# ASSISTING RWANDANS WITH ENTRY INTO THE INTERNATIONAL ORGANIC MARKET PLACE FOR TROPICAL FRUIT

**ADAR RWANDA AGRIBUSINESS DEVELOPMENT ASSISTANCE**

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## EXECUTIVE SUMMARY

As a part of the USAID/Chemonics ADAR Rwanda project, I visited the country from 20 October to 3 November 2001 to assist with the organic certification of exporters of fruit and fruit products. At the same time, I assessed the potential for the agricultural sector in Rwanda to enter the international organic market place, including via production of commodities other than those of primary interest (namely passion fruit, apple banana and *Physalis* or Cape Gooseberry).

From a production standpoint, Rwanda fruit producers should have little difficulty passing organic inspection, and certification should be forthcoming in the near future, provided all paper work is completed and documentation submitted to the certification organization as per its instructions. The cost of certification will probably be the major hurdle encountered, but can be reduced by exporters getting together as a group for the inspection visits, either for separate or for group certification. The disadvantage of the latter is that if one member is found not to be adhering to organic regulations, all shall lose their certification status. I therefore advised individuals interested in organic certification to be certain they could rely on the other members in their group if they elected this option.

From what I observed, there is room for improvement on both the production and post harvest handling of produce if Rwanda is going to be competitive in the international organic market over the long run; pest and disease management, reducing soil erosion and careful sorting, packing and storage of produce must be attended to. Processing of fresh produce which does not meet export standards due to blemishes, size, stage of maturity, etc. would help to make the Rwandan enterprises more profitable; there is a demand for organic fruit juice/juice concentrate, and dried fruit products, however processing facilities would have to be upgraded to meet EU hygiene standards. Another way to add value to the Rwandan products would be through "fair trade" labeling, and this option should be investigated. Formation of a horticultural exporters association is advised as a means of coordinating and improving storage facilities along with air freight for fresh produce, and to serve as a resource center for technical and marketing information. Finally, other commodities could be produced for the organic market, some of which are already grown such as dry beans and peas. New crops could be grown on a trial basis to determine their suitability to Rwanda's farming systems, and these include essential oil crops (vetiver grass, evening primrose), vanilla, some dried herbs and spices and macademia nuts.

## 1. INTRODUCTION

Following the recommendation of James Cartwright[1], the USAID/Chemonics ADAR Rwanda project invited a specialist in organic agriculture to assess the current status of organic fruit production, and assist Rwandan exporters to become certified by one of the internationally recognized organic certification bodies so that they can sell products on the EU organic market place. At the time of my visit (20 October – 3 November 2001), no Rwandan exporters or producers held organic certification. One exporting company, Emballage Rwanda (ER), had in the past sold apple banana, passion fruit and other tropical fruit to a Belgian company which had been certified by Ecocert (organic certification body based in Germany) to import and sell the fruit as certified organic in Europe. This arrangement ceased to operate some time after the last Ecocert inspection in March 2001. ER continued to market fruit, but as conventional rather than organic products. Another exporter, Gaperi Fruit, had been selling *Physalis* on the EU conventional market.

Being aware of the higher price premium for organic produce, both ER and Gaperi Fruit were interested in applybing for organic certification, preferably under some sort of group arrangement in order to share costs. I additionally assessed current fruit production for compliance with organic standards and to determine what constraints, if any, might be encountered if organic production for export is to become a profitable enterprise. While in Rwanda I also investigated the possibility for two fruit processing companies to produce certified organic products.

[1] The reader is referred to Mr. Cartwright's reports of April and August 2001, which are on file in the ADAR office in Kigali.

## 2. ORGANIC CERTIFICATION FOR EMBALLAGE RWANDA

Numerous discussions were held with Evase Nsengimana, owner and manager of Emballage Rwanda /Rwanda Volcano Export Produce in order to determine how his company could be certified for export of organic fruit by one of the recognized organic certification bodies (in this case, Ecocert which is based in Germany). According to Evase, production of the fruit had been following organic standards since 1997 (and in fact has always been "organic" in that producers of banana and passion fruit do not use synthetic fertilizers or pesticides). Previously the certification with Ecocert had been held by Tanganyika Nature, a Belgian company which had been importing apple bananas and passion fruit from Rwanda. Evase had been unhappy that the burden of keeping records on the producers (as part of the organic certification requirement) had been placed on him[2], yet the certification was not in his hands. The last inspection by Ecocert was in March 2001; sometime shortly after this the relationship between Tanganyika Nature and ER was broken off. According to Evase, the costs associated with keeping the organic certification (documentation of production, etc.) had increased and since this fell upon him his production costs went up. Tanganyika Nature however was not willing to increase the price they paid for the fruit. Given the "economic crisis" which Rwandans are facing Evase found he could no longer make a profit exporting through Tanganyika Nature and therefore broke off the trade agreement.

After numerous e mails were exchanged between myself and Andreas Kratz (my contact at Ecocert), it was decided Evase could go ahead with the application to Ecocert for certification, with Andreas notifying me immediately should he determine this would adversely affect their relationship with Tanganyika Nature. Initially, Andreas had stated that Evase could be certified if he didn't procure his fruit from the same producers from which that sold by Tanganyika Nature had come; I explained that the banana producers had been grouped together and were provided technical as well as harvest, transport and marketing assistance by Evase's company, and that they could not be considered to be the domain of Tanganyika Nature alone (in fact, it is doubtful that the latter is obtaining fruit from any of the producers grouped into Evase's association). However, Andreas still maintains that Ecocert cannot certify ER if the same producers as were listed under Tanganyika Nature's certification appear on ER's application form. If, after having reviewed ER's application, Ecocert decides they cannot grant

[2] Evase commented that this paperwork was required of him "even when nothing was being exported"; he will have to become accustomed to complying with this request from Ecocert if he is to hold the certification himself. In other words, he will need to be prepared to pay the price in terms of the workload and costs he will carry in order to maintain organic certification.

certification due to conflicts that may arise with Tanganyika Nature, another certification organization such as Soil Association (based in the UK) or IMO (based in Switzerland) will have to be approached.

The likelihood that ER will be certified for organic apple bananas is high, due to (1) the fact that production follows organic standards and (2) ER keeps careful records on production and marketing of the fruit. In the Kibungo region (which the Ecocert inspector has visited in the course of certification for Tanganyika Nature), for example, ER keeps a permanent staff of 20 (with 10 occasional workers) to assist with production, harvest, purchase and transport of the fruit. A total of 750 families grow bananas for ER in this region, with producers grouped into cooperatives which are served by one staff from ER; this employee provides technical assistance in that he/she visit the producers on a regular basis to "bag" the flower bunches 8 days after flowering[3], places a colored strip of plastic at the base of the bag which indicates the date of "bagging", and records this information in a notebook. Eight to fourteen weeks after bagging the staff member returns to harvest the fruit, pack them with banana leaves for protection and transport the fruit to the "conditioning site" of ER where the fruit are sorted, washed and packed into cardboard boxes for shipping.

The initial mass of the packaged fruit is 3.8 kg, so that by the time fruit arrives at its ultimate market destination, weight will be near the target of 3.5 kg (due to respiration and transpiration losses of fruit mass in transit and storage). Each ER "extension agent" (as they might be called) keeps records of the dates on which bunches are bagged, date and weight of the harvested fruit; the farmer/producer keeps similar records so that there is transparency throughout the operation. Information from all the extension staff is compiled into a monthly report which is sent to the head office in Kigali. This set up would facilitate organic certification (and maintenance of same from one year to the next) in that much of the information required by the certification body is already being gathered as a standard procedure. There is certainly room for improvement to ER's apple banana production scheme, in particular as follows:

- A significant percentage of the fruit are over ripe by the time they reach their final destination due to fruit of a range of maturity levels being packed together, rather then sorting out those which are at an advanced stage of maturity prior to shipping.

[3] The polyethylene sacks serve to protect the developing fruit from insects and birds, and mechanical damage which could result from exposure to wind or direct sunlight; leaves are also pruned at the time of bagging to facilitate air flow around the fruit bunch and ensure proper orientation towards the sun. The resulting increase in temperature inside the bag is reported to speed up the rate of fruit development as well.

- Harvest and post harvest handling techniques need to be improved (along with packaging) in order to reduce losses from damage to the fruit (for example, Evase reported storing his bananas and passion fruit in the same location prior to shipment; this exposure of the banana to the high level of ethylene produced by passion fruit would undoubtedly shorten their shelf life).
- Weight measurements taken in the field are not reliable due to the poor quality of the balances used.
- There is a surplus of bananas produced during the period of September through December, indicating a need for some sort of processing of the fruit[4].
- Producers will need to be more careful about the materials they apply to their crops (a rusting household battery – definitely a "non-conform product" – was found in one plantation), and be certain to keep detailed records of materials applied, sources, amounts and date if they are to meet organic standards.
- The system of determining the price the producers receive for fruit may need to altered; currently the price is decided at twice yearly during meetings held by the cooperatives, and at least one producer expressed the opinion that the price is too low (but then this is typical of most contract production set-ups).

Organic certification of passion fruit exported by ER may be more problematical than that of the apple banana. According to Evase, the Ecocert inspector had previously visited only one "model farm" as producers are scattered and therefore it was too difficult to access a large number of them. This solitary inspection along with interviewing passion fruit producers at market places apparently sufficed for certification purposes. From what I know of Ecocert's (and most certification body's) requirements, more information on the producers is likely to be required if organic certification is to be granted. This will have to be worked out prior to the arrival of the inspector in order to avoid incurring high costs from a time-consuming inspection exercise. As an example, on a visit to one small scale passion fruit plantation in Kigali North, Evase and I were informed it would take one person two days to visit all 200 passion fruit growers on the same hill (and that is assuming the inspector is in the fit physical state required to hike up the steep slopes!). Evase indicated he would commence collecting the names of and details on all the passion fruit producers in the region in preparation for the certification

[4] Evase has a small fruit dehydrator which he has used to produce dried pineapple and banana at a rate of only 1-2 kg dried product per day. This has never been commercialized, not only due to its small scale, but also because Evase was not able to get a price he was satisfied with from Tanganyika Nature.

application, which will help in estimating the time (and therefore costs) which can be expected for the inspection.

Insofar as meeting organic production standards, passion fruit growers visited in Kigali North appear to be following acceptable practices. Cow manure and compost are used for fertilizer (the producer we met stated he had "seen the disadvantages of chemical fertilizers" and knew they would only be rapidly leached on the stony soils), and no pesticides are applied. Drainage of the soils is good which should reduce incidence of root diseases such as *Fusarium* , and grass mulch is applied around the base of each plant to keep the zone around the roots moist during the dry season. Some potential problems were noted, however, which need to be addressed:

- Soil erosion is occurring at an apparently high rate due to the steepness of the slopes on which passion fruit is grown and lack of much terracing; planting against instead of along the contours of the hills (a practice done to reduce wind damage) only exacerbates the problem.
- Poor hygiene standards are maintained in the field, with diseased plants/plant parts simply discarded in the rows rather than being removed from the field and destroyed.
- Trellising was not practiced in a way that takes into consideration mechanical damage of the developing fruit from abrasion when blown against other parts of the plant/trellising structure (resulting blemishes render the fruit unmarketable in the export marketplace).
- The scattered nature of fruit production and topology of the area results in fruit having to be carried considerable distances by hand before reaching a point where truck transport is possible.
- Vacillations in the price producers receive for their fruit (according to the season) along with "middlemen" serve to discourage production.
- Theft of fruit from the isolated fields is a problem (and was the reason a producer came running when he spied us up in his parcel).
- Previous visits to the producers by "politicians" who had made promises they did not keep has left producers wary of any proposed production schemes (this a response to the question of whether producers would be interested in undertaking certified organic production for export).

Despite the potential constraints, I believe it will be possible for ER to be granted organic certification and at an affordable cost if all documentation and provision of the necessary information is conducted prior to the scheduling of the inspector's visit. I gave the necessary forms and technical information sheets provided by Ecocert to Evase, along with the recommendation he commence the application

procedure as soon as possible. I also advised him there might be a delay between the initial application and the final scheduling of the inspection, as additional information is usually requested by Ecocert after they have received the application forms. Evase seemed most interested in filing for a joint certification together with Alphonsine Mutabonwa of Gaperi Fruits, and perhaps Gerard Sina of Nyirangarama in order to share the costs. In this regard I warned him he must be certain of his partners in a joint certification arrangement as he would lose organic status if they failed to comply with the standards at any point.

## 3. SWOP ANALYSIS OF RWANDA ORGANIC SECTOR

### Overview of production situation with respect to certified organic standards

Rwanda has a great advantage over countries such as Kenya, Zimbabwe and Uganda in that production of most crops is (as noted by James Cartwright) is already according to organic standards in that no synthetic fertilizers or pesticides are used, with the exceptions of coffee, Irish potato[5] and cut flowers. Therefore, almost all agricultural products run no risk of being contaminated with materials not accepted according to organic criteria. Moreover, organic certification is likely to be granted soon after inspection without producers having to undergo a 2 – 3 year conversion period. In Kenya and Zimbabwe, on the other hand, most arable land has received applications of non-conform products in the recent past, thereby presenting the dual problems of a required conversion period before products can be sold as certified organic, and the adverse effects of chemical fertilizers and pesticides on the agricultural environment ("mining" of the soils, enhanced deterioration of soil structure, destruction of natural enemies of pests and development of resistant pathogens and insects, etc).

Additionally, with non-conform products already present in farmers' storage facilities in these countries, obtaining and maintaining certification status is more problematical, and the risk of the non-conform products being applied to the organic lands is much greater than in Rwanda. Finally, where both conventional and organic products are grown, measures (which must be approved by the organic inspector) have to be in place to prevent any possible mixture of conventional with organic products at all points along chain from harvest, post harvest handling, processing (where applicable) and marketing. Since conventional fruit are not produced in Rwanda, the organic certification should be much easier to obtain and maintain, and minimal risk of contamination with unacceptable products could be used as a selling point on the organic market place.

One of the major constraints to Rwanda's becoming a strong competitor in the EU organic market is transport: for fresh products which must be air freighted, direct flights to Europe take place only twice a week and often after the plane has been loaded with produce from Kenya[6]. The airline, which was serving this route, namely Sabena, is reported to be folding at the time this report is being compiled.

[5] There is a slight possibility of non-certification of fields where Irish potato are grown and pesticides used in the process; during a discussion at *Physalis* production sites in Byumba a farmer mentioned pesticides had been applied for potato production. These sites will need to be mapped out and excluded in the certification application unless it can be proven that at least 3 years have elapsed since last pesticide application.

[6] According to Paul Delucco of ACDI/VOCA, rose growers in Rwanda are finding it difficult to make profits due to the airfreight problem.

Another airline (e.g. British Air) may move in to take over Sabena's role, however this has yet to be established. Transport of non-perishable (processed) organic products which can be achieved through a combination of road and sea shipment also appears to be problematical, once vehicles leave the boundaries of Rwanda. Large sums of money are demanded to pay fees and taxes in the neighboring countries through which vehicles must travel, and products requiring reliable refrigeration are at risk of deteriorating en route, according to Jean-Calvin Kayiranga of Inyange Dairy.

Some of the other issues which must be addressed if Rwandan organic products are going to sell well in the EU or other export markets had been noted by the group from Rwanda which attended the ANUGA trade fair in Germany: packaging of their products needs to be upgraded, and greater attention paid to the appearance of the fruit/product being sold. They also remarked there is room to improve the post harvest handling of the fruit in order to reduce injuries which detract greatly from the fruit's appearance by the time it reaches the market place. I visited only one storage facility (that of ER), and was given information by Alphonsine Mutabonwa on the sort of storage rooms she was employing. Much could be done to extend the shelf life of and prevent physiological injury to the products if they are stored in appropriate conditions. For the passion fruit, this includes well-ventilated storage to prevent an accumulation of ethylene (which is produced in copious quantities by this commodity), as this hastens the senescence of the fruit. As noted in the discussion on ER, the practice of storing bananas and passion fruit together must be avoided at all costs due to the effects of ethylene (i.e. stimulating accelerated maturation and ultimately senescence) on this and other fruit (*Physalis* similarly being ethylene-sensitive).

Quality, in particular the appearance, of fruit could also be improved by pre-harvest factors: in the case of passion fruit, careful trellising could prevent developing fruit from being blown against other plant parts, as mentioned above, and should be practiced. For *Physalis*, which is sold with its papery calyx still surrounding the berry, Alphonsine Mutabonwa mentioned that often the calyx is dirtied by soil prior to harvest, with the result that such fruit cannot be sold. Mulching the soil could reduce the extent to which the calyx is soiled, both from soil splashed up onto the fruit while still on the plant, and when fruit fall to the ground prior to harvest. All fruit can be attacked by insect pests and/or diseases while still in the field which, if not bringing about complete deterioration of the fruit, can blemish its appearance. In the case of passion fruit, damage by "woodiness" virus (reported by one source to be cucumber mosaic virus), *Alternaria* brown spot and an insect, which «stings», the young fruit were observed in Rwanda. In *Physalis* grown in Byumba,, symptoms of a fungal pathogen (possibly

*Alternaria* ) were apparent on the calices of fruit from scattered plants; with Irish potato (a source of many diseases such a *Alternaria* ) grown in the same plots, this wasn't surprising. Improving pest and disease management in the field could reduce the percentage of fruit rendered unmarketable by these problems.

While Rwanda may enjoy an advantage over Kenya and Zimbabwe at present with respect to lower levels of pests and diseases in their fruit plantations, this may not continue to be the case if fruit production is expanded and/or extended in the same location over a longer period of time. Measures should be put in place now to prevent pests and diseases from reaching damaging levels, and if Rwandan producers are to adhere to organic standards this will be comprised of a combination of techniques: proper hygiene in the field (as noted above in the case of passion fruit), appropriate rotations and intercrop mixtures (e.g. NOT planting *Physalis* in the same field as Irish potato), selecting for resistant crop varieties[7], using clean, disease and insect free planting material[8] and ensuring a good fertility status of the soil through adequate application of manure, compost, and other organic fertilizers to boost plants' capability to resist pests and diseases.

Organic certification of Rwandan producers and/or exporters could prove to be a bit of an obstacle to their entering the organic market due to the cost and the large amount of paperwork, which must be carefully completed, and on an ongoing basis. As had been suggested by James Cartwright, a group certification, or at least coordination of all interested exporters for the inspection, would reduce the cost factor to some extent since the airfare, accommodation and food costs for the inspector's visit would be shared. Given that the fee charged for the certification depends to a large extent on the amount of time the inspector spends on site gathering the information, those who apply for certification can reduce their costs by doing as much of the documentation in advance as possible, and with a great degree of care. Should the inspector find any discrepancy between what the applicant has submitted on the application form, and what s/he observes in the field, the certification is at risk of being withheld until further inspections are conducted to verify practices are according to organic standards. This of course brings with it additional expense. If group certification is chosen, all members must have a high degree of confidence in the honesty, reliability and dedication of the others to ensure organic procedures are

[7] The agronomist at Gerard Sina's passion fruit plantations in Nyrangarama was already practicing selection of the most vigorous parent plants for seed production.

[8] Alphonsine Mutabonwa mentioned she had been offered a package deal by Colombian *Physalis* exporters wherein they would provide her the seed and production technology if in turn she had Rwandan growers produce the fruit for their company; I warned her about the danger of the Colombian seed being contaminated – accidentally or not – with diseases not present in Rwanda and to demand any seed she might receive be certified disease free and/or tested before planting it out into Rwandan farmer's fields.

followed; otherwise, all are at risk of losing certification if one member of the group fails to adhere to organic regulations. Should this occur, it could be even more difficult for any Rwandan company/organization to be certified in the future due to the country's "tarnished" reputation.

**Overview of the processing situation**

Shema Fruits in Butare, which produces a range of fruit juices/juice concentrates, jams and preserves appeared to be very interested organic certification. While the fruits which go into their products do fall under organic criteria, other ingredients may not (potassium sorbate being one example). An even greater problem is that their processing methods are unlikely to meet EU standards in terms of food safety.

According to a food technologist I contacted, food borne diseases have been carried in fruit juices sold in the EU and as a result are particularly suspect when examined for meeting processing hygienic standards (A. Graffham, personal communication). Shema Fruits informed me its fruit juice is pasteurized at 65°C to 75°C for one hour, whereas the recommended practice is a temperature of 80°C; of even greater concern, a closed system whereby the pasteurized product is prevented from coming into contact with air (in which contaminants may be present) is not used, rather the juice is transferred into bottles from the heating vat via an open spout. Many other aspects of Shema's processing plant would have to be changed to meet EU standards, and staff would need to be trained in hygienic practices as well. Inyange Dairy in Kigali, on the other hand, already approaches EU standards for fruit juice processing, and could probably produce juice for the EU organic market with relatively minor modifications of the operating procedure. Jean-Calvin Kayiranga, Director General of Inyange would be interested in producing certified organic fruit juice, but is not ready to pursue the marketing aspect at this point. If an exporter such as Emballage Rwanda or Gaperi Fruit would be willing to undertake marketing of the organic juice in the EU, it appears Jean-Calvin would be amenable to such an agreement.

## 4. RECOMMENDATIONS FOR ACTIONS TO BE TAKEN BY ADAR IN THE ORGANIC ARENA

Production, processing and export of certified Rwandan organic products could become a reality in the near future, and additional assistance from ADAR would greatly facilitate the development of a viable organic sector. Recommended activities are as follows:

**Organic certification:**

- Assisting Rwandan companies seeking certification with the application to the certifying body in order to ensure all paperwork is completed prior to the arrival of the inspector, thereby reducing the risk of the latter's having to spend unplanned time on the inspection in order to complete the documentation required. This can be achieved by maintaining an open channel of communication between the applicants and the certifying body, and supervising the incoming and outgoing messages to ensure applicants fully respond to all queries and requests (e.g. for provision of maps, land-history, etc.).
- Co-funding the cost of certification; the certifying body will, after processing the full application, request for 50% (in the case of Ecocert) up to 100% (for Soil Association) of the estimated cost of certification in advance. Once this has been paid, a time lag of approximately one to three weeks can be anticipated prior to the scheduled arrival of the inspector (for Ecocert; others, such as Soil Association take longer to process applications).
- Ensuring that all players in the organic production and processing chain have access to and understand information on organic standards. Not only is this important to prevent violations of the standards from occurring, but a requirement of the certifying body is that this information is available in a language producers understand. ADAR might need to assist with translation of pertinent materials into vernacular.
- Ensuring that producers are trained in the record keeping necessary to achieve and maintain organic certification, keeping in mind that certification is an ongoing process with annual re-inspections required to keep certification status.
- Ultimately, to train Rwandan agronomists/extension agents and processors on organic certification, production and processing procedures, including record keeping, packing and transport.

**Technical assistance on production, harvest and post harvest handling**

- "Training of trainers" (TOT): agronomists, others involved in extension/field management should receive training on pest and disease management according to organic regulations. As noted above, problems are apparent at only a low level at present, however steps must be taken to ensure proper management is practiced to prevent major pest/disease problems from arising. This can be comprised of the recommended combination of field hygiene, rotations/ intercropping (including with pest/disease suppressive species such as red sun hemp and marigold), resistant varieties, etc., along with organic pesticides, where appropriate (pyrethrum, hot pepper/onion sprays). *
- TOT on maintaining/improving soil fertility and structure through organic manures, inclusion of leguminous crops (as intercrop or in rotations), green manures, agro-forestry species.*
- TOT on preventing and combating soil erosion, especially on slopes where passion fruit is cultivated; trials with species such as vetiver grass (*Vetiveria zizaniodes*) which have dual purposes as both soil stabilizers and sources of other products, in this case essential oil and livestock fodder, could be conducted on farmers fields as a part of the training in addition to generating useful information. *
- Research and training on pre-harvest practices to prevent post harvest losses: this could include mulching/cover crops in *Physalis* to prevent soiling the calices, proper trellising for passion fruit, prevention of insect/disease infestation in the field by promoting plant vigor (e.g. providing good, balanced nutrition), selection of resistant, high-quality fruit varieties.
- Research and training on appropriate harvest techniques and aids to minimize damage to products, for example appropriate harvest containers to prevent bruising, heat and ethylene accumulation.
- Research and training to reduce post harvest losses: proper sorting and packing, evaporative coolers, appropriate storage conditions (temperatures, ventilation, product mixtures), treatments with organically acceptable products to slow respiration rate.
- Trials (following market research) on transformation of surplus and unmarketable fruit into preserved products (dried fruit slices and fruit leather/roll ups, fruit juices and juice concentrates, jams, etc.).

*The Gako Organic Farm in Kabuga, which is already involved in training activities, could serve as a venue for the TOT programs. Trial plots of passion fruit, apple banana and other crops intended

for the organic market should be installed at the farm, which can serve for both demonstration and training purposes. Ideally, trials should also be set up in farmer's fields, if the information gathered is to be truly relevant to their actual situation.

**Access to markets and market information**

Help exporters, particularly through the medium of the ABC, to procure more information on which products are in demand in organic markets, when, where, and in what form (fresh vs. processed, and if the latter the type of processing).

Sponsor selected Rwandan exporters to attend – as visitors - organic trade fairs such as Biofach in Germany so that they can gather ideas on products, packaging/presentation from other exporters, learn more about organic production and trade, meet with representatives of the certifying organizations and make initial contact with potential buyers.

Assist Rwandan exporters in gaining acceptance into CBI's produce marketing courses (note: applicants must be fluent in English and in good health to qualify); it is advisable to start contacting CBI in this regard as soon as possible as selection of candidates is on basis of expression of interest and perceived ability (and initiative) to make use of the information.

Help exporters to access information on prices in the organic market place so that they can competitively and profitably sell their products (again the ABC would be useful for this activity).

Assist exporters in developing contacts with buyers in the EU and other organic market places; this goal can be achieved through a combination of "surfing the web" (using the ABC facilities) to learn which buyers might be interested in their products, and eventually when exporters have developed attractive products which can compete on the international market place, to sponsor their attendance as exhibitors at international organic and other international trade fairs.

**Packaging**

Investigate the possibilities for production of improved (attractive, biodegradable and protective) packaging, in the region if not in the country.

Look into novel packaging designs, which are unique to Rwanda (e.g. gorilla emblem, hand made baskets or other hand-crafted containers which are particularly appealing to European consumers)

Possibly apply for "fair trade" labeling if market research indicates this will enhance the attraction/value of the products, and meeting the fair trade criteria can be achieved without too much difficulty.

## Transport

For air freighted produce, establishment of a low-cost cold storage (e.g. evaporative cooler on a larger scale) at the airport could help to maintain the cold chain in the event flight departures are delayed, or the cargo hold unable to carry all produce ready for transporting to overseas markets

To help resolve problems of transport by surface and air both, formation of a horticultural exporters association[9] which would lobby on behalf of this sector's interests could be useful. ADAR could assist with setting up the association, and initially serving as a base from which the association could operate.

[9] Such an association could serve as a clearing house for information on horticultural production and marketing issues, in addition to organizing exporters together in a larger group which can wield greater power when it comes to lobbying for improved transportation, reduction in tariffs, and could eventually establish a "code of conduct" for horticultural producers, as has been done in countries such as Kenya and Zimbabwe. The Horticultural Promotion Council of the Commercial Farmers Union in Zimbabwe provides such services, and has succeeded in vastly improving the air freight situation, among other accomplishments (such as providing farmers with pest and disease management information, recommendations for cultural practices, and exposure through seminars to horticulturalists and relevant experts from around the world).

## 5. CONCLUSIONS

1. Rwanda has the potential to become competitive on the EU (and perhaps other international) organic market place, if present constraints (from learning the ropes of certification to proper post harvest handling, developing attractive packaging, processing surplus products and learning how to link up with reliable buyers) are overcome.

2. In order to address the above constraints, there is need for technical assistance at all levels. For the moment, this assistance will have to be sourced from outside Rwanda, unless there are trained specialists who I may have overlooked. Once a core of experienced organic producers, extension agents/trainers, processors and exporters has been developed, the organic sector will hopefully become self-sustaining. Key to achieving this goal is for Rwandans to learn how and where to look for information on topics ranging from new crops, pest and disease management, product development and marketing, and to apply it to their situation.

# ANNEXES

# ANNEX I: HOTOGRAPHS ILLUSTRATING PRODUCTION PROBLEMS AND OTHER POTENTIALLY CONSTRAINING ISSUES MENTIONED IN TEXT

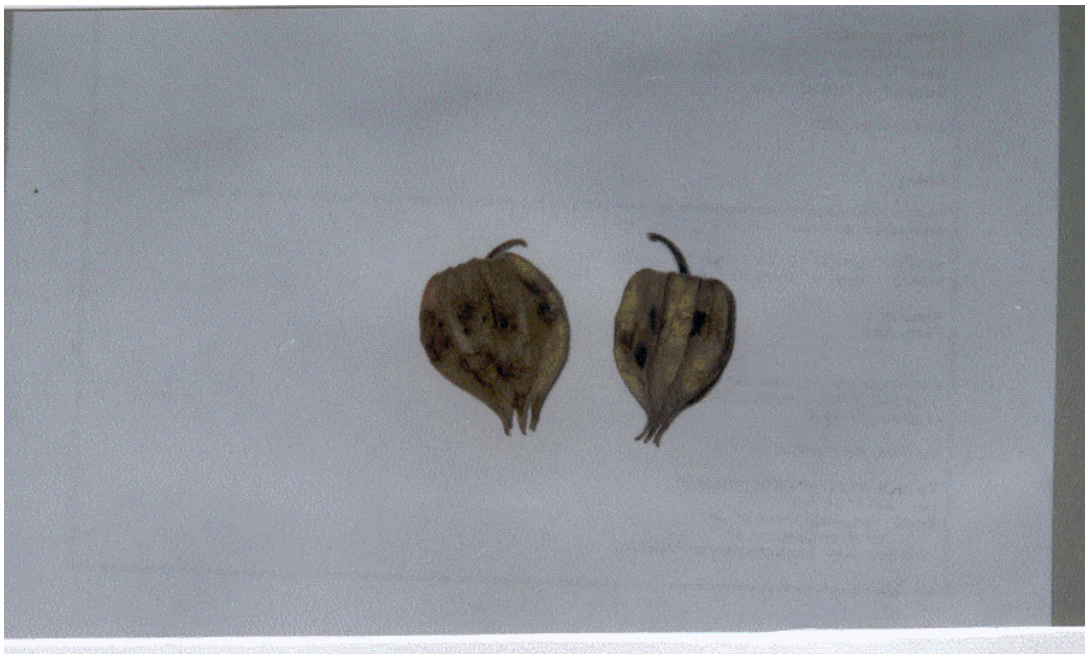
1. ***Alternaria* brown spot on leaves of passion fruit; when fruit are attacked, blemishes, with or without rot, make them unmarketable**

2. **Suspected insect damage to passion fruit (foreground), fruit blemished by physical abrasion in background. Cosmetic defects leading to unmarketable fruit.**

3. **"Woodiness" virus on passion fruit (blemished fruit are not marketable)**

4. **Passion fruit trellised in a manner that leads to physical abrasion (and therefore scarring) during development; could be avoided with more careful trellising practices**.

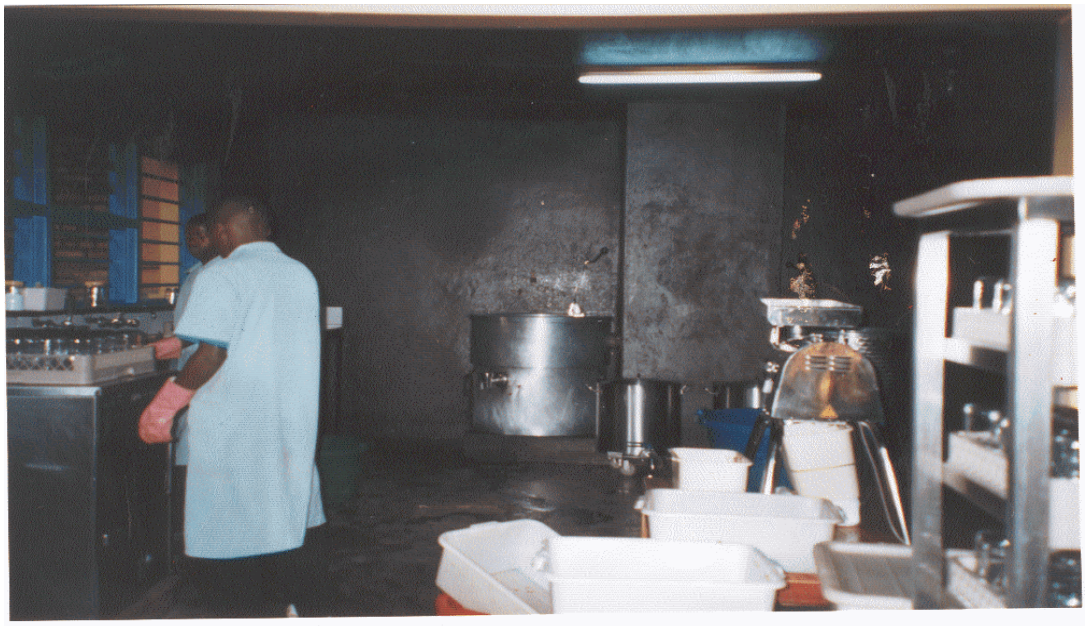
5. ***Physalis* fruit with symptoms of disease (possibly *Alternaria*) on calices; since sold with calyx attached, these fruit would be unmarketable.**



6. **Steep slopes planted to passion fruit running down (instead of along) hill, facilitating soil erosion.**

7. **Soil erosion in passion fruit plantation**

8. **Shema Fruit factory where fruit juice is dispensed from vat (seen in rear) via spout, rather than closed-system, which precludes contact of product with air.**



## ANNEX II: USEFUL WEB SITES AND E MAIL ADDRESSES

Organic standards, statistics and other information

- International Federation of Organic Agriculture Movements: www.infoam.org; e mail headoffice@ifoam.org
- Organic agriculture worldwide (statistics on production and marketing compiled into a recently published report): www.ifoam.de/statistics and www.soel.de/inhalte/publikationen/s_74.pdf
- Food and Agriculture Organization: www.fao.org
- Organic agriculture in Europe (by country): www.organic-europe.net
- Links to organic institution: www.soel.de/inhalte/oekolandbau/statistik_europa.html
- EU Commission responsible for EU Regulation 2092/91 governing organic produce and products within the EU: Mr, Alberik Scharpe, DGVI – EU Commission, e mail: alberik.scharpe@dg6.cec.be
- UK Register of Organic Food Standards (UKROFS) – regulated the EU Regulation 2092/91 in the UK, and provides import authorization. Contact Mr. Peter Crofts, e mail p.crofts@env.maff.gov.uk

Organic certification organizations

- International Organic Accreditation Services: Head Office: ioas@dakel.com.
  Coordinator for Africa Francophone: Pascal Badjagou: redad@leland.bj
- Ecocert: info@ecocert.de, or contact Andreas Kratz (andreas.kratz@ecocert.de)
- IMO Institute for Marketecology: imoch@compuserve.com, www.imo.ch
- KRAV Kontroll (Swedish Certification organization, particularly active in certifying coffee), info@kontroll.se, www.krav.se
- Soil Association Certification, info@soilassociation,org, www.soilassociation.org

Market information/contacts

- International Trade Centre, website www.intracen.org, and Market News Service (provides price and market information on a number of food products) website www.fresh-

marketplace.com; knowledgeable and helpful person for information on the organics market who is with ITC: Rudy Kortbech-Olesen, e mail KORTBECH@intracen.org

- International market place for organic products: www.green-trade.net
- Organic market news, including regular newsletter: www.organicTS.com
- Frutis, a French company which purchases organic fresh produce: www.frutis.com, Contact: Pierre-Jean Caron: e mail Pierre-jean@frutis.com (Note: need import license which takes ½ month to process following receipt of a list of certified organic products from exporter)
- FoodTrader.com: An online business-to-business marketplace for the food and agricultural industry offering an exchange for buyers and sellers: www.foodtrader.com or sales@foodtrader.com
- Utopia UK, Ltd.: Company purchasing organic fruit products, contact Lucie Crawford, e mail lcrawford@utopiauk.com
- Tradin Organic Agriculture BV, a trading company basic organic commodities (including fresh and dried tropical fruit, fruit juices and concentrates) based in the Netherlands: www.tradinorganic.com, e mail postmaster@tradinorganic.com
- Whitworths, a UK based company trading infruit products: www.whitworths.co.uk
- Tiptree, another UK based company trading in fruit products: www.tiptree.com

EU standards and food processing regulations (including HACCP)

- Leatherhead Food Research Association: a food research institute in Europe which provides information to the international food and drinks industry: www.lfra.co.uk
- Campden and Charleywood Food Research Association Group (CCFRA): An independent membership based organization in the UK carrying out research and development for the food and drink industry worldwide: www.campden.co.uk
- EU quality standards for fresh fruit and vegetables: www.marketag.com/markets/eu/standards and www.europa.eu.int/eur-lex/dat/1989/en_389R0920.html

Organic Trade Fairs/Events

- BIOFACH, annual international trade fair for organic products held in Germany during the month of February: www.biofach.de (scheduled for 14 – 17 February 2002)

- IFOAM Organic World Congress and Organic World Exhibition: of interest o producers and traders along with researchers and policy makers. For the 2002 event (scheduled for August) contact ifoam2002@cog.ca, web site www.cog.ca/ifoam2002

## ANNEX III : USEFUL PUBLICATIONS, NEWSLETTERS AND JOURNALS


- Organic Food and Beverages, World Supply and Major European Markets, ITC, Geneva, 1999. Order from ITC, Palais des Nations, 1211 Geneva 10, Switzerland (free to developing countries)
- Export Seminars on Export Development of Organic Food and Beverages in Africa (Uganda, Kenya, Tanzania, Zambia and Malawi), ITC, Geneva, 1999.
- Schmidt, H. and M. Haccius, 1998. EU Regulation "Organic Farming": A legal and Agro-Ecological Commentary on the EU's Council Regulation (EEC) No. 2092/91. Margraf Verlag, Germany. ISBN 3-8236-1288-3.
- Ecology and Farming, the official English language magazine of IFOAM, order from headoffice@ifoam.org
- Quality and Communication for the Organic Market, 6th IFOAM Organic Trade Conference, October 20th – 23rd, 1999, Florence, Italy. W. Lockeretz and B. Geier, Editors. ISBN 3-934055-06-0. Order from headoffice@ifoam.org
- Elwell, H. and A. Maas, 1995. Natural Pest and Disease Control. The Natural Farming Network, P.O. Box 301, Causeway, Harare, Zimbabwe. ISBN: 0-7974-1429-0

## ANNEX IV : POTENTIAL NEW ORGANIC CROPS AND PRODUCTS FOR RWANDA

1. Coffee: world market currently poor for coffee in general, however certified organic Arabica coffee of high quality has potential to sell at as much as 50% over conventional. Problems would include three year conversion period for existing coffee plantations, risk of being mixed/contaminated with conventional coffee at several points along the chain from harvest to processing to marketing and overcoming pest and disease problems such as Coffee Berry Disease without pesticides.
2. Vanilla : A tropical vine which requires support and preferably shade for growth; could be cultivated with *Dracaena* as a live trellis, or intercropped with sugar cane to provide both shade and support. Coffee growers in Rwanda had seen vanilla in Ugandan coffee plantations, so this system could also be investigated. Trials would have to be conducted first to determine if this crop grows well in Rwanda; also a bit difficult in that it requires hand pollination. Market for organic vanilla is very good, however, and it has the advantage of being relatively non-perishable.
3. Macademia nuts: as suggested in an earlier report by James Cartwright, macademia nuts are produced in neighboring Kenya, along with Zimbabwe and Malawi, and could be a crop for Rwanda farmers to try. Growth of the trees is slow, and hence a gap of 4 – 6 years can be expected between planting and the first harvest. On the other hand, macademia nuts are fairly easy to process (a simple roasting plant, and method of extracting the nut from the hard outer shell being the only requirements), have a long shelf life and are greatly in demand on the organic market.
4. Vetiver grass oil: If sufficient volumes of high quality oil could be produced from grass planted to stabilize slopes, there is a market for the oil in the perfume industry. It is advisable to first plant a trial to determine both the yield and quality of the oil (extracted from roots 18 months after planting; material used for extraction should be at least 5 mm diameter and 2 – 2.5 m in length). Extraction rate of oil from dry material is about 0.3% , and the volume produced should be 1 – 5 tons oil per year to be profitable. Leaves can be used as mulch or be fed to livestock. Estimated cost for stationary still heated by wood or charcoal is $6,000; designs are available in Zambia.

5. Dried legumes (*Phaseolus* and soy beans, dried peas): grain legumes are already widely grown (often as an intercrop) in Rwanda; these crops are important as part of a rotation in organic systems for the nitrogen they add to the soil, are non-perishable and harvested material which can not be sold on the export market would be readily sold on the local market. Market research into types of dried legumes most in demand is recommended as a first step.
6. Dried herbs and spices: worth testing on a trial basis, if market research indicates these could be profitable: coriander (seed and/or leaf), fennel (seed) , bird's eye pepper (identified in Zimbabwe as being *Capsicum fructescens*), garlic. Would require drying facilities meeting EU hygiene standards (except for garlic sold in fresh form).
7. Dried fruit/fruit products: If dried fruit of a uniform and high quality could be produced, this would both reduce the problem of seasonal gluts of fruit on the market and offer exporters to add value to their products. "Fruit leather" (or "roll-ups") could be produced using fruits too blemished to be sold as dried fruit alone, and are a popular snack for children (who are the target of many organic food marketers). Hygiene would present a possible constraint in the fruit processing facilities, unless training and other technical assistance were provided to set up a production unit which meets EU standards.
8. Other oils: Tuberose (*Polianthes tuberosa*) is already grown in Rwanda as a cut flower; if it could be successfully grown organically, the essential oil could be extracted for export to the organic essential oil/perfume industry (oil could be sold even if grown conventionally, however price would be lower). This would be a good way to profitably grow tuberose, as non-export grade flowers would go for processing. Evening primrose (*Oenothera*) is grown in Kenya and Zimbabwe for its oil (extracted by simple cold press) which is widely used as a dietary supplement and in medicinal applications. It is adapted to a range of climate and soil types, and could possibly be productive under Rwandan conditions. Trials with a range of planting materials should first be conducted, possibly in collaboration with company such as Earthoils in Zimbabwe, which provides growers seed and production information and purchases the oil (provided it can be certified organic).
9. Botanical medicines: research into the potential to market plant products used medicinally might be worth undertaking; for example, several Rwandans remarked that a plant in the mint family observed growing spontaneously in numerous locations was used for medicinal purposes. The market for organically produced botanical medicine (used in homeopathy and other "natural" medical systems) is good, provided the materials pass required tests to ascertain

whether they have any adverse effects. It might be worth sending samples of this and other plant materials used in traditional medicine to laboratories in Europe or the USA for analysis. Psyllium (*Plantago major*) is a plant grown for medicinal compounds extracted from its leaves, for which there is a demand in the organic market. The crop, which can be sold as dried leaves, could be grown in trials in Rwanda to determine the level and quality of the yield it may give there.

## ANNEX V: HANDOUT FROM 3 NOVEMBER ORGANIC SEMINAR AT ADAR AND SOME KEY POINTS RAISED BY PARTICIPANTS

### What is organic farming?

a) An approach to farming that recognizes the whole environment and that all living things are inter-related and inter-dependent
b) A method of farming which is reliant on the use of sound husbandry techniques
c) A system of whole farm management which treats the farm as a living organism (hence, the term "organic")

### Organic Production and Processing is based on a number of principles and ideas

- To interact in a constructive and life-enhancing way with natural systems and cycles.
- To consider the wider social and ecological impact of the organic production and processing systems
- To encourage and enhance biological cycles within the farming system, involving micro-organisms, soil flora and fauna, plants and animals.
- To maintain and increase long term fertility of soils.
- To use, as far as possible, renewable resources in locally organized production systems.
- To create a harmonious balance between crop production and animal husbandry.
- To minimize all forms of pollution.
- To process organic products using renewable resources.
- To produce fully biodegradable organic products.
- To allow everyone involved in organic production and processing a quality of life which meets their basic needs and allows an adequate return and satisfaction from their work, including a safe working environment.
- To progress toward an entire production, processing and distribution chain which is both socially just and ecologically responsible.

### Demand for Organic Products World Wide

1. Market for organic products growing, especially in industrialized countries; demand for products expected to exceed supply
    - Share of organic products on retail markets is only 1%-1.5%, but expected to be from 5% - 10% in some counties within next few years

2. Major market for organic products are in Europe, USA and Japan
    - Retail sales estimated to be ca. $20 billion in 2000

**Why is the world "going organic"?**

1. Consumer concern about health issues:
    - Incidence of "Mad cow" (BSE) disease in UK saw a sharp increase in demand for organic foods
    - Fear of pesticide poisoning from consumption of conventionally produced foods, adverse effects of hormone-treated poultry and livestock on consumers in many parts of the world
    - Belief by many that organic foods are "more nutritious" (higher in vitamin and mineral content).

2. Consumer concern about environmental issues
    - Use of pesticides such as DDT adversely affected wildlife in USA, bringing about demand for pesticide-free products.
    - Large consumption of fossil fuels used in production of synthetic fertilizers is seen as undesirable in some parts of the world (e.g. Scandinavian countries).
    - Pollution of water resources from pesticides and from nitrates and other products of synthetic fertilizers major concern in parts of the world (e.g. USA).

3. "Fashion"
    - In some countries, organic foods are considered to be better tasting (e.g. France).
    - Popular to show support of environmentally friendly agricultural products in USA, Europe (e.g. organic cotton clothes sold at "The Gap").

4. Major retail groups are carrying out aggressive marketing and promotion of organic products following the above developments.

**Current production base of organic products**

1. Area under organic production estimated to be around 15.8 million hectares
    - Major part is in Oceania (Australia), followed by Europe, Latin America and North America, although practiced in almost all parts of the world.
    - Global figures: commercial organic production occurs in at least 130 countries: 30 in Africa, 30 in Asia, 20 in Central America and the Caribbean, 10 in South America, 5 in Austral-Asia and the Pacific, most European countries, the USA and Canada.

**Reasons for increasing interest in organic agriculture in Africa**

- Disappointment with some of the "Green Revolution" technologies, including resource degradation.
- Promising "Green Revolution" technologies are out of reach for the majority of farmers (Rwanda being a perfect example).
- Organic farming can be built upon indigenous knowledge ("traditional agriculture" is in fact source of many recommended organic agricultural practices).
- Growing global environmental movement has raised awareness of people in Africa, and organic farming is practiced to combat erosion and desertification.
- The international market for organic products with premium prices is an opportunity for farmers to increase their incomes.

## ORGANIC PRODUCTION: AFRICAN COUNTRIES (ITC 1999)

| COUNTRY | COMMODITIES | COMMENTS |
|---|---|---|
| Algeria | Dried fruit (dates) | Small quantities, for export |
| Benin | Dried fruits and nuts (palm, sesame, coconut), cotton | |
| Burkina Faso | Mango, sesame, pulses, vegetables | For domestic consumption, some export (dried fruit, sesame) |
| Cameroon | Fresh fruit (pineapples, papayas, bananas) and vegetables | For export |
| Comoros | Vanilla | |
| Egypt | Fresh and dried fruits (bananas, mangoes, dates, citrus), vegetables (cucumbers, eggplant, garlic, onions, squash., tomatoes), herbs (basil, dill, paprika, mint), spices (coriander, pepper) grains, legumes, roots/tubers, medicinal plants, cotton | Large area under organic production; main exports are fruits and vegetables, herbs, medicinal plants and cotton |
| Ghana | Cocoa, fresh fruits (bananas, papayas, mangoes, pineapple), groundnuts and vegetables | Some wild/gathered products may be developed for export |
| Kenya | Macadamia nuts, vegetables, dried beans, tea and cotton | Macadamia nuts exported, along with some vegetables |
| Madagascar | Cocoa, coffee, essential oils, fresh fruits (apples, passion fruit, litchis), dried fruits (orange, papaya, pineapple, mango), processed fruits (e.g. juice and pulp), herbs and spices (vanilla, clove, allspice, pepper, nutmeg, ginger, cinnamon, chilli), honey, oil crops (coconut, pine, palm), sugar can, molasses and syrup, vegetables (green beans) | Organic products mainly for export |
| Malawi | Herbs and spices, groundnuts, bambara nuts, beans (dried), medicinal plants, essential oils, sesame and sunflower seed, sugar cane | Mainly for export, though small domestic market exists |
| Mauritius | Fruit, spices and cane sugar | Mainly for export |
| Morocco | Fresh fruits (citrus), vegetables, dates, olives, dried legumes, spices and herbs | Mainly for export |
| Mozambique | Cashew nuts | |
| Senegal | Fruits (mangoes) and vegetables | Export potential (self sufficiency is first objective) |
| South Africa | Fresh fruits (mangoes, avocados, litchis), vegetables, herbs and spices, cane sugar, cereals, teas and wine | Considerable amount sold on domestic markets; also exported |
| Tanzania | Cotton, essential oils, dried fruits (banana, pineapple, mango, papaya), fresh fruits (citrus, papaya, guava, mango), herbs and spices, honey, nuts (groundnuts and cashews), oil seeds (sunflower), tea, fresh vegetables and processed vegetables (garlic and onion powder), tea, coffee | Large hectarage under organic production, mainly for export |
| Togo | Fresh fruits (bananas, mangoes), dried fruits (pineapples, papayas, mangoes), coconuts, coffee, cocoa and ginger | |
| Tunisia | Citrus, vegetables, dates, nuts, olive oil and herbs | Exports to EU rapidly increasing |
| Uganda | Fresh fruits (pineapples, passion fruit, bananas, avocado,), dried pineapple, sweet potatoes, sesame and sunflower, soya beans, coffee, cocoa, herbs, spices and honey | |

Constraints to expansion of organic agriculture in Africa

- Lack of technical know-how (e.g. on production methods).
- Lack of storage and processing facilities (also need for innovations in packaging by food processors and manufacturers).
- Inadequate market information (which products to grow, which markets and distribution channels to use, competition, market access).
- Insufficient financing.
- Need for product development.
- Expense and difficulties of certification.

## Why should Rwanda be interested in certified organic agriculture?

- The demand for organic products on the world market place is high: conclusion from ITC study on Organic Food and Beverages: World Supply and Major European Markets: "…*demand is growing rapidly in most markets, and that insufficient supply of organic products is the main problem rather than lack of supply.*"
- As noted by James Cartwright (and observed personally over past two weeks), most agricultural production in Rwanda is already organic in that no chemical fertilizers or pesticides are used, exception being coffee, and to a lesser extent Irish potato – in this Rwanda has an enormous advantage over Kenya, Zimbabwe and many other African countries.
- Price premium for certified organic products ranges from 5% to 20-30% over conventional products,[10] therefore is a good potential generator of foreign exchange.

## What products can Rwanda competitively produce for the international organic market place?

- Fresh fruit: passion fruit, apple banana, physalis.
- Processed fruit: passion fruit juice and syrup/juice concentrate, dried banana, physalis jam, fruit leather/roll ups.

### *Some potential products warranting further consideration:*

- Coffee/tea.
- Dried pulses (beans, peas).
- Herbs and spices (garlic, chilli pepper, vanilla).
- Essential oils (lemon grass, evening primrose, *Passiflora* spp.).

*Comment*: Advantages to processed products include longer shelf life and value-added aspect. Additional advantages to essential oils are absence of hygiene considerations, and availability of low cost distillation units.

[10] Even higher for some products, e.g. pre-packs of organic bananas reported commanding price premium of between 50% and 200% (Unpeeling the Banana Trade, www.fairtrade.co.uk).

# Constraints which need to be addressed if export oriented organic agriculture is going to succeed in Rwanda:

1. Certification
   - Cost,
   - Paperwork,
   - Cooperation of group,
   - Annual inspection.

2. Technical aspects of production, harvest and post-harvest handling
   - Disease and pest management;
   - Preventing/combating soil erosion;
   - Soil fertility;
   - Pre-harvest factors to reduce post harvest losses;
   - Appropriate harvesting techniques and aids;
   - Storage structures.

3. Access to markets/market information
   - Products in demand;
   - Price information;
   - Personal contacts;

4. Transport
   - Reliable airfreight;
   - Resolution of surface transport problems.

5. Packaging
   - "Environmentally friendly";
   - Distinctive, unique to Rwanda;
   - Handcrafted adds attraction;
   - Protection of product;
   - Fair Trade labeling.

# Recommendations

- Trials with evaporative coolers, post harvest treatments and packaging to extend shelf life of fresh produce.
- On-farm trials to improve quality of fruit production and minimize losses due to mechanical damage in field, and pest and disease management.
- Extend erosion control and soil improvement techniques to producers.
- Training of trainers on certification and organic production procedures, including record keeping, packing and transport.
- Market research to determine which products are in demand, where, when, and in what form.
- Visit BIOFACH 2002 (Nuremberg, Germany) to learn what organic products are on offer, how to design attractive but functional packaging, develop market contacts.
- Attend CBI Marketing Course (September 2002).

**ISSUES RAISED BY SEMINAR PARTICIPANTS**

- Risk of chemicals applied to coffee moving into adjacent organic passion fruit plantations (response: (1) encourage organic certification of coffee and (2) organic regulations stipulate minimum distance between organic and conventional lands so as to prevent chemical contamination).
- Market for organic pineapple? (response: market exists, however demand largely supplied by other countries already (e.g. Uganda), quality would have to be very high to compete).
- Can processing plants get "fair trade" labeling? (response: yes, although first recommend facilities be upgraded to meet EU processing standards, including HACCP).
- Where could information on organic production and processing be obtained from within Rwanda? Would the Office Rwandais de Normalisation be able to play a role in provision of information on organic standards? (response: at present no information source exists in Rwanda itself but could be accessed via e mail and the internet, or from consultants brought in to the country. ORN does not have information on organic standards, however if they were willing to undertake gathering and studying the necessary documents they could possibly fulfill this role in the future.).

## ANNEX VI: TECHNICAL INFORMATION ON ORGANIC PRODUCTION

1. PEST AND DISEASE MANAGEMENT FOR COFFEE (French version handed out to participants of ADAR's coffee seminar on 21 October 2001)

Sowing/Nursery Practices

- ⇒ Start with clean, disease free seed; be cautious about seed ;
- ⇒ Use nematode and disease free soil (steam treat or solarise), or soil-less substrate in clean sleeves or seedling trays; to avoid contamination with irrigation water use only borehole water or water which has been held in a storage tank for 24 hours after having been pumped from a river or a dam, and take water from the surface of the storage tank with minimum disturbance of the bottom;
- ⇒ Keep pots/sleeves/trays on concrete or on benches and do not allow to come into contact with soil which may be contaminated (wood chips are not satisfactory as roots can grow through them into the soil);
- ⇒ All implements, shoes, hands and pots must be washed clean before being used in the nursery (a dip of four to five minutes in a 1% solution of sodium hypochlorite is effective);
- ⇒ Locate nursery far from established plantings, or at least upwind of prevailing wind direction, preferably screen with insect-proof mesh;
- ⇒ Inspect for *Fusarium* when seedlings are at the cotyledon stage (this is when the disease transmitted by seed can easily be recognized); destroy all infected seedlings immediately. Roguing of weak seedlings is also recommended.

Clearing and Land Preparation

- ⇒ Select site with good soil drainage within the rooting zone (at least 1,5 m depth);
- ⇒ On virgin land larger trees should be ring barked at least two years prior to planting to allow depletion of root starch which acts as a substrate for *Armillaria mellea;*
- ⇒ Ensure maximum distance from older plantings; preferably separate with a physical barrier to minimize wind-blown dispersal of insects and pathogen propagules ;

Field Hygiene

⇒ Prevent infections and infestations with good cultivation practices: regular scouting and roguing of affected plants; have workers move from younger to older plantings, not the reverse; maintain favourable growth so that dieback is prevented (thereby negating the need for pruning) or if pruning is required, sterilized tools in solution of sodium hypochlorite in between each cutting and carry out infected (e.g. *Fusarium*) material in plastic bags to prevent spore dispersal;

⇒ Regular, preventative sprays of copper oxychloride (85% w.p. at 10 kg/ha) prior to and at monthly intervals during the rains are effective against *Fusarium*, Leaf Rust and Cercospora;

⇒ Derris (rotenone) sprays as a contact and stomach poison controls some insect pests; Tephrosia and pyrethrum are also effective ;

⇒ For weed control, have a permanent mulch (but prevent it from coming into direct contact with young seedlings as it can harbor pests which will attack the stem) – organic mulches also stimulate the development of additional surface roots (vigorous root system promotes vigorous top growth and boosts the plant's resistance, as well as productivity);

⇒ Avoid physiological stress such as overbearing – a weakened plant is more susceptible to disease.

**National Organic Agricultural Movement of Uganda**
**(NOGAMU)**
**C/o Box 11330, Kampala**
**Tel:- 041 266261 Email:- taylor@kulika.org**

Apple Banana Growing and Management

1. Requires rich and fertile soils and it is necessary to continue adding compost around the stem. Benefit will be big bunches, smooth texture at chewing and continuous production.
2. Measuring and making holes:- 7 ft by 8 ft is the ideal spacing. An alternative is 8ft x 8ft. The former will give you 777 plants in an acre and the later will give you 680 plants. Dig holes of 2ft wide and 1.5ft deep, and add at least 5kg of compost before planting.
3. Selection of Planting materials:- Select a sucker from a disease free plant – observe closely leaves and roots for signs of disease. Best size of sucker is between 1.5ft to 2.5ft tall and with a round base.. Clean off all roots and soak in hot water for 10 to 15 minutes (water temperature should be 60 – 70C, (or in a chemical if you believe in that). Now plant the sucker normally, pressing the soil firmly around the base.
4. Make contours in the banana garden. From the beginning try to harvest as much water as possible into the banana plantation – bananas need a lot of water. Mulch the plantation after the plants have set their first flowers. Before this stage a legume can be intercropped for at least two seasons. Control weeds by mulching and not the hoe, as this will destroy the banana roots. The mulch should be at least 1ft away from the stem to avoid disease and pests.
5. After the fruit is on, protect it from leaves that make rub on it, causing scratching and a lowering of quality.

6. Cut off the flower 4 inches from the fruit 4-6 weeks. Too early will lead to a poor taste and too late will lead to thin fingers because the flower takes all the nutrients, which otherwise would be for the fruit.
7. Check and remove excess suckers. Each hole should remain with 4 plants maximum, one with a fruit and the 3 at varying stages to make sure that there is fruit on each group of plants all year around.
8. Prop up the plants that have fruit on them with wooden poles to prevent them from collapsing due to excessive weight. This also helps to reduce losses during storms.
9. Prune off all dried and yellow leaves and fibres. This can be done at any time of year to give the chance to new leaves and stem sheets o develop. Dry matter also acts as a breeding ground for pests.

**Pests and Diseases**

Panama Disease

The Apple Banana is very susceptible to Panama Disease. This is a fungal wilt disease which is on the increase in Uganda. Panama disease has no treatment. All plants affected must be destroyed and the area NOT USED to grow more bananas until at least THREE years have passed. The land can be used for crops from other plant families.

Prevention is by selecting CLEAN planting materials and sterilising tools that have been used in an infected garden or plants.

Nematodes

Nematodes attack the roots causing them to rot and dry, whilst the rest of the plant looks healthy. This is best controlled by shaving off all the roots from the planting material before transferring it to your garden and then to use the hot water treatment.

Banana Weevil

This pest is common in Uganda, but doesn't cause heavy losses in Apple Bananas – it is much more serious in cooking bananas. Prevention is the same as the above, plus the removal of all dry matter from the plant.

Leaf Spot

This is best prevented by intensive cultural practices, e.g. Weeding, mulching, applying compost and pruning.

Points to Note:-

1. Apple Banana is ready to harvest 15 – 18 months after planting
2. It is a high value, delicate fruit, that must be allowed to mature on the plant as much as possible, if maximum flavour and sweetness is to be obtained

Compiled by Ms Proscovia Nankya, 28/10/01