Egyptian Journal of Basic and Applied Sciences xxx (2017) xxx–xxx

HOSTED BY

Contents lists available at ScienceDirect

Egyptian Journal of Basic and Applied Sciences

journal homepage: www.elsevier.com/locate/ejbas

The success story of the implementation of the national food safety agency in Ivory Coast

Montet Didier [a,*], Akaki David [b], Moretti Christine [c], Brabet Catherine [a], Manizan Ama Lethicia [a], Elleingand Eric [b], Baud Guillaume [c], Mens Frédéric [c], Yao Benjamin [b], Michel Thomas [c], Assidjo Emmanuel [b], Aw Sadat [b], Akmel Clément [b], Hubert Assin [b], Durand Noel [a], Alter Pascaline [a], Berthiot Laurent [a], Métayer Isabelle [a], Tape Thierry [d]

[a] Cirad, UMR 95 Qualisud TA B-95/16 73, Rue Jean-François Breton, 34398 Montpellier Cedex 5, France
[b] Institut National Polytechnique FHB, BP 1313 Yamoussoukro, Cote d'Ivoire
[c] Supagro/IRC, Site de La Valette, 1101 Avenue Agropolis, BP 5098, 34093 Montpellier Cedex 5, France
[d] Codinorm, Cocody, Angle Bd Latrille/Sideci, Rue K115, Villa 195, Abidjan, Cote d'Ivoire

ARTICLE INFO

Article history:
Received 15 May 2017
Received in revised form 4 July 2017
Accepted 5 July 2017
Available online xxxx

Keywords:
Food safety
Foodstuffs
Ivory Coast
National agency
Hazards
3C Ivoire

ABSTRACT

The 3C Ivoire EuropeAid project (2011–2015), set up a coordination committee in Ivory Coast to evaluate the effectiveness of sanitary controls, prevent sanitary risks and coordinate nationwide actions on food safety [1].

This paper reports main findings: difficulties to apply regulations in Ivory Coast, to establish a national food safety agency, to implement a national health surveillance system, to set up a potential food safety label, training on food safety systems (HACCP, traceability, good hygiene practices), first experimental committee of national experts.

Ivoirians are concerned by food safety hazards. All food samples collected in markets were contaminated by pathogens. Three of the main food consumed in the country: rice, maize, peanut were contaminated with mycotoxins, and aflatoxin levels in peanut paste were well above the EU limits. The decree creating the Ivorian agency was signed in late June 2016.

1. Introduction

Since 2002, Ivory Coast has faced a socio-political crisis affecting its economic development and the quality of life of its population. Despite the political stability since 2011, government food control and analysis structures in previous decades have suffered greatly from this situation and their effectiveness is markedly diminished. Despite the proposal to implement the Regional Special Program for Food Security of the Member States of the West African Economic and Monetary Union [2], Ivory Coast still lacks a coordinated and reliable national system for securing the food produced and circulating on Ivorian territory.

There are real risks to consumers and farmers, such as pesticide residues that are widespread for the control of aggressors or the contamination of crops and products derived from mycotoxins produced in the field or post-harvest by molds. These molecules with various toxic effects are sometimes found at high concentrations in Ivory Coast. In addition, residues from export products are detrimental to exports to the European Union (EU).

There is an upsurge in foodborne diseases and pathologies and an increase in food poisoning. The induced effects of this situation are, on the one hand, a serious threat to the economic development of the country, in particular due to the deterioration of the general state of health of the population, resulting in a decline in the productivity of the active population and an increase in health care spending. On the other hand, in certain Ivorian regions, there is also the problem of food shortages, penalizing these local populations doubly.

The quality and quantity of foodstuffs is therefore a key issue for public and private decision-makers as well as for scientists. During the conference "Concrete Actions to Promote Food Safety" [3], representatives of 45 African States advocated the coordination of capacity building, particularly at the national level. This coordination between public health watch structures, consumer associations, private sector, academics and research organizations would allow for appropriate actions to produce optimal and lasting results. However, this recommendation was not followed up.

* Corresponding author.
E-mail address: didier.montet@cirad.fr (M. Didier).

http://dx.doi.org/10.1016/j.ejbas.2017.07.004
2314-808X/

The objective of the 3C Ivoire project (3CI, 2011–2015) [1], funded by the EU (EuropeAid), was to set up a coordination committee which will ultimately assess the effectiveness of health controls, prevent health risks and coordinate scientific actions, national actions on food safety (SSA) and disseminate information to civil society and public and private actors. The project also proposed the setting up of a national committee of experts to study specifically the health problems encountered in Ivory Coast.

This publication presents a summary of the work carried out by the 4 partner institutions of the 3CI project – Center for International Cooperation in Agricultural Research for Development (CIRAD) – UMR Qualisud (www.cirad.fr); Montpellier Supagro (www.supagro.fr/web/irc/); Codinorm (www.codinorm.ci) and Institut National Polytechnique Houphouët Boigny (INP-HB) Yamoussoukro (www.inphb.edu.ci/), as well as a health inventory of foodstuffs taken from the Ivory Coast markets, obtained thanks to large-scale sampling for physico-chemical and microbiological analyzes. The report of this project served as a basis for negotiations with the African Development Bank (ADB) and the French Development Agency (AFD) to launch a call for tenders to experts for the creation of the National Food Safety Agency of Ivory Coast.

2. Methodology

The activities were carried out on the basis of protocols of action developed specifically for the 3C Ivoire project and taking into account the political and administrative specificities of Ivory Coast.

2.1. Diagnosis of regulatory difficulties

This documentary diagnosis of the Ivorian regulations was made by visiting the documentation centers and technical departments of the structures in charge of the question, consulting the official gazette of the Republic of Côte d'Ivoire and the documentary monitoring system of the Ivory Coast National standardization body called "Côte d'Ivoire standardization" (Codinorm).

2.2. Establishment of the national coordinating committee within the framework of the project

The creation of a national committee of about 20 members was proposed: a national coordinator, a national secretary, a representative of the Prime Minister, one representative per department involved (11), a Codinorm representative, a representative of the Chamber of Commerce and a representative of small and medium-sized enterprises and industries, a representative of consumers, and a representative of the Union of Cities and Municipalities of Côte d'Ivoire. The selection of members was made on the basis of hierarchical and technical position in order to facilitate decision-making and follow-up of actions. This committee was responsible for crisis management. This coordinating committee managed the work of the committee of experts by drawing up invitations, paying expenses, drafting the reports of meetings, advising the corresponding ministry, liaising with industry.

2.3. Creation of a committee of national experts

The committee of national experts was set up after a call for candidates in several Ivorian newspapers. Approximately fifty candidates were dealt with by the 3CI project management team to select only 15 experts based on their curriculum vitae, taking into account the multidisciplinarity (microbiology, toxicology, food chemistry, biochemistry, medicine ...). These experts carried out a collective assessment of health hazards in order to inform managers of the risks associated with these hazards and to recommend actions to minimize their impact for the consumer.

2.4. Implementation of a national health surveillance system

Food analysis units/laboratories were upgraded into equipment, analytical procedures, trained personnel. Consumption surveys were conducted among 1003 households for their daily food consumption. A total of 2700 samples (water, meat, fish, rice, maize, etc.) taken from markets in the cities of Abidjan, Bouaké, Yamoussoukro, Daloa, Korhogo and Abengourou were subjected to conventional microbiological analysis. Also multi-mycotoxin analysis (total 79) were carried out by liquid chromatography coupled with mass/mass spectrometry (LC-MS/MS) at Queen's University Belfast on 238 samples collected: 88 rice samples including 47 local rices and 41 imported rices, 79 corn samples including 29 crushed maizes and 50 maize flours, and 71 samples of groundnut paste.

2.5. Study to establish a safety quality label

A diagnosis of the existing quality labels in Ivory Coast and similar experiences in Ghana was carried out. The opportunity to implement a safety quality label in support of the agricultural and agro-food sectors in Ivory Coast was studied by conducting a series of surveys and interviews at the ICC, the Ivorian Industrial Property Office (OIPI), Codinorm and three major food cooperatives (Association for the Development of Intensive Food Crops [ADCVI], National Confederation of vegetables producers [CNAVICI], National Federation of Food Cooperatives [FENACOVICI]).

3. Results

3.1. Diagnose the difficulties of application of the regulation

Ivory Coast has adopted legislative and regulatory provisions that provide the legal basis for food safety, with a view to protect consumers while ensuring the quality of imported, exported and locally consumed food products. It has more than 200 standards for agricultural and food products (Table 1). They are developed by Codinorm. The proposed standards are adopted by technical committees composed of representatives of the administration,

Table 1
Classification of the main standards for agricultural products and foodstuffs in Ivory Coast.

Categories	Number of norms	Years of publication
Total Vegetable Productions	**69**	
Generalities	3	1989(1), 1993(2)
Stimulants and Derivatives	15	1985(8), 1989(5) 2006 (02)
Fresh Fruits and Derivatives	13	1989(7), 1993(4), 2009 (02)
Fresh Vegetables and Derivatives	15	1989(14) 1993 (1)
Seeds and oilseeds	11	1993(11)
Cereals and leguminous plants	12	1993(11) 1995 (1)
Total Animal Productions	**21**	
Fishing Products	10	1993(8), 2001(1), 2002(1)
Meat and meat products	11	1990(9), 1993(2)
Total food Industries	**81**	
Generalities	10	1989(8), 1995(1), 2001(1)
Milk and dairy products	34	1993(26), 2001(6), 2002(2)
Drinks	25	1993(4), 2001(5), 2002(3) 2008 (13)
Flours and starches	9	1995(8) 2007 (1)
Food Additives (Salt)	3	2001(1), 2002(2)

Please cite this article in press as: Didier M et al. The success story of the implementation of the national food safety agency in Ivory Coast. Egyp. Jour. Bas. App. Sci. (2017), http://dx.doi.org/10.1016/j.ejbas.2017.07.004

manufacturers, inspection bodies (laboratories), research institutes and consumer associations. Codinorm works with 24 committees and mobilizes 600 experts. It adopts international standards at the rate of 200–300 per year. Certification is carried out through international organizations (French Insurance for Quality [AFAQ], Tunisian Accreditation Council [TUNAC] ...). In Ivory Coast, there are some 100 companies certified totally or partially, of which 70% are in industry.

It should also be noted that there is a National Codex Alimentarius Committee, which is responsible for monitoring standards. Ivory Coast has a strategic plan based on five main axes: (i) development of policies, laws and regulations to adapt and strengthen the legislative and regulatory framework for better control of food safety; (ii) capacity building of inspection and control structures; (iii) information, education, communication to food actors and consumers; (iv) coordination of national and international food safety networks; (v) seeking adequate financial resources for implementation.

This strategic plan is still theoretical in its application. The fundamental reason might be the non-designation, formally, of a structure responsible for its implementation and monitoring. One could add to this the lack of financial and structural resources.

3.1.1. Ivorian standards

As regards standards, the analysis in Table 1 shows that the legal and regulatory texts available to Ivory Coast are divided into five groups:

- Legislative texts on the health control of plants and products of plant origin. Most of the decrees are old (1964–1966). Only 3 decrees affecting coffee and cocoa are newer (1999 and 2000).
- Texts ensuring the sanitary control of animals and animal products, and their derivatives.
- Other legislation relating to foods specific to food products not covered by the previous texts.
- Decentralization process. These texts define the regulatory provisions granting local authorities competences in food safety as part of the decentralization process.
- Texts of general interest, which have an impact on food safety such as the decree on ionizing radiation and the law on the repression of false or misleading advertising.

There is therefore a basic national legislative and regulatory framework covering aspects of primary production, formal and informal processing, and distribution, sales and catering. Some important aspects, such as genetically modified organisms (GMOs) or polycyclic aromatic hydrocarbons (HPAs) are not covered.

There is a lack of capacity to ensure food safety, low sensitivity of policies to quality issues, obsolete legislation and regulations that are inadequate to meet international requirements, weak enforcement, weak private-public exchanges, a multiplicity of structures intervening at the institutional level and a lack of coordination and communication within the organizations involved.

Moreover, Ivorian standards, legislation and regulations do not take in account the aspects of responsibility, traceability, transparency, emergency situations (food crisis) and prevention.

The application of this legislation may lead to inadequate protection of the Ivorian consumer against fraudulent practices and the importation of contaminated food products.

3.1.2. Ivorian structures involved in food safety

The number of ministries involved in food inspection and safety, as well as the multiplicity of stakeholders, makes coordination and management of this safety ineffective. These are mainly the Ministry of Agriculture (Directorate for Plant Protection, Control and Quality), the Ministry of Animal Production and Fishery Resources (Directorate of Veterinary and Quality Services), Ministry of Health and the Fight against AIDS (National Institute of Public Hygiene, National Nutrition Program), Ministry of Commerce (Directorate of Distribution and Consumer Affairs, Directorate of Metrology, Competition, Quality control and enforcement), the Ministry of Industry and Mining (Directorate for Industry, Private Sector Development Directorate, Quality and Standardization Directorate), Districts, municipalities, public analytical laboratories (LANADA National Agricultural Development Support Laboratory, INHB, LNSP National Laboratory for Public Health, LANEMA National Laboratory for Quality, Metrology and Analysis), Private and academic laboratories, organizations (FIRCA Agricultural Research and Advisory Fund, FENACOVICI, Federation of Consumers, etc.). Approximately 1000 agents from these ministries and about 500 agents from the decentralized structures (districts and municipalities) are involved in food safety in Ivory Coast. These agents have different qualifications depending on the intervention structures (veterinarians, doctors, agricultural and agro-food engineers or agricultural technicians, plant and animal production assistants).

It is important to note that the industrial sector (mainly foreign firms) meets fairly well the standards in force (80–90% satisfaction rate). However, the lack of human and financial resources makes it difficult to monitor the standards approvals granted. This situation is more striking in the informal sector (20–30% of approvals).

Health surveillance is essentially the work of the Ministry of Livestock and Fisheries Resources' Health Information and Management System (GIS). The available statistical data are an approximation of epidemiological data. The standardization body, through its activities for issuing certificates and attestations of conformity on the one hand, and the relevant ministries, through their directorates, inspection services and specialized laboratories, monitoring activities but lack of means, know-how and coordination make monitoring ineffective. Thus, most of the official alerts come from the early warning networks of food importing or exporting countries.

Some ministerial structures produce reports in isolation that are, for the most part, punctual results from laboratory analyzes or audit or inspection reports. No follow-up is done. Food safety information available at the level of the competent structures is not disseminated to civil society and no structure coordinates all of these activities. It is important to note that the low contribution of consumer associations and media in raising awareness accentuates the health risk in Ivory Coast.

3.2. Establishment of a national coordinating committee and creation of a committee of national experts

The objective of this experimental committee set up by the project was to implement a concerted policy between the public authorities and the actors of civil society in the field of food safety. The missions of the national committee are those of a national agency (see www.anses.fr for France):

- contribute to a high level of protection of consumer health;
- provide independent scientific assistance to Ivorian policy and legislation in food safety. Provide risk communication;
- formulating scientific advice and recommendations as a basis for the adoption of legislative or regulatory acts by political bodies;
- coordinating the activities of independent scientific expert groups and financing the organization of periodic meetings;
- ensuring health surveillance in food, nutrition, animal health;
- assessing the health risks and nutritional benefits of human and animal foods and recommending health protection measures;
- training, informing and contributing to public debate;

Please cite this article in press as: Didier M et al. The success story of the implementation of the national food safety agency in Ivory Coast. Egyp. Jour. Bas. App. Sci. (2017), http://dx.doi.org/10.1016/j.ejbas.2017.07.004

- Establish relations with other African National Committees to build an African early warning network and with other committees around the world to communicate on global risks.

These founding values are based on the independence of scientific expertise, which must be multidisciplinary, collective and contradictory. This implies taking into account the impartiality of experts, the prevention of conflicts of interest and a code of ethics. Transparency should be mandatory in expert processes and take into account minority opinions. The views of the project experts were published on the National Committee website.

An experimental committee of experts was created during the project had the following roles:

- to propose recommendations on food safety according to self-referrals and problems encountered on Ivorian territory;
- publish annually a newsletter on food safety collective expertise;
- meet the ad hoc departmental scientific support needs for food safety;
- to inform the stakeholders of the results of the expertise and to contribute to the public debate on food safety;

The themes of work of the experimental committee were chosen by self-referral of the members of the committee. The first session dealt with the meat sector in Ivory Coast and in particular the slaughterhouse in Port-Bouët. An opinion (N° 2012-3CI-04-001 of 27/04/2012) was produced, taking into account the conclusions and recommendations of the experts and published on the project site. Four other topics have been the subject of self-referrals: contamination of food by aluminum, aflatoxins and peanuts, risks related to the consumption of braised street meat and the fish industry.

A national system of health surveillance was set up and made it possible to know the eating habits of more than 1000 Ivorian households. The commodities most commonly consumed by Ivorian families are in descending order: rice, fish, tomato, chilies, oil, and onions. In animal protein, fish is the most consumed with 41% of animal protein, followed by meat (38%). Fruits and vegetables are mainly represented by tomato (18%), pepper (17%), eggplant (18%) and onion (16%). Rice (28%) is the most widely consumed cereal; cassava (54%) and plantain (27%) are the most consumed starchy foods.

3.3. Microbiological and mycotoxins analyzes in Ivory Coast markets

3.3.1. Microbiological analyzes

All samples had high microbial contamination (results not shown) and especially in potentially pathogenic microorganisms (*E. coli*, staphylococci, *Clostridium perfringens* and salmonella). Fig. 1 shows sample rates that do not meet World Health Organization (WHO) quality standards and Fig. 2 shows non-compliant water sample standards.

Fresh products had the highest non-compliance rates. Indeed, these ranged from 35% for the couple *E. coli*/tomato to 100% for staphylococcus/meat and streptococcus/fish couples. Against all odds, even products that have undergone heat treatment such as attiéké, braised meat and fish, have equally high levels of non-compliance ranging from 20% (*E. coli*/attiéké) to 100% (Streptococci/banana). Water also contains microorganisms with a high level of non-compliance, regardless of the form of availability (wells, sachets or running water) (Fig. 2). It is therefore undeniable that the health status of these commodities in Ivory Coast requires a particular attention of the public authorities and that an expert decision on the improvement of these sectors is necessary.

Determination of mycotoxin content in the main foodstuffs at high risk of contamination consumed in Côte d'ivoire

For EU-regulated mycotoxins (EC Regulation No 1881/2006) [4], 80% of the 238 samples collected were contaminated with aflatoxins [5], with 57% and 50% exceeding the limits of 2 μg/kg for aflatoxine B_1 (AFB_1) and 4 μg/kg for total aflatoxins (AFT: B1 + B2 + G1 + G2) respectively.

All samples of peanut paste were contaminated with AFB1 with 99% content above EU limits. Samples of maize (97%) and rice (57%) were contaminated with AFB1 with 62% and 23% respectively above EU limits, and maximum values of 80.4 μg/kg for maize and 14.1 μg/kg for rice. Only 2% of the 238 samples had ochratoxin A (OTA) levels above EU limits (3 μg/kg): 3 rice samples with maximum levels of 15.1 μg/kg and a corn sample (7.5 μg/kg). Fumonisins and zearalenone were present in 72 and 6 corn samples respectively, as well as in 16 and 5 rice samples but at levels below the EU limits.

The 238 samples were also contaminated with other mycotoxins such as beauvericin, equisetin, citrinin, fusaric acid, cyclopiazonic acid, diacetoxyscripenol, and sterigmatocystin. Peanut paste represented the greatest health risk for Ivorian consumers, due to the very high levels of aflatoxins analyzed in the collected samples (up to 4535 μg/kg for AFB1 and 8094 μg/kg for AFT).

Given the results of microbiological analyzes and mycotoxins, we can say that the health status of Ivorian products sold on the markets is deplorable and that none is healthy from a bacteriological point of view for consumers. As for the groundnut pulp samples, the first results show that the levels of aflatoxin B1 can exceed up to more than 2000 times the levels permitted by Europe.

3.4. Dissemination of HACCP safety systems, traceability and good hygiene practices to public authorities, consumers and experts

3.4.1. Consumer awareness of hygiene and food safety

For a year, the national coordinator of the project informed Ivorian TV viewers about the dangers linked to the marketing of food near schools, consumption of foods such as garba (traditional Ivorian dish based on cassava and tuna), the maintenance of refrigerators and the storage of food for better conservation, the dangers associated with the slaughter, transport, and marketing of carcasses, through 15-min passages on the "Matin Bonheur" program.

3.4.2. Training in good agricultural practices BPA, good hygienic practices GHP, good manufacturing practices GMP, HACCP of selected companies, cooperatives and production associations

A training needs analysis was carried out on about ten companies and national laboratories for analysis and inspections. Capacity building seminars were organized:

- Training of 30 agents of the National Board of School Canteens over 3 days. Participatory pedagogy has fostered the exchange of practices and the contextualization of the stated principles to the reality of the territory and means. Improvements in quality control have been identified: training of canteen employees in basic hygiene rules (hand washing, surfaces, etc.), health control for canteen employees, provision of appropriate storage facilities in stores of stocks, respect of the principle of hot connection.
- Training of quality teams of Ivorian SMEs on food safety, updating or strengthening the GHP and GMP mastery and introducing the principles of the HACCP method.
- A self-checking guide for university restaurants was set up at the INP-HB, which made it possible to test the feasibility of such an action. A training plan for university restaurants on the hygiene package, GHP and GMP was conducted to raise awareness among stakeholders.

Please cite this article in press as: Didier M et al. The success story of the implementation of the national food safety agency in Ivory Coast. Egyp. Jour. Bas. App. Sci. (2017), http://dx.doi.org/10.1016/j.ejbas.2017.07.004

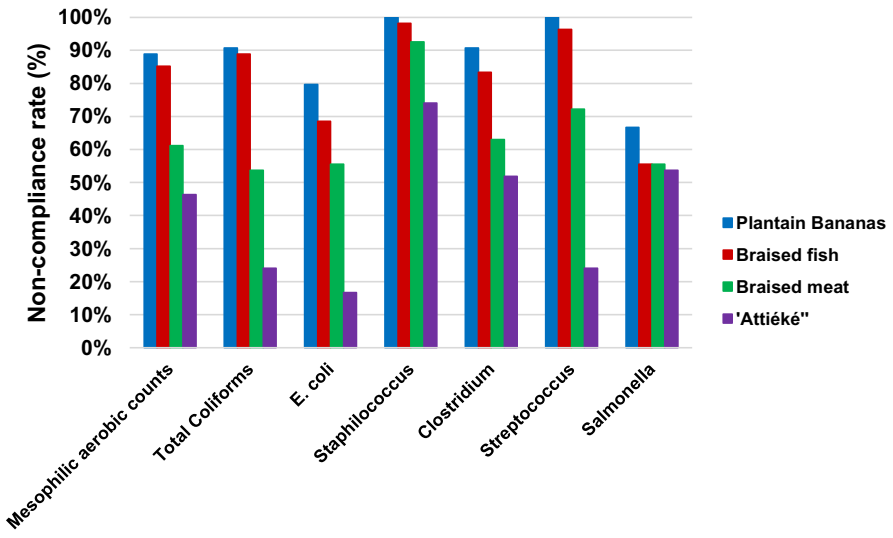

Fig. 1. Percentage of samples of food products consumed in Ivory Coast not meeting WHO quality standards. GAM = mesophilic aerobic germs.

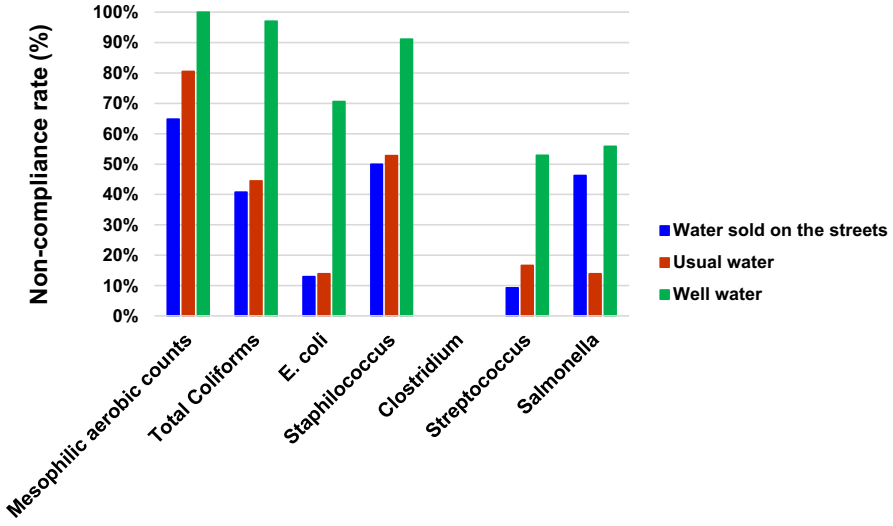

Fig. 2. Percentage of water samples not meeting WHO quality standards.

3.4.3. Strengthening the technical capacity of food control professionals

Capacity building sessions for better management of analyzes were organized for a dozen INP-HB technicians. The topics covered: Quality assurance and good laboratory practice, HACCP training and health inspection techniques, methodology of physico-chemical analyzes (quality control), methodology of chromatographic analyzes (high-performance liquid chromatography - chromatography in Gaseous phase, spectrometric analysis methods and polarimetry.

3.4.4. Sensitization of elected representatives to food safety and upgrading of market gardening cooperatives

The Assembly of Regions and Districts of Côte d'Ivoire (ARDCI) organized awareness among elected representatives on the theme of "Ensuring food safety and quality to better protect consumers". It addressed the following issues: major food-related health problems, elements of a national food control system, strengthening of national food control systems, specific problems of Ivory Coast.

Some market gardening cooperatives in three regions of Ivory Coast (Korhogo, Katiola, Odienne) were trained on Good Agricultural Practices (GAP), which allowed the following elements to be addressed: organic and mineral fertilization, crop protection, observation and diagnosis, prevention, curative control, marketing and processing, improvement of the conditions of conservation, promotion of simple and adapted technologies for the valorization of local products, creation of a favorable environment for a better disposal of agricultural products.

3.4.5. Study of the desirability of setting up a quality label

The diagnosis of the existing quality label in Ivory Coast showed that the Ivorian Office of Industrial Property (OIPI) and the Chamber of Commerce and Industry have carried out work for the creation of quality labels (Yam from Bondoukou and some food products from the Abengourou region). This consisted in an identification of the products to be labeled but this work did not result because of lack of funding. The National Institute of Public Hygiene (INHP) gives sanitary approval to certain food structures, but this is done without reference for the concerned companies. Codinorm

Please cite this article in press as: Didier M et al. The success story of the implementation of the national food safety agency in Ivory Coast. Egyp. Jour. Bas. App. Sci. (2017), http://dx.doi.org/10.1016/j.ejbas.2017.07.004

issues certificates of conformity for a particular product lots and non-mandatory certificates for a product for a specified period. Some labeling experiments in production areas are currently being carried out in Ivory Coast, such as the Kent mangoes in the north of the country, with several cooperatives under the banner of the Société de Culture Bananière (SCB).

In order to study the feasibility of setting up a food safety label, it was necessary to define a "pilot" channel. The market gardening sector was chosen because these products are very widely consumed by Ivorians. The involvement of the main players in the sector was an essential prerequisite for setting up a label.

Three major players in the horticultural sector, FENACOVIC, ADCVI and CNAVICI, were keenly interested in the process. However, the constraints associated with the implementation of a quality label are multiple. Indeed, a label is either imposed by a public authority, or developed by professionals or a sector as a marketing tool for differentiation. However, there does not seem to be a market for labeled products (or a niche market for elitist customers). No demand came from market gardening professionals to develop such a label, while their awareness of the issues of food safety is real. Moreover, the control structures to validate such a label are insufficient, and practices downstream of the chain (use of unauthorized pesticides, overdoses ...) would be long to correct. Insufficient transport and storage infrastructure would take a long time to be upgraded. Finally, it is important to note that there are currently regulatory texts and an "Ivory Standard" label that should be applied. The official opening ceremony of the Ivorian national food safety system was organized by FIRCA on January, 24th in Abidjan, Côte d'Ivoire.

4. Main conclusions

The training of stakeholders in the food sector has been very successful. The health status of the food products collected in the Ivorian markets was found to be deplorable and would require an urgent response from the government. Indeed, no food or water distributed would be considered healthy by the European Union. Peanut pastes collected in major markets are highly contaminated with aflatoxins (100% of the samples). Although to a lesser extent, in terms of frequency and maximum levels, maize and rice are also contaminated with aflatoxins.

The Ivorian experts recruited by the 3CI project did remarkable work and proved that the actors of the food safety exist in this country. The Ivorian media have been very supportive of project work and have supported the team in this project.

The main objective of the project, which was the appropriation of the National Health Committee of Ivory Coast by the governmental bodies, seems to have been achieved. Indeed, the Minister of Research of Côte d'Ivoire has publicly announced the creation of the National Agency for Food Safety. The French Development Agency and the African Development Bank will make available large sums of money to renovate the health security system and national agricultural sectors. The training of stakeholders in the food sector has been very successful.

Acknowledgement

We thank the European Union, in particular its Abidjan branch in Ivory Coast, for its financial support, which has enabled the creation of the Ivorian National Health Agency through the funding of the EuropeAid 3CI project N° DCI/NSAPVD/2010/64.

References

[1] Information bulletins of the National Coordinating Committee for Food Safety Actions in Côte d'Ivoire, 3C Ivoire info. No 1 November 2013, No 2 December 2014 Contact: Assin Hubert assinhubert@yahoo.fr.

[2] Initiatives of the UEMOA Commission on food security, population and market. Meeting of the Working Group of the Secretariat of the Club of Sahel and West Africa (CSAO/OCDE) on the work program 2011-2012 (2011). https://www.oecd.org/fr/csao/dossiers/47427488.pdf.

[3] Final report, regional conference FAO/OMS for Africa « Concrete actions to promote food safety », Harare (Zimbabwe). 3-6 october 2005. http://www.fao.org/docrep/meeting/010/a0215f/a0215f00.htm.

[4] Regulation (UE) N° 1881/2006 of the Commission of 19 december 2006 fixing maximum levels for certain contaminants in foodstuffs. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri = OJ:L:2006:364:0005:0024:FR:PDF.

[5] Manizan L, Oplatowska-Stachowiak M, Campbell K, Metayer I, Akaki D, Montet D, Brabet C. Multi-mycotoxin occurrence in the cereal and oilseed products most consumed in Côte d'Ivoire. Oral communication with referees, 1st African Symposium on Mycotoxicology (ASM), 26-28 may 2015, Livingstone, Zambie. http://www.asm2015.co.za/.

Please cite this article in press as: Didier M et al. The success story of the implementation of the national food safety agency in Ivory Coast. Egyp. Jour. Bas. App. Sci. (2017), http://dx.doi.org/10.1016/j.ejbas.2017.07.004