvreté. Des pertes importantes liées à l'insuffisance des connaissances et des moyens appropriés de conservation, de transformation, de transport et de commercialisation sont enregistrées depuis la capture jusqu'au stockage des produits finis.

Aussi une faiblesse voire un manque d'organisation des populations riveraines, la non prise en compte des préoccupations des femmes et leur faible participation dans les activités communautaires ont été notées du fait de barrières socioculturelles.

Les difficultés d'accès et d'approvisionnement en matières premières des groupes défavorisés, la discrimination des sexes et la domination des groupes plus nantis sur le plan socioéconomique constituent des obstacles qui freinent l'élan de solidarité et de développement tant souhaité dans ces communautés.

L'étude a permis également de mettre en évidence des zones potentielles d'intervention pour mener des actions visant à réduire la pauvreté et à améliorer les moyens d'existence des communautés de pêche riveraines du lac Tchad et du Chari.

Cette analyse de la pauvreté a servi à consulter un large éventail d'institutions travaillant avec ou pour ces communautés de pêche dans le but de comprendre les succès et les échecs des tentatives précédentes, les leçons tirées et les meilleures pratiques qui peuvent être adoptées ou améliorées afin de profiter à un grand nombre de personnes.

Les démonstrations ont été menées dans les communautés où le Projet pilote post-capture (PPPC) du PMEDP a préalablement développé les capacités organisationnelles et elles ont permis aux bénéficiaires de comparer les avantages des techniques améliorées par rapport aux techniques traditionnelles, facilitant ainsi l'appropriation des technologies améliorées.

Cette contribution met l'accent sur la conception, la réalisation, le fonctionnement et la spécificité de l'approche plateforme technologique expérimentée au Tchad. L'impact des améliorations technologiques dans le secteur post-capture et les mutations sociologiques notées sont aussi abordés. Les recommandations formulées portent sur les perspectives pour la filière et les actions à mener pour pérenniser les acquis.

2. CONCEPTION ET RÉALISATION DE LA PLATEFORME

La première étape a consisté à sensibiliser, informer et impliquer les autorités locales, administratives et les communautés ciblées.

La seconde étape a porté sur l'identification et la sélection des sites d'intervention devant abriter les plateformes dans les zones potentielles présélectionnées par le projet PMEPD sur la base des données de l'étude du profil de pauvreté.

Le choix des sites d'intervention repose sur les critères suivants:

- disponibilité des ressources (plans d'eau, ressources halieutiques);
- sédentarisation des acteurs;
- accès à l'espace (construction de plateforme de démonstration);
- existence de groupements structurés (reconnaissance juridique, patrimoine du groupement, dynamisme des acteurs);
- approche genre pour plus d'équité dans l'assistance et le renforcement des capacités.

La troisième étape a concerné la construction de la plateforme.

Les réalisations et les constructions sont matérialisées sur des plans de masse et les principes d'aménagement technique et sanitaire ont été respectés.

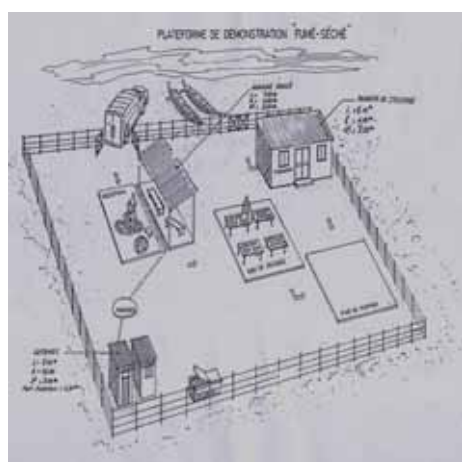


Figure 1. Agencement des opérations de manutention et traitement de poisson sur une plateforme spécifique



Figure 2. Halle de réception de la matière première (poisson frais) lors du débarquement

Pour construire la plateforme, le projet a assuré l'approvisionnement en matériaux de construction. Les bénéficiaires ont contribué en apport en sable, au stockage et à la surveillance des matériaux de construction et à l'hébergement des ouvriers étrangers. Leur participation avec l'instauration d'un système de suivi a permis en permanence d'effectuer les ajustements nécessaires.

Le four banda trouvé sur l'un des sites a été amélioré. Le prototype proposé est construit en briques réfractaires et des chaînages au niveau de la fondation et à la partie supérieure permettent d'augmenter sa durée de vie de 1 an à 10 ans. Les dimensions ont été révisées et la capacité est passée de 50 kg à 200 kg. Les accessoires (portillon, couvercle) inexistants du four traditionnel et la matérialisation des foyers pour le combustible ont permis de réguler les paramètres de fumage (température, densité et vitesse de la fumée, humidité).

Un prototype de claie de séchage démontable horizontale surélevé à 1,50 m du sol avec des supports métalliques a été proposé par rapport aux claies de séchage de fortune à même le sol. Chaque support peut recevoir 4 claies démontables facilement empilables de 1,20 m de longueur, 1,12 m de largeur et de 8 cm la hauteur de la latte. La capacité de la claie est en moyenne 20 kg.

Trois prototypes de conteneurs isothermes ont été confectionnés (Figures 3 et 4). Le conteneur de capacités 1500 kg est utilisé pour le stockage de la glace, celui de 1000 kg pour le glaçage et la conservation du poisson frais et celui de 200 kg pour la conservation du poisson à bord des pirogues ciblées. Ce dernier modèle est aussi utilisé pour l'achat et le transport de la glace.



Figure 3. Conteneurs isothermes de stockage de poisson frais



Figure 4. Intérieur d'un conteneur adéquatement isolé

Après les constructions, la plateforme est équipée en matériel de manutention, de préparation et de traitement, de conditionnement, de stockage du poisson, de tenues vestimentaires et des récipients pour la conservation de l'eau potable. Du matériel et des produits de nettoyage et de désinfection ont été mis à disposition pour l'entretien et l'hygiène des opérations et des équipements.

3. FONCTIONNEMENT DE LA PLATEFORME

Les bénéficiaires (Figure 6) en majorité de femmes et des facilitateurs de l'administration des pêches ont participé aux sessions de formations et de démonstrations en technologie post capture, en gestion et en comptabilité au niveau de la plateforme.



Figure 5. Four amélioré de fumage du poisson issue d'un prototype traditionnel



Figure 6. Des opérateurs post-capture à la fin d'une session de travail, autour du poste de parage du poisson

Afin de permettre une meilleure utilisation des infrastructures, des équipements et du matériel et viabiliser l'exploitation, la gestion des infrastructures et la pérennisation des acquis du projet, un comité de gestion a été mis en place au niveau de la plateforme.

Les membres sont désignés par les adhérents des groupements bénéficiaires. En assemblée générale avec l'appui des agents de l'administration des pêches, les conditions et les critères de gestion de ces infrastructures ont été définis (redevances provenant de l'utilisation des fours, des claies de séchage, des caisses isothermes, du magasin de stockage, de l'aire de prétraitement et du petit matériel, ainsi que de la vente de glace).

L'utilisation de la redevance a été allouée en priorité à :

- l'achat de matériel et de produits de nettoyage et d'entretien des équipements;
- la réparation et la maintenance des équipements;

- la construction ou l'achat éventuel de nouveaux équipements;
- la motivation des membres du comité de gestion.

Les fonds issus de la vente des produits frais et/ou transformés obtenus lors des expérimentations et des démonstrations durant les activités du projet ont permis d'alimenter au départ la caisse du comité de gestion de la plateforme.

Des cotisations sont aussi prévues pour renforcer les moyens financiers de l'organe de gestion. Le montant est arrêté en assemblée générale, notamment en cas de besoin d'un fonds d'investissement lorsque le montant épargné est insuffisant ou encore en cas d'urgence, pour assurer la continuité du fonctionnement des installations et équipements de la plateforme.

4. SPÉCIFICITÉ DE L'APPROCHE PLATEFORME TECHNOLOGIQUE

Le choix des groupements structurés opérationnels et bien organisés par le projet pilote PPC du PMEDP et la participation effective des communautés ciblées ont été déterminants pour la réussite de l'approche.

La méthodologie de proximité du projet avec la traduction en actes concrets des préoccupations des communautés cibles en construisant la plateforme ont permis d'initier une dynamique de développement local autour des activités post-capture.

La plateforme a été une initiative innovatrice pour ces communautés de pêche et a servi de lieu de ralliement des populations, de cadre d'échanges et d'entraide, de forum pour discuter et traiter toutes les questions sans discrimination et de manière holistique. Elle a par conséquent favorisé le renforcement de la cohésion sociale.

L'approche pluridisciplinaire appliquée est particulière, en ce sens qu'elle va au delà des schémas classiques d'assistance technique qui mettent davantage d'accent sur l'acquisition d'équipements techniques.

Le succès enregistré est surtout dû à la participation des bénéficiaires, les efforts d'information et de sensibilisation des agents de vulgarisation du Ministère en charge de la pêche et à l'implication des ONG de développement.

5. CONSTATS

Ponts forts

L'approche mise en œuvre semble avoir répondu aux attentes des communautés de pêche. La plateforme a servi de courroie de transmission des connaissances technologiques et sociologiques et a ainsi facilité l'encadrement et le renforcement des capacités des opérateurs; de nouvelles capacités techniques, managériales et de gestion ont été acquises.

La participation et l'intégration des bénéficiaires, en majorité des femmes, ont été réellement positives et ont permis des changements quantifiables avec cette approche.

L'utilisation des conteneurs isothermes a permis de mettre à la disposition des pêcheurs et des populations une tonne de glace en barre pendant 10 jours et les durées sur l'eau sont passées de quelques heures à 3 jours augmentant du coût la quantité et la qualité des captures. Le poisson frais sous glace est conservé dans le conteneur isotherme pendant une semaine contre un jour dans les caisses traditionnelles en bois. Les pertes sont réduites et le gain peut s'élever à plus de 50%. La caisse de transport a facilité la commercialisation du poisson frais vers les marchés urbains.

Les essais effectués avec le prototype de four type parpaing ont donné des produits avec un lustre très apprécié (Figure 7), une texture ferme, une odeur caractéristique très bonne, un fumage homogène et une cuisson très bonne.



Figure 7. Poissons en cours de fumage dans un four amélioré

Le bénéfice tiré de la vente de ces produits est 2 fois plus important. La durée de fumage est réduite, elle est passée de 24 à 8 heures. La consommation en bois de combustible est passée de 3 à 1 fagot (un fagot pèse 100 kg) pour 300 kg de poisson frais.

Le rendement en moyenne de 40% est plus important que les produits traditionnels souvent calcinés (25%). Sur le plan de la gestion de l'environnement, comparé à la méthode traditionnelle, l'usage du four Parpaing réduit très sensiblement la pollution par la fumée et expose moins les transformateurs à la chaleur et l'inhalation de la fumée.

Le séchage sur claies améliorées (Figures 8 et 9) ayant facilité le drainage des eaux d'exsudation, la durée de séchage se trouve réduite de 48 heures à 10 heures pour les gros poissons et 24 heures à 6 heures pour les petits poissons à une température ambiante de 42 °C. Les conditions d'hygiène et de stockage sont nettement améliorées.



Figure 8. Prototypes de claies de séchage améliorées



Figure 9. Prototypes de claies de séchage améliorées inclinées

Le poisson est à l'abri des contaminants et des prédateurs. Il peut être protégé de l'humidité nocturne et de la pluie en le couvrant avec un matériel imperméable (par exemple une bâche). La qualité du poisson séché est nettement améliorée, la couleur ambrée, sans aucune brûlure par le soleil, la bonne odeur de début de fermentation et la souplesse de la texture font que le produit est très apprécié, plus facile à empiler et se conserve mieux.

Le rendement après séchage est de 20 à 25%. Le bénéfice tiré du séchage amélioré est 2 à 2,5 fois plus important que celui du séchage traditionnel du poisson.

Le partenariat entre les bénéficiaires et ONGs a été d'un apport salutaire pour la pérennisation des actions déjà initiées.

Les médias publics et privés en synergie avec l'équipe IEC (Information, Education et Communication) ont joué un rôle important dans l'information et la sensibilisation des populations sur la spécificité de l'approche et les réalisations concrètes.

Faiblesses

Malgré les impacts positifs notés, il existe néanmoins des aspects qui pourraient limiter considérablement l'engouement que devrait susciter cette approche, parmi lesquels:

- les opérateurs les plus nantis, particulièrement les hommes au sein des communautés qui, en monopolisant la location des infrastructures des plateformes deviennent les utilisateurs exclusifs, au détriment des bénéficiaires réels, surtout les femmes. Ceci pourrait décourager voire pousser à l'abandon les opérateurs les plus pauvres.
- le manque d'équipements adéquats de transport du poisson (notamment camion isotherme, réfrigéré) constitue un handicap pour une continuité de la chaîne de froid;
- Le manque d'équipements de froid sur les marchés destinataires affecte les efforts de préservation du poisson consentis au niveau des plateformes technologiques depuis la capture.

6. CONCLUSIONS ET RECOMMANDATIONS

L'approche plateforme technologique développée au Tchad est salutaire pour les communautés de pêche ciblées. Dans un environnement où les problèmes au développement de la post-capture sont de nature complexe, elle constitue un cadre efficace, sinon un point d'entrée idéal pour aborder de manière holistique les obstacles identifiés dans les communautés de pêche. Elle a contribué au renforcement des capacités des opérateurs organisés, à accroître la compétitivité des produits halieutiques sur les marchés et à poser les conditions de base pour l'amélioration des revenus des producteurs, des transformateurs et des distributeurs.

Les bénéficiaires ont démontré leurs capacités à assurer la poursuite des nouvelles innovations simples introduites ainsi que la gestion et la maintenance des installations et des équipements réalisés.

Dans la perspective d'une meilleure vulgarisation de cette approche dans nos pays, il est recommandé de:

- partager les expériences acquises par les communautés ciblées par le biais de la diffusion d'une documentation appropriée dans les pays ayant des problèmes similaires;
- assurer l'ancrage institutionnel de l'approche plateforme de manière à assurer un impact économique et social visible, s'inscrivant ainsi dans le cadre de la lutte contre l'insécurité alimentaire et la pauvreté;
- fournir un environnement favorable pour les bénéficiaires afin d'éviter le monopole des individus dominants au sein des communautés;
- mettre en réseau tous les groupements concernés à travers un dispositif et des outils de communication/information adaptés;
- assurer la mise en relation des groupements concernés avec une structure d'épargne et de crédit adaptés aux besoins de la filière; et
- améliorer les conditions des marchés au poisson avec l'implication des autorités locales et centrales pour que les efforts fournis au niveau des plateformes soient optimisés.

SITUATION ANALYSIS OF LONG-DISTANCE FRESH FISH DISTRIBUTION ALONG THE COAST OF TANZANIA

[ANALYSE DE LA SITUATION DE LA DISTRIBUTION À LONGUE DISTANCE DU POISSON FRAIS LE LONG DE LA CÔTE TANZANIENNE]

by/par

Yahya I. Mgawe¹

Abstract

The distribution of fresh fish from rural fishing areas to urban centres in Tanzania has increased over the past ten years. This tide has been driven by urbanization, increased preference for fresh fish among local consumers and high price tags on fresh fish compared to traditional cured products. Currently, fishers in remote places are struggling to sell their products in major urban markets, even to those located in distant places.

Long-distance fresh fish distribution, however, faces a host of technical problems. A large proportion of fish, about 5% to 10%, gets to the market already spoiled or in poor quality condition. Consequently, fishers get low prices for their produce and fail to secure greater benefits from the trade.

The situation analysis study conducted along two of the major fish supply chains (Mafia Island to Dar es Salaam and Kilwa to Dar es Salaam) has identified major problems affecting fresh fish trade. It includes delay in handling and distribution of fish, poor supply, use of ice and failure to apply Good Hygienic Practices (GHP). Likewise, the use of poorly designed local fish containers increases the cost of using ice as a result of high melting rate in the tropics and reduces the shelf life of fish.

The study has found that, on average, long-distance fish traders incur about 8% or 250 kg of fish per canoe/trip as physical loss during the South Monsoon (kusi). High losses occur during the North Monsoon period (kaskazi) when about 16% of the fish is found to be of poor quality. This paper outlines technical problems found at each stage along the fresh fish supply chain, with recommendations that could contribute to reducing post-harvest quality loss and waste and, more importantly, the findings could help in setting minimum standards for safety and quality assurance in fresh fish distribution.

Keywords: *Fish trade, losses, fresh fish*

Résumé

La distribution de poisson frais des zones de pêche rurales aux centres urbains en Tanzanie a augmenté au cours des dix dernières années. Ce courant a été provoqué par l'urbanisation, la préférence des consommateurs locaux pour le poisson frais et le prix élevé du poisson frais par rapport aux produits traditionnels transformés. Actuellement les pêcheurs dans les endroits isolés s'efforcent de vendre leurs produits dans les marchés urbains importants, même ceux situés dans les endroits éloignés.

Cependant, la distribution à distance de poisson frais fait face à de nombreux problèmes techniques. Une grande proportion de poisson, environ 5 à 10%, arrive dans le marché déjà altérée ou en mauvais état. Par conséquent, les pêcheurs obtiennent des prix bas pour leurs produits et ne tirent pas de grands profits du commerce.

L'étude sur l'analyse de la situation menée le long de deux chaînes principales d'approvisionnements de poisson (Île de Mafia à Dar es Salaam et Kilwa à Dar es Salaam) a identifié des problèmes majeurs qui affectent le commerce du poisson frais, notamment: le retard dans la manutention et la distribution du poisson, le mauvais approvisionnement, l'emploi de la glace et l'échec d'application des bonnes pratiques d'hygiène (BPH). Également, les conteneurs locaux de poissons mal conçus qui sont utilisés augmentent le coût de l'utilisation de la glace du fait du taux de fonte élevé sous les tropiques et réduisent la durée de la conservation du poisson.

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L'étude a montré que, en moyenne, les commerçants de poisson enregistrent environ 8% ou 250 kg de perte physique de poisson par pirogue/voyage pendant la mousson du sud (kusi). Les pertes élevées se produisent au cours de la période de mousson du nord (kaskazi) quand environ 16% des poissons s'avèrent de qualité inférieure. Ce document décrit les problèmes techniques remontés à chaque étape le long de la chaîne d'approvisionnement de poisson frais, ainsi que les recommandations qui pourraient contribuer à réduire les pertes post-capture de qualité et le gaspillage et, de façon plus importante, les résultats pourraient aider à établir des normes pour l'assurance de la sécurité sanitaire et la qualité dans la distribution du poisson frais.

Mots clés: *Le commerce du poisson, Pertes, Poisson frais*

1. INTRODUCTION

The inshore marine fishery in Tanzania is dominated by small-scale fishery carried out by over 36,000 fishermen using about 7,300 fishing canoes and an assortment of fishing gear and techniques (URT, 2008). The industrial fishery is limited to shallow-water shrimp fishing, engaging about 20 trawlers licensed on an annual basis. Currently, there is a moratorium imposed on inshore shrimp trawling, which has left the area under the exclusive use of small-scale fishers.

Regarding catches, it is estimated that between 60,000–90,000 tonnes of fish are being harvested annually (URT 2007, Jacquet *et al.*, 2008). The catches are consistently dominated in weight and numbers by the small-bodied Leiognathidae, Mullidae, Gerreidae, Nemipteridae and Carangidae in that order. Large fish makes up a relatively small proportion of the total catch.

Fish traders are found in all of the 230 landing sites spreading along the 1,400 km shoreline. Most of them purchase fish from fishermen to sell it within their vicinities or process it before selling to hinterland markets. There are others who take the fish to distant markets where prices are relatively higher. Different means of transport, to include bicycles, transport canoe and trucks, are used in fish distribution, depending on the type of fish and market destination.

Traditional fish processing methods such as smoking, sun drying and salting are still popular in fishing villages and among Tanzanian consumers. The curing methods are predominantly in remote areas located far from urban centres. Generally small-sized sardines (<10 g) locally known as *dagaa* are mostly sun dried whereas most of the table-sized bony fish are hot-smoked or fried. Cartilaginous fish, such as sharks and rays, are traditionally dry-salted to meet consumer preference and to attain longer shelf life.

The local fish processors are well experienced in dealing with their business though they still use inefficient technology and quite often encounter unfavourable weather conditions, especially during the rainy season. Over the past few years, however, consumer preference has shifted from cured to fresh fish. The economics of selling fish in its fresh condition become apparent even when production costs and outputs with traditional processing are taken into consideration.

The change in consumer preference has compelled fish traders to venture into the fresh fish trade. They purchase fish from fishing villages to sell in urban centres especially Dar es Salaam, where the price is relatively higher compared to other fish markets. The initiative is faced with formidable challenges in terms of safety, quality issues and losses.

In view of this situation, it was important to conduct a situation analysis study in order to identify and analyse technical problems occurring throughout the upstream fresh fish supply chain; fishing, handling and transportation stages. Hence, the decision to conduct the study along two major supply chains; the Kilwa – Dar es Salaam chain and the Mafia – Dar es Salaam fresh fish supply chain (Figure 1).

Fishing practice and distribution pattern in the two districts are more or less similar. Generally, there are two modes of collection and transportation of fish from the two places to the Dar es Salaam market. The first option is to fish or purchase fish right at sea, store it with ice in locally-made onboard containers known as *friji*. The same canoe is often used in transporting the fish to Dar es Salaam market by sea.

An alternative method involves landing of fish at a nearby landing site, where fish traders will purchase and store it in locally-insulated boxes known as *koki*. Traders under this category transport their produce by using trucks as in the case of Kilwa or a combination of canoe and truck as in the case of Mafia Island, where one has to board a canoe to the closest mainland small port before taking up a truck to Dar es Salaam.

2. OBJECTIVE

The main objective of the situation analysis study was to identify technical problems that affect fresh fish distribution along the upstream supply chain and interventions that are being made, and to recommend areas for quality and safety improvement, as well as loss reduction intervention.

3. METHODS

The study used different methods to include review of literature, historical data analysis, Semi-Structured Interview, physical observation and inspection by using general check-lists for the upstream control chain. The checklists were filled in at each stage along the chain by a panel of four students from Mbegani Fisheries Development Centre.

The sample group was divided into traders using the sea and those using a combination of sea and road transport. Fish price differential between good and bad quality fish at the Dar es Salaam fish market was used as a yardstick in determining quality loss.

Study areas

Mafia Island is located adjacent to *Rufiji* river mouth (Figure 1), where silts flowing from up-country enrich the food chain and support a good fish stock in the area. This has made Mafia fishery one of the most important inshore marine fisheries in Tanzania in terms of both the Catch Per Unit Effort (CPUE) and size of individual fish landed. It is being estimated that there is more than 5,700 fishermen in Mafia (URT 2008) producing about 300–400 tonnes per month. The fish caught in Mafia is sold within the district and to distant markets especially Dar es Salaam.

On the other hand, the historical district of Kilwa has about 2,300 fishermen (URT 2008). Most of fish in Kilwa is caught by seine nets and gill nets. The fish landing is estimated to range between 100 to 200 tonnes per month (URT 2008). Medium and large-sized fish is sold to fish collectors for the Dar es Salaam market whereas small-sized is barbecued for distribution to land-locked districts.

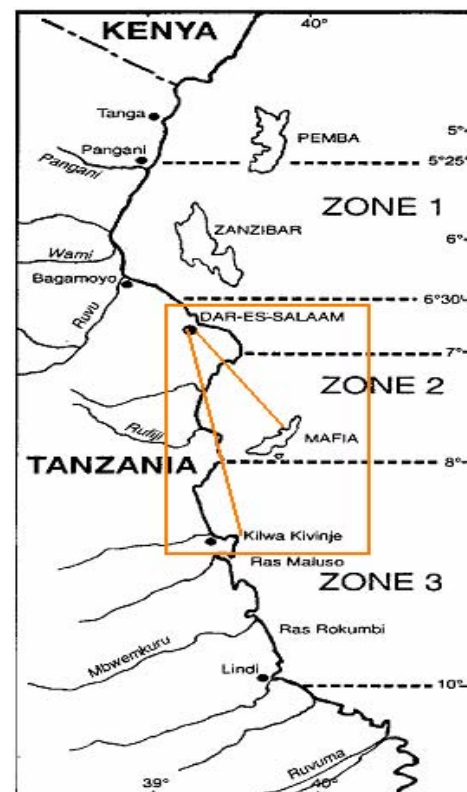


Fig. 1: The study site

Figure 1. The study site

Regarding Dar es Salaam, this is the commercial capital of Tanzania with an estimated population of about four million. The city is the largest consumer market with a very strong preference for fresh fish and it is the most active fresh fish outlet in the country, where over 20,000 tonnes per year are landed by fishing fleets and fish collection boats from nearby and distant coastal districts, such as Mafia and Kilwa located 180 km and 320 km from Dar es Salaam, respectively.

4. RESULT AND DISCUSSION

The distribution channel

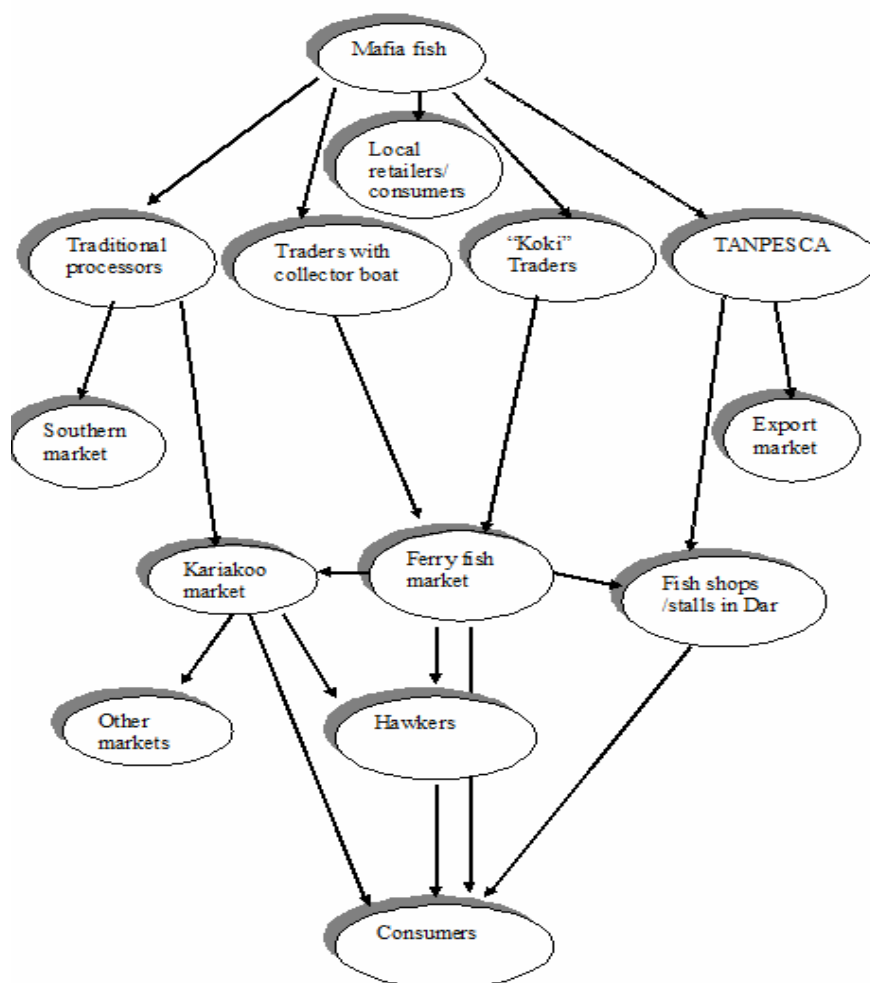


Fig.2 Distribution channel of fish from Mafia fishery

Figure 2. Distribution channel of fish from Mafia fishery

The distribution channel of fish in Mafia (Figure 2) and Kilwa district follows a common pattern whereby low-value fish, especially the anchovy and sardine are processed for the remote markets in landlocked districts, while high-value fish is stored in ice before being transported to urban markets, mainly Dar es Salaam.

Fishing

Fishers in the two districts use a variety of fishing gear which includes purse seines, gill nets, shark nets, scoop nets, traps and lines. The catch is generally composed of various species dominated by: snapper *Lutjanus* spp., (changu), spinefoot *Siganus* spp. (tasi), trevally *Carangoides* spp. (kolekole) and mackerel *Rastrelliger kanagurta* (kibua). Sardines, anchovies, sharks, rays, lobsters and octopus are also being caught.

Regarding post-harvest fish loss during the fishing stage, the results suggest that an average of 5% physical loss occurs when using passive gear, such as gill nets, due to the prolonged setting time of up to ten hours. However, the losses are less than 2% when using active gear, such as surrounding nets, because the setting and hauling operation takes less than one hour. There is almost no loss at this stage for those using traps, locally known as *malema*, because the fish remains alive up to the time of hauling.

Table 1 shows that the use of dirty fishing gear, failure to separate fish from potential onboard contaminants and low-level personal hygiene are the major safety and quality problems that could be the source of microbial contamination and Post-Harvest Fish Loss (PHFL) at the fishing stage.

Table 1. Sanitary conditions related to the fishing operations

Elements to verify	Yes	None	Comments
Fishing gear easy to clean Well maintained		V	Fishing gear are seldom cleaned
Are fish isolated from products/objects that might contaminate or damage them?		V	The boats are small to have effective separation
Are the fish protected from the sun?	V		60% kept in containers
Has the fish been iced at sea	V		No problem for fish iced at sea
Are the fish stored in an insulated hold?	V		Locally insulated containers
Are the fish iced?	V		Though not adequately
Crew health and hygiene monitored Medical checks practiced Adequate personal hygiene		V	Low level of personal hygiene

Holding onboard

Handling and storage of fish onboard fishing canoes is done by crew members. Those with insulated containers apply ice at sea, which enables them to continue fishing for a number of days, maximizing fishing efficiency. The time taken to collect fish depends on whether it is a lean or peak season. It takes more days, up to 10, to fill in the 3–tonne container (Figure 3) during the lean season whereas it could take 6–8 days during the peak season between November and March. In addition, traders need 1–2 days to get to the market by using 40 HP motorized canoes. The handling practice on board the canoe has a number of weaknesses as outlined below (Table 2).

Table 2. Sanitary conditions related to the construction of containers and hygienic handling of fish

Elements to verify	Yes	None	Comments
Fish gutted, washed and cooled immediately		V	No gutting is done
Protection of products (from sun and contaminants) Fish boxes adapted (insulated, easy to clean) clean, in good condition with drainage.		V	Only a few meet the minimum requirement
Rapid and hygienic fish landing (not more than 8hrs) Allowing drainage of melted water		V	No drainage system
Hygiene maintenance Boat cleaning after landing Fish boxed, cleaned after each use Fish boxes used for landing clean		V	Very partial cleaning
Oil and fuel kept separate		V	Poorly separated
Crew health and hygiene monitored Medical checks practiced Adequate personal hygiene		V	Low level of personal hygiene
Quantity of ice utilized is sufficient for the journey		V	Less than 1:1 ratio
Ice made of potable water?		V	Questionable
Ice handled hygienically		V	Not much
Ice stored in a container that protects it from external contamination?	V		Most of the time closed
Container in which fish are stored clean and lined with material that is durable, waterproof and easy to clean?		V	Hardly the case
Fish handled carefully to avoid damage?	V		Reasonable care is taken
Fish handlers clean and wearing clean clothing?		V	Poor personal hygiene
All surfaces and equipment that fish come into contact with are cleaned with potable water or clean seawater?		V	Cleaning is done using unclean sea water
Equipment used to land fish made of material that is easy to clean and in a good state of repair and cleanliness?		V	

Storage ashore

Fishermen fishing without insulated on-board containers land their daily catch in designated landing sites, where Dar es Salaam fish traders have established makeshift camps. These traders will purchase fish and store it in fish boxes locally known as “*koki*”. A *koki* is a locally insulated fish box with a capacity for carrying about

200–300 kg (Figure 4) of fish. They are made in such a way that insulation is only applied to the main body or the base. Otherwise, the boxes are covered by polyethylene sheeting on top to allow for flexibility in over-filling the koki for the sake of reducing transport costs charged per koki.



Figure 3. On board container “friji”



Figure 4. Fish box for storage at shore “koki”

Although it was not quantified, there is every reason to believe that failure to use insulated covers is costing the traders a lot in terms of the increased cost of ice led by a high ice melting rate and rapid fish spoilage.

In addition, failure to observe basic principles of Good Hygienic Practice (GHP), delays in sales negotiation and poor design of most of the fish boxes allow for massive microbiological contamination. It all results in accelerated spoilage and increased quality loss. In view of this situation, one would not be wrong to suggest that effective training of fishers in fish handling, including proper application of ice, seems to be an ideal intervention to reduce the loss and increase the income of stakeholders. Likewise, it is important to promote the use of properly designed and constructed containers for both on board and onshore storage, such as the ones being used in areas where traders have been successful (Figures 5 and 6).

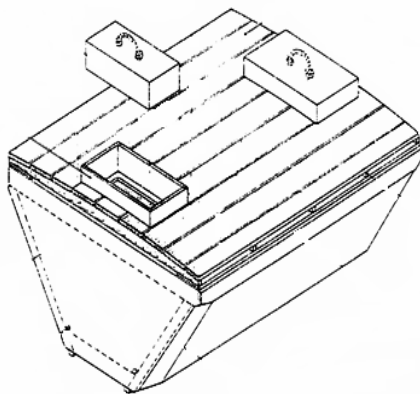


Figure 5. Sketch of Senegalese onboard insulated container

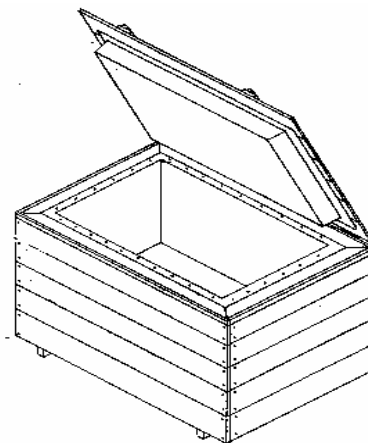


Figure 6. Sketch for an ideal design for storage and transportation

Transportation

There are two strategies that are used in the transportation of fish from Kilwa and Mafia to Dar es Salaam market. One option is to purchase the fish right at sea, and store it with ice in locally-made insulated containers placed on board a collection boat. After collecting about 3 tonnes of fish, an exercise which can take up to 10 days, the fish is taken to Dar es Salaam by using transport canoes. The other option is to land the fish on shore, where traders will purchase and store it in *koki*. After 3–4 days the fish is taken to Dar es Salaam Integrated Fish Market Complex (DIFMC), first by a transport canoe to small ports on the mainland especially Nyamisati or Kisiju. A fish trader may spend a day at the transit point before boarding a truck to the final destination in Dar es Salaam.

Keeping the fish for prolonged time causes quality degradation, which lowers the price at the market. Again, sea transport takes longer compared to road transport. The delay causes quality loss, especially when weather conditions are not favourable.

The use of old trucks in transporting fish has its own problems including poor sanitary conditions and frequent mechanical breakdowns. As a matter of fact, there is a very clear contrast between the quality of trucks used in transporting fish for export in Lake Victoria area and those used along the coast for the domestic market (Figures 7 and 8). Nevertheless the use of trucks is considered to be a quicker option compared to the sea option given the improved condition of roads.



Figure 7. A typical fish truck on Lake Victoria Export fishery



Figure 8. A typical fish truck carrying koki along the coast

The general situation regarding the transportation aspect (Table 3) suggests that there is an urgent need for improvement to bring up the practice to a minimum standard required for ensuring safety and quality of fresh fish supplied for the domestic market.

Table 3. Road transport sanitary conditions related to the construction and hygienic operation

Elements to verify	Yes	None	Comments
Fish container, box or lorry closed: Easy to clean Hygienic and adapted to the purpose Clean and well maintained, with drainage Space for the ice sufficient		V	Trucks being used are open, not meant for transporting fish
For refrigerated trucks Temperature under regime below -18 °C Recorded and readable temperature (from outside)		V	Not applicable
Loading / unloading Quick and hygienic Fish contained in cases of proper material		V	The operation is slow
Hygiene control Cleaning of lorry after and before use Vehicle periodically subject to general cleaning		V	General cleaning, not thorough as required by sanitary standards in handling fish
Oil and fuel kept separate	V		Certain degree of separation
Health and hygiene of crew monitored Medical checks up to date General hygiene adequate		V	No such initiative
Temperature under control Lorry temperature Product temperature		V	Not much of the control

The situation at DIFMC

Unloading of fish at DIFMC is done by experienced labourers who are paid in relation to the amount of fish handled per man. However, their level of personal hygiene is low, which could be a source of contamination.

Likewise, they use highly contaminated beach water for washing fish, which increases microbial contamination and spoilage. The same applies to the habit of throwing fish on dirty ground and the slow auctioning process.

Experienced buyers at the DIFMC determine the quality of fish by using organoleptic or sensory assessment. They look at the skin of fish (whether it is shiny) to indicate freshness or not. The sunken eyes will surely suggest that the fish has deteriorated. Sometimes they open the operculum to check whether the fish has heavy mucus on its gills, a sign of bad quality fish. The off-odour as opposed to seaweed smell will tell with certainty that the fish has spoiled.

These factors determine the price of fish that buyers would pay *ceterus paribus* (assuming other things are equal). Physical observation and weight measurement taken at DIFMC suggest that, using the same yardstick, the long-distance traders incur about 8% or 250 kg of fish as physical loss per canoe/trip during the South Monsoon (kusi). Higher losses occur during the North Monsoon period (kaskazi), when about 16% of the fish is discarded. On the other hand, losses are relatively lower, 3–4%, for those using koki.

Getting to DIFMC at odd hours, say in the evening, is another problem causing losses to traders since the market itself is lacking in many facets (Table 4).

Table 4. Landing site sanitary conditions related to the construction and hygienic operation

Elements to verify	Yes	None	Comments
Contamination of fish must be avoided		V	Lack of awareness prevails
Operations should proceed rapidly		V	Very slow process
Fish should be placed in a protected, temperature controlled environment as soon as possible		V	Process takes place slowly in the open
Equipment and handling practices that damage the fish should not be used	V		Mostly use edgeless baskets
Fish should not be placed on the ground or auction room floor		V	Fish is placed on the ground and on floor during auctioning
Auction hall should be covered and have walls that are easy to clean	V		Walls have tiles but cleaning is inadequate
Floor should be raised above ground level, waterproof, easy to clean and facilitate drainage of water	V		The auctioning floor is raised
Landing site should have a hygienic waste-water system		V	Not adequate
Sanitary facilities with adequate flushing toilets and wash basins should be provided		V	Not adequate
Premises should not be used for other purposes		V	Several other activities are carried out potential for cross contamination
Undesirable animals must not be admitted		V	No such protection
Premises should be regularly cleaned, at least after each sale, with potable water or clean seawater	V		Premises not cleaned thoroughly
Signs prohibiting smoking, spitting, eating and drinking must be displayed in areas where fish is handled		V	No such signs are available
Premises should have adequate water supplies		V	No adequate water supply
Water-tight containers made of corrosion resistant materials should be available for storage of fish that is unfit for human consumption		V	Not available
After landing or first sale, fish should be transported without delay to their destination		V	They use public transport system, which is not efficient
Where it is not possible to promptly transport fish they should be stored in chill rooms that approach the temperature of melting ice		V	Very limited cooling facilities and storage
Ice available produced on the spot Storage condition/containers		V	Ice supply at DIFMC is inadequate

Based on the results presented in Table 4, there are reasons to believe that failure to adhere to GHP at the market increases blowfly infestation, microbial contamination and generates high loss of quality and physical fish. These weaknesses have to be addressed in order to secure greater benefits from the fresh fish trade.

5. CONCLUSIONS AND RECOMMENDATIONS

The long-distance fresh fish trade has a potential for increasing benefits to operators. However, there is an urgent need for technical intervention especially in terms of Good Hygienic Practice and introduction of properly designed local insulated containers. Again, there is a need to put in place minimum safety and quality standards to improve the practice throughout the upstream supply chain.

Regarding the two types of containers used in the transportation of fish, *friji* and *koki*, it seems the later offers an ideal solution compared to the former. Its small size makes it possible to reduce the number of collection days compared to the *friji*. Again, road transportation is relatively cheap and quicker. It is cheaper to buy a *koki* and more important easier to assign a few fishers to send the combined cargo to the market, reducing the opportunity costs. Also, with *Koki* traders could expand their business and secure greater benefits by capturing the fish-stalls market, which is expanding very fast in major towns.

Fish supply at DIFMC is greater than demand during the dark-moon period of the month. At this time the market-force losses become more pronounced. One option could be to expand the distribution of fish to the growing regional market. However, such intervention requires increased government effort in harmonizing the trade.

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**TRADING THE SHRIMP TRAWLING BYCATCH IN THE CENTRAL GULF OF GUINEA:
A DILEMMA FOR ITS NEGATIVE/POSITIVE IMPACT**

**[VENDRE LES CAPTURES ACCESSOIRES DES CHALUTIERS CREVETTIERS DANS LE GOLFE DE
GUINÉE CENTRE: UN DILEMME POUR SON IMPACT NÉGATIF/POSITIF]**

by/par

Oumarou Njifonjou¹

Abstract

The study characterizes the trade of bycatch in shrimp fisheries in Cameroon and Nigeria in the context of the FAO-REBYC project. Following the introduction of the Bycatch Reduction Device (BRD) and the Turtle Excluder Device (TED) in Cameroon, sea trips undertaken on board commercial vessels to test and demonstrate the different devices show a ratio of shrimp to bycatch of 1:24. Samples of the discarded component of the catch present five components: marine debris (21%), hairtails (16%), crabs (13%), shad (8%) and juveniles of many species (42%). In Cameroon and Nigeria nearly all the bycatch species are retained, transferred to shore and sold. In a recent study carried out in Dockyard Limbe, one of the big bycatch landing site in Cameroon, 231 persons are involved to this transfer using 2 categories of boat collectors, big and small ones. A group of 70 wholesalers, mainly women, also operate in a situation of monopoly. An average monthly landing of 2,056 bags per big boat and 681 bags per small boat are given, for a total annual bycatch landings of around 9,350 tonnes, from all the 35 active boats, sold fresh or smoked and distributed to the main markets. Considering the production of two other big Jabru landing sites in Douala and Kribi and that of many other small ones along the coast, one can estimate the total bycatch produced in Cameroon to be around 20,000 tonnes. The study analyses the food security dilemma and prescribes the general use of BRDs but each country in its own way. The official legalization and regulation of bycatch trade, as well as the organization of the business, are highly recommended.

Key words: Trading, Cameroon and Nigeria, Bycatch, REBYC project, Shrimp trawling, Food security

Résumé

L'étude caractérise le commerce des captures accessoires de la pêche crevettière au Cameroun et au Nigeria, dans le contexte du projet FAO-REBYC. Les sorties en mer à bord des bateaux de pêche pour tester et faire une démonstration du Dispositif de réduction des prises accessoires (BRD) et du Dispositif d'exclusion des tortues (TED) après l'introduction de ces différents dispositifs au Cameroun, montrent une proportion crevettes-captures accessoires de 1:24. Les échantillons prélevés des rejets des captures présentent quatre composantes: les débris marins (21%), les hairtails (16%), les crabes (13%), les requins (8%) et les juvéniles de plusieurs espèces de poissons (42%). Au Cameroun et au Nigeria, presque toutes les captures accessoires sont retenues à bord, débarquées puis vendues. Dans une étude menée récemment à Dockyard Limbe, un des grands centres de débarquement des captures accessoires au Cameroun, il ressort que 231 personnes sont impliquées dans ces transferts avec l'aide de deux types de bateaux collecteurs, grands et petits. Un groupe de 70 grossistes dominés par les femmes, opèrent également dans ce secteur en situation de monopole. Les grands bateaux débarquent en moyenne par mois 2.056 sacs de poissons par bateau et les petits 681 sacs par bateau, ce qui donne pour les 35 bateaux en activité, un débarquement total annuel de près de 9.350 tonnes de captures accessoires, vendues à l'état frais ou fumé dans les principaux marchés. En prenant en compte la production de deux autres centres importants de débarquement de Jabru à Douala et Kribi et celle de plusieurs autres petits centres le long de la côte, l'on estime à environ 20.000 tonnes la production totale des captures accessoires au Cameroun. L'étude analyse le dilemme de la sécurité alimentaire et prescrit une utilisation générale des BRDs, mais chaque pays dans son contexte. La légalisation officielle et la réglementation du commerce des captures accessoires, tout comme l'organisation de ce secteur d'activité, sont fortement recommandées.

Mots clés: Commercialisation, Cameroun et Nigeria, Captures accessoires, Projet REBYC, Pêche crevettière, Sécurité alimentaire

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1. INTRODUCTION

Many authors (Clucas and Teutscher, 1998, Eayrs, 2005) define bycatch as the unwanted or non-target part of the catch taken by fishermen. This component of the catch is either discarded at sea or landed to be used for human or animal consumption. The capture of excessive amounts of bycatch may pose a threat to species diversity and ecosystem health because this part of the catch is usually unregulated. In Tropical shrimp trawl fisheries bycatch often consists of juvenile food-fish species and may threaten food security and sustainable fisheries production if excessive amounts are removed. Bycatch is a global problem that must be addressed. FAO has recently estimated that nearly seven million tonnes of fish bycatch are discarded globally by commercial fishermen every year. To address this problem, FAO is executing since 2002 a GEF funded global project entitled “*Reduction of Environmental Impact from Tropical Shrimp Trawling, through the introduction of Bycatch Reduction Technologies and Change of Management (EP/GLO/201/GEF)*” named as the REBYC project.

The main objective of the project is to reduce unwanted bycatch and discards in tropical shrimp trawl fisheries by introducing appropriate fishing technologies, mainly BRD (bycatch reduction device). Discards here means all what the fisherman returns to the sea, mainly constituted of marine debris, juveniles food fish and other bycatch not transferred to shore. The project objectives also include the reduction of unwanted bycatch by shrimp trawlers, in particular the capture of juveniles of commercially valuable and ecologically important species, and a better understanding of the impact of shrimp trawling on different marine habitats. Twelve countries from Latin America, the Caribbean, Southeast Asia, the Gulf region, West Africa and the NGO SEAFDEC (Southeast Asian Fisheries Development Centre) are participating in the project. Cameroon and Nigeria are the two project participants from Africa.

Situated in the Central Gulf of Guinea, Cameroon and Nigeria operate together about 300 vessels, mostly shrimp trawlers fishing in the same area. The trawling activities in the area occur very close to river mouths and shallow waters which are breeding and nursery grounds of many fish species; this inevitably results in large quantities of juveniles caught. Some species are already disappearing from trawler landings while juvenile fishes (less than 10 cm in total length) now constitute over 80% (in weight) of overall trawler landings in both countries. However, much of the bycatch is not discarded but collected by artisanal canoes and sold to local processors (smokers) on shore, for human consumption and this constitutes a source of income giving employment opportunities in the coastal area.

With regard to the objective of the project and considering the present situation faced by Nigeria and Cameroon, the project work plan included to conduct a socio-economic survey of bycatch trades in order to better address the problem of bycatch utilization.

From the case study carried out in Dockyard landing site in Cameroon, this paper characterizes the trade of the shrimp bycatch and discards in the context of the REBYC project, and analyses the project food security dilemma as faced by some of the participant countries.

2. DATA AND METHODS

The study uses data from 2 sources:

Information from sea trips undertaken on board commercial vessels for experimental trials of BRDs during 2005–2006

These experimental and demonstration trials were made onboard stern trawlers that are shrimpers rigged with four nets, a quad rig, fishing simultaneously. This permitted comparative testing for the TED (Turtle excluder device) and BRDs (bycatch reduction device) at the same time. The four traditional trawls were modified from left to right as TED only outside, T 90 codend inside for the port side, and for the starboard side, square mesh window inside and traditional codend outside. A total of 21 hauls each of two hours trawling were made during 7 trips and catches composition from different codends sorted into three major categories (shrimps, fish of commercial value and trash fish) and compared.

During each trip a sample of 50 kg of discards was retained onboard and taken to the SRHOL-IRAD laboratory for analysis: composition, identification of different species and length frequency distribution.

A socio-economic study undertaken on bycatch utilization and trade during 2005

Data necessary for this study were collected from questionnaires during interviews of collectors, processors and sellers. The main trash fish landing site in Limbe is Dockyard, with around 35 Boat collectors including 11 big canoes (category big) and 24 small and medium size ones (category small). A representative sample of 12 canoes (6 big and 6 small) was selected to be monitored for a year. Information on landings, buying and selling price, processing, operating costs, earnings and destination markets was collected twice a week during twelve months.

3. RESULTS AND DISCUSSION

Catch composition from different codends

The species here included mainly the croakers (Scianidae), sole (Cynoglossidae), thread-fins (Polymenidae), shad, ethmalosa (Clupeidae), silver fish (Trichiuridae), and shrimps (Penaeidae) notably *Penaeus notialis*, *P. kerathurus* and *Parapenaeus atlanticus*.

Table 1 below shows the catch composition sorted into Shrimps, Fish of commercial value and Trash fish (constituted mainly of juveniles, immature fish species and small pelagic). The more important finding is the ratio of shrimp to bycatch in general and to different categories represented here. It shows clearly that the figure here is 1:24, meaning that the production of one kg of shrimp involves catching 24 kg of bycatch. The comparison between different codends of the stern trawler is not considered in this paper. One can just observe that the weight of shrimps of commercial value was similar in both traditional and BRD codends. BRD codends caught more commercial fish species than the traditional diagonal codend and Traditional diagonal codend caught more thrash fish than BRD codends.

Table1. Fish composition and rate of shrimp to landed bycatch by categories

Catch per weight (kg)						
Rig	TED only	T 90	Square window	Traditional	Total	For 1 kg of shrimp
Shrimp	120	193	165	161	639	-
Fish of commercial value	1 714	1 661	1 736	1 594	6 705	10
Trash fish	2 046	1 161	1 970	2 698	7 875	12
Total landed (Fish and trash fish)	3 880	3 015	3 871	4 453	15 219	24

Composition of discards' samples

The samples of discards collected by SRHOL-IRAD laboratory present five components including Marine debris (21%), Hairtails (*Trichurus lepturus*) (16%), Crabs (13%), Shad (*Illisha africana*) (8%) and many other juvenile food fish (42%). As shown in Annex I, the specific composition of the samples shows more than 40 different species, mostly juveniles.

Size and weight frequencies of species found in discards

The size and weight measurements of each fish found in the discards were taken. Results of the analysis of these measurements are presented in Table 2, showing minimum and maximum weights and lengths by species. Weight of the individual fish ranges from 1.6 g to 127.8 g, while their size distribution ranges from 4.5 cm to 23 cm according to the species.

Table 2. Minimum and maximum weight (g) and length of fish discarded

Total length	<i>Brachydeuterus auritus</i>	<i>P. typus</i>	<i>P. senegalensis</i>	<i>Cynoglossus spp.</i>	<i>Drepana africana</i>	<i>Pentanemus quinquarius</i>	<i>Polydactylus quadrifilis</i>	<i>Chloroscombrus chrysurus</i>	Turbot	<i>Selene dorsalis</i>
Smallest fish	5,5 g	4 g	10,3 g	7,2 g	8,3 g	8,9 g	7,9 g	21,1 g	8,3 g	1,6 g
	8 cm	8 cm	11 cm	9,5 cm	7,5 cm	12 cm	9,5 cm	12 cm	10 cm	4,5 cm
Biggest fish	37,1 g	42,2 g	25,5 g	104,2 g	54,6 g	39,9 g	38,5 g	34,9	35,9g	127,8 g
	16 cm	20 cm	15 cm	23,5 cm	13 cm	18 cm	16,5 cm	15,5 cm	16 cm	23 cm

Estimates and quality of bycatch in Limbe

In Cameroon particularly in Limbe, bycatch products are known as “Jabru fishing”. The main Jabru fish landing site in Limbe is Dockyard. After data analysis, about 35 boats collectors of different sizes (11 big canoes and 24 small and medium-sized canoes) are involved in the business. As in Nigeria (Akande, 1998), big boats have a crew of 11 people and are equipped with high horsepower engine (40 and 75). The medium size canoes have a crew of 5 members. This gives around 231 persons who undertake a full-time business of transferring bycatch to shore. This number can increase, as fishermen who normally target small pelagic (*bonga* and *sardinella*) during the peak season, opt for the bycatch transfer trade during the low season. In Limbe, these collectors operate mostly during night time and return to the landing site in the morning where buyers, mostly women are already waiting for them.

Before, only trash fish could be given to the collectors onboard. The apparent depletion of the resources and the need for more food, especially proteins sources to meet the requirements of the fast-growing population have motivated the trawl operators and crew to focus their activities on fish bycatch. They are now retaining and preserving all bycatch and trash fish. Marketable size fish as well as those that were often discarded (immature, snake fish, small pelagic, crabs etc.) are transferred to collector boats carrying it to Limbe and Douala Jabru markets.

The quality of bycatch landed

The quality and sanitary conditions of Jabru fish have also improved. After towing net and hauling the capture onto the deck, the catch is washed with seawater and sorted. While sorting, shrimp is picked up continuously and put into a basket. Fish of high commercial value (most valuable fish) are sorted out first (Croaker, Barracuda, Sole, Bar etc.), and then separated into sizes, species and different categories. There exist 9 fish commercial categories. These include average size bars, small size bars, average size soles, small size soles, big fish species, whitebait, Mix 3, rays and sharks. The different fish categories are then packed into rectangular plastic baskets, and marked accordingly. After the sorting operation has finished, the fish is washed again by clean seawater; the plastic baskets filled with ice (the layer of ice covering the fish) and then stored properly in the fish holds. The trash fish remaining, that would have been discarded, is also considered and put in plastic bags and stored. The discards here are very insignificant and are mainly made up of marine debris. The ice compartment is at normal temperature control, medium in the fish hold for most small to medium-size boats. This allows normal conditions to keep and upgrade the fish quality, both for target and bycatch.

Fish from collectors includes fish of high commercial value (big fishes as barracuda, bar, captains of good quality), shrimp and other crustacean well appreciated as boat collectors sometimes are offered possibilities of keeping ice on board for the quality of fish carried.

The total bycatch production in Cameroon

Production of bycatch is mainly from industrial shrimp fishing. The bycatch from the artisanal shrimp fishery is negligible. The composition of bycatch landed by trawlers includes croaker (Scianidae), sole (Cynoglossidae), *Arius* spp. (Ariidae), shinose (Polynemidae), grunter (Haemulidae), bonga and sardinella (Clupeidae) and the mixed category includes ribbon fish, mullets, threadfin, moonfish, spade fish, etc. Data on the landings were collected from a sample of 12 boat collectors by categories (6 big and 6 small).

Table 3 shows, on a monthly basis, data collected by all the sample units and expressed in bags. It shows average monthly landings of 2,056 bags for the category big and 681 bags for the category small. Considering a weight of 20 kg per bag, this gives an annual transfer estimated at 5,428 tonnes by big canoes category and 3,923 tonnes by small canoes category, for a total landing of 9,351 tonnes of Jabru commercialized in Limbe Dockyard Fish market.

The total quantity of Jabru landed in Dockyard Limbe (one of the Jabru’s biggest market in the country) appears to be higher than the total industrial fish production, 8,000 tonnes of fish and shrimp landed by all the industrial vessels operating in Cameroon (Meke and Njifonjou, 2007). Moreover, there are two other Jabru landing sites in Douala (Youpwe) and Kribi Mbouamanga, having also similar bycatch landings, and many other small jabru landing sites along the coast. When taking these sites into account, one can estimate the total landings of Jabru to be around 20,000 tonnes in the whole country. This situation emphasizes the economic importance of bycatch and expresses concern that bycatch reduction may lead to lower catches and consequently to lower incomes.

Table 3. Data collected and total bycatch marketed in Limbe during 2005

Month	Sample of 6 big boats (bags of 20 kg)	Sample of 6 small boats (bags of 20 kg)
January	12 800	4 280
February	12 192	4 232
March	14 496	3 352
April	12 280	4 304
May	11 944	4 232
June	12 784	3 776
July	11 624	3 656
August	9 760	3 840
September	12 008	4 296
October	12 960	4 200
November	12 328	3 504
December	12 896	4 368
TOTAL	148 072	49 040
Monthly average of the sample	12 339	4 087
Monthly average per collector vessel	2 056	681
Annual landings per category of boat	5 428 tonnes	3 923 tonnes
TOTAL landings of bycatch at Dockyard Limbe (tonnes)	9 351 tonnes	

Marketing of bycatch products

As mentioned earlier, selected bycatch and trash fish chilled in plastic sacks on board the trawler are collected at sea by collector boats. Once on shore, the sacks are discharged and transported from the boats by *boloboy*s (conveyors) and packed on the cemented floor. Those of commercially important species are sold in bags directly to wholesalers having stores in Douala and Limbe, or to “buy and sell” women and other retailers for local consumption. Trash fish (greater part of the landings) is sold to women who make a second sort to take off small marketable fish that is sold fresh to consumers. The remaining fish is transported for the smoking/drying process. Women dominate in the processing and marketing of Jabru fish. Smoking is the common technique used in processing, done in smoke houses traditionally known as Banda.

Seventy “buy-and-sell” including 47 women and 23 men are involved in the commercialization of bycatch in Limbe Dockyard landing site. They are the only ones allowed and recognized by their association to buy from the collectors and to sell to retailers. Most of them own one or even two boat collectors or are simply financing the business (fuel and buying of fish to trawlers).

Up to 80% of fish landed here including bycatch is processed through smoking/drying process. The department of Fisheries and the Limbe Urban Council have constructed a big smoked fish market in Limbe. There are two market days per week, Tuesday and Friday. The market is managed by the “Buy and Sell Organization” (The BSO). This is a kind of trading force dominated by women. The BBO works effectively to clean the environment and improve sanitary conditions, to prevent conflicts among the members, to guaranty security from thieves, to ensure the price of fish is profitable to the retailer and to ensure safety of the products when reaching the final market. This fish marketing sector also generates a lot of opportunities for informal employment, informal and institutional “rent capturing” activities.

Table 4 shows that prices of fish vary with commercial categories. Fish bycatch is cheaper when landed by boat collectors than when landed by the trawler itself in Douala. In Limbe, fish price of different categories ranges from FCFA 600–800, 900–1200, and 1300–1500 when buying from trawlers, at the landing site or from the retailers, respectively.

These prices are a little bit higher in internal markets. Those of the retailers carrying their products to internal markets, use big baskets or big cartons for the purpose. Packaging is usually in plastic bags or in recuperated newspaper and cement paper. The product is then carried by public transport from Limbe and Douala to different destinations. From the recent survey of the “buy and sell” buying in Limbe fish market, the main destination markets are: Douala (23%), Limbe (20%), Kumba (15%), Yaounde (14%), Bamenda (9%) Bafoussam (8%) and other towns (11%). The actual markets for the smoked/dried big fish products are both domestic and export markets mostly towards European countries (France, England, Germany, etc.) and United

States of America. Currently, this product generates the highest value in the sector of traditional fish exported products. The price here ranges from FCFA 1,300 at the landing site to FCFA 2,200 when smoked for exportation.

Table 4. Price of fish bycatch in Limbe fish market

Different categories (in bags of 20 kg)	From trawlers (FCFA)	From the landing site (FCFA)	From retailers (FCFA)
Big size bar	16,000	24,000	30,000
Small size bar	14,000	20,000	26,000
Average size sole	16,000	22,000	28,000
Small size sole	12,000	18,000	26,000
Mix 3	16,000	22,000	28,000
Friture	14,000	20,000	26,000
Big fish (fresh in pieces) FCFA/kg	1,000	1,300	1,500
Price of fresh fish/kg in FCFA	600 to 800	900 to 1200	1,300 to 1,500
Trash fish in bag (fresh)	2,000	3,500	8,000 (smoked)
Price of trash fish in kg	100	175	400 when smoked

5. THE PROJECT FOOD SECURITY DILEMMA

With regard to the main goal of the REBYC project (the reduction of bycatch) it has to be recognized that the situation and conditions under which the shrimp fisheries operate vary considerable among countries.

As seen in the Central Gulf of Guinea, notably Cameroon and Nigeria, or in some Southeast Asia countries (Indonesia and the Philippines), all or most of the bycatch is used and carries a - although sometimes low - commercial value. Hence, operators have little incentive to reduce it. Boat owners and crew may also have different incentives; in some places bycatch is sold by the crew outside the control of the boat owner. Some times, as stated by Ogbonna (2006) in Nigeria, unscrupulous captains deliberately fish near the shore in order to produce more bycatch of juveniles in order to make extra money. There is therefore a socio-economic implication of the project because an intricate network of processed fish bycatch market has developed along the coastal communities and even into the hinterland. Moreover, low-value fish play a role in food security by giving employment to traders/processors and supplying local markets. Therefore, there are important differences between the countries where bycatch is used and has commercial value and those where bycatch is generally not wanted and discarded. Moreover, where bycatch is being used, it often plays an important role in food security for poorer population groups and this situation needs to be better understood.

As mentioned by Ekowati (1998), the REBYC project is likely to be more successful (and sustainable) in countries where there are economic incentives for the industry to reduce bycatches (Mexico and some other Latin American countries).

An important consideration that has been observed is the continuing decline of the size of fish captured which is tending towards increasing number of juveniles. This means that some economically valuable and ecologically important species might have been overfished. This is an important consideration for the project and the focus of actions for the REBYC II. The questions that need to be answered for a proper management of these tropical resources are:

- Are any of the economically valuable and ecologically important species overfished?
- What levels of bycatch are sustainable and result in vibrant fisheries and contribute to food security?
- Are there some important areas which have large densities of juveniles and can these be protected through spatial and temporal closures;
- Where should multispecies shrimp trawling be allowed to take place and how can damage to the environment from trawling be minimized;
- Could the vessel reduce its operating costs by becoming more energy efficient, or by increasing the value of the catch? If yes, then the effort to adopt reduction measures may have less of an impact; and
- Long-term food security requires that measures are taken to ensure that catches are sustainable, in which case there may be requirements to introduce effort control measures.

6. CONCLUSIONS AND RECOMMENDATIONS

The REBYC project has an honourable objective, that of reducing bycatch for a sustainable development of our fisheries' resources. One should notice that with regard to likely sustainable impact of the project, there is an important difference between the countries where bycatch is used and has commercial value and those where bycatch is generally not wanted and discarded. Once a fish is caught and removed from its environment, even discarded immediately, it has a very little chance to survive, mainly for the juveniles. When a country is willing to operate shrimps fisheries, it must be aware of the production of an important quantity of bycatch, particularly for the multi-specific fisheries. However, all regions have something in common and that is the requirement that all fish and shrimp are managed sustainably. As a consequence, this may require the consideration of some form of effort control. For those fisheries where all bycatch is retained, this may require that spatial and temporal closures, MPAs, etc. be considered either in combination with or as an alternative to BRDs.

The Device to be introduced by the REBYC's project simply tends to reduce bycatch, mainly juveniles that should grow for the sustainability of the resources and better future incomes.

With respect to food security, bycatch should neither be discarded at sea nor be made up only of juvenile fish, as is the case in Cameroon and Nigeria. In this respect, one can say that the REBYC project is likely to be successful, and sustainable, in all the participant countries, each country in its own way.

Governments should then try to regulate and implement bycatch trades, and Regional cooperation in the context of harmonization of regulations should be put in place in an area where many countries share the resources as well as the observer programme.

About trading of bycatch and discards:

- It is advisable to legalize the trade of bycatch and organize the marketing;
- There is a need of onboard chilling of bycatch in order to improve the quality at landings and thus raise commercial value;
- Bycatch must be handled hygienically;
- There should be research into simply market-oriented methods of value-addition to bycatch, with emphasis on small-scale fish traders and processors.

While concluding, it is important to give information about the REBYC's project. The phase1 has ended in September 2008. After the valuable gains made by the REBYC phase1 towards the objective of establishing tropical shrimp trawl fisheries on a sustainable basis, the REBYC phase2 is now in the process of being put in place. The draft Project Concept Note has proposed 33 Recipient Countries instead of 12. In Africa four more countries are willing to participate bringing the number to six participating countries: Nigeria, Cameroon, Madagascar, Mozambique, Kenya and Tanzania. www.fao.org/fi/gefshrimp.htm.

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ANNEX I

Various species identified in the discards of shrimps trawlers

N°	Common name	Family name	Scientific name
1.	Soles	Soleidae	<i>Synaptura</i> sp.
2.		Cynoglossidae	<i>Cynoglossus senegalensis</i>
3.	Bonga (sardine)	Clupeidae	<i>Sardinella maderensis</i>
4.			<i>Ethmalosa fimbriata</i>
5.	Bars	Scianidae	<i>Pseudolithus senegalensis</i>
6.			<i>P. typus</i>
7.			<i>P. elongatus</i>
8.	Petits capitaines	Pomadasyidae	<i>Pomadasyus rogeri</i>
9.			<i>Galoides decadactylus</i>
10.			<i>Polydactylus</i> sp.
11.	(Fritures)		<i>Brachydeuterus auritus</i>
12.	Grands capitaines	Polynemidae	<i>Pentanemus quinquarius</i>
13.	Disque		<i>Drepana africana</i>
14.	Fritures		<i>Eucinostamus melanopterus</i>
15.		Tetradontidae	<i>Lagocephalus laevigatus</i>
16.		Bagridae	<i>Chrysichtis negrodigitatus</i>
17.	Carangues	Carangidae	<i>Selen dorsalis</i>
18.			<i>Alectis alexandrinus</i>
19.			<i>Caranx hippos</i>
20.			<i>Caranx senegalus</i>
21.			<i>Chlorocombrus chrysurus</i>
22.			<i>Trachurus</i> sp.
23.	Ceintures	Trichiuridae	<i>Trichiurus lepturus</i>
24.	Raies	Rajidae	<i>Raja miraletus</i>
25.		Dasyatidae	<i>Dasyatis margarita</i>
26.	Barracuda	Sphyraenidae	<i>Sphyraena piscatorium</i>
27.		Sparidae	<i>Pagellus</i> spp.
28.			<i>Dentex</i> spp.
29.	Rasoirs	Clupeidae	<i>Illisha africana</i>
30.	Crabs	Calapidae	<i>Calappa rubroguttata</i>
31.		Squillidae	<i>Squilla aculeata calmani</i>
32.		Portunidae	
33.	Mulets	Mugilidae	<i>Mugil</i> spp.
34.			<i>Mugil capunil</i>
35.	Seiche	Sepiolidae	<i>Sepia</i> spp.
36.	Shrimps	Peneidae	<i>Penaeus notialis</i>
37.			<i>P. keraturus</i>
38.	Carpes	Lutjanidae	<i>Lutjanus</i> spp.
39.	Congres		<i>Conger</i>
40.	Mâchoiron	Ariidae	<i>Arius heudeloti</i>
41.	Ceintures		
42.	Sharks		

The second Workshop on Fish Technology, Utilization and Quality Assurance in Africa was organized by the Fish Utilization and Marketing Service of FAO's Fish Products and Industry Division in collaboration with the Centre spécialisé de valorisation et de technologie des produits de la mer (CSVTPM), under the auspices of the Institut national de recherche halieutique (INRH) in Casablanca, Morocco. The workshop reviewed progress in post-harvest fish utilization in Africa and made recommendations to FAO, its member countries and institutes interested in fish utilization in Africa. The experts reviewed in particular fresh or live fish handling, fish processing, post-harvest loss assessment, quality and safety, and marketing and socio-economic issues. The meeting included: a presentation by the secretariat of a report on progress and events since the workshop held in 2005, presentation of 22 papers and a field trip to the port of Agadir (fish auction and jetty) and to CSVTPM. The report includes the recommendations as well as the papers that were made available to the experts.

Le deuxième Atelier sur la technologie, l'utilisation et l'assurance de qualité du poisson en Afrique a été organisé par le Service de l'utilisation et de la commercialisation du poisson de la Division des produits et de l'industrie de la pêche de la FAO, en collaboration avec le Centre spécialisé de valorisation et de technologie des produits de la mer (CSVTPM), sous les auspices de l'Institut national de recherche halieutique (INRH) de Casablanca, au Maroc. L'atelier a passé en revue les progrès dans l'utilisation du poisson post-capture en Afrique et fait des recommandations à la FAO, à ses pays membres et aux instituts intéressés par l'utilisation du poisson en Afrique. Les experts ont passé en revue notamment la manutention du poisson frais ou vivant, la transformation du poisson, l'évaluation des pertes post-captures, la sécurité sanitaire et la qualité, la commercialisation et les questions socioéconomiques. Cette révision s'est effectuée à travers la présentation, par le secrétariat, du rapport sur les progrès et événements depuis l'atelier qui s'est tenu en 2005, des présentations de 22 communications et une visite de terrain au port d'Agadir (halle de criée et débarcadère) et au CSVTPM. Le rapport inclut les recommandations de même que les communications qui ont été mises à la disposition des experts.

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