Annex C.11

List of Research Priorities

1. Brazil

1.1 Production

1.1.1 When and how infection occurs in the field?

Importance/relevance of:

- Physical damage through insects (CBB), importance for infection and OTA production;
- Flower infection.

Planned approach: introduction of molecular markers to track the fungus.

Impact: Broaden basis of knowledge and improve and support good practice recommendations.

1.1.2 Inoculum source

Importance of weeds, intercrops and shade trees.

Impact: Information on risk of possible inocolum sources and develop technology to avoid the problem.

1.1.3 Organic production – are there specific risks?

Impact: Knowledge on safety of organic production.

1.1.4 Knowledge about biological characteristics

Optimal biological and physical (environmental) conditions for growth and OTA production.

Impact: Broaden basis of knowledge and improve and support GAP´s and GHP´s recommendation to reduce growth and development of risk fungi.

1.2 Harvest and Dry Process

1.2.1 Most significant defects (sour, black, CBB, broken, foxy) as a source of infection and OTA contamination

Impact: better understanding of defect formation and impact on susceptibility to infection and contamination.

1.2.2 Multivariate analysis on all contamination vectors

Impact: To guide focus of remedial interventions.

1.2.3 Drying

Number of options are available, mechanical and natural drying (Prof. Juarez - University of Viçosa).

Impact: Develop and specify methodologies for each type of dryer.

1.3 Harvest and Wet Process

1.3.1 Economic feasibility of selective picking

Impact: Cost factor and impact on reducing OTA contamination (Prof. Juarez).

New methods: selective PCR for detection of gene expression involved in the biosynthetic pathway of OTA in coffee.

2. Coffee Board of India

2.1 Research Studies

2.1.1 At production stage

- Effect of pest & disease control measures on occurrence of moulds in coffee.
- Target pests/ diseases: Coffee Berry Borer/Coffee Leaf Rust.

2.1.2 Harvest stage

- Economic implications of selective picking, sorting, gleanings collection, use of mats in mould prevention programmes.

2.1.3 On-farm processing (wet & dry method)

- Effect of soaking cherries before pulping on mould suppression - conditions of soaking, duration, water quality etc.
- Evaluation of pulping machines – effect of quantities of water used for pulping/ demusciligisation on mould formation.
- Evaluation of role of fermentation on mould contamination – use of yeast as suppressants.
- Validation of 'test weight method' for on-farm moisture measurement.
- Impact of separation of floats for cherry preparation.

2.1.4 Storage & transport

- Impact of defects on mould contamination in coffee during storage – wet & dry processed coffee.
- Studies on shelf life of coffee under different conditions - packing material etc.

2.2 OTA Analysis

- Interlaboratory proficiency test for laboratories in the country.
- Monitoring of OTA levels in green coffee at national level.

2.3 Training & Transfer of Technology

- Development of guidelines on prevention of moulds in coffee through out the chain – for extensionists, growers, curers, local traders/ agents, exporters.
- Training of post graduate students on OTA analysis and extensionists on GHPs.
- Awareness programmes for growers, curers, local trades/ agents & exporters.

3. Coffee Research Foundation, Kenya

3.1 Research Studies

3.1.1 Further search for better coffee drying technology

These are required to complement the current practice of sun-drying in combination with conditioning mainly in the cooperative sectors. Recently, the number of drying tables in a primary cooperative factory and the small holders processing stations has reduced drastically and manual conditioning bins are being used to hold semi-wet coffee when there is not enough available space in the drying yard. If appropriate technologies are available, coffee producers might choose to invest in these rather than investing in replacement of drying tables. It should be noted that some of the coffee producing areas do not have an electricity supply.

Requirements:

- Screening of prototype coffee driers with respect to their technical performance and from an economic perspective;
- Coffee for testing driers;
- Moisture meters;
- Coffee handling equipment;
- Training on the installation, operation and maintenance of the alternative options;
- Technical staff for 2 years.

Duration: Four (4) coffee harvesting seasons i.e. 10 months/year.

3.1.2 Processing water minimization at the pulping, pre-grading and final washing and grading stages

The major output here is expected from re-using the morning's final grading water for the days' pulping later in the day. Monitoring the coffee quality and mould formation during processing will assess the effect of recycling water use as such or any other water requirement revisions. Reduction of processing water implies positively towards checking environmental pollution and hence enhanced coffee quality via processing coffee with unpolluted water.

Requirements:

- Coffee for the trials;
- Technical staff for 8 months per year;
- Processing equipment.

3.1.3 Studies on the fermentation/prolonged soaking of parchment coffee

The effect of prolonged soaking on coffee quality has been reported before. However, the impact of the same on mould growth needs to be done now. The benefits of using biocultures for enhancing coffee quality and check the growth of the OTA producing fungi needs to be ascertained.

Requirements:

- Staff time of 8 months per year.
- The necessary Coffee processing equipment

3.1.4 Upgrading primary coffee factory hygiene

Composting of coffee pulp trials; treatment of the coffee processing effluent and; undertake studies on the possibility of an economic utilization of the coffee processing by-products (value addition).

This would be expected to complement on the desired primary factory hygiene since the farmers will collect the newly valuable coffee processing wastes.

3.1.5 To establish when and how infection occurs in the coffee in the coffee farms

To consider physical damage; infection through the flower – molecular markers and berry development stage. To apply specific CBB/CBD prevention strategies and risk of not doing so.

3.1.6 Establish the relationship between coffee nutrition management and the incidence of disease attacks and pest infestation

Now that a positive correlation is emerging between coffee defects and OTA levels, methods of controlling diseases and pests attack in coffee besides use of chemicals are necessary.

3.2 Further capacity building

3.2.1 OTA analysis (routine monitoring of OTA status in the Kenya coffee industry)

3.2.2 Training of Trainers and training of coffee factory managers and operators

Requirements:

- Modern analytical equipment e.g. HPLC.
- The relevant training materials.
- Technical staff and trainers full time.

3.3 Other

3.3.1 Development of a Kenya standard on the production of safe, healthy and high quality coffee

To be completed in collaboration with Kenya Bureau of Standards (KEBS), Kenya Industrial Research and Development Institute (KIRDI) and Kenya Plant Health Inspectorate Service (KEPHIS).

3.3.2 Development of a suitable coffee processing model plant for the emerging smallholder coffee sector