Ex-post Evaluation of Project STDF 114 " Sustainable and effective aflatoxin management system in Brazil nut production "

Final Report for:

WTO, STDF Secretariat

Submitted by:

Mrs Marta Bentancur
International Trade Consultant

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TABLE OF CONTENTS

Glossary of Acronyms

CAC	Codex Alimentarius Commission
CAPEB	Cooperativa Agroextraativista dos Produtores de Epitacionandia e Brasileia
CIRAD	International Cooperation Centre in Agronomic Research for Development. France
COOPERACRE	Cooperativa Central de Comercializacao Extrativista do Eastaod de Acre Ltda.
CCCF	Codex Committee on Contaminants in Foods
CSL	Centre Science Laboratory-United Kingdom
EMBRAPA	Brazilian Agricultural Research Corporation
LACQSA	Laboratorio de controle de qualidade e Seguranca Alimentar
LANAGRO	Laboratorio Nacional Agropecuario
NFA	National Food Administration. Sweden
SPS	Sanitary and Phytosanitary Measures
STDF	Standards and Trade Development Facility
MAPA	Ministry of Agriculture, Fisheries and Supply. Brazil

EXECUTIVE SUMMARY

This document provides an evaluation of the project "*Validation and transfer to the key stakeholders of a sustainable and effective aflatoxin management system in the Brazil nut production chain for recovering and consolidating export markets, particularly in Europe*" funded by the STDF, and implemented from June 2006 to November 2008 (final report submitted in February 2009). The main project proposition was to deliver an effective and sustainable management system for aflatoxins in Brazil nuts (BN), through a structured research component, followed by a dissemination phase and the involvement of private sector actors during project meetings and activities, to be held particularly in the States of Para and Acre. The evaluation methodology focused on detailed review of project documentation as well as other data and information available, and the feedback from relevant stakeholders and project implementers through structured surveys.

In the view of most of the respondents to the surveys, the project was the right answer to the constraints faced by the Brazil nut production chains in the areas of Acre and Para. There is generalized agreement that the SafeNut project contributed to narrowing knowledge gaps, especially improving awareness of the critical points and factors for fungal growth and aflatoxin production, as well as increased local capacity for aflatoxin surveillance and control. Under the project, an extensive number of scientific papers and documents were produced, advancing global knowledge of aflatoxins.

Although the project was formulated to identify effective methods for reducing aflatoxin contamination, from a technical and socio-economic point of view, given the time-frame and project resources, the project prioritized the research phase, which resulted in the validation of practices that were at that time recommended in the national code of practices and by the Codex Alimentarius Commission, with the findings demonstrating that the current recommendations were not effective in reducing aflatoxins in unshelled nuts to within European tolerance limits. Some of the recommended Good Extrativist Practices (GEP) emerging from the project have been questioned from the perspective of their applicability/practicability in the context of the Amazonian region. The focus on research provided little opportunity, at the end, to test the practical applicability of the recommended practices, understand the economic implications of those practices, as well as the implications for supply-chain restructuring.

Furthermore, the research focus also limited the capacity of the project to disseminate results. There is an apparent unbalance between the number of dissemination activities (e.g. papers) specifically targeting Brazilian stakeholders, and those of a more scientific nature, targeting the international scientific community and other actors in the international context. In a way, this is understandable, as further adoption and validation of critical recommendations emerging from the project are needed before moving toward broader dissemination among producers.

The project was effective in improving knowledge and developing skills, particularly as related to aflatoxin analysis, but delays in the implementation of some activities might have compromised the efficiency of the project. In spite of this, the project can be seen as a model for institutional cooperation and coordination of efforts. It was able to bring together different institutional capacities, put in place a very structured planning process for the implementation and coordination of activities and distribution of responsibilities among partners.

The overall project objective was to find ways to effectively control aflatoxins so the Brazilian industry could regain position in international markets, particularly the EU. However, by the time the project was formulated, there was clear indication that the strategic orientation of the industry, in the face of stricter EU regulatory requirements, was to re-direct trade to less stricter markets (primarily Bolivia), where companies subsequently process and export shelled nuts to the US and Europe. A few companies have tried to shift product lines toward processing (shelling) for which the problem of aflatoxin contamination is more manageable.

Thus, given the presence of alternative regional and international markets and the lack of price differentiation achieved through improved quality, the project highlighted the fact that there are few incentives to apply the project's recommended practices to achieve the lower aflatoxin levels required by the EU market.

Until now, exports of in-shell nuts to the EU have not resumed and have continued to decline. The EU has recently loosened its regulations on aflatoxins for BN, and this may create incentives for the industries to re-engage in export of in-shell nuts.

It is clear that reducing the levels of aflatoxins in order to supply the EU market with in-shell nuts, through the implementation of improved practices, would require further coordination between industry players. The relevance of the project may not be best measured in terms of the solutions—practical or not—provided to the industry to achieve an effective control of aflatoxins, rather, the relevance of the project's outcomes is better assessed in terms of the insights provided into the complexities of supplying in-shell nuts, in a sustainable manner, to the EU market, under stricter standards, and on the challenges that achieving sustainable compliance would represent for the in-shell industry. As stated by one of the Peruvian private actors "*The presence of aflatoxin is undoubtedly a significant problem for BN exports. The SafeNut project has identified possible methods to avoid this problem. However, the problem of controlling aflatoxin on in-shell BN, is a Brazilian problem, the Peruvian industry does not export in-shell nuts."*

There may have been opportunities within the project to better contextualize the challenges according to market options and actor capabilities; however, it is clear that the impact the project may likely have in the future is linked to the capacities of the industry and public actors to act together to use the knowledge generated by the project to clearly define the industry's orientation and abilities to satisfy demands in different markets with different BN products. If the Brazilians remain engaged in exports of in-shell BN, they have gained significant insights and improved understanding, through the SafeNut project and other critical research done by others, of the complexities associated with doing so. From the STDF perspective, improving the actors' understanding of those complexities is itself a significant achievement.

1. INTRODUCTION

1.1. Context

During the last few decades, international trade of food products has been dominated by increasingly strict measures adopted by countries in the wake of a series of food safety scares and crises, in the context of expanded trade, increased scientific knowledge about various food safety hazards, and improved access to modern technologies for detection and analysis. Awareness of the safety risks associated with the consumption of food products contaminated with mycotoxins, and aflatoxins in particular (Aflatoxins are toxic secondary metabolites produced by *Aspergillus sp.* under conditions that favour the growth of these fungi and toxin production) has increased significantly since the early 1990s. The European Union established its harmonized levels for aflatoxins in 1998, and Codex Alimentarius, in 1999. Many other countries have followed, setting their own permitted levels. The maximum levels permitted by the EU are the strictest in international trade. These levels apply to a wide range of products, including Brazil nuts (BN).

Brazil nuts represent one of the most important non-timber forest products of extractivistic exploration in the Amazon region. The Amazon rainforest consists of multiple ecosystems with a huge biodiversity. It has an important role in the global weather balance and it provides the shelter and sustenance for many native ethnicities. The equatorial climate is hot and humid, with an average temperature of 26ºC and relative humidity 80-95%. The fruit pods are collected in the forest when they have fallen down from the wild and tall trees (*Bertholletia excelsa* Humb. & Bonpl.) and chopped open to obtain the nuts in-shell. Most of the collected Brazil nuts are subject to minimal processing for export either in-shell or shelled (as a kernel). The number of collectors and processors making a living from the BN industry is estimated at about 1.2 million in Brazil, 600,000 in Bolivia and 200,000 in Peru.[1]

As a result of the enforcement of the EU regulations on aflatoxins, the EU's oversight of Brazil nuts intensified in the early 2000s, due mainly to the increasing number of border notifications related to contaminated nuts, which were predominantly from Brazil. In 2003, the EU issued specific directives on BN originating in or consigned from Brazil, with tremendous implications on the country ´s exports. Between 2000 and 2004, Brazilian exports of unshelled Brazil nuts, primarily to the European Union, fell by almost 90 percent. Several actions had been taking place not only in Brazil, but also in Peru and Bolivia in order to be able to control contamination by aflatoxins and to be able to achieve international sanitary requirements to allow market access.

[1] Codex Committee on Contaminants in Foods. Rotterdam, the Netherlands, 23 - 27 March 2009—Proposed Draft Maximum Levels for Total Aflatoxins in Brazil Nuts (N11-2008)

Table 1. Summary of the STDF Project 114

<table>
<tr><th colspan="3">STDF 114--Validation and transfer to the key stakeholders of a sustainable and effective aflatoxin management system in the Brazil nut production chain for recovering and consolidating export markets, particularly in Europe.</th></tr>
<tr><td colspan="3">Overall objective</td></tr>
<tr><td colspan="3">To validate and transfer to the key stakeholders a sustainable and effective safety management system for reducing and controlling the occurrence of aflatoxins along the Brazil nut production chain. This work is aimed at enhancing the capacity to meet the international sanitary standards, in particular the recent stricter European regulations, for recovering and consolidating export market access, to protect human health and prevent deforestation of the Amazonian forest.</td></tr>
<tr><td colspan="3">The specific objectives</td></tr>
<tr><td>1-3 applied research component</td><td>4-disemmination component</td><td>5-the organization and implementation of project meetings and workshops</td></tr>
<tr><td colspan="3">1. Characterization of the Brazil nut production chain, and formulation of organizational and incentive strategies for safety control.
2. Validation of recommended good practices in the Brazil nut production chain for aflatoxin control.
3. Validation and implementation of a rapid aflatoxin surveillance system for use along the Brazil nut production chain.
4. Knowledge and technology transfer to the key stakeholders.
5. To strengthen the public-private dialogue and partnership in the Brazil nut sector.</td></tr>
<tr><td colspan="3">Activities</td></tr>
<tr><td>Activity 1-Describe the current conditions of Brazil nut production and commercialization in the Brazilian States of Acre and Para, and their constraints and opportunities for aflatoxin control.</td><td>Activity 2-Formulate propositions to improve the organization and to provide better
incentives for the development of a sustainable Brazil nut production chain.</td><td>Activity 3-Validate and update existing recommendations of good practices in the Brazil nut production chain for aflatoxin control through in-field case studies and the development of a simple predictive model for aflatoxin and fungi production.</td></tr>
<tr><td>Activity 4- Adapt and validate rapid methods brought in to the project for aflatoxin analyses in Brazil nuts - e.g. Enzyme Linked Immunosorbent Assay (ELISA) and Lateral Flow Device (LFD)-; complete protocol /standard operating procedure; and implement them in Brazil in the laboratory, the Brazil nut production area and one processing plant.</td><td>Activity 5-Disseminate project information and results through different information systems (website with details & outputs from the project ; scientific and specific sector publications, etc).</td><td>Activity6-- Training courses in ELISA and LFD for aflatoxin analyses in Brazil nuts, AFPA agar plate methodology for the identification of aflatoxin producing fungi and good practices in the Brazil nut supply chain for the project participants and other key stakeholders.</td></tr>
<tr><td colspan="3">Activity 7-Organize project meetings and workshops (kick off meeting and first workshop, progress meeting and final workshop).</td></tr>
<tr><td colspan="3">Outcomes/Indicators of Success</td></tr>
<tr><td colspan="3">1. Current conditions of Brazil nut production and commercialization in the Brazilian States of Acre and Para will be described along with the major constraints and opportunities for aflatoxin control.
2. Availability of information and analysis through reports on the full identification of production chains and the effectiveness of existing codes of practice will allow the output of a predictive model for the probability of aflatoxins in Brazil nuts. The model outputs combined with (1) above will lead to the reformulation of a Manual of Safety and Quality in Brazil Nuts.
3. Inexpensive and rapid assay for use in the laboratory and on-site throughout the production chain will be available to complement existing confirmatory and standard HPLC methods. These “new” methods will be adapted, developed and fit for purpose evaluation carried out specifically for and within the Brazil nut industry. The output of technical training will be carried out with key stakeholders in the Brazil nut industrial area. In addition to the assays for aflatoxins, analytical methods for the causative organisms (A. flavus/A. parasiticus) will be implemented in the Brazilian laboratories close to the Brazil nut production areas.
4. Training outputs will be knowledge & technology transfer to the key stakeholders. This will include training courses and material on of AFPA agar plate methodology, ELISA, LFD and good practices in Brazil nut production chain. Other outputs will include the implementation and maintenance of a project specific website and scientific and specific sector publications. Some of the latter will also be available on the website.
5. In addition to the outputs of (4) above, there will be a kick off meeting at the beginning, and progress meetings throughout the development of the project and a final workshop. These will include Brazilian, Bolivian and Peruvian key partners.</td></tr>
<tr><td colspan="3">Foreseen Impacts</td></tr>
<tr><td colspan="3">• Protect and promote human health through the commercialization of safer Brazil nuts and by avoiding the reintegration of rejected contaminated lots in the national market of the producing countries. This applies to: consumers in the Amazon region and Brazil nut producing and importing countries, both raw nuts and processed products like flour and biscuits that are frequently consumed by school students in the Brazilian North region.
• Alleviate the poverty of the local Amazon population through the reduction of Brazil nut post-harvest losses due to aflatoxin contamination, and consequently income generation.
• Preserve the Amazon forest against deforestation and thus the biodiversity through the valorisation of the Bertholletia excelsa tree that depends on other species for pollination and fruit production.
• All the expected socio-economic and environmental project impacts are considered to be positive and will contribute to the sustainable development of the Amazon region.</td></tr>
</table>

In 2005, several international organizations experienced in leading aflatoxin research and/or other activities related to aflatoxin prevention and control, came together to complement the efforts undertaken by the Brazilian government in support of compliance with stricter international standards. A project proposal was elaborated, aimed at: reducing and controlling aflatoxin contamination in the Brazil nut production chain to levels that meet the international sanitary standards, in particular the stricter European regulation, and

transferring best practices along the key stakeholders within the chain. The main contributions that the project was expected to made included: building synergies between the public and private sector for sustainable production, recovering and consolidating the international markets, protecting human health, and preventing deforestation of the Amazonian forest.

The Standards and Trade Development Facility (STDF), in its role of facilitating trade, through assisting developing countries enhance their expertise and capacity to analyze and to implement international sanitary and phytosanitary (SPS) standards, improving human health, and thus increase the ability to gain and maintain market access, served as the main partner to fund these collective institutional efforts.

The request for STDF funding for the proposal came from the Brazilian government through the Ministry of Agriculture, Livestock and Supply. The proposed executing agency was the Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD) in France, in partnership with: the National Food Administration (NFA) in Sweden; the Central Science Laboratory (CSL), in the United Kingdom; R-Biopharm AG company, in Germany – As a sub-contractor of CSL; the Brazilian Ministério da Agricultura, Pecuária e Abastecimento (MAPA), and the Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA). The project was expected to deliver an effective and sustainable management system for aflatoxins in BN, through a structured research component, followed by a dissemination phase and the involvement of private actors during project meetings and activities. The summary of project objectives, activities, outcomes and impacts is presented in Table 1 above.

The regions for implementing the project included the States of Para and Acre. The SafeNut project was approved by the STDF in March 2006, within the framework of STDF Theme 2: "Capacity building for public and private organizations, notably with respect to market access", and ran for 30 months, from 2006 to 2008 (Final Report-February 2009). The description of the role of each partner is presented in Table 2. The total project budget was US$826,219—75 percent represented by STDF contribution, and 25 percent from MAPA and the other partners.

Table 2. Specific Roles of Partner Organizations

CIRAD	General Coordination. Scientific support for technical and socio-economic issues (agri-chain analysis, good practices, appropriate post-harvest technologies).
NFA	General scientific coordination. Scientific support for fungi identification and characterization. Links with European policy and mycotoxin clusters.
CSL	Scientific support and coordination with industry of the work on rapid immunoassays for aflatoxins.
MAPA	Support for the development and validation of quantitative and screening aflatoxin analytical methods. Field support for the execution of the project activities in the State of Para. Links with the Brazil nut chain stakeholders.
EMBRAPA	Field support for the execution of the project activities in the State of Acre. Links with the Brazil nut chain stakeholders.

1.2. Objectives of the evaluation

The international consultant Mrs. Marta Bentancur was selected to conduct the ex-post evaluation of the project. She is a freelance advisor to governments, private enterprises and international organizations in food safety and quality management systems. She is independent from all the parties concerned and has no other conflicts of interests that could affect the objective conduct of the evaluation. The structure and framework for this evaluation is based on the STDF's standard guidelines for the evaluation of projects funded by the STDF and on the OECD-DAC Principles for the Evaluation of Development Assistance. As per the applicable terms of reference, the objective of this evaluation is to verify whether the project achieved the objectives set out in the project document in the light of STDF evaluation criteria; and identify whether the project has achieved any of the higher level objectives: measurable impact on market access; an improved domestic/regional SPS situation; poverty reduction; and identify key lessons learned for the benefit of both recipients and donors and for future STDF program development.

2. METHODOLOGY

The evaluation of the STDF 114 was organized around the standard evaluation criteria of relevance, effectiveness, efficiency, impact, sustainability and lessons learned. From these criteria analysis, a set of conclusions and recommendations were detailed.

The evaluation was conducted as a desk study, including the following phases:

i) *Detailed review of project documentation*— This included a review of project quarterly and final reports, workshop materials, the project action plan, the project's web site, studies/technical reports, workshops´ materials, educational materials for Good Practices Training, etc., and other project- related documents sent to the evaluator by the STDF Secretariat and the project's general and scientific coordinators, Catherine Brabet and Monica Olsen, respectively. Organization web sites consulted included those of: the EU, the STDF, Codex Alimentarius, and private companies. COMTRADE was the source for statistical data on trade.

ii) *Gaining views/insights from relevant stakeholders and project implementers*—Following this input, two survey questionnaires were structured in collaboration with the STDF Secretariat, based on the standard evaluation criteria (Annex 2). One of them was distributed among partners and project implementers, and a second questionnaire was distributed among more direct project beneficiaries— processors and exporters.

To facilitate responses, both questionnaires were sent in English, Portuguese and Spanish, according to the stakeholders' mother tongue. In spite of the efforts made by the evaluator, not all stakeholders returned the questionnaires dully completed. A total of nineteen questionnaires were distributed among project implementers/partners, with ten replies received; while four companies, out of ten, gave their opinion on the project.

A preliminary list was elaborated including relevant stakeholders selected from the partners' institutions and other independent beneficiaries, as well as processors, exporters and participants in training courses. Annex 3 presents the list of total implementers and processors-exporters contacted, including the information of those who finally returned the questionnaire. The methodology applied has limitations, including the following:

a) Ability to accurately determine the relevance and impacts of the activities proposed by the project from the perspective of the end-beneficiaries—this is due to the fact that the project was implemented in parallel to other government-led initiatives. Therefore, from the responses of some beneficiaries, it is clear that isolating the results of the SafeNut project from those of other activities becomes problematic. Similarly, a more robust number of responses would have been desirable (four out of ten of the contacted producers/exporters completed the survey), although the responses to the survey by the beneficiaries provided invaluable insights on their perspectives, in terms of project outcomes and possible impacts.

b) Project implementers provided valuable insights to the evaluator, however, there are possibilities for bias to be introduced as respondents may feel that their performance is being assessed, reducing the objectivity of their responses. The evaluator has reviewed extensive background documentation in an effort to gain a better understanding of the facts and compensate for this potential bias.

c) It is quite challenging to quantify the impact of SPS-related capacity-building activities in terms of higher level objectives of the STDF—country trade performance, improved overall SPS situation, poverty reduction, etc.—within the context of very short-term project activities. Thus, to establish a link between the project activities and the achievement of higher order objectives of the STDF is difficult.

3. MAIN FINDINGS

3.1 Relevance

Acute exposure to aflatoxins at high levels can be lethal. Cronic exposure is more pervasive, with epidemiological studies showing a strong correlation between aflatoxin levels in the diet and development of cancer. Aflatoxins are a particular problem in nuts, especially in groundnuts and tree nuts growing under ideal conditions of temperature and humidity for mould growth. Although the size of the Brazil nut worldwide production is relatively small, estimated at 28.806 metric tons in 2006[2] (kernel basis) it represents an important source of livelihood for the producers involved in its extractive exploitation (as there is no commercial production), and a potential risk to public health, due to high risk of aflatoxin contamination of the product along the chain, resulting from the specific conditions of production and marketing[3]. According to samples taken by official authorities in Brazil during the period 1998 to 2004, in-shell Brazil nut samples showed significantly higher levels of contamination than shelled Brazil nuts. Thus, the strict aflatoxin standards applied by the EU since the late 1990s, the main destination market for Brazilian BN until 2002, represented certainly a tremendous challenge for the industry, whose bulk of its exports is in unprocessed form (in-shell nuts). A summary of EU regulatory developments related to Aflatoxins in Brazil Nuts, including those applying only to in-shell BN originating in or consigned from Brazil, is presented in Table 2.

Table 2. EU regulatory developments on aflatoxins in Brazil Nuts

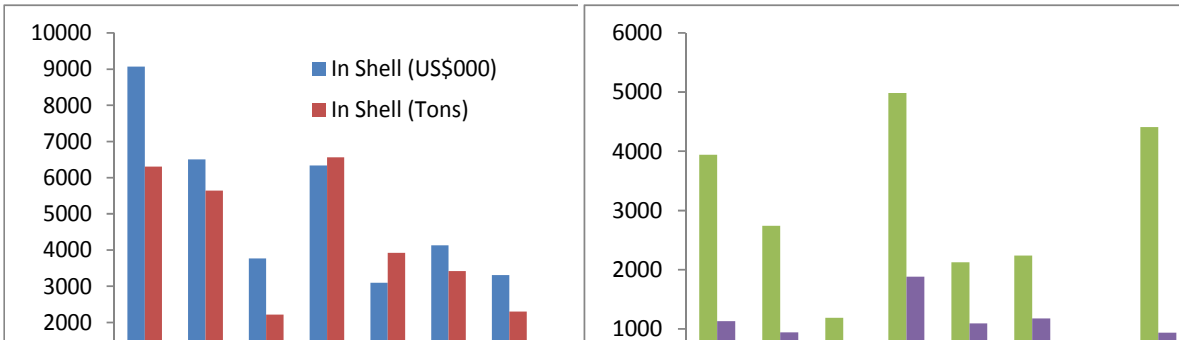
Objective	Regulations/Description
Provision setting maximum levels of aflatoxins (including Brazil nuts)	The aflatoxin maximum levels (aflatoxins B1, B2, G1,maximum levels G2, and M1), originally laid down in Commission Regulation (EC) No. 1525/1998, were maintained in effect from April 2002 by regulation EC 466/2001. Commission Regulation (EU) No 165/2010 of 26 February 2010 amends Regulation (EC) No 1881/2006 setting maximum levels for certain contaminants in foodstuffs as regards aflatoxins, to include Brazil Nuts. Under this regulation, the levels for Brazil nuts intended for direct human consumption or use as an ingredient in foodstuffs have been amended taking into account Codex Alimentarius developments. Levels for Aflatoxin B1 shifted from 2 µg/kg to 5 µg/kg, and for total aflatoxin from 4 µg/kg to 10 µg/kg. Levels for Brazil nuts, to be subjected to sorting, or other physical treatment, before human consumption or use as an ingredient in foodstuffs, are established at 8 µg/kg for B1 and 15 µg/kg for total aflatoxins. The regulation specifies that the maximum levels refer to the edible part of the tree nuts. For tree nuts "in-shell" are analysed, and it is assumed, when calculating the aflatoxin content, all the contamination is on the edible part, except in the case of Brazil nuts. The total aflatoxin content in BN considers also the aflatoxin present in the shell.
Provisions for methods of sampling and analysis for the official control of aflatoxins	Provisions for methods of sampling were laid down in Commission Directive 98/53/EC of July 16, 1998. This directive was replaced by Regulation (EC) No. 401/2006, which unifies, in a single document, the sampling procedures and analyses for mycotoxins, including aflatoxins.
Specific provisions on Brazil Nuts originating in or consigned from Brazil	- Commission Decision 2003/493/EC of 4 July 2003 imposing special conditions on the import of Brazil nuts **in-shell** originating in or consigned from Brazil. - Commission Decision 2004/428/EC of 29 April 2004 amends Decision 2003/493/EC as regards the points of entry through which Brazil nuts **in-shell** originating in or consigned from Brazil may only be imported into the Community. - Commission Decision 2006/504/EC requiring that all costs resulting from sampling, analysis, storage and all costs resulting from official measures taken as regards non-compliant consignments related to the official controls of foodstuffs from Brazil pursuant to this Decision are to be borne by the importers or food business operators concerned and restricting the analyses to the official laboratory which can provide guarantees as regards the analytical results and to impose strict conditions regarding the return of nonconforming lots. - Commission Regulation (EC) No 1152/2009 of 27 November 2009, repealing Decision 2006/504/EC— Experience has shown that the additional conditions for non-compliant shipments of **unshelled** Brazil nuts imported from Brazil are no longer necessary, since such shipments can be handled in accordance with the general provisions for non-compliant shipments and those additional conditions should therefore be repealed.

[2] Marcio Bayma et al. Dinamicas, procesos e atores da cadeia produtiva da castahna-do-brasil nos estados do Acre e do Pará, Brasil. Novembro de 2008.

[3] Official analysis of 500 Brazil nut samples, shelled (302) and in-shell (198), collected in different sites of Brazil from 1998 to 2004 showed that 30 percent of the samples were above 4 µg/kg and 14 percent above 50 µg /kg for total aflatoxins, and 30,6 percent were above 2 µg /kg and percent above 50 µg /kg for aflatoxin B1, with levels up to 5000 µg /kg (8). In-shell Brazil nut samples showed significantly higher levels of contamination than shelled Brazil nuts (Reported by SAFENUT Project)

By 2000, the industry generated a total of US$26.7 million export revenue (nearly 19,000 tons), of which 41 percent was represented by exports to the EU (about 8,500 tons). By 2003—the year in which the EU issued specific provisions on in-shell BN originating in or consigned from Brazil—the total country exports declined to US$10 million (nearly 7,000 tons), of which only US$3.8 million represented exports to the EU (2,500 tons), a decline of nearly three-quarters the value reached in 2000. However, by 2005, the total country exports had experienced a significant recovery, reaching the highest value ever, US$34 million (over 17,000 tons), yet the share of EU exports reached only 15 percent (mainly shelled nuts), while the share of exports to the US and to Bolivia reached 35 and 50 percent, respectively. Brazil's exports to the EU has been in decline, in both segments—in-shell and shelled nuts (Figure 1). Exports of shelled nuts experienced a short boom in 2004/2005, and later in 2007, with product mainly exported to the US market.

Figure 1. Exports of Brazil Nuts to the European Union from Brazil (In-shell and Shelled)



Source. Calculations based on COMTRADE data

Thus, export data seem to suggest that in the face of stricter regulatory requirements, the strategic orientation of the industry has been to re-direct trade to less stricter and less profitable markets, increasingly Bolivia, where companies subsequently process and export shelled nuts to the US and Europe. Similarly, efforts have been made by the companies to find alternative markets, such as Hong Kong (China), Vietnam, etc., with relative success, although exports to these destinations are not yet done in a very consistent manner (Figure 2). Figure 2 below also indicates that BN have continued to serve as a source of livelihood for the Brazilian producers, even in the face of declining opportunities for exporting in-shell nuts to the EU market.

Figure 2. Main destination markets for Brazil nuts from Brazil (Tons)

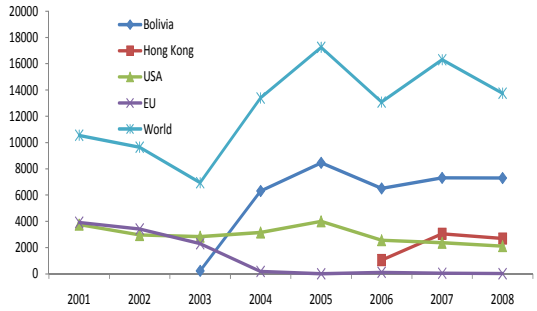
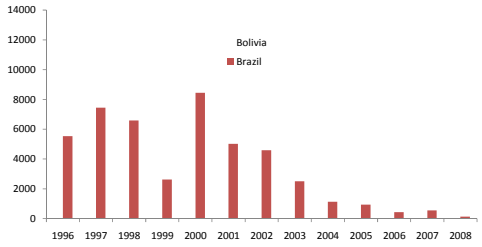


Figure 3. Brazil and Bolivia exports of Brazil nuts to the EU (Tons)



Source. Calculations based on COMTRADE data

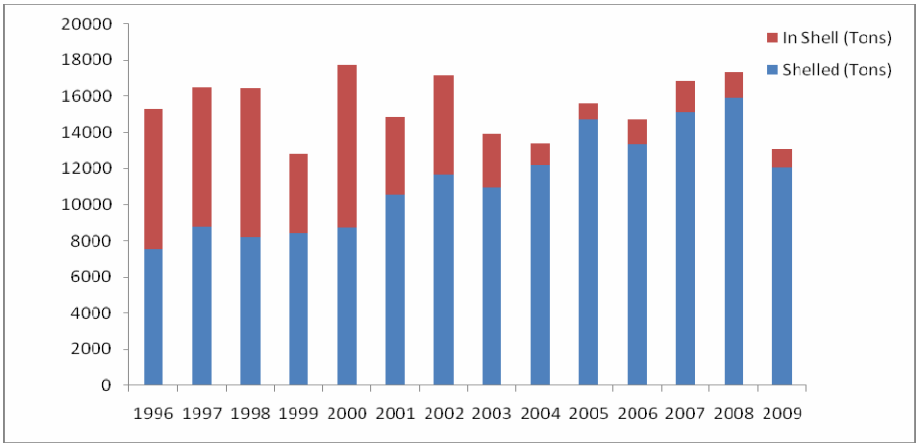
As illustrated in Figure 3 above, Bolivia has successfully been able to consolidate its position as the main supplier of BN to the EU and is increasingly gaining market position in the US market. In 2009, its exports to the EU reached nearly 12,000 tons, about 56.6 percent of total country BN exports.[4] Exports to the US reached over 6,000 tons. The country's strategy has been to add value through processing— about 98.7 percent of Bolivian exports are as kernels (shelled nuts).[5] The industry in Bolivia has also been very proactive

[4] The value of total BN exports from Bolivia was estimated at US$72.8 million in 2009 (COMTRADE Data)
[5] The export value of a ton of in-shell BN from Bolivia reached US$1320, while the corresponding value for a ton of shelled BN was US$3495.

in responding to the challenges imposed by strict EU regulations, pushing for changes in national regulatory requirements, diversifying product lines, investing in technologies, and imposing strict quality and testing controls for aflatoxins (Coslovsky, 2006).

Overall, international trade for shelled nuts has been showing more dynamism in recent years, with the volume imported by the EU in 2008, for example, almost doubling the volume imported in 2000. It is apparent that importing shelled nuts has been the strategy adopted by many international buyers to minimize risk of contaminated consignments, as it has been proved that removing the shell can significantly reduce contamination.

Figure 4. EU Imports of Brazil Nuts (Tons)



Source. Calculations based on COMTRADE data

The SafeNut project proposition: achieving compliance to regain the EU market

It is apparent, that the SafeNut project activities were formulated to respond to the recommendations of the European Union resulting from the missions undertaken to Brazil in 2003 and 2004, to verify whether facilities and measures were in place to control aflatoxin contamination of Brazil Nuts[6]. The mission recommended undertaking a structured scientific research to identify which stages in the process and under what conditions (moisture content, time and temperature) *Aspergillus flavus/A parasiticus* contamination and aflatoxin synthesis occurs. As a result of that research, proceed with development and dissemination of GAPs and GMPs. Additional recommendations included the amendment of sampling protocols and the review of export procedures, as well as recommending the analysis be carried out by an accredited laboratory, etc.

The current process of Brazil nut harvesting, transport, processing and export is poorly defined and varies significantly between states and even between neighboring villages. Control over such a process, particularly in remote and inaccessible areas, and due to problems of illiteracy and poor infrastructure, is difficult. The crucial points of mould contamination and aflatoxin synthesis are not known. The assessment of crucial parameters such as moisture content and presence of mould spores has not been carried out. This makes the implementation of adequate controls (such as GAP and GMP) difficult. The conditions observed indicate that at most stages of the chain there is visible mould activity and high moisture levels, conducive to mould growth.

Damage to shells, which exposes kernels, and visible mould activity was noted particularly during the extraction and transport stages. There is, therefore, a high risk of the raw product being contaminated with aflatoxin. There is currently no adequate traceability system in place in relation to Brazil nuts, either during the process chain, or in relation to export procedure and certification.

Source. EU Directorate Food and Veterinary Office-DG(SANCO) 9027/2003

The project proposition was then to identify, through research, the critical control points for aflatoxin contamination along the chain, and with these results update the manual of safety and quality in Brazil nuts published in 2004 by the Brazilian authorities under the Program of Safe Foods (PAS) - Farm Sector program, and that served as the reference for the proposed practices highlighted in the Codex Code of Practice for the

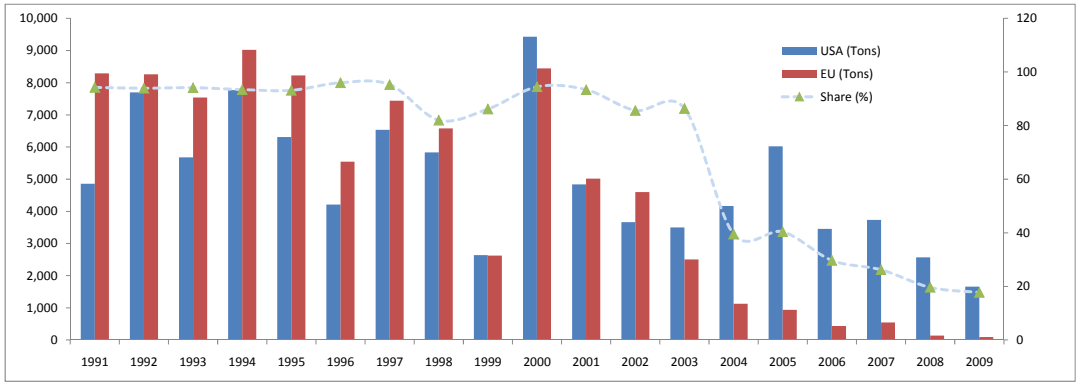
[6] By 2002, 48 notification of BN exceeding the EU required levels, mainly dispatched from Brazil, were reported by the EU.

Prevention and Reduction of AFT Contamination in Tree Nuts, that were specific to BN.[7] In parallel to this research, identify organizational and incentive strategies for the sustainable implementation of practices/improvements and validate and implement a practical surveillance system to be used by different actors along the chain. All of this was expected to result in a *sustainable and effective aflatoxin management system.*

However, the project was not implemented in isolation. It complemented the initiatives already undertaken by the Brazilian Government to respond to the stricter EU regulation, which included: supporting the creation of domestic demands for in-shell nuts; awareness creation and training on good practices; improving laboratory infrastructure; and raising voice to level the playing field, through advocating for the establishment of less stringent standards, including the establishment of specific, internationally accepted levels for in-shell Brazil nuts[8]. In parallel, the scientific effort to be undertaken by the SafeNut project, including the dissemination of the validated practices, was expected to bring improvements in the safety of the BN production to regain participation in international markets, particularly the EU. Thus, within the context of this integrated approach, the added value of the SafeNut project proposition to ongoing activities was undeniable.

It is apparent, however, that the assumption underlying the project objectives and activities was that the main factor underpinning the competitiveness of the Brazilian BN chain was the difficulty in complying with the stricter EU aflatoxin regulations. However, as presented in Figure 5 below, the importance of the USA market (which applies less restrictive levels for aflatoxins) for Brazilian BN has also been in decline. Brazil has successfully reached the US market with significant volume of shelled nuts (e.g. in 2004, 2005 and 2007), but this has not been done in a sustainable manner.

Figure 5. Brazilian exports to the EU and USA, and combined shared of total Brazilian exports



Source. Calculations based on COMTRADE data

Clearly, an underlying weak or fragile competitive position can be made worse by demands for better compliance with increasingly stringent standards. In the case of Brazil, competition from other country suppliers in the in-shell sector was low, as Bolivia and most recently also Peru, had developed a market for shelled products. Stricter regulatory EU requirements and its enforcement clearly highlighted the weakness of the Brazilian in-shell BN supply-chain and the lack of institutional arrangements for collective action.

The SafeNut project was implemented in a context in which the Brazilian industry in major production areas had opted to "non-compliance' as the strategic response to stricter EU requirements, and to search for alternative less demanding markets, rather than face the risk of rejected consignments, or act collectively to either add value through processing and/or significantly upgrade operations to achieve compliance. For example, given the proximity of the production areas around Acre to Bolivia, more than 60 percent of the production from this state is shifted to Bolivia for further processing (shelled nuts) and exportation (SafeNut final project report).

[7] The code is currently under revision, to include the recommendations of the SafeNut project. During the Fourth Session of the Codex Committee on Contaminants in Foods held in May 2010, the proposed draft revision of the Additional Measures for the Prevention and Reduction of Aflatoxin Contamination in Brazil Nuts was moved from step 5 to 8 and included in the Agenda for approval by the Codex Commission to be held in June 2010.

Thus, although the project proposition was relevant in the context of declining Brazil exports to the EU, the project's focus on in-shell nuts to be exported to the EU (and on the allowed levels permitted by the EU at that time) may have represented a missed opportunity to:

a) provide detailed recommendations on the set of practices to be implemented by the Brazilian players to prevent aflatoxin contamination within the context of less stringent markets (including domestic markets) and/or according to intended used (exported shelled versus in-shell nuts). The project clearly pointed out that the recommended practices under the current code of practice were not appropriate to reduce aflatoxin levels to those applied by the EU authorities. Yet, the final recommendations of the project are less clear in indicating if those practices were enough to provide safety assurance, within the context of nuts intended for further processing (shelled nuts) before being exported to the EU or to less demanding markets.b) undertake a detailed identification of constraints/opportunities and policy recommendations to support a shift on product line towards processing (e.g. shelled nuts)—a more dynamic segment of the international market.

The target: a system approach based on prevention along the chain rather than on product-end testing controls

Proven methods to reduce aflatoxin levels in Brazil nuts include shelling or sorting by size, specific gravity, colour or damage, which are applicable by many of the companies supplying shelled nuts to the international market. The focus of the project was then to develop sustainable and effective aflatoxin management practices for a supply chain providing the EU market with in-shell nuts, with an emphasis on the development of good extrativist practices (GEP). The project put little emphasis on improvements at the company level.

In the view of the organizations involved in the implementation of the project and of the few beneficiaries reached through the survey, the project was the right answer to the constraints faced by the Brazil nut production chains in the areas of Acre and Para, as it allowed for the determination of the critical control points for aflatoxin contamination and control (see Table 2). Four out of 13 respondents—including two of the four direct beneficiaries of the project that responded the survey—considered that the project was somewhat adequate. One of the reasons mentioned by the respondents for this was due to the extractivist nature of BN production, making the SafeNut project recommended practices difficult to be implemented by many communities. Thus, in the view of the respondent, the development of an appropriate selection method to be used by the companies seemed more imperative—During the first planning meeting of the project, the lack of reliable criteria for the Brazil nut selection procedure, and consequently, the need to develop selection methods applicable to the whole chain, were identified by the stakeholders as very relevant. It is apparent, however, that the focus on GEP may have represented a missed opportunity to achieve important gains in terms of proposing a more effective method of control at the level of the processing companies, as the need for further development and validation of the current quality control system implemented by the companies, was one of the follow-up actions proposed by the project, in the final report.

The perception of the somewhat applicability of the recommendations is emphasized by the answers of three out of the four surveyed beneficiaries on the specific question about applicability, one of them, once again indicating that the recommendations of the project are partially applicable due to the difficult conditions of the Amazon region.

In retrospective, to what extent were the activities proposed by the SAFENUT project the right answer to address the constraints faced by the Brazil nut production chains in the areas of Acre and Para?	Project implementers and organizations involved	Adequate= 7 Somewhat= 3 Inadequate=0
From your perspective, did the SAFENUT project activities address the most relevant needs identified of the Brazil nut production chain?	Beneficiaries	Yes= 3 Somewhat=1
For beneficiaries only—In your view, are the recommendations of the project (good practices) applicable? (Consider here economic, cultural and other aspects)	Beneficiaries	Applicable= 1 Somewhat= 3 Not Applicable=0

Although the project was formulated to identify effective methods for reducing aflatoxin contamination from a technical and socio-economic point of view, given the time-frame and project resources, the project prioritized the basic research phase, providing little opportunity at the end to disseminate results and test the practical applicability of the recommended practices, understand the economic implications of those practices, as well as the implications for supply-chain re-structuring (e.g. better coordination between extrativists/producers, intermediaries, processors and exporters). Furthermore, although the project made efforts to contextualize the challenge of compliance within the broad socio-economic context, it fell short in better integrating the issue of compliance within the context of the overall competitiveness of the Brazilian industry in both the in-shell and shelled nuts segments of the market.

From a research point of view, the project certainly contributed to closing knowledge gaps in terms of the identification of critical control points where contamination occur and the interactions with environmental factors, while providing a set of recommended practices. However, as pointed out in the final project report, how the knowledge gained transfers into practical solutions still needs considerable action-oriented research and validation, including:

- testing the most effective drying method from a technical/cultural and socioeconomic perspective;
- testing the effect of storage conditions at the field level and the processing sites on moisture re-absorption;
- further development and validation of the current quality control system, used in most processing plants, by checking the percentage of "bad" nuts in the incoming lots;
- demonstrate proof-of-principle use of LFD in effecting quality, noting that its use would need to be based around a Hazard Analysis Critical Control Point (HACCP)-styled quality scheme that provided traceability to the gathering stage.

Thus, based on the evidence, and particularly on the conclusions of the final project report, by the end of the project the need for proven practical recommendations for sustainable and effective aflatoxin management for product to be exported in the in-shell form to the EU, still existed, although, it is undeniable that the findings of the project contributed to make a significant progress towards that end.

Many of these recommendations are particularly relevant for in-shell nuts as per the permitted levels by the EU authorities

According to the final project report, one of the main achievements of the project was *"to demonstrate that the practices recommended and implemented by some actors in the Brazil nut production chain based on the recommendations of the existing guidelines on good practices, in particular the Codex ones, were not effective for reducing aflatoxins in unshelled nuts below the European tolerated limits, without Brazil nut drying to a safe moisture content (water activity less than 0.7 in order to prevent fungal growth and aflatoxin contamination) within 10 days after collection and adequate storage conditions to avoid moisture re-absorption."*

Thus the focus on critical control points for in-shell product might have reduced the relevance of some of the project activities for the Bolivian players that were expected to benefit from the recommendations arising from project (Bolivia and Peru export mainly shelled nuts). Similarly, the recommendations of the project were based on the levels established by the EU at the time (4 µg/kg for total aflatoxin), however, in January of 2010, the EU loosened its requirements increasing the allowed levels from 4 µg/kg to 10 µg/kg for total aflatoxins, and from 2 µg/kg to 5 µg/kg for B1. Thus, although this might not have implications in terms of the project's recommended practices for drying and storage, it highlights the possible limitations of using the EU regulatory requirements (4 µg/kg) as the main reference point to guide the research, as the recommendations arising from the project are expected to be adopted by the Codex Commission.

A question that remains is whether the practices recommended prior to the SafeNut project, are sufficient to reduce aflatoxin to safe levels for domestic, regional, or less demanding international markets, and, therefore, is there a reason to continue to promote those practices, within the context of Brazil nuts supplying these markets. For example, according to results of parallel research, the levels of aflatoxins in good (edible) shelled Brazil nuts in lots to be exported from Brazilian plants as ready-to-eat are normally very low.

Conclusively, the SafeNut project contributed to narrowing knowledge gaps and its relevance may not be best measured in terms of the practical solutions provided to the industry to achieve an effective control of aflatoxins to the EU requirements in place at that time. Rather, the relevance of the project's outcomes is better assessed in terms of the insights provided on the complexities of supplying in-shell nuts, in a sustainable manner, to the EU market, under stricter standards, and on the challenges that achieving sustainable compliance would represent for the in-shell industry, in its current state.

There may have been opportunities within the project to better contextualize the challenges, according to market options and actor capabilities. Yet, the project has provided significant insights into recommended practices and the complexities for their implementation. It is expected that these insights will be the basis for a more critical dialogue among public and private actors on the strategic orientation of the industry, to include compliance as a critical factor, but also broader considerations determining industry competitiveness in the EU market, as well as in regional and other less demanding international markets. The recent amendments in the EU regulations have loosened the EU levels and the provisions applied on non-compliant consignments[9]; this may open opportunities and create new incentives for the implementation of recommended practices, or, in the lack of individual and collective action, it may reduce the incentives for improvements and push companies to assume risks, prior to making the required investments to sustain market participation.

3.2 Effectiveness

The project's effectiveness was examined in terms of the extent at which the objectives and outputs were achieved. The project defined a set of outcomes to assess performance, setting strict datelines for achievement of each activity and project outcomes. The project has been seen as an effective tool particularly to improve knowledge on the Brazil nut production chain, specially improving awareness of the critical points and factors for fungal growth and aflatoxin production, as well as increased local capacity for aflatoxins surveillance and control. Also, an important output was the set of technical and scientific documents which were produced. Most objectives and activities were performed as proposed, see Table 3. A set of products/outputs had been clearly defined in the Action Plan but some others did not include explicit expected outputs, for example, the dissemination activities.

The characterization of Brazil nut and complementary activities were partially achieved. As a result of the diagnosis, private/public sector roundtables had been planned but not realized. These would have certainly added value as an opportunity to perform a SWOT analysis from the beginning of the project. The update of the Manual of quality and safety for Brazil nuts, as a tool to assist training activities was not achieved within the period of the project.

In the case of validation and implementation of a rapid aflatoxin surveillance system for use along the Brazil nut production chain no clear outputs had been detailed and the perception from implementers, (3 out of 10 respondents) the objective was partially achieved and outcomes were too delayed to be effective within the project deadlines. Additionally, in the case of training within Specific Objective 4, the project did not specifically set indicators of performance in terms of number of courses, type and number of targeted beneficiaries, post-courses evaluations, etc. The project clearly prioritized the research phase over dissemination activities. There is an apparent unbalance between the number of dissemination activities specifically targeting Brazilian stakeholders, and those of a more scientific nature, targeting the international scientific community and other actors in the international context.

Public-private dialogue was partially achieved through several activities planned and realized during the project (Kick-off meeting, workshops). In general implementers and beneficiaries felt a satisfactory interaction among public and public sectors , but that there seems to be a generalized mistrust between the parties, with few exceptions, due to declining business within the region of the project.

[9] The new amendments have also highlighted the "risky" nature of in-shell nuts exports and therefore, it is not clear the influence this will have on EU importer perceptions on the product. For example, for in-shell products, the shell is part of the analysis for aflatoxins, and this contamination considered at the moment of determining the total content of aflatoxins (shell and edible part). There are positive developments as well, the EU regulatory developments, open the possibility of marketing intercepted consignments of in-shell nuts in the EU market, once the shell is removed, and therefore, minimizing exporter and/or importer losses.

In terms of the achievement of the project's overall goal, there is a generalized agreement that the project presented valuable information about critical control points and recommended practices, as well as increased local capacity for aflatoxins surveillance and control. Yet, in the words of some of one of the project implementers the project fell short in achievement of its overall objective: "*transferring to stakeholders those procedures, as well, designing methods to effectively prevent contamination, specially due to the long time between harvest times, limited the possibility to undertake practical experiments, to design those procedures more applicable to local reality of folk people and the industry.*" Six out of ten of the respondents from the institutions participating in the project considered that the project fell short in transferring project's results to the stakeholders. This might have a comprehensible explanation, the results of the research produced significant results, however, several of the recommended practices require further validation before significant efforts can be made to support their adoption among producers and others actors.

Table 3 Objectives, indicators and assessment

Project Objectives	Activities/Indicators	Assessment
General Objective: To validate and transfer to the key stakeholders a sustainable and effective safety management system for reducing and controlling the occurrence of aflatoxins along the Brazil nut production chain.		**Partially achieved**. The project validated the effectiveness of the practices recommended by the national code of practices, with new recommeded practices emerging. However, by the end of the project, the recommended practitces needed further validation and adaptation. The transference of project's results to stakeholder was also partially done. The project prioritized research over dissemination.
Objective 1. Characterization of Brazil nut production chain and formulation of organizational and incentive strategies for safety control.	1. Inventory of regulations applied to Brazil nuts for commercialization. A synthetic report-done	**Achieved**. The report will need permanent updates and facilitate strategic plans according to market requirements.
	2. Description of the current conditions of Brazil nut production and commercialization in the Brazilian states of Acre and Para, undertaken	2 and 3 p**artially achieved**. Information was gathered that will surely contribute to further actions in the region. Cost analysis was done only in Acre. Proposed roundtables in the regions were not implemented, and the recommendations of the project on strategic options for the industry were far too general, and in some cases unrealistic (e.g. proposed that the EU buyers pay a price premium for in-shell nuts)
	3. Formulation of organizational and incentive strategies. Roundtables between private/public sector to define constrains and opportunities.	
Objective 2. Validation of recommended good practices in the Brazil nut production chain for aflatoxin control.	1. Identify existing or set up Brazil nut production systems following recommended code of practices. Existing Brazil nut production chains with good practices identified in the states of Acre and Pará. BnFD of the selected production chains constructed and verified.	**Achieved**. The flowcharts were done and a cost analysis was performed for traditional practices versus improved systems,. The latter included some of the project's recommended practices, but mostly those practices recommended in tha Brazilian code of practices and that were under implementa+C19tion at the time.
	2. Collection of data was done. Report on the effectiveness of the already published code of practices, and at which steps in the BnFD the mycotoxin hazard originates, or concentrations increase to EU accepted levels.	**Achieved.**
	3. Selection of production chains in Acre and Pará; Construction and verification of Flow Diagrams; Definition of sampling plans, building laboratory capacity and collection and analysis and environmental factor registration through the selected production chains. A simple statistical model describing the probability of A. flavus/A. parasiticus growth and aflatoxin	**Achieved.** Determination of Critical Control Points was done. According to implementer's opinion, improvements could have been made on the selection of the firms/companies involved in the project, and expand the project coverage to include the Amazonia. The manual of safety and quality in Brazil nuts was not updated, but the recommendations were included in the draft proposal of the Codex Code addressing good practices in BN.
	4. Updated of the recommended good practices. CCP confirmed	**Achieved**. Confirmation of CCP and suggested recommendations to minimize or prevent contamination.
Objective 3. Validation and implementation of a rapid surveillance system	1. Adapt and validate existing rapid ELISA and on-site LDF brought into the project for aflatoxins in Brazil Nuts.	**1 and 2 were Achieved** and reported in Report SO3 Final 1 and 2 predictive model; Report Protocol Elisa LFD MAPA. A Protocol and Standard Procedures were produced. Adequacy of the laboratory infrastructure and facilities, and improvement of laboratory skills for Brazil nut sample preparation were main products obtained. Transfer to private companies was also realized.
	2. Completed protocol /Standard Operating Procedure.	
	3. Validation and implementation of a rapid aflatoxin surveillance system for use along the Brazil nut production chain.	**Partially achieved.** No specific indicators were outlined within the Action plan. According to some project implementers, the objective was delayed and not completely fulfilled as expected. Statistical sampling methodology was not delineated before the investigation started.
		A better coordination of these activities by CSL since the beginning of the project would have allowed a more effective progress and complete achievement, in particular regarding the validation of the rapid methods for aflatoxin analysis.

Project Objectives	Activities/Indicators	Assessment
Objective 4: Knowledge and technology transfer to the key stakeholders	1. No indicators/products expected had been outlined in the Action Plan. Training in Agar plate, ELISA and LFD was done. Course on Agar Plate methodology 2006-- 11 EMBRAPA and MAPA, 1 Bolivian processing industry and 1 from CIRAD. A course on ELISA meth--7 from EMBRAPA-MAPA and 1 from the Bolivian company.	**Achieved**. Training courses on both ELISA and LFD in Acre and Para and 1 Training course in LFD in Para were organized.
	Training in Good Practices. No indicators/products expected had been outlined in the Action Plan. 2 courses were implemented-- 141 participants -1 Peruvian company, 3 Brazilian companies, 1 private laboratory, official inspectors 3, 114 officials from MAPA and EMBRAPA, and 16 project partners.	**Partially achieved.** Courses were focused mostly on official institutions and project partners. No evidence of clear goals to whom the courses were directed to. As for the information of participants, only 3 Brazilian companies and 1 from Peru assisted.
	Development of web page- Project specific website implemented and updated. From January-March 2010: there were 268 visits, 62 from Brazil (66 % of new visits- The rest from Europe, USA and Mexico, 3,76 minutes per visit for Brazilians.	**Achieved.** The web is a good repository of scientific articles and other project-related information.
	Scientific and specific sector publications. Leaflet, technical and scientific documents produced. Participation in congresses and activities within the SafeNut project.	**Achieved**. An outstanding number of activities and technical and scientific documents will be valuable for further research in Brazil Nuts and they are valuable contribution. However, not many of those materials were directed to project beneficiaries.
Objective 5: Strengthen the public-private dialogue and partnership in the Brazil nut sector	The expected products were measured through participation in workshops and other activities.	**Partially achieved**. The project has benefited from arrangements between public-private sectors during the project. A few emerging initiatives of collaborative work are emerging (see project's impacts)

* Campo PAS, Series qualidade e Seguranca dos Alimentos, Brasilia, DF, 2004.

3.3 Efficiency

The project's efficiency was examined in terms of the extent to which funding, staff, time and other resource considerations contributed or hindered the achievement of results. In this respect, and taking into consideration what was discussed above in 3.2, the project mostly delivered what was outlined in the action plan and established appropriate coordination mechanisms to monitor their achievement. Most of activities and outputs were delivered on time and within budget. However, some key activities and outputs showed a significant delay. One of the consequences was the extension of the project's time frame, from 24 to 30 months.

Delays in some administrative arrangements and the transfer of funds between CIRAD and some of the SafeNut partners (particularly EMBRAPA and MAPA) represented a challenge for the partner coordinating the project (CIRAD), which assumed the expenses of the period and not compromise the execution of the project activities. Finally contracts were signed a year after the project was started (EMBRAPA-June 2007 and MAPA-September 2007). A delay also occurred in the delivery of annual scientific and financial reports by Brazilian partners.

A major delay was observed in the fulfillment of Objective 1— Characterization of the Brazil nut production chain and formulation of organizational and incentive strategies for safety control as well as an evaluation of the costs/benefits of the implementation of good practices in the States of Para and Acre. Difficulties in the identification of an expert in this area, led to a significant delay, and the report came out at the end of 2008. Detailed costs analysis on the implementation of improved systems was done in Acre, but not in Para.

In objective 2, the updated manual on good practices was not provided within the life of the project. This would have been an important tool for dissemination of good practices. The determination of the CCP and good practices is often outlined as an outstanding product of the project, but some actors are questioning their applicability given the conditions of the Amazonian forest. Processors though, have stated that they are adjusting procedures to improve quality in their companies.

In objective 3, validation and implementation of a rapid aflatoxin surveillance system which was under the responsibility of CSL was delayed and although according to Safenut coordinators it was finally completed,

the delay in equipping the laboratories, impeded or delayed the implementation of some activities on timely manner.

- Cost effectiveness

According to the opinion of implementers, due to local logistic constraints in the Amazon regions (remote production areas and with difficult access), the implementation of the technical activities (in particular sample collections and analysis, and to a lesser extent of the socio-economic activities (surveys-project specific objective 1) required important financial resources. Some of the results needed to be re-validated through expanding samples, with implications in the project's budget.

It was mentioned that "because of budgetary constraints, the participation of relevant stakeholders in Safenut workshops and training courses, in particular of key Peruvian and Bolivian partners was limited, leading to a less effective transfer of project outputs to the intended beneficiaries."

Additionally, "improved efficiency would have been achieved through a larger and firmer contribution from institutions, community and industry in order to obtain more involvement from stakeholders and direct more actions directly to the field work".

3.4 Impacts

By undertaken systematic research the project made significant contributions in terms of proving the need for improvements on recommended practices, particularly drying and storage, and for overall efficiencies along the supply chain, as confirmed by the responses to the survey (see Annex 6).

The project concentrated on providing general recommendations, but did not move toward the implementation of pilots to prove, in the field, the technical and economic feasibility of the recommended practices. Certainly, the main impact of the project was expected to be seen on the reduction of aflatoxins in BN to below the EU permitted aflatoxin levels. Sorting, and improvements in drying and storage are fundamental to achieving this, but the project did not make emphasis on the implementation of those practices. Therefore, it was left to new initiatives to implement adaptive research conductive to the identification of the most suitable ways to implement the recommendations. In this context, it is too ambitious to expect significant improvements in the volume of safe in-shell nuts exported by Brazil to the EU, as a result of the project, which has continued declining from the over 8,000 tons exported in 1997 to only 20 tons in 2008[10].

Another impact of the project was expected on the protection of human health through the commercialization of safer Brazil nuts and by avoiding the reintegration of rejected contaminated lots in the national market of the producing countries. In this regard, and as mentioned above, it is difficult at this point to determine the impact that the project might have, as market gains have not yet been perceived. As is discussed below, the evidence seems to suggest some steps being taken by the industries, in partnership with the government to implement recommended practices. Unfortunately, as mentioned by one of the surveyed beneficiaries, harmful practices, such as accepting poor quality raw material, continue to be utilized by industry players.

Similarly, and based on the above, expected impacts of the project in terms of avoid deforestation and loss of biodiversity resulting from regaining participation in the EU market, cannot be assessed here. Available data indicates deforestation shows a reduction tendency in general and particularly in the States of Para and Acre since 2005, but these cannot be assessed as to be a direct consequence of SafeNut project. However, it is clear that the industry has continued providing opportunities for income generation for thousands of producers, as indicated by the increasing total exports of BN. Reduced participation in the EU market has not resulted in the collapse of the BN industry. It is apparent that the results of the project have led to emergent initiatives, mainly led by the government, to disseminate the knowledge gained and the further applicability of the project's results and findings. For example, initiatives coordinated by EMBRAPA and ITAL have emerged, many of which address the follow-up actions recommended by the SafeNut project. The emergence of new projects and initiatives, as a response to the proposed project's follow-up actions, and expected to further contribute toward the achievement of the main goal— finding a sustainable and effective management system for aflatoxin contamination of BN— is clearly a very important impact of the project.

[10] COMTRADE does not present data for in-shell exports in 2009, while the volume reported for shelled nuts is 96 tons.

An unintended impact of the project might lie at the level of the scientific community, with several scientific papers and documents published illustrating the results of the project, confirming results of previous scientific research and enlightening the discussions on critical control points for aflatoxin prevention.

The implementation of the project required a close collaboration with the private sector to collect samples, determine geographic areas, etc. Although, it is apparent that there is not a "task force" or a more specific type of public-private sector coordinating body for the sector emerging, it is perceivable that the project facilitated the dialogue among actors, and set the stage for the emergence of public-private collaborative initiatives to more specifically address industry needs (e.g. workshops on shelling and sorting machines).

In the short run, the major gains from the project might be expected to come from the improved knowledge and skills of the staff working in the regional laboratories and from improvements in the country-regional laboratory infrastructure, and to some extent from the improved knowledge within private actors, through their participation in training on sampling procedures and aflatoxin detection and analysis.

Some of the respondents to the survey attributed the fact that the EU recently loosened the levels for aflatoxin on Brazil nuts as a direct impact of the SafeNut project. Clearly, although the project activities and outcomes might have contributed to this less stricter standard by providing a better understanding of the complexities of the effective control of aflatoxins at the levels by then applied by the EU, it is fair to say that this result was a direct contribution of the work led by Codex on tree nuts, and the work led by the Brazilian government under the ConforCast project[11]. Organizations participating in the SafeNut project provided individual support to the ConforCast project activities.

One of the main impacts of the SafeNut project is seen in the suggested changes to the Codex Code of Practice for the Prevention and Reduction of Aflatoxin Contamination in Tree Nuts, specific appendix on Brazil Nuts (CAC/RCP 59 -2005, REV.1-2006), changes that were recently approved by the Committee on Contaminants in Food, moving the draft revised code from step 5 to 8, for approval for the CAC in June 2010.

The loosening of the EU regulations may create incentives for the industries to re-engage in the exports of in-shell nuts, however, this needs to be accompanied by systemic changes in the behavior of the different players, from producers to exporters. Achieving this represents a significant challenge, well beyond the contributions that a research project such as SafeNut could have made. The difference that the project may be likely to make in the future is linked to the capacities of the industry and public actors to act together to use the knowledge generated by the project to clearly define the industry's orientation, in the different regions and the type of investments needed, by both private and public actors, to satisfy demands in different markets.

3.5 Sustainability

Sustainability of the project outcomes was expected to be achieved by involving different players in the project activities, including actors from Brazil and Peru. Clearly, without the contribution and active participation of local authorities, producers, firms, etc., several of the project activities would not have been possible.

In terms of the outcomes of the project on the improved testing capacities at the regional level, there was consensus among the survey respondents that this capacity will be sustainable. Comments included:

- players will be able to obtain timely test results and reduce risk of cross contamination.
- the laboratory capacity and skills of LANAGRO-Pará/MAPA and EMBRAPA Acre for Brazil nut sample receipt, preparation, storage and analyses have greatly improved due to the SafeNut project's actions, and both institutions have now their laboratory implemented with adequate conditions for such a purposes. The new capacities have already been used in other projects at EMBRAPA Acre and MAPA and can be adapted to other commodities as well. Also, further

[11] Conforcast Project: Ferramentas Analíticas para Capacitação do Brasil na Garantia da Conformidade da Castanha-Do-Brasil (Bertholletia Excelsa) quanto ao Perigo aflatoxina. Projeto nº 1.265/05. The main objectives of the project were to design sampling plans for shelled and in-shell Brazil nuts and to evaluate which Brazil nut categories (kernels and shells) could be most associated with the aflatoxin contamination in Brazil nut. Information was also obtained on the incidence of aflatoxins in Brazil nut lots ready to be marketed (shelled and in-shell). The samples were collected during the years of 2006 and 2008 in processing plants of the Pará and Acre states.

training in laboratory skills and quality controls for LANAGRO-Pará/MAPA and EMBRAPA Acre will be performed within the Brazil nut project recently approved by EMBRAPA in order to reinforce and make the actions initiated by the Safenut project sustainable.

- The kit for aflatoxin screening tested by the project is expected to contribute to improved screening capabilities by industry players, increasing the current analytical capacity in the regions.

In terms of the implementation of recommended practices, the surveyed participants highlighted the fact that the sustainability of the outcomes of the project will rely on the efforts made by the extractivists-producers to implement the recommended practices. Further training was highlighted as being required.

The project's socio-economic study of the improved practices implemented by some players indicated that there are little incentives to apply the set of the project recommended practices, as the market price does not compensate for the additional costs associated with the improvements. Unfortunately, a more systematic value-chain analysis was not done to understand price margins and production costs along the chain by supplying nuts to different markets and in different presentations (both in-shell and shelled), including an in-depth analysis of the capacities of the players to support required upgrades. This would have been crucial for better understanding incentives, possibilities for upgrading and sustainability of results. The recommendations provided by the project in this regard, are far too general.

It is clear, however, that reducing the levels of aflatoxins in order to supply the market with in-shell nuts, through the implementation of improved practices would require further coordination between industry players and it cannot be seen as only the responsibility of the "extractivists-producers" with the support of the government. Unfortunately for the Brazilian industry, the working group set by the Codex Commission on Contaminants in Foods (CCCF), and led by Brazil did not succeed in its efforts to set internationally accepted maximum levels for aflatoxins specifically for in-shell brazil nuts, including specific sampling procedures involving the segregation of good in-shell BN from the rotten nuts in the analytical sample selection. The proposal was rejected during the meeting of the CCCF, last April.[12]

The SafeNut project and other initiatives implemented by the government in coordination with several actors, as well as scientific work done by others, have provided invaluable insights on the complexities of supplying the EU market with in-shell nuts. Thus, the future direction of the industry will certainly be determined by the range of incentives, market possibilities and the capacity of industry players to act individually and collectively to increase the competitiveness of their business. It is difficult to assess through the project documentation whether these capacities are in place, yet, evidence from the literature suggests that the lack of industry collective action has been an important constraint to a more proactive response by the Brazilian industry to the challenges imposed by stricter standards (See for example Coslovsky, 2006).

[12] The CCCF agreed to move from step 5 to 8, the proposed Codex Maximum Levels for Total Aflatoxins in Shelled, Ready-to-Eat Brazil Nuts and Shelled, Destined for Further Processing Brazil Nuts (including sampling plans), with levels set at 10 and 15 µg/kg, respectively; levels that are being presented for approval by the CAC in the meeting to be held in June 2010.

4. CONCLUSIONS

In a context of increasing regulatory and market demands for quality, safety and other product and process attributes, development partners are facing the challenge of finding effective ways to support developing country stakeholders in achieving compliance and remaining competitive in international trade. In the case of the project concerned here, and from the perspective of the project's partners, the challenge to research and discover effective methods to prevent and reduce the contamination of the Brazil nuts that were reaching the processing companies, plus improving the capacities of local authorities, firms and other actors to detect and analyze aflatoxins was achieved. A parallel study would be able to provide a better understanding of the socio-economic implications of the recommended practices.

The project was a clear response to the recommendations resulting from the EU missions to Brazil, and, therefore, it was not contextualized within the set of strategic options faced by the industry's players. Leading competitors such as Bolivia and Peru had already implemented control steps –sorting and shelling— and had re-oriented their industries toward the shelled nut segment, to minimize market risks. In the case of Brazil, the country decided to continue providing the international market with a product for which the challenge of compliance with stricter regulations was significant, particularly given the conditions related to primary production. The reasons for the industry maintaining this strategic orientation were not clearly explored in the project proposal, but other studies have indicated that there is little evidence that the industry had taken significant steps to re-organize itself and take the measures necessary to achieve compliance. It is apparent, however, that the government of Brazil has been the driving force behind several initiatives to support the industry in achieving compliance, including playing an advocacy role, supporting extensive research, improving laboratory capacity, providing training, etc.

It is undeniable that the project was pertinent, for both government authorities and industry players. According to some stakeholders, the SafeNut project showed there are real opportunities for the production of contamination-free BN, even under the European requirements. Others indicated that the industry can now proclaim that a serious study has been performed with results and the Brazil nut trade is no longer "incognito." The socio-economic study undertaken by the project provided very general recommendations and missed opportunities to explore the options and roles of different players more comprehensively. For several of the respondents, the responsibility of implementing GEP relies on the extractivist, thus, it is apparent that an understanding of the importance of improved coordination is poor. In a sense, this is understandable, given the extractivistic nature of the industry.

From the perspective of this assessment, the most critical contribution of the project has been to illustrate the complexity of remaining competitive in the in-shell market segment. There was also an important "advocacy" role played by the project in terms of creating awareness among regulators (e.g. the EU) and other international stakeholders, and in advancing knowledge of aflatoxins.

Perhaps the major shortcoming of the project was not to contextualize the proposal, from the beginning, within the set of different options available to the industry and according to the capacities and willingness of the actors to engage in a process leading to sustainable compliance.

The impact the project may likely have in the future is linked to the capacities of the industry and public actors to act together to use the knowledge generated by the project. Taking advantage of the current opportunities offered by a less strict EU standard, both entities may be able to more clearly define what is needed to comply and possibly be able to achieve sustainable participation in the EU and other international markets.

5. LESSONS LEARNED

- A critical lesson emerging from this project, and pointed out by several authors before, is that when a project is formulated to address a compliance issue, specific emphasis should be place on understanding the need to adopt a strategic perspective of the industry, which implies understanding the implications of the emerging regulatory requirements, the constrains/opportunities faced by different industry players, and analyzing the different options available to address those constraints to effectively identify the required adjustments. The only option considered by the project was compliance with EU restrictive regulatory requirements for in-shell nuts. A more critical analysis of industry options was not entirely done.
- The project demonstrated the significance of establishing "good practices" aimed at achieving food safety objectives on the basis of sound scientific research. It also demonstrated the importance of proper planning in terms of timeframes, to allow for testing the practical applicability of the research results from a technical and socio-economic point of view.
- An important aspect in the formulation of the project is a critical assessment of the socio-economic environment from the beginning, in which the project is going to be implemented, as crucial to evaluate the viability of the proposed options and to bring the perspectives of stakeholders to be more involved in the project (particularly the private sector).
- Reporting project progress to STDF at frequent intervals, although time demanding, was considered by the coordinators to be very effective in allowing problem solving in a timely manner.
- It is possible through a very well-structured coordinating process to leverage positive learning outcomes for the participating institutions. The SafeNut project has been an excellent model of coordination and collaboration between institutions and has been seen by several of the local institutional partners as an excellent process of capacity enhancement for project planning and implementation.

Annex1

Terms of Reference for the ex-post evaluation of STDF project 114

Background

In February 2009, STDF project 114 entitled "Sustainable and effective aflatoxin management system in Brazil nut production" was completed. The objective of the project was to validate and transfer to the key stakeholders a sustainable and effective safety management system for reducing and controlling the occurrence of aflatoxins along the Brazil nut production chain.

Specific activities of the project were:

- Characterization of the Brazil nut production chain, and formulation of organizational and incentive strategies for safety control;
- Validation of recommended good practices in the Brazil nut production chain for aflatoxin control;
- Validation and implementation of a rapid aflatoxin surveillance system for use along the Brazil nut production chain;
- Knowledge and technology transfer to the key stakeholders; and
- Strengthening public-private dialogue and partnership in the Brazil nut sector.

A project website (www.stdf-safenutproject.com) was developed to contribute to the dissemination of information related to the project.

The STDF Operational Rules require an independent "ex-post" evaluation of all STDF projects, and the STDF Secretariat have to make the necessary arrangements in this regard.

In August 2009, an independent consultant started the ex-post evaluation. Unfortunately, the STDF Working Group was not satisfied with the way the evaluation was conducted, and decided, in December 2009, to discontinue the work and to find another evaluator to conduct the task. Following consultations, Ms Marta Bentancur was selected as the consultant for to carry out this assignment.

Description of tasks

Under the overall supervision of the STDF Secretariat, and in close collaboration with other stakeholders involved, the consultant shall conduct an independent ex-post evaluation of STDF project 114 in accordance with the STDF Evaluation Guidelines (Appendix 1). In particular, the consultant shall:

- review all available documentation related to the project STDF 114 - to be submitted separately to the consultant by the STDF Secretariat;
- collect and review other relevant information and documentation as appropriate;
- contact the relevant stakeholders involved in the implementation of the project to collect additional documentation as appropriate; in particular, Ms Catherine Brabet (catherine.brabet@cirad.fr), the project general coordinator, and Ms Monica Olsen (monica.olsen@slv.se), the project scientific coordinator.
- develop – in collaboration with the STDF Secretariat – a survey questionnaire for this evaluation based on the standard evaluation criteria of relevance, effectiveness, efficiency, impact, sustainability and key lessons learned;
- identify and request main stakeholders and beneficiaries to complete and return the survey questionnaire, to get their views about the project and follow-up activities conducted or needed; and
- on the basis of the information collected, draft and submit an evaluation report in English in the proper format (see Appendix 1) to the STDF Secretary no later than Friday 18 June 2010 close of business.

Annex 2

Guidelines for the evaluation of projects funded by the Standards and Trade Development Facility (STDF)

The STDF's Operational Rules require an independent "ex post" evaluation of all projects. These Guidelines set out a framework for such evaluations. The Guidelines draw heavily on the OECD-DAC Principles for the Evaluation of Development Assistance. [13]

Objective

The objective of the evaluation of STDF projects is to:

- verify whether the project achieved the objectives set out in the project document;
- identify if the project has achieved any of the higher level objectives of the Facility, e.g. a measurable impact on market access, an improved domestic, and where applicable regional, SPS situation, and poverty reduction;
- identify key lessons learned for the benefit of both recipients and donors and for future STDF programme development.

Structure

Evaluations may be conducted as "desk studies" or require the collection and review of information in the beneficiary country or region. Project progress reports will be reviewed against the project documents as approved by the STDF Workshop Group. This literature survey will normally be supplemented by survey questionnaires and/or interviews with relevant stakeholders. Other methods such as case studies or cost-effectiveness analyses may also be applied depending *inter alia* on the size and complexity of the project.

Evaluations should be typically organized around the standard evaluation criteria of relevance, effectiveness, efficiency, impact, sustainability and lessons learnt. In this regard, the following set of evaluation questions provide a framework for the evaluation process and a basis for a clear set of conclusions and recommendations. More specific questions will be elaborated within this general framework for each individual project.

Relevance

1. Was the project the right answer to the needs of the beneficiary?

2. To what extent do the needs which gave rise to the project still exist?

Effectiveness

3. To what extent were the objectives achieved /are likely to be achieved? (Indicators of achievement should be used where applicable and refined on the basis of the specific project to be evaluated).
4. What were the major factors influencing the achievement or non-achievement of the objectives?

Efficiency

5. Were the activities and outputs delivered according to the project document (e.g. on time and within the budget)?

[13] See the DAC Principles for Effective Aid (http://www.oecd.org/dataoecd/31/12/2755284.pdf).

6. What changes, if any, were made during project implementation?

7. Was the project a cost-effective contribution to addressing the needs of the beneficiary?

Impact

8. To what extent did the project contribute to higher level objectives of the STDF programme such as a measurable impact on market access, improved domestic, and where applicable regional, SPS situations, and/or poverty reductions?

9. What real difference has the project made or is likely to have on the final beneficiaries?

Sustainability

10. To what extent will the benefits of the project continue after STDF funding ceased? Do the recipients of the project have the necessary capacity to sustain the results?

11. What are the major factors which influenced sustainability of the project?

12. Was sustainability adequately considered at the project design phase?

Lessons learned

13. What lessons can be learned from the project as to the process of project design and implementation?

14. What lessons can be learnt from the project which are of importance to the broader donor community and which should be disseminated more broadly?

Reporting

The evaluation report shall be clear, as free as possible of technical language, and normally no longer than 16 pages. It shall be written in the same language as the project documents. Additional information shall be confined to annexes. The report shall take account of the draft OECD-DAC Evaluation Quality Standards[14] and shall have the following outline:

1. Executive summary (1 page)

   - Overview of the report, which highlights the main conclusions, recommendations and key lessons learned

2. Introduction (2 pages)

   - Description of the policy context and institutional environment within which the project has taken place - including the role of the STDF, other donors and project partners as well as the private sector, consumer organizations and NGOs, if any
   - Summary of the project including its objectives, activities, inputs (budget) and outputs
   - Objective of the evaluation
   - Indication of independence of the evaluator from the STDF, project partners and beneficiaries - including a description of conflicts of interest, if any

3. Methodology (2 pages)

[14] See http://www.oecd.org/dataoecd/34/21/37854171.pdf

- Explanation of the used evaluation method, its validity and reliability, including an explanation of the methods and techniques used for data and information collection and processing
- Description of the sources of information used (documentation, respondents, literature etc.)
- Description of the stakeholders consulted, their relevance, and the criteria for their selection

4. Findings and analysis (8 pages)

   - Answers to each evaluation question, including findings and an analysis for each
   - Overall judgement, which shall cover:
     - relevance to needs and overall context, including the extent to which the project suited the priorities and policies of recipients and the STDF
     - effectiveness - in terms of the extent to which the objectives and outputs were achieved
     - efficiency - in terms of the extent to which funding, staff, regulatory, administrative, time and other resource considerations contributed or hindered the achievement of results
     - impact - in terms of the established and unforeseen impacts
     - sustainability, i.e. whether the results of the project can be maintained over time without STDF funding or other donor support

5. Conclusions, recommendations and lessons learned (2 pages)

   - Main conclusions following from the findings and analysis[15]
   - Recommendations, i.e. actionable proposals for the STDF and/or the wider donor community
   - Key lessons learned for wider use and future programme development, both on process and substance.

Dissemination

The evaluation report shall be discussed by the STDF Working Group and further disseminated through the STDF website and other fora, as appropriate.

[15] Please note that any conclusions and recommendations should be based on the findings and analysis included in the previous section of the report.

Annex 3

List of contacts

a) Partners and project implementers

Institution/ Company	Contact	E-mail	Position/Responsibility in the project	Answered questionnaire
CIRAD	Catherine Brabet	**Catherine.brabet@cirad.fr**	General Coordinator	Yes
NFA	Mónica Olsen	**Monica.olsen@slv.se**	Scientific coordinator	Yes
CSL (Central Science Laboratory)	John Banks	**j.banks@csl.gov.uk**	Responsible for CSL	No
	Julian Smith	**Julian.j.smith@csl.gov.uk**		No
LANAGRO-PA-MAPA	Mauricio Quaresma de Araújo	**Mauricio.araujo@agricultura.gov.br**	In charge of laboratory of mycotoxin analysis	Yes
EMBRAPA-ACRE	Cleisa Brasil da Cunha Cartaxo	**Cleisa.cartaxo@ac.gov.br**	Contact with the BN stakeholders. Support for the construction and verification of BN flow diagram	No
	Virginia de Souza Alvares	**Virginia@cpafac.embrapa.br**	Support for sample collection and analysis	No
	Joana Maria Leite de Souza	**joana@cpafac.embrapa.br**	Organization and follow up of field activities	No
	Marcio Muniz Albano Bayma	**marció@cpafac.embrapa.br**	Consultant for the Characterization of BN chain	Yes
Rural Extension Dissemination of technologies	Dorila Silva O. Mota Gonzaga	**dorila@cpafac.embrapa.br**	Coordination of training activities to technicians and producers	No
EMBRAPA-Amazonia	Jair Carvalho de Santos	**jaircs@cpatu.embrapa.br**	Socioeconomic activities in Acre and Para	No
University of Amazonas (Manaus)	Arianne Mendonca Pacheco	**arianepacheco@hotmail.com**	Professor	Yes
International Nut and Dried Fruit Committe,	Giuseppe Calcagni	**Giuseppe.calcagni@besanagroup.com**	Chairman of the Scientific and Gov. Affairs Committee, Besana,Italy	Yes
	Cameon Ivarsson	**Cameon.ivarsson@napasol.com**	Director NAPASOL, Switzerland	No
SFA-Pará	José Carlos Barroso Junior	**Jose.barroso@agricultura.gov.br**	Contact with Brazil nut stakeholders for selection of flow diagram	Yes
LACQSA/LANAGRO-MAPA	Eugenia Azevedo Vargas	Eugenia.vargas@agricultura .gov.br	In charge of the LACQSA	Yes
MAPA	Luzia María Souza	**Luzia.souza@agricultura.gov.br**	Policy Maker	Yes
Agrocon Consultancy	Agrimar Vasconcelos Simoes	**agrimarvs@yahoo.com.br**	Consultant	No
Laboratories R-Biopharm	Dan Kaplan	**d.kaplan@biopharmlat.com.ar**	Biopharm-Latinoamerica-Argentina	Yes

b) Processors and exporters

Company	Contact	E-mail	Position in the company	Answered questionnaire
Candela Perú	Gastón Vizcarra	gvizcarra@candelaperu.net	Director	Si
Renmero Indústria e Comercio	Manuel Rodrigues Eliana Conceicao Couto Rodrigues	renmero@uol.com.br	Director/Owner	No
ARQMO, Orizimina	Francisco Hugo de Souza	arqmo@quilombo.org.b	President	No
Industria Tahuamanu S.A., Cobija, Pando, Bolivia	Evangelina Jurado	Evangelina@tahuamanu.com		No
Jorge Mutran, Exportadora de Castanha Ltda	Délio Chuquia Mutran	jomutran@supridade.com.br jsalimentos@yahoo.com.br	Owner	No
	Evandro Mutran		Owner	No
	Florencio Jorge da Silva Leite		Quality Manager	No
Mundial Exportadora Comercial Ltda	Abraham Chocron	mundialexportadora@gmail.com		No
Exportadora Mutran Ltda.	Mauro Mutran	expmutran@expmutran.com.br	Owner	No
	Cristiane de Nazaré Paes dos Santos		Technical Manager	No
Caiba Indústria e Comercio S.A	Marcos Jayme Belicha Bruno Marcos Gabbay Belicha	caiba@usa.net	Director Presidente	Yes
Coopeacre	Felicia María Nogueira	felicialeite@hotmail.com		Yes
Exportadora Florenzano Ltda,	Manuel Francisco Casemiro de Florenzano Filho	expfloren@floresnzano.net	Director-Owner	Yes

Annex 4. Questionnaires

I. To partners and other implementers

EVALUATION OF SAFENUT PROJECT
STDF PROJECT 114
"Validation and transfer to the key stakeholders of a sustainable and effective aflatoxin management system in the Brazil nut production chain for recovering and consolidating export markets, particularly in Europe"

I. FOLLOW-UP QUESTIONNAIRE FOR IMPLEMENTING PARTNERS

Please return completed questionnaire via email to:

Marta Bentancur (WTO/STDF Consultant)
E-mail: marta.bentancur@gmail.com

The information requested in this questionnaire will be very valuable to improve future activities funded by the STDF. Sincere thanks for your willingness to collaborate with us. We would appreciate if you could provide your inputs and return the completed questionnaire to the address indicated above, no later than **May 15, 2010**. We value your inputs and assure you that your responses will be treated with strict confidentiality. Only consolidated results will be presented in the final report.

Part 1. Personal Data

COMPLETE NAME	
E-mail	
Telephone/Mobile	
Company/Institution	

Part 2 Your opinions about the Project

1) From your perspective, to what extent was the SAFENUT project successful in validating a safety management system for reducing and controlling the occurrence of aflatoxins along the Brazil nut production chain in the Acre and Para regions of Brazil?

Successful ____ Somewhat successful _____ Not successful ____

Comments:

2) From your perspective, to what extent was the SAFENUT project successful in transferring a safety management system to the intended beneficiaries for reducing and controlling the occurrence of aflatoxins along the Brazil nut production chain in the Acre and Para regions of Brazil?

Successful ____ Somewhat successful _____ Not successful ____

Comments:

3) In retrospective, to what extent were the activities proposed by the SAFENUT project the right answer to address the constraints faced by the Brazil nut production chains in the areas of Acre and Para?

Adequate ____ Somewhat adequate ____ Inadequate ____

Comments:

4. In your opinion, did the SAFENUT project reinforce the private-public dialogue and partnership in the Brazil nut sector?

Yes ____ Somewhat ____ No ____

Please explain:

If YES, has the public-private dialogue/partnership continued after the end of the project?

5) Which project activity(s), if any, would you have further emphasized and/or added and why?
6) Which project activity(s), if any, would you have given less emphasis to and why?

7) From your perspective, to what extent was the project successful in bringing regional differences (in terms of production, structure of the chains, target market—domestic vs. international) into the final project recommendations?

Successful ____ Somewhat successful ____ Not successful ____

Explain:

8) In your view, were there areas in which further effort could have been made to improve the timeliness and effectiveness of the project activities and results?

Yes ____ No ____

If yes, please explain:

9) Were there any budgetary constraints to effectively implement any specific project activity(s)?

Yes ____ No ____

If yes, please explain:

10) In which areas was the project most successful in articulating needs/gaps with activities to produce results?

- List the major factors influencing this success:

11) In which areas was the project least successful in articulating needs/gaps with activities to produce results?

-List the major factors influencing this less relative success:

12) From your perspective, what real difference has the project made or is likely to make on the Brazil nut supply chain?

13) In your view, did the project achieve any measurable impact on export of Brazil nut?

Yes ____ No ____

14) From your perspective, will the improvements achieved in analytical capacities (at national and production regions level) be sustainable?

Very likely _____ Somewhat likely _____ Not likely _____

Explain:

15) From your perspective, will the set or identified good practices translate into sustainable reduction of aflatoxin along the Brazil nut chain, thus moving from an end-product testing system to a preventive system?

Very likely _____ Somewhat likely _____ Not likely_____

Explain:

16) Overall, was the project, in your view, the most cost-effective way to address the problems of aflatoxin along the Brazil nut chain?

Yes ____ Somewhat ____ No ____

17) To your knowledge, were/ are there any follow-up activities undertaken/planned by beneficiaries since the completion of the project?

Yes ____ No ____ Do not know_____

18) What are the main take away lessons from the implementation of this project that will enhance your future work?

19) What lessons can be learned from the project that may be of importance to practitioners and development partners and which ones should be disseminated more broadly?

Thank you for your kind collaboration

Please return the complete questionnaire to:
MARTA BENTANCUR
(WTO/STDF Consultant)
marta.bentancur@gmail.com

II. To processors and exporters
EVALUATION OF SAFENUT PROJECT
STDF PROJECT 114

"Validation and transfer to the key stakeholders of a sustainable and effective aflatoxin management system in the Brazil nut production chain for recovering and consolidating export markets, particularly in Europe"

II. FOLLOW-UP QUESTIONNAIRE STAKEHOLDERS WITHIN THE BRAZILIAN NUT CHAIN

Please return completed questionnaire via email to:

Marta Bentancur (WTO/STDF Consultant)
E-mail: marta.bentancur@gmail.com

The information requested in this questionnaire will be very valuable to improve future activities funded by the STDF. Sincere thanks for your willingness to collaborate with us. We would appreciate if you could provide your inputs and return the completed questionnaire to the address indicated above, no later than **May 15, 2010**. We value your inputs and assure you that your responses will be treated with strict confidentiality. Only consolidated results will be presented in the final report.

Part 1 Personal Data

COMPLETE NAME	
E-mail	
Telephone	
Company/Institution	

Part 2 Your opinions about the Project

1- In which of the following SAFENUT project activities did you participate?
(tick all that apply)

a- participation in project workshops (Progress, final or kick off meetings) ____
b- collaboration with the implementation of field activities (sampling, providing information, etc.) ____
c- received training on good agricultural practices or laboratory training ____
d- other ___

2- From your perspective, did the SAFENUT project activities address the needs identified for the Brazil nut production chain?

Yes ___ Somewhat ___ No ___

Please explain:

3- To what extent did the project meet your expectations?
Not at all ___ Partially ___ Fully ___

Please explain:

4- What do you believe were the main benefits of the project:

a) for the Brazil nut industry, as a whole?

b) for your company/cooperative, in particular?

5- Are there any topics and/or activities on which you would have liked the SAFENUT project to provide more information/results?

Yes _____ No _____

If your answer is yes, what are they?

6. To what extent are the recommendations of the project (good practices) applicable? (Consider here economic, cultural and other aspects)

Applicable ____ Somewhat applicable ____ Not applicable ____

Please explain:

7. In your opinion, did the courses/workshops you attended have some positive impact on the quality of your products/processes in your company/region?

Yes ___ Somewhat ___ No ___

Explain:

8. In your perspective, has the SAFENUT brought about or is likely to bring about a change in behaviour of the final beneficiaries i.e. producers, processors.?

Yes ___ Somewhat ___ No ___

Explain:

9. In your opinion, were the SAFENUT project activities (workshops, training courses) well organized and performed timely?

Yes ___ Somewhat ___ No ___

Explain:

10- In your opinion, did the SAFENUT project reinforce the private-public dialogue and partnership in the Brazil nut sector?

Yes ___ Somewhat ___ No ___

If yes, has the public-private dialogue/partnership continued after the end of the project, please explain?

11. In your opinion, has/will the SAFENUT project contributed/contribute to improve international market access and domestic market?

Yes ___ Somewhat ___ No ___

12- Additional comments regarding the design and/or the implementation of the project:

Thank you for your kind collaboration
Please return the complete questionnaire to:
MARTA BENTANCUR
(WTO/STDF Consultant)
marta.bentancur@gmail.com

Annex 5_

Consolidated responses from processors/exporters

	Q2	Q3	Q5	Q6
Yes/Applicable	2	2	1	1
Somewhat	2	2		
No/Not Applicable			3	
COMMENTS	• Entendemos que as necesidades e os principais pontos críticos da cadeia de produção da castanha foram abordados pelo projeto. • La presencia de aflatoxina constituye sin duda el problema mayor para la exportación de castaña. Los resultados del proyecto SafeNut han identificado posible métodos para evitar este problema. Sin embargo, el problema de la calidad de castañas en cáscara es un problema brasileño ya que la industria peruana no exporta este producto.	• O projeto em si alcansou as expectativas, porém, estaremos totalmente satisfeitos se o objetivo principal for alcansado, que é a determinação de novas taxas de tolerancia de aflatoxina por parte da União européia, que nos possibilite comercializar a castanha novamente para esse mercado "principalmente com analise e procedimentos na cadeia produtiva que precisa ser melhor estudada e trabalhada principalmente junto aos coletores com informaçoes e treinamento. • Los resultados obtenidos que se pueden aplicar a la industria peruana han sido excelentes." • Os principais objetivos foram alcançados	métodos rápidos de análise de aflatoxina – o motivo porque alguns métodos não foram recomendados	• Atualmente muito pouco e aplicavel porem da nossa parte estamos desenvolvendo alternativas para melhorar as boas praticas na floresta principalmente em fazer com que o produto chegue mais rápidamente na centro de processamente. • Os principais responsáveis na base da cadeia produtiva são os extrativistas/produtores e a maioria deles em conversas informais, afirmam que se melhorar o preço, compensa aplicar. • Classificamos como PARCIALMENTE APLICAVEIS devido as peculiaridades da Regiao Amazonica onde DETERMINADAS boas práticas são praticamente impossíveis de serem aplicadas. • Tal como funciona la industria de la castaña en el Perú, las compañías que comercializan la castaña tienen muy poco control sobre los métodos de cosecha y acopio y los tiempos asociados.

	Q7	Q8	Q9	Q10	Q11
Yes/Applicable	2	3	3	3	3
Somewhat	2	1	1	1	1
No/Not Applicable					
COMMENTS	• Ja observamos um melhor controle de qualidade do produtor que tambem esta mais interressado em aprender manejar melhor a castanha na floresta. • Tal como funciona la industria de la castaña en el Perú, las compañías que comercializan la castaña tienen muy poco control sobre los métodos de cosecha y acopio y los tiempos asociados • as discussões, a troca de experiências e o conhecimento de outras realidades facilitam no momento de delinear estratégias e tomada de decisões. • Los talleres sobre procedimientos para la medición de aflatoxina han sido muy útiles y los procedimientos recomendados han sido adaptados para nuestras operaciones	• Com o aprimoramneto de treinamento certamente vai contribuir muito para o melhoramneto da materia prima. • Os resultados indicam os novos caminos para buscar a condição desejada, ou seja, direcionam a aplicação dos esforços para corrigir ou amenizar os problemas. • Sim, pois ensinou e demonstrou determinadas técnicas e medidas a serem adotadas que beneficiam a todos, processadores, clientes e fornecedores. • " Por las razones expuestas arriba, en el Perú, es difícil que las recomendaciones del proyecto relativas a la cosecha, acopio y transporte de las castañas lleguen a los productores. Pero es probable que la situación sea más favorable en Bolivia y en Brasil. Por otra parte, las recomendaciones relativas al procesamiento de la castaña sí pueden llegar mas fácilmente a los procesadores	• os locais, a organização foi muito boa, onde os resultados de cada encontro foram alcançados • Faltou escolher melhor as areaas de atuaçao pois foi realizados em zonas produtoras que nao exportam castanha com casca tais como ACRE em vez do AMAZONAS que hoje e o maior exportador de com casca	Continuation of the dialogue betw een public and private actors • Lamnetavelmente nao isso acontece com quase todos os projetos nesse país encerrado nada mais se houve falar infelizmente. • Sim. Pelo menos aquí no Acre, se não existisse diálogo e parceria público-privado, estaríamos atrasados em pelo menos 10 anos. • No puedo opinar. El proyecto ha sido organizado para resolver un problema brasileño con actores públicos y privados principalmente brasileños, y nuestro involucramiento has sido relativamente marginal.	

Q4.	
for the Brazil nut industry, as a whole?	**for your company/cooperative, in particular?**
Me parece que ainda não se pode observar pois muitos industriais permanecem com as mesmas praticas nocivas do mercado tais como receber matéria prima de baixa qualidade principalmente	temos implementado um melhor controle de qualidade no recebimento de matéria prima e maior concientizaçao dos nossoa produtores inclusve com treinamento nas zonas produtoras.
Mejor conocimiento de los métodos de producción adecuados para mejora la calidad del producto.	Mejores métodos de control de calidad.
Comprovação da necessidade melhorar a estrutura de secagem, armazenagem e eficiência no processo em toda a cadeia.produtiva	idem anterior
Ajudar com que a catanha-do-brasil seja novamente comercializada nos países da União Européia. E mostrar que os maiores índices de aflatoxina estão na casca e nas amêndoas podres da castanha.	Ajudou na implementação das melhores práticas a serem adotadas na cadeia de produção da castanha.
Q12	
• Precisamos dar continuidade. • Statistical delineation for the sampling points was not carried before initiating the research. • Acreditamos que o projeto Safenut contribuirá no acesso ao mercado internacional na medida em que se for entendido que a aflatoxina está predominantemente na casca e nas amêndoas podres da castanha-do-Brasil. Sendo assim imprescindível que tanto a casca quanto as amêndoas podres sejam retiradas da amostra que será verificada a aflatoxina, ficando apenas as amêndoas sãs e boas.	

Annex 6

Consolidated responses from partners and other stakeholders

Question 1- From your perspective, to what extent was the SAFENUT project successful in validating a safety management system for reducing and controlling the occurrence of aflatoxins along the Brazil nut production chain in the Acre and Para regions of Brazil?	Successful	Somewhat successful	Not successful	NA / Other
	9	1		
Question 2- From your perspective, to what extent was the SAFENUT project successful in transferring a safety management system to the intended beneficiaries for reducing and controlling the occurrence of aflatoxins along the Brazil nut production chain in the Acre and Para regions of Brazil?	Successful	Somewhat successful	Not successful	NA / Other
	3	6		1
Question 3- In retrospective, to what extent were the activities proposed by the SAFENUT project the right answer to address the constraints faced by the Brazil nut production chains in the areas of Acre and Para?	Adequate	Somewhat	Innadequate	NA / Other
	7	3		
Question 4- In your opinion, did the SAFENUT project reinforce the private-public dialogue and partnership in the Brazil nut sector?	Yes	Somewhat	No	NA / Other
	8	2		
Question 7- From your perspective, to what extent was the project successful in bringing regional differences (in terms of production, structure of the chains, target market—domestic vs. international) into the final project recommendations?	Successful	Somewhat successful	Not successful	NA / Other
	5	3	1	1
Question 8- In your view, were there areas in which further effort could have been made to improve the timeliness and effectiveness of the project activities and results?	Yes	No		NA / Other
	7	2		1
Question 9- Were there any budgetary constraints to effectively implement any specific project activity(s)?	Yes	No		NA / Other
	3	4		3
Question 13- In your view, did the project achieve any measurable impact on export of Brazil nut?	Yes	No		NA / Other
	4	4		2
Question 14- From your perspective, will the improvements achieved in analytical capacities (at national and production regions level) be sustainable?	Likely	Somewhat likely	Not likely	NA / Other
	6	4		
Question 15- From your perspective, will the set or identified good practices translate into sustainable reduction of aflatoxin along the Brazil nut chain, thus moving from an end-product testing system to a preventive system?	Likely	Somewhat likely	Not likely	NA / Other
	6	3	1	
Question 16-to your knowledge, were/ are there any follow-up activities undertaken/planned by beneficiaries since the completion of the project?	Yes	Somewhat	No	NA / Other
	5	5		
Question 17-To your knowledge, were/ are there any follow-up activities undertaken/planned by beneficiaries since the completion of the project?	Yes	No	Do not know	NA / Other
	6		3	1

Q1	The Safenut project allowed identifying the critical control point (CCP) and factors for fungal growth and aflatoxin production along the Brazil nut production chain, as well as the recommended good practices for aflatoxin control. Showed the critical points and the weakness of the current code of practice and led to changes in the Codex code of practice for treenuts. A pesar do sucesso, precisamos implementar um sistema de gestão de segurança mais eficiente e abrangente, pois a Amazônia é um Continente. The project brought to light many data under a scientific approach, before not available, most of then completely. The procedures to mitigate this foodbornedanger, seems be effective and now, the issue have data do direct further research.
Q2	Allowed transferring project outputs to the intended beneficiaries in the main producing countries – Brazil, Bolivia, Peru, trainers, in particular the recommended good practices and to improve their awareness of the critical points in the Brazil nut production chain. This was achieved through the organization of two workshops , an open meeting with the private sector and two training courses in BN nut good practices in both states of Acre and Pará, with the participation of key Peruvian and Bolivian stakeholders. The transfer of BN good practices has been limited because the project has prioritized the identification of critical control points/factors and good practices as a prerequisite than originally scheduled in the Safenut proposal). Larger-scale dissemination of effective and sustainable BN good practices, in particular to producers/extractivists (most of the communities are still not aware of good practices for reducing aflatoxin contamination), is still needed and must also be extended in both Peru and Bolivia for a greater regional impact. More time would have been needed to transfer more successfully. However, since some partners were very late in delivering data for the completions of the validation, but considering this the time left was used well to transfer. Transferring to stakeholders those procedures, as well, design methods effectively on prevention of contamination was not done at all, specially due to the long time between harvest times, so the experiment may need for longer time and resources to make practical experiments, to design those procedures more applicable to local reality of folk people and the industries. Houve maior conscientização das empresas envolvidas com a cadeia produtiva da castanha-do-brasil, em relação a treinamentos e transferência de tecnologias aos próprios funcionários como também aos extrativistas fornecedores de castanha para as suas empresas.
Q3	**Adequate** Socio-economical approach to identify the major constraints and opportunities in the Brazil nut production chain and to formulate organizational and incentive strategies for the adoption of sustainable and effective aflatoxin control measures. As principias medidas propostas que trouxeram respostas para as dificuldades da cadeia de produção são: limpar, apanhar os ouricos, clasificar, secar, armazenar- In retrospective, the Amazonia should have been included in this work Apartir do projeto Safenut conhecemos os pontos críticos do problema, precisamos intensificar a conscientização dos Extrativistas. **Somehow adequate** Due to the extractivist nature of Brazil Nut, making management methods some hard to be implemented by many communities, I consider develop a selection method, into the industries, be more impactive on retain the contaminated material, and so increase the safetyness. Principalmente com analise e procedimentos na cadeia produtiva que precisa ser melhor estudada e trabalhada principalmente junto aos coletores com informaçoes e treinamento.
Q4	**Yes** The organization of the Safenut workshops and open meeting has contributed to an improved dialogue on Brazil nut issues between the private and public sectors with high participation of both sectors in the debates in plenary session and working groups during these events.

	The cooperation between the Brazil nut sector and public institutions was strengthened through the involvement of key stakeholders of the Brazil nut production chain (associations of producers/extractivits; processing industries) in the Safenut activities (field participative research). Many contacts have begun with the private partners, and we still have good results from this. A pesquisa sempre é relevante,e agrega conhecimento e facilita o diálogo com os atores da cadeia produtiva. Projeto proporcionou uma interação satisfatória entre setores públicos e privados, gerando parcerias importantes para o desenvolvimento de projetos de pesquisa pela Empresa Brasileira de Pesquisa Agropecuária – EMBRABA, como também de projetos de geração de dados e informações técnicas para embasar a elaboração de regulamentos técnicos pelo MAPA, como é caso do Projeto CONFORCAST e outros. **Somewhat** There is a generalized mistrust between the parties, with few exceptions, also due to declining business
Q5	**More Emphasis** Developing a system for early delivery of nuts in shell to final processing. Training the trainers in GEP, GSP and GMP . More training and dissemination through castanheras community. Seria o sistema de exploração da Castanha do Brasil na floresta, pois lá é que precisa maior transferência de tecnologia. Básicamente, todas as atividades de Boas Páticas que contribuem para prevenção e redução da contaminação por aflatoxinas. Porque a prevenção e redução da contaminação por aflatoxinas pode trazer a possibilidade de rehabilitar o Brasil nas exportações de castanha-do-brasil com casca para a UE. None. All the Safenut activities were relevant to achieve the final project goal. See answer in 5) A transferência de tecnologia poderia ser mais abrangente e adequada para envolver produtores de outros estados produtores, tais como Amazonas, Rondônia e Roraima que possuem condições logísticas deferentes das existentes no Acre e do Pará. Reforçaria o diálogo entre o setor público e o privado por meio da criação de consórcio e de uma câmara técnica permanente da castanha-do-brasil. A transferência de tecnologia poderia ser mais abrangente e adequada para envolver produtores de outros estados produtores, tais como Amazonas, Rondônia e Roraima que possuem condições logísticas deferentes das existentes no Acre e do Pará. Reforçaria o diálogo entre o setor público e o privado por meio da criação de consórcio e de uma câmara técnica permanente da castanha-do-brasil.
Q6	**Less Emphasis** The analytical part of ELISA and LFD for aflatoxins. This part gave very little if any new information. We could have given the course in LFD and ELISA with direct contact with the company instead of a partner who didn't deliver. The original idea was to use the ELISA for analyses of the samples but since they didn't validate the method correctly and too late, we had to use expensive and time consuming LC methods. However, these analyses, which was taken over by another partner, were very well performed and led to very good data to put in to models how to predict safe storage time etc. To the laboratory validation methods to improve the estructures and the quality requirements for the aflatoxin analysis. Aparte laboratorial, pois já conhecemos os índices de contaminação por Afatoxinas. Não houve atividades menos importante, todas contribuiram, de alguma forma, para o desenvolvimento da atividade de extrativismo e consequentemente da melhoria da qualidade e segurança da castanha-do-brasil.
Q7	**Successful** The industry can now proclaim that a serious study has been performed with results and Brazil nuts are not any longer an 'incognito'. Foi possível fazer uma análise comparativa entre as duas principais regiões produtoras do país (Acre e Pará) e assim identificar as peculiaridades de cada uma delas.

	The Safenut specific objective 1 allowed a better knowledge of the conditions of Brazil nut production and commercialization in both states of Acre and Pará by underlying the regional differences, and of the major constraints and opportunities in the Brazil nut production chain. Based on this information, organizational and incentive strategies for the adoption of sustainable and effective aflatoxin control measures were determined. **Less successful** Especially concerning the economical incentives. A produção é de acordo com a natureza, pois a Castanha do Brasil é um produto extrativista. Precisamos trabalhar mais a estrutura da cadeia. O mercado continua aquecido. **Not successful** The project coud reach, due to the available resources and the high cost of accessory operations, only few communities, on Pará and Acre States, but the production is sprayed thru Amazonian Forest.
Q8	Instigate the involved parties to explore more deeply the forest and find new ways to bring the nuts into the market. Considero que, por ser uma experiência inédita o prometo foi desenvolvido de acordo com as condições e dificuldades inerentes à realidade do extrativismo na Amazônia. A partir dessa experiência os projetos poderão apresentar maior fluidez e eficácia nos resultados. Method selection on industries. The implementation of the Validation and implementation of a rapid aflatoxin surveillance system for use along the Brazil nut production chain was delayed and not complete as expected by the Safenut coordinators and other project partners. A better coordination of these activities since the beginning of the project would have allowed a more effective progress and complete achievement, in particular regarding the validation of the rapid methods for aflatoxin analysis (more comprehensive validation). A transferência de tecnologia poderia ser mais abrangente e adequada para envolver produtores de outros estados produtores, tais como Amazonas, Rondônia e Roraima que possuem condições logísticas deferentes das existentes no Acre e do Pará. Reforçaria o diálogo entre o setor público e o privado por meio da criação de consórcio e de uma câmara técnica permanente da castanha-do-brasil. Still the project was more academic rather than practical
Q9	A larger and firmer contribution from institutions, community and industry is needed. Due to the local logistic constraints in the Amazon region (remote production areas and with difficult access), the implementation of the technical activities (in particular sample collection and analysis – project specific objective 2) and to a lesser extent of the socio-economic activities has required important financial resources. Because of budgetary constraints, the participation of relevant stakeholders in Safenut workshops and training courses, in particular of key Peruvian and Bolivian partners, had to be limited leading to a less effective transfer of project outputs to the intended beneficiaries. Os recursos não foram suficientes para incluir outras regiões produtoras de castanha-do-brasil portanto houve restrição na amostragem que deveria ter ocorrido em outras regiões com diferentes estruturas de cadeia; Os projetos desenvolvidos na Amazônia são caríssimos devido a logística de transporte e pessoal.
Q10	In identifying the critical control points and setting limits for safe handling of the in-shell Brazil nuts (models on predicting aflatoxin levels). Improving the laboratory skills (sample preparation and fungal analyses) O empenho dos técnicos envolvidos no projeto Área de micologia – microbiota da amazônia • Identification of CCP/factors for fungal growth and aflatoxin production which led to the update of good practices for aflatoxin control in Brazil nuts • Identification of the major constraints and opportunities in the Brazil nut production chain for the adoption of the good practices and Identification of a rapid, simple and low-cost method for aflatoxin analysis along the production chain. A competência técnica da equipe coordenadora (Catherine Brabet Mônica Olsen) que conduziram o projeto de forma brilhante; A competência técnica da equipe brasileira em particular a equipe do Lacqsa; O apoio local dado pelo Ministério da Agricultura (MAPA) nos trabalhos laboratoriais e na coleta de amostras; O espírito de colaboração (networking); Os treinamentos disponibilizados. **Major Factors**

	Dedicated activity leaders and participants (the efforts of collecting all the samples from the rain forest, following strictly the sampling plan, immediate fungal analyses and taking over all the chemical analyses of aflatoxin in the end). Tecnologías utilizadas. Nivel de conhecimento dos especialistas envolvidos. Obtenção de dados ainda não pesquisados. Contacts with others institutions, through the coordination of project – Dr. Catherine Brabet. Structure – providing equipments and consumables, not readily available to partners. Production of articles and publication of results on International papers. • A strong involvement of the Safenut partners and good cooperation between them for executing the project activities. Exchanges of technical and scientific information and experiences, in particular on methodological issues, were effective and essential for the implementation of the activities; • The constitution of a multi-disciplinary team with relevant competences; • The good cooperation of the private sector which was involved in the Safenut activities in a participatory research approach; • The use of an appropriate sampling design and method based on the Commission regulation (EC) No. 401/2006.
Q11	Large-scale dissemination of effective and sustainable Brazil nut good practices to intended beneficiaries (producers/industries and trainers of the three main producing countries – Brazil, Bolivia and Peru -) Transferência de tecnologia; Finalização dos achados conforme relacionados nos itens anteriores; dificuldades de acesso aos locais de produção; falta de recursos e tempo restrito do projeto considerando os níveis de dificuldade de se implementar qualquer atividade na Amazonia. Rapid aflatoxin surveillance system Developing of a rapid test for industries was not completed, maybe due to the findings os project, about the range of contamination needed. Formalização das parcerias entre as instituições, disponibilidade de recursos financeiros para aporte , qualificação e empenho dos técnicos envueltos.
Q12	We have the knowledge why and how the nuts get contaminated with aflatoxin and how to avoid. Improve the GMP Understanding the real problems and responsibilities of the various players of the chain. Código de Boas Práticas com base em dados e informações mais reais, pesquisadas por meio do Projeto. Take to external market that Brazil is capable for supply a safe food, but need assistance to solve this big and complicated issue about controlling contamination on extractives products like Brazil Nut. O projeto apresentou estratégias que podem ser adotadas para controle dos níveis de contaminação da castanha-do-brasil. A implementação dessas estratégias dependerá de ações coordenadas dos diversos setores da cadeia produtiva. It remarked the idea of the importance of quality controls for international trades. It showed that is not so difficult to make an important improvement in quality.
Q13	This question is too early to reply. It takes a while before a new system is implemented. And there has been a tendency to sell to other regions and to a lower price instead of changing practice. However, the exportation of Brazil nuts to Europe has gone from zero to a few consignments each year after the project. Se as ações sugeridas pelo projeto e incorporadas pelo Codex Alimentarius forem efetivamente implantadas e houver controle rigoroso condições de temperatura e umidade do transporte das castanhas-do-brasil até o destino final.
Q14	The analytical skills in identifying the moulds have already been used and are used in other projects in Brazil. And they are improving the skills even more. Due to lack into selection process, on industries, the sampling process have to be high costly, but, remains some unpredictable about its accuracy to a "real contamination level" of the lot. O método de análise de aflatoxinas por meio de kits, contribuirá para a realização de análises de autocontroles aumentando a capacidade analítica atual, que é limitada devido a carência de laboratório na região produtora de castanha. Um dos resultados concretos do projeto Safenut é a contribuição para que o laboratório do LANAGRO-PA hoje está apto a realizar análises rápidas de aflatoxinas no estado do Pará e atender as demandas da região da amazonia.

Q15	In the case that a dedicated person will lead the implementation of system for early delivery of in-shell nuts to final processing (keeping to the limits identified by this project. It will be set by the private compa-nies interest in keep the improves Devemos intensificar e/ou expandir o projeto Safenut. I believe good practices can be developed by projects like Safenut, but it´s appliance to production chain must be done by the extractivists and producers itself, so an self-controlled production can be achieved, on this view, the chain remains waiting to evolute.
Q18/19	**Lessons learnt and final comments** Give substantial amount of time for the planning and creating the project and action plan (including milestones and risk analysis). Keeping the dialogue with the project with the project owner, partners and stakeholders Confidence gained for the product Trabalho com equipe multidisciplinar.e com parcerias internacionais The reporting on Safenut project progress to STDF Working Group at four monthly intervals. This frequency which may be seen as quite demanding at the beginning is also very useful for an effective project development. In case of project implementation problems, it allows to take actions to resolve them in a timely manner. The involvement and relationship with key international regulatory authorities which are valuable to address issues concerning trade in food products. The Safenut final workshop counted with the participation of a representative of the European Commission (DG SANCO) and members of the Technical Group on Food Additives and Contaminants (GTFAC) of the Codex Alimentarius Committee of Brazil (CCAB). The Safenut project also contributed to the Codex discussions and works on aflatoxin contamination in Brazil nuts Os procedimentos de produção com foco nas boas práticas recomendados pelo projeto, servirão de referencia para a definição de futuros estudos de coeficientes técnicos de produção que são elaborados pela equipe em que trabalho na Embrapa. O Projeto resgatou a confiança das empresas do ramo de castanha-do-brasil nas instiuições nacionais e da UE, por meio do trabalho em parceria do Projeto, que resultou na flexibilização dos limites máximos de aflatoxinas e a possibilidade concreta de retorno das exportações de castanha-do-brasil para a UE. There are real opportunities on production of contamination-free Brazil Nut, fulfilling even the European requirements. A food safety problem cannot be addressed by considering only one particular aspect (e.g. technical aspect), but must be solved by an integrated approach addressing several aspects: technical (good practices based on HACCP principles), socio-economical (incentive strategies for the adoption of sustainable good practices), and regulatory aspects (maximum limits of contaminants based on scientific evidence, aiming at the protection of human health with a minimum economical impact on international trade).

Annex 7

Documents consulted

STDF 114 Documents:

- Application for a stdf project grant
- Action Plan
- First Progress Report
- Second Progress Report
- Third Progress Report
- Fourth Progress Report
- Final Report SafeNut Component Presentation
- Training Course Good Practices CIRAD
- Training Course Good Practices NFA
- SafeNut SO1 . Report 1Actual situation of brazilian and international legislations related to the commercialization of Brasil nuts
- SafeNut SO1. Report 2 Dinamics, processes and actors within the production chain of Brazil nut in the states of Acre and Para, Brazil.
- SafeNut SO2 Report 1 Validation of recommended good practices in the Brazil nut production chain for aflatoxin control
- SafeNut SO2 Report 2 Validation of recommended good practices in the Brazil nut production chain for aflatoxin control Second study carried out from March to April 2008 -
- SafeNut SO3 Report 1 First fit-for-purpose study on Brazil nuts spiked with aflatoxin B1
- SafeNut SO3 Report 2 Second fit-for-purpose study on Brazil nuts naturally contaminated with aflatoxins CSL / R-Biopharm AG
- SafeNut SO3 Comprehensive protocol for evaluating the performance of R-Biopharm ELISA and LFD kits in the estimation of aflatoxins in Brazil nuts
- SafeNut Global Financial Report
- EMBRAPA. Manual de Seguranca e Qualidade para a Cultura da Castanha-do-Brasil. Campo PAS, Serie qualidade e seguranca dos alimentos. Convenio CNI/SENAI/SEBRAE/EMBRAPA. Brasilia, DF 2004.

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- Report of the Fourth Session of the Codex Committee on Contaminants in Foods. Izmir, Turkey, 26 – 30 April 2010.
- Proposed Draft Maximum Levels For Aflatoxin In Brazil Nuts (N11-2008). Codex Committee on Contaminants in Foods. Third Session. Rotterdam, the Netherlands, 23 - 27 March 2009.