

Concept Note 4

Ensuring production quality and safety for small rural agroenterprises: learning and projecting from experience

Goal and objectives:

Goal: To contribute to the equitable and sustainable integration of small and medium-scale agroenterprises in rural and peri-urban areas into value-adding supply chains serving growth markets

Support to Small and Medium Agro-enterprises (SMaEs) in developing countries to develop appropriate Food Safety and Quality Management Systems (FS&QMS) and build capacity in the institutions that support them, so that their products meet appropriate regulatory standards and quality requirements for national and export markets.

Objective 1:

To support Small and Medium Agro-enterprises (SmaEs) in developing countries to identify and address the constraints in developing appropriate Food Safety and Quality Management Systems (FS&QMS). At the same time, facilitate capacity building within the institutions that support SMaEs, to study the processes involved so that strategies can be identified for the promotion of sustainability in the production of a safe and wholesome food supply. This approach will ensure that farmers products comply with appropriate regulatory standards and quality requirements for national and export markets.

Background and justification:

Expanding world trade in food, fresh and processed, has made food safety and quality a global issue. Today, food businesses are buying their raw materials from different regions around the world. For SMaEs to obtain access to both national and international markets, strategies need to be researched and developed. Stakeholders need to understand the whole commodity system, from production to consumption. Damage caused to the commodity during production may not be removal at subsequent stages along the commodity chain. It is therefore important for stakeholders involved in production, especially those working with SMaEs, to understand at which steps in the chain such constraints will occur. Research will be carried out to identify key areas that need to be addresses to ensure the production of a safe and wholesome commodity. These investigations will include:

- identification of steps in the commodity chain where safety and quality attributes may be compromised

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- development of strategies to determine the risk of identified hazards
- research and development of user friendly, rapid tools to monitor measurable constraints
- strategies to control the identified constraints.

Food Safety issues impact upon national governments, food producers and processors, food retailers, as well as consumers. All groups need to collaborate and take responsibility for their part in the commodity system as issues can impact upon food productivity, food habits, as well as consumer health. It is important to research strategies, using tools based on a scientific approach that will improve knowledge in this dynamic field.

Internationally, the reduction of tariff barriers and quotas through World Trade Organization (WTO) negotiations has brought food quality-related issues to the forefront. Many developing countries are running into difficulties meeting their developed economy trading partners' safety and other quality standards, which are becoming more stringent in response to consumer concerns. For instance, the European Commission has recently introduced much tighter maximum tolerance levels for aflatoxin affecting numerous tropical products (groundnuts, pistachios, coffee, cocoa, cereals), and restrictions on pesticide residues for certain products used on tropical fruits and vegetables are soon to be set at the limit of detectability. In both cases, developing country exporters may be losing access to the international markets that earn millions of dollars in trade.

At the same time, the rapid growth in urban markets within developing countries has been accompanied by rising consumer demand for products with safety and other quality guarantees. While this is certainly a positive factor in terms of social and economic development – as improved food safety should contribute favorably to human health – it is also a challenge for local supply chains. For many urban consumers, there is a tendency to associate imported products produced by “brand name” companies with quality in general and safety in particular, because local suppliers have difficulties establishing the necessary quality reputation.

Putting into place quality programs in developing countries requires overcoming both some general difficulties and some specific problems faced by small-scale entrepreneurs. One general difficulty relates to ***understanding the determinants of safety and quality***, in order to design quality management programs. For many tropical products, such information is lacking or incomplete. In the area of food safety, this is particularly true for contamination by mycotoxins, which can occur at various stages in the production and handling process. What are the critical control points, and what practices, at different stages, can minimize damage? There is similarly a need to gain better understanding of how one can improve other quality parameters, including taste and appearance, shelf-life, etc., in a “farm to fork” approach which considers the role of varieties, agronomic practices, product handling and processing.

Another general difficulty relates to the ***level of food quality and safety objectives in place***. Commonly, food regulatory systems adopt international

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quality standards – either those agreed to by the Codex Alimentarius or those of major developed country trading partners. These standards are often far out of reach of local agroenterprises, at least in the early stages of a quality program. The well-developed export-oriented suppliers tend to be the only ones aiming to meet these standards (necessary for export markets). Meanwhile, the regulations exist on paper, but are largely irrelevant, for suppliers to the local market. It could be more beneficial to establish realistic quality and safety objectives, taking into account local conditions (level of risk and feasible quality/safety targets for supply chain actors). Appropriate quality management systems can then be put in place, with a goal to progressively improve compliance with safety and other quality objectives, over a set period of time.

Such programmes for establishing and maintaining compliance with food safety and quality management specifications and standards will be a crucial to the success of this proposal. Standards and specifications required by the diverse markets will need to be researched and understood:

- Stakeholders will need to interact with regulatory bodies in order to set realistic goals and establish actions plans so that legal standards will be met;

Codex will be followed as a framework, however, national food control systems should be tailor made to address specific constraints in country

- 1.) Begin with particularly hazardous foods
 - 2.) Research a strategy that will address barriers to export markets
 - 3.) Identify priority commodities, food security versus niche markets
- Include flexible attributes of consumer preferences such as tastes, appearance. etc.
 - Understanding of nutritional standards and targets, especially in relation to the health of national populations
 - Consumer understanding of management systems for safety and quality.

For several reasons, ***the quality challenge is particularly acute for supply chains dominated by small and medium-scale operators***. First, quality is created and maintained along the whole supply chain, “from farm to fork”. This requires coordination among the various stakeholders growing and handling the product at different stages along the chain. Second, managing quality requires the ability to understand how quality is maintained (or lost) and the ability to conduct diagnoses at critical points. This means having access both to knowledge about the “quality process” and to resources for diagnostics, often involving laboratory testing. Finally, demonstrating quality to consumers and winning their confidence is significantly aided by the ability to show adherence to a quality assurance program (and to advertise this).

Large firms are in a better position to meet the challenge on all three counts:

1. they have easier access to the knowledge and capital required to design quality assurance systems;

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2. they have more control over the supply chain – either thanks to vertical integration or the ability to impose quality requirements on suppliers;
3. they have the resources to advertise and can benefit from scale economies in earning their quality reputation.

Smaller scale operators will need support to develop and adopt appropriate systems of quality assurance, with suitable, affordable methods FOR monitoring critical control points for safety, nutrition and quality. To support this coordination between stakeholders along the chain is essential to establish suitable systems for earning a sustainable quality reputation, e.g. recognition through quality labels.

To enable local supply chains to meet the quality challenge, participatory R&D is needed to:

- (i) develop quick and effective techniques for identifying sources of quality problems along the supply chain;
- (ii) develop appropriate quality and safety objectives;
- (iii) design, implement and test effective and lowest cost quality assurance systems;
- (iv) provide information outreach and training to foster the widespread development of a “quality culture.”

Clients and partners:

This project will link collaborating international and national research institutions with local supply chain operators (farmers, processors, traders), food quality analysis laboratories, regulatory and health officials and consumer groups. National networks of stakeholders will be established and roles of individual partners will be determined. Assessments will be made identifying gaps in the commodity system in relation to safety, quality and nutritional attributes. With this information in depth investigations will be carried out to by key partners to develop strategies to address these issues.

Project components:

For commercially important commodities in selected sites, the project will cover the following six areas:

1. Identify and understand constraints

Participatory research conducted with key stakeholders along the supply chain to identify and quantify constraints and research methodologies to prevent deterioration of safety and quality attributes. This can be initiated with workshops, involving stakeholders in the supply chain along with key partners aware of methodologies for law enforcement and laboratory testing, to identify problems in compliance with quality standards, market requirements, and the establishment of on-site research programmes. Practical solutions, supported by scientific based evidence, will be developed using the farm to fork approach. To support the scientific investigation, a cost benefit analysis will be made of the introduction and implementation of the methods developed.

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2. *Design, test and implement food quality assurance systems*

Based on the identification of constraints identified in 1, safety and quality assurance systems will be developed and introduced, based on “Good Practices”, HACCP and Total Quality Management approaches, for small and medium-scale agro-enterprises supply chains. To ensure that appropriate monitoring and record-keeping systems are managed by sector groups/SMaEs a national business support service for SMaEs will be established. Economic analysis of costs & benefits of implementing and maintaining equivalent systems will be compared with traditional methods. This work will initially be done with voluntary SMaEs from pre-identified sectors, to be followed by capacity building of national food production chains.

3. *Develop and test low-cost diagnostic techniques*

Applied research and development of low-cost, rapid techniques for diagnosis and monitoring of contaminants, appropriate for use by small and medium-scale agro-entrepreneurs, buyers for local and export markets, food inspectors.

Understanding of food testing within a framework of food safety and quality management systems is an essential element of this project. Laboratory staff, involved in research, as well as in routine testing will participate in workshops on topics including Good Laboratory Practice: meeting the requirements of ISO 17025 to establishing sound practices for statistical experimental design in research.

4. *Develop realistic food safety and quality standards, specifications and objectives*

The principles of risk analysis, based on scientific investigations, will be used to develop appropriate quality and safety objectives which agro-entrepreneurs will aim to attain over a specified period of time. This will include taking into account:

- the nature and prevalence of quality problems identified in 1;
- a determination of acceptable levels of quality for the consumer (based on regulations in effect, on WHO-determined acceptable levels of exposure for certain contaminants, on market analysis for non-safety quality issues);
- assessment of the capacity of local supply chain actors to meet safety and other quality objectives, given potential methods for addressing constraints identified in 1.

This work will be carried out through a consultative process involving all stakeholders, laboratories, regulators and consumer representatives. National business support services will co-ordinate outputs from legislative groups, researchers, national legislators and inform stakeholders through a series of workshops or by another suitable medium for dissemination of information.

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The above process may demonstrate that specific international standards are unrealistic and restrictive to export, without evidence of significant harm to consumers. With this scenario, delegations will be made to the World Trade Organization.

5. Establish food quality and safety management networks

The establishment of food safety and quality management networks at the national and regional level, involving the range of stakeholders (farmers, processors, traders, laboratories, government regulators and health officials, consumer groups) – to review standards and objectives of quality programs and determine new needs for training, analysis and outreach to consumers.

6. Develop and implement outreach and training programs for introducing quality assurance systems

The training will target both SMaEs (farmers, traders, processors), consumers as well as the support groups and laboratories with which they will be working. The project will hold workshops to review and exchange results on crosscutting issues, such as the development of control methods and of diagnostic techniques and the lessons learnt in putting into place quality assurance systems for SME-based supply chains. A key output of this activity will be the establishment of centres of excellence, e.g. a regional laboratory for pesticide analysis, with satellite support centres in identified countries of the region.

Outputs:

- Methodology(ies) that can be applied to quality management/ assurance along the whole chain and in different contexts (e.g. for local/national markets and for export).
- An analysis of the socio-economic and environmental impact along the chain from production to consumption.
- Low-cost diagnostic methods for safety and other quality parameters appropriate for use by actors in developing economy supply chains
- Crops and products evaluated, that have been nutritionally improved through selection, breeding, fortification or genetic engineering
- Traditional and novel methods of packaging adapted and tested, to maintain or enhance quality over a longer shelf life.
- Network of all key stakeholders and centres of excellence established.
- Improved human capacity in national and regional institutions that provide support to rural agroenterprises and guarantee the compliance of products with quality standards.

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- Guidelines formulated for regulatory bodies, on realistic quality parameters and standards according to the local context in which the products are produced, and to the levels of safety necessary and satisfaction required by the consumer.
- Success factors/lessons learned for setting up HACCP and other quality management systems in supply chains with small and medium scale farmers and processors identified.
- Training manuals developed for establishment and operation of effective quality control systems for different types of commodities (and controlling for different types of key contaminants).

Areas of innovation:

- Taking a full supply chain approach to looking at quality and safety management with approaches like HACCP, total quality management (up to now these approaches mainly focus on the manufacturing level)
- Adaptation of quality control techniques to supply chains with many small-scale operators (farmers, processors)
- Development of rapid diagnostic tests to support the quality assurance activities
- Establishing local and regional appropriate quality and safety objectives for key commodities produced for growing urban markets in developing countries (rather than using international norms and not attaining them)
- Developing coherence between private sector and government standards.
- Establishment of networks to promote the understanding of standards and specifications

Key Partners:

While all PhAction members have expressed interest in contributing to this project, the key institutions involved are: CIRAD and NRI.

It is proposed that these two institutions take the lead in the cross-site component of the project, while other PhAction members are involved at the site level or for particular cross-site inputs, as appropriate to their mandates and interest. Other international agencies involved in the food safety field could have key cross-site inputs are the WHO, particularly in the area of risk analysis, and the FAO Food Quality and Standards Service, in the area of food standard-setting.

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Delegates from Latin America, The Caribbean, Africa and Asia expressed support for this concept note and would certainly welcome an opportunity to participate in projects that result from this concept note.

Institutional strengthening of local collaborators will be a prime activity. Staff in key areas will be identified and invited to attend a series of training courses to give them the skills to carry out the bulk of identified research activities locally. Support in these activities will be provided initially by CIRAD and NRI, with additional inputs from other consortium members.

Key Supply Chains and Sites:

The choice of commercially important/traditional supply chains for focus should provide a balance between meeting the demands of different types of end-product markets, e.g. export, local/regional urban markets. This will also contribute towards experiences in the management of different quality/safety issues, e.g. contaminants – chemical: pesticides/mycotoxins, biological or physical. Experiences and ongoing research programmes will be a factor in this selection process. The following supply chains could be appropriate for providing this cross-section (list to be amended according to interest, funds available, etc.):

- **groundnuts** – export and local markets, mycotoxin control, low perishability
- **maize** – local food and feed markets, mycotoxins and pesticides, semi-perishability
- **roots & tubers** – local and regional markets, mycotoxins and pesticides, perishable
- **dairy** – local and regional markets, microbial contaminants and veterinary drugs, perishable
- **poultry** – local and regional markets, microbial contaminants and veterinary drugs, perishable
- **fresh fruits & vegetables** – export and local markets, pesticides, perishable
- **coffee & cocoa** – export markets, mycotoxins, semi-perishability
- **fish** - reduction of losses, quality improvement, monitoring of known hazards, e.g. histamine.
- **street foods** - strategies to improve the safety and quality
- **horticultural produce** - value added, strategies to improve quality and safety attributes

The project will be implemented where PhAction members already have relevant activities in place (or planned) and where an organizational support infrastructure exists. Some proposed sites are (to be amended according to interest, funds available, etc.):

- Africa: Senegal, Benin, Ghana...
- Latin America: Brazil, Colombia, Paraguay, Bolivia...
- Asia: Vietnam, India, ..

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Relevant On-going Activities

Summary of recent and ongoing activities by key partners in this area:

- CIRAD + NRI + FAO. Food quality and standards service – food safety management workshop December 2000 with national experts from some 20 countries (HACCP in theory and in practice, diagnostic methods and challenges for laboratory analysis, risk analysis)
- Various CIRAD departments with local research systems and supply chain actors on management of contaminants for groundnuts in Senegal, yam in Benin, Nigeria, Ghana; dairy in Colombia (with CIAT) and several African countries, poultry (Senegal) , animal feed; coffee (with the FAO)
- NRI – collaboration with the FAO/WHO in establishing national Food Control Systems (Head Office) Eastern Africa, South East Asian Regional Office (SEARO), Eastern Mediterranean Regional Office (EMRO).
- NRI – DFID programmes of research into:
 - appropriate quality management systems for SMEs (Central America and the Caribbean)
 - Managing hazards associated with Street Foods (Ghana, Nigeria)
 - Quality Assurance systems for fish and fishery products (Thailand, India, Bangladesh).

Added value from this proposal:

This proposal adds a global context to the current more isolated efforts of individual institutions or groups of collaborators in different countries/regions in the area of support for quality management. This should:

- Ensure that location-specific activities include a range of locations, types of products and supply chains, market and policy environments
- Facilitate cross-project analysis and the development of the international public goods mentioned previously and a strategy for dissemination of results.