CROP POST HARVEST PROGRAMME

Management and control – Essential features for continued access by small-scale growers to EU fresh produce markets

R8431 (ZB0373)

PROJECT FINAL REPORT

15 January 2005 – 15 January 2006



Dr Andrew Graffham Dr Glenn Humphries Mr Fred Ssango Dr Alan Legge

Natural Resources Institute NRDC / ZEGA Training Trust Agribusiness Management Associates

CROP POST HARVEST PROGRAMME

Management and control – Essential features for continued access by small-scale growers to EU fresh produce markets

R8431 (ZB0373)

PROJECT FINAL REPORT

15 January 2005 – 15 January 2006

Agribusiness Management Associates Amfri Farms (Uganda) Limited Awaggwa Ekku Cooperative Society Limited Jaksons Farms (Uganda) Limited Kamazi Farmers Cooperative Society Limited Lubulima Commercial Cooperatives Union National Institute for Scientific and Industrial Research Natural Resources Institute NRDC/ZEGA Training Trust

> Managing Partner's Dr Andrew Graffham Mr Robert Bush Mr Fred Ssango

Natural Resources Institute NRDC / ZEGA Training Trust Agribusiness Management Associates

CONTENTS

Contents	
List of plates	
Glossary	
Acknowledgement	
Section A – Executive summary	1
Section B – Identification and design stage	2
Poverty focus & Livelihood constraints	2
Approach for working with end user groups & design for adoption of project outputs by project partners	4
Institutional factors	5
Section C - Research activities	6
EUREPGAP for small-scale growers	6
EUREPGAP for small-scale growers – the R8431 approach	8
Management and control system for EUREPGAP	10
Selection of farmers and primary marketing organisations	14
Farm profiling & farmer commitment	15
Farm site infrastructure	16
Depot site infrastructure	25
Issues of basic agronomy in Uganda	30
Record keeping and traceability	32
Training	36
Auditing	37
Costs and benefits of EUREPGAP certification	41
Key requirements for success	43
Section D – Outputs	45
Summary of project outputs	45
A. How the outputs have been made available to intended users?	48
B. What further stages will be needed to develop, test and establish manufacture of a product by the relevant partners?	48

C. How and by whom, will the further stages be carried out and paid for?	49
D. Have they developed plans to undertake this work? If yes, what are they? If not, why?	49
Section E – Purpose	49
Section F – Goal	50
Section G - Project effectiveness	51
Section H – Uptake and impact	52
Organisational Uptake End user uptake Knowledge Institutional Policy Poverty & livelihoods Environment	52 52 54 54 55 55 55
ANNEX 1: Project Logical Framework (Revised version included in the project inception report dated 18 th July 2003)	52
ANNEX 2: Partner (user) organisations workplan for adopting project outputs	65
ANNEX 3: Feedback on the process from Partners(s) and users (where appropriate)	66
ANNEX 4: Disseminated outputs	68

LIST OF PLATES

Figure 1. View to show planting in rows using ridges laid out with lines	18
Figure 2. View of calibrated containers for application of different types of fertiliser	18
Figure 3. Zambian field toilet with hand-wash station	19
Figure 4. View of an unacceptable hand-wash station on a farm in Zambia	19
Figure 5. Field toilet made from simple materials in Uganda	20
Figure 6. Field toilet made from simple materials in Uganda	20
Figure 7. View of a CPP spray barrier and crop separation on a farm in Zambia	21
Figure 8. View of a spray marker placed in a field in Zambia	21
Figure 9. View of a CPP soakaway pit on a farm in Zambia	22
Figure 10. View of a chemical container disposal pit on a farm in Zambia	22
Figure 11. View inside a first aid box on a farm in Zambia	23
Figure 12. Large field shelter constructed by one of the farmer groups in Uganda	23
Figure 13. Portable field shelter in use in Zambia	24
Figure 14. Frontal view of Zambian CPP store at Buteko depot	27
Figure 15. Detail of ventilation bricks used in CPP store	27
Figure 16. Bucket of sawdust for dealing with CPP spillage	28
Figure 17. CPP and protective clothing poster in the CPP clothing storage area at Buteko	28
Figure 18. Buteko depot showing entrance before construction of the partition	29
Figure 19. Buteko depot showing partition to separate produce from inputs	29
Figure 20. EUREPGAP compliant permanent plot marker	35
Figure 21. EUREPGAP compliant produce container label	35
Figure 22. Selection of documents required for the QMS audit	40

GLOSSARY

	GEOSSART
ACP	= Africa Caribbean & Pacific countries
AECS	= Awaggwa Ekku Cooperative Society Limited
AKA	= Also Known As
AMA	= Agribusiness Management Associates (Uganda) Limited
APS	 Assured Produce Scheme (United Kingdom)
AWB	= Airway Bill
BRC	= British Retail Consortium
СВ	= Certifying Body
CFU	= Colony Forming Unit
CLI	= Crop Life International
CPHP	= Crop Post Harvest Programme
CPP	= Crop Protection Product
DFID	= Department for International Development (UK Government)
EU	= European Union
EUREPGAP	= European Retailers Protocol for Good Agricultural Practice
GIN	= Goods Issued Note
GRN	= Goods Received Note
IMO	= Institut Fur Marktokologie GmbH
IPM	= Integrated Pest Management
ISO	= International Standards Organisation
KFCS	= Kamazi Farmers Cooperative Society Limited (Uganda)
LACCU	= Lubulima Agricultural Commercial Cooperatives Union (Zambia)
MRL	= Maximum Residue Limit
NGO	= Non Government Organisation
NRDC	= Natural Resources Development Centre (Zambia)
NRI	= Natural Resources Institute (United Kingdom)
NZTT	= NRDC/ZEGA Training Trust (Zambia)
PDV	= Produce Delivery Voucher
PDN	= Produce Delivery Note
PDS	= Produce Delivery Sheet
PRN	= Produce Receipt Note
PHI	= Pre-Harvest Interval
PIP	= Pesticide Initiative Programme (EU funded programme)
PMO	= Primary Marketing Organisation
QM	= Quality Manual
QMS	= Quality Management System
SPS	= Sanitary and Phytosanitary (human and plant health)
SSG	= Small-Scale grower
WHO	= World Health Organisation
WTO	= World Trade Organisation
ZEGA	= Zambian Export Growers Association

ACKNOWLEDGEMENT

This publication is an output from a research project funded by the United Kingdom Department for International Development (DFID) for the benefit of developing countries. The views expressed are not necessarily those of DFID. R8431 – (Crop Post Harvest Research Programme)

Section A Executive Summary

At the conclusion of project (R8271) a management system was created but changes to EUREPGAP and experience with farmers in Zambia suggested the need for improvements. A refined cost effective modular management and control system for EUREPGAP compliant production and handling of fresh fruits and vegetables was developed, that includes a quality management system, quality manual, farmer manual, training & training material package, on-farm advice package, farmer profiling package, essential infrastructure package, system for risk assessment, farm inspection and internal auditing package, traceability & record keeping package and a system for division of management responsibility between farm, produce handling sites and PMO office. The high scores achieved during the December 2005 audit in Zambia indicated that the system is virtually complete, with only minor modifications required to the traceability system.

Experience in Zambia and Uganda showed that if farmers and primary marketing organisations are committed, compliant farm infrastructure and agronomic practices can be put in place at even the most primitive farm sites. However, management and control of the complete system is much more difficult. Record keeping to the level required for EUREPGAP has proved to be a major challenge. A dedicated record clerk is required who can demonstrate the competence and understanding required to maintain the central system and supervise record keeping by individual farmers.

Changes to the EUREPGAP protocol in September 2005, resulted in the need to put in place an ISO compatible quality management system with both QMS and quality manuals. The main system has ~150 documents, including 36 different types of records, 35 sets of advice notes for farmers on policies, procedures and actions and an ISO type document control system. Auditing of the QMS takes 0.5 days, involves ~400 documents and requires staff of the PMO to be able to understand and explain the interrelationships between all the documents and to relate the theory of the system to practice at the depot and the farm sites. LACCU have shown that given time and a high level of external support, small-scale growers can cope with this complex system, but it should be borne in mind that LACCU management all have professional backgrounds and management experience, and most of the Zambian farmers involved in EUREPGAP have high standards of education. In systems with lower levels of education (such as found in Uganda) successful operation of the management system will be the biggest barrier to compliance.

External support from the local institutional framework is a key factor, in Zambia NZTT played a major role in developing systems and supporting and verifying operation of the management system by LACCU and the individual growers. Success is determined partly by the knowledge, experience and approach taken by the main service provider, but also by the service provider forming a close and long-term partnership with the primary marketing organisation and farmer group. Short term training and advisory inputs will not work and private sector partners must be highly committed and recognise that service provision is part of the cost of compliant production.

Section B Identification and design stage

Poverty focus & Livelihood constraints

Production and processing of fresh produce for export to the European Union (EU) is an attractive market opportunity that is currently exploited by 25 nations in sub-Saharan Africa (see table below). Ten of these countries (shown in bold-italics in table 1) export significant volumes of fresh fruits and vegetables to the EU, and in countries such as Kenya export horticulture has become the fastest growing sector of the economy. According to the EU-COLEACP Pesticide Initiative Programme (PIP) exports from these countries amount to 480,000 tonnes per annum, and involve over 3.5 million people directly in production and another 7 million in supporting services. Small-scale growers (SSG) play a significant part in this process, in Kenya 46,000 tonnes was exported in 2002, and ~50% of this came from small-scale growers.

Burkina Faso	Ghana	Mali	Nigeria	Tanzania
Cameroon	Guinea	Mauritania	Senegal	Togo
Djibouti	Ivory Coast	Mauritius	South Africa	Uganda
Ethiopia	Kenya	Mozambique	Sudan	Zambia
Gambia	Madagascar	Namibia	Swaziland	Zimbabwe

Table 1.	Sub-Saharan	African countries	s involved in frest	n produce ex	ports to the EU
----------	-------------	-------------------	---------------------	--------------	-----------------

Source: Anonymous 2003

In many of these countries small-scale family growers make a major contribution to production of produce for export and derive significant levels of income in return. In Zambia for example where rural household incomes are often less than £100 per annum, small-scale growers have made incomes of £1,000 to £7,500 from vegetable exports. In Uganda 90% of production is believed to come from family plots, many of whom operate traditional slash and burn agricultural techniques. Uganda has 17 export companies and 2,250 small-scale growers active in export production. These farmers who are mostly found within 100-150km of Kampala (exception being the Mabuku Irrigation Scheme with 154 SSG's in Western Uganda, 455km from Kampala) grow mainly hot pepper, chilli, okra and matooke for export although some grow other tropical fruits and vegetables. Current export volume is approximately 116 tonnes of fresh produce per week. Most companies are small, exporting 1-5 tonnes per week, but 4 companies export between 15-25 tonnes per week each. The majority of exports go to UK and Dutch wholesale markets, but 4 companies are supplying major retailers in the UK and Netherlands. Uganda is a relatively new entrant, relying heavily on small-scale farmers and small export companies for success and therefore Ugandan export horticulture is most likely to be threatened by changes in EU regulations and private sector standards on food safety and guality assurance. In fact recent information from industry sources in Uganda (November 2004) indicates that some companies are reducing the number of SSG's that they buy from as the exporters consider that demands for improved traceability will incur a cost that can be reduced by limiting the number of SSG's or in some cases starting to develop large company farms. This would not be unusual as some 1,500 SSG's were seen to lose their livelihood in October 2002, after a Dutch retailer demanded EUREPGAP compliance within 3 months.

Stricter food regulation in the EU during the 1990's and the need for access to a due diligence defence drove retailers to develop strict commercial standards culminating in the introduction of EUREPGAP (European Retailers Protocol for Good Agricultural Practice). EUREPGAP has been the main driver for change in producer and exporter practices. The 31 retailer members of EUREPGAP control 85% of fresh produce sales in the EU and their standards go much further than the legal minimum

specified under EU regulations for food of non-animal origin. The EUREPGAP standard could not be met by the small-scale sector in Uganda, but this did not concern many of the growers and smaller exporters as they were focussing on wholesale markets and small retail outlets where traceability and proven production standards were not considered an issue.

However, in January 2005, the EU General Food Law (EC/178/2002) came into effect as the first step towards introduction of the new EU harmonised regulatory framework for Sanitary and Phytosanitary Measures (SPS). Under EC/178/2002 it has become a legal requirement for all food businesses in the EU to demonstrate traceability to at least the African exporter ("one up one down principle"). Responsibility for ensuring safety and quality of food is laid on the food business, and the law considers the entire food chain from primary production through to consumption. Demonstrating vertical traceability to at least the export company has proved relatively straightforward for even the smaller companies, but the real issue rests in the wording of the new food hygiene regulation (EC/852/2004) that came into force on 1st January 2006 with full implementation by August 2007. EC/852/2004 requires EU importers and retailers of food to ensure the food safety from farm through to the final consumer. Annex 1A of the regulation specifies a range of food safety assurance measures applicable to primary production, harvesting, transport on farm, storage and transport to the point of sale or further processing. Areas covered include record keeping, full horizontal traceability to farm level, correct use of crop protection products (CPP), training in food hygiene, use of potable water, farm hygiene and control of pests such as rodents on farm.

In many respects the criteria found in EC/852/2004 resemble closely many of the controls specified in the EUREPGAP and BRC Global Technical Standards thus making these requirements mandatory for access to any EU market rather than simply applying to major retailers. Although EU regulations do not apply extraterritorially, all EU food businesses must comply with the law, and will therefore have to demand compliance from all their suppliers. In practical terms this will mean that African exporters and growers will need to demonstrate vertical traceability to farm or even plot level, and horizontal traceability of all production and processing inputs at the African end of the market chain. To ensure horizontal traceability growers will need to adopt professional agricultural practices and management systems so as to ensure control of safety and quality of produce through to export.

NRI experience of growers and exporters in Ghana, Kenya, Mozambique, Uganda, Zambia and Zimbabwe, suggests that compliance with increasingly strict EU regulations and commercial standards will represent a major challenge for the small-scale grower, who traditionally operate with few controls, no management system, poor or non-existent records and lack of either vertical or horizontal traceability. Previous CPHP funded research (R7528 & R8271) highlighted some of the weaknesses of small-scale growers but also showed not only that the real risks to health were much lower than the retailers perception, but also that management systems could be designed and applied that would enable small-scale growers with proper support from the exporter to obtain certification from EUREPGAP under option 2 of the protocol and these in turn could be adapted to suit growers and exporters requiring to demonstrate compliance with the legal minima for continued access to EU markets.

Project R8431 can be categorised as covering both enabling and inclusive research as access to high value export markets affects both rich and poor, but the poor have most to gain in terms of economic, environmental and social benefits from adoption of professional farming practices and improved income from sale of export crops. Conversely they are also the most vulnerable group who are most likely to be excluded from the market and suffer the maximum loss from exclusion.

Approach for working with end user groups & design for adoption of project outputs by project partners

This project used a consortium approach, whereby a team comprising of NRI (UK), & NZTT (Zambia) provided the technical information, training skills, institutional approach and management package for final implementation in Zambia and transfer to Uganda. The Zambia / United Kingdom team took responsibility for preparation of the final versions of the management system package, training of trainer's material, and technical training course packages. They also provided training for the Ugandan team partly in Zambia and partly in Uganda, and ran several joint training activities in Uganda to establish the Ugandan team. The Zambia/UK team had responsibility for technical support to the Ugandan team and monitoring and evaluation of the success of uptake of the project outcomes in Uganda.

In Zambia, NZTT (with external support from NRI) strengthened their partnership with the Lubulima Agricultural Commercial Cooperatives Union (LACCU) who since the demise of Agriflora had taken over the role of marketing fresh produce from their member cooperatives. The individual farmer members of the grower cooperatives had the role of managing the production of export crops to EUREPGAP standards, the grower cooperatives took responsibility for managing the produce handling depots and LACCU had responsibility not only for marketing of produce to the export company but also took overall responsibility for implementation and maintenance of a EUREPGAP compliant quality management system (QMS). NZTT became a sub-contracted service provider for LACCU charged with provision of training, extension and auditing services and also with development of a suitable QMS to include all necessary risk assessments, policies, procedures and work instructions.

In Uganda, Agribusiness Management Associates provided training and technical support for two Ugandan exporters and their small-scale growers groups to meet either the minimum legal requirements specified under EC/852/2004 (and related regulations) or EUREPGAP as the most important private sector standard. Two companies were selected in order to provide a contrast in market requirements, company capacity and current organisation of farmer groups. The key features of the two companies are summarised in table 2.

Table 2.	Summary of key features of Ugar	idan export companies involved in project
R8431.		

FACTOR	AMFRI	JAKSONS
Market	UK & wider EU retail and wholesale	UK, Netherlands & France wholesale
Requirements	EC/852/2004 & EUREPGAP	Originally EC/852/2004 but by March 2005, two EU buyers requested for EUREPGAP
Company size	Medium – 15 tons / week	Small – 3 tons / week
Number of SSG	306	85
Location of SSG	Luwero, Mukono, Iganga, Kamuli, Sugerere, Najembe	Mpigi
Products	Hot pepper, chilli, matooke, apple banana, pineapple, papaya, ginger	Hot pepper, okra, matooke, apple banana, passion fruit, pineapple
Existing systems	Well developed due to organic certification under EC2092-91	Very limited but some elements in place, and company willing to push forwards

Following training from AMA & NZTT, the company staff and senior farmer representatives provided further training and technical support for their small-scale grower groups and started implementation of the management system in order to retain market share in the EU. Farmers were encouraged to pass on extension messages to any workers on their farms.

Informal links were developed with the Pesticide Initiative Programme (PIP) of the EU as a potential route for much wider dissemination of the successful outcomes of this project and previous CPHP funded projects in export horticulture to much wider audiences outside the CPHP target regions and countries. In a more immediate sense AMA, AMFRI, Jaksons, LACCU, NRI and NZTT are all involved in PIP funded activities allowing for ready exchange of material between the two programmes and cross-linking of activities to avoid duplication of effort and more efficient use of available resources.

Institutional factors

The EUREPGAP protocol for fresh fruits and vegetables is a complex system for management and control that represents a considerable challenge for small-scale growers. Research carried out under R8271 demonstrated that small-scale growers cannot hope to attain certification unless they are organised into cohesive groups and have an excellent level of provision by the supporting institutional framework. This framework must include institutions capable of providing the necessary training, extension advice, additional technical support and auditing services. In addition the producers must have a primary marketing organisation (PMO). The PMO can be derived from within the small-scale grower group (as with LACCU in Zambia) or make use of an exporting company (as with AMFRI and Jaksons in Uganda). However, it is vitally important that the PMO has suitable facilities and personnel with the necessary competence to be able to run centralised management and control systems on behalf of the growers.

In Zambia, the NRDC/ZEGA Training Trust were already well placed to provide a high level of support to the small-scale growers (SSG) in the form of training, extension

advice and internal auditing. The SSG's were organised into legally registered primary cooperatives linked to a legally registered secondary level cooperative (LACCU), hence the issue here was to provide training and additional technical support for LACCU and individual growers to enable them to implement and maintain a EUREPGAP compliant management and control system.

In Uganda, private extension companies such as Agribusiness Management Associates (AMA) were identified who were already providing support for export companies and SSG grower groups under the EU funded COLEACP Pesticide Initiative Programme (PIP). In comparison to Zambia the Ugandan companies were less well equipped with the necessary skills to cope with EUREPGAP. The Zambian private companies had little experience and lacked the personnel capacity to deal with EUREPGAP, and the Ugandan SSG's were not organised into formal legally registered groups, and as individuals were operating very primitive agricultural systems (slash and burn bush cultivation). Hence in Uganda the institutional objectives were much wider as NRI and NZTT had to plan to provide training and capacity building for AMA as a service provider, AMFRI and Jaksons Farms as PMO's and individual SSG's. This was achieved mainly by integrating the Ugandan work very closely with activities in Zambia, by bringing representatives of all parties in Uganda to Zambia for joint training programmes and sending teams of Zambian staff from NZTT to Uganda to train Ugandan personnel and monitor implementation activities by AMA, Jaksons Farms and AMFRI. Additional visits were made by NRI and NZTT staff to Uganda to assess progress with implementation and improvements in capacity by AMA and the PMO's to provide the level of service provision required when dealing with EUREPGAP.

Section C Research Activities

In order to tell a coherent story of the development of the management and control system to enable smallholders to comply with EUREPGAP and retain access to European markets this section has been divided into sections that reflect the various components of the system and follow a logical sequence from selection of farmers through to certification. Background information has been provided on EUREPGAP which has been updated to take account of recent developments, and issues specific to Uganda such as the primitive nature of the farming system are also discussed.

EUREPGAP for small-scale growers

The European Retailers Protocol for Good Agricultural Practice (EUREPGAP) code for production of fresh fruits and vegetables was started in 1996 by a group of 11 British and Dutch retailers, with the objective of creating a single private sector standard for ensuring food safety and quality of fruits and vegetables from seed through to the farm gate. From the retailers perspective getting suppliers to prove compliance with EUREPGAP would provide all parties with a due diligence defence under EU food safety regulations. Major growers in Europe were also interested in EUREPGAP as it appeared to offer a way of reducing the number of private sector standards in the market place and thus reducing problems with incompatibility of standards when trying to supply several retailers with the same product. The EUREPGAP standard has evolved with time by December 2005, the number of retailer members had increased to 31 with sites in 12 countries.

EUREPGAP has been successful and the number of markets requiring compliance has increased nearly 3 times since its inception. In parallel with this development, the EU regulatory framework has also become increasingly strict, and many EU wholesalers and smaller retailers have started to ask their non-EU suppliers with proof of EUREPGAP certification. This offers the EU food business a cheap and very comprehensive due diligence defence against the food safety measures established for primary production under EC/852/2004 (Regulation on Hygiene of Foodstuffs). In fact

the defence costs the EU food business nothing as they do not have to become part of the EUREPGAP system, but compliance has serious economic and technical implications for developing country suppliers. EUREPGAP claims to offer a global partnership for agriculture and a level playing field for all but this has not worked in practice because the essential features of the standard were designed to suit largescale commercial farming practice in Western Europe and are not readily adapted to systems elsewhere in the world. EUREPGAP demands equivalence of system and large-scale commercial growers in Africa, Asia and Latin America have responded by changing their operating systems to mirror those used in the EU. However, smaller commercial growers and small-scale farmers have not been able to meet the challenge of EUREPGAP and now face exclusion from lucrative markets in the EU.

To understand why the smaller farms are losing out, it is essential to understand the workings of the EUREPGAP standard. EUREPGAP is divided into 14 chapters with sub-divisions into a large number of control points that cover all aspects of agricultural production from seed through to delivery of the product at the farm gate. Each control point has specific criteria for measuring compliance, and the system for measurement is via independent audits of the application of EUREPGAP on the farm. To make the verification process easy the most important control points are highlighted in red and known as "major musts". For a farm to pass the certification audit there must be 100% compliance on major musts. The second category of control points are highlighted in yellow and known as "minor musts", the farm must demonstrate compliance with 95% of the audit. The final category of control points are highlighted in green and known as "recommended controls". Failure to comply with the recommended points cannot be used as grounds for withholding a certificate, but a few of the recommended points are linked to minor and major musts.

EUREPGAP offers 4 optional routes for achieving certification but only two of these are applicable to most developing country suppliers, the key features of these are as follows:

Option 1: Individual grower certification

- Individual grower demonstrates compliance with protocol
- Grower accepts management responsibility for compliance
- Apply EUREPGAP approved certifying body (CB)
- Initial audit by CB
- Internal audit min 1 per annum
- External audit min 1 per annum

Option 2: Primary marketing organisation (PMO) / grower certification

- PMO = group with legal structure, 100% control
- PMO has ultimate management responsibility for compliance
- PMO central procedures, all farm sites under central system
- All farms initial internal inspection, CB for PMO
- Internal audit 1 per annum all sites
- PMO annual system check by CB
- CB audit $\sqrt{\text{farm sites}} = 100 \text{ farms}$, audit 10 per annum

Most large-scale commercial growers go for option 1 of EUREPGAP, but most smallscale growers are unable to meet the requirements for certification under option 1, due to an inability to demonstrate compliance with all of the control points specified, resulting from inadequate technical and financial resources. The only option available to SSG's is option 2, but most attempts at applying option 2 to small-scale schemes have failed due to either lack of commitment by some growers, or poor understanding of the type of management systems required to attain EUREPGAP. In September 2005, EUREPGAP introduced a new feature for option 2 of the protocol in the form of a quality management system (QMS) checklist (Annex II of EUREPGAP) and checklist of requirements for internal farmer group inspectors. The QMS which was allegedly developed with the needs of small-scale farmer groups in mind introduces a new level of complexity to the EUREPGAP system. To pass the certification audit the farmer group must demonstrate compliance with 85 control points in the QMS checklist and 9 control points pertaining to the farm inspector. The QMS covers issues such as legality of the farmer group and contractual documentation, and introduces the concept of an ISO compatible document control system and specifies the need for a Quality Manual, HACCP manual and Quality Management System manual. Development of these manuals is a major challenge, and auditing of the QMS takes half a day and involves the management of the PMO being able to understand and explain the interrelationships between some 400 different documents. This is the biggest challenge of all for small-scale growers. Under project R8431, suitable documentation was developed and validated under audit conditions and approaches were developed to support PMO's and farmer groups through the EUREPGAP process.

EUREPGAP for small-scale growers – the R8431 approach

The approach taken under R8431 evolved as a means of reducing costs and developing a management and control system that would enable the compliance criteria for EUREPGAP certification to be met. The key features of the R8431 system for attaining EUREPGAP under option 2 were as follows:

- Development of a single management system for all production under the scheme, that includes a compliant quality management system manual, quality manual and HACCP manual;
- PMO takes full legal responsibility for implementation of the scheme;
- Management responsibility for individual control points is split between PMO and SSG's with the major burden falling on the PMO initially, but with scope for shifting responsibility of some control points to the SSG's as capacity improves;
- SSG's sign one page contractual agreements to meet the requirements of EUREPGAP by following all the rules specified under the schemes management system;
- PMO controls purchase of all inputs thus maintaining quality and achieving discounts for bulk purchases that are passed on to the SSG's;
- PMO maintains centrally controlled spray teams to provide all CPP spraying of export crops (exceptions may be possible as in the case of application of bulldock granules to babycorn to control stalk borer);
- PMO controls authority to spray and setting of re-entry periods and pre-harvest intervals;
- PMO maintains main record and traceability system for each grower using the principle of farmer files (see traceability & record keeping section);
- PMO is responsible for preparation of all risk assessment and central policies as defined in the EUREPGAP protocol, and sourcing for sampling and analysis of soil, water, produce and pesticide residue samples;

- PMO controls sourcing of training inputs and professional extension support, but individual SSG's provide training (peer educator system see under training) for waged labour on the farm;
- SSG's are responsible for farm layout, plot marking, basic farm infrastructure (field toilet, hand wash station, field shelter, chemical soak-away and construction of spray barriers), basic farm records (feed into the main farm file at the depot), preparation of land, planting, fertiliser application, production of composts, irrigation, weeding, harvesting, correct labelling of harvest containers and delivery of produce to collection centres (depots);
- No produce handling or processing (as specified in EUREGAP) occurs on farm hence a not applicable declaration can be made for exemption from complying with chapter 10 (produce handling) of EUREPGAP for individual farm sites. Although no handling occurs at the depots, as produce may be stored overnight (depending on the scheme) chapter 10 will always be applicable to the depot sites;
- Farmers in a geographical area are formed into a cooperative with a central depot / collection centre and the cooperative is legally registered under national legislation pertaining in the producer country;
- The depot is equipped with separate CPP, protective clothing, seed, fertiliser and produce stores (produce store should preferably be refrigerated), produce grading area (if required), office for record keeping, chemical preparation area, chemical disposal area (soak-away, waste pit & Silsoe incinerator), toilets, washing facilities, emergency shower, first aid box and two way radio (or other means of communication);
- Depot staff should include depot coordinator/clerk, spray man or men and produce grader. At least two of these staff (typically the coordinator & produce grader) should be qualified first aiders. Ideally the PMO should have their own extension staff but this can be out sourced as long as the external service provider can meet the staff competency criteria specified in the EUREPGAP protocol;
- For certification purposes each depot is considered as a "farm" and the individual growers supplying the depots as blocks on the "farm". This is an acceptable concept for EUREPGAP and some EU retailers as long as homogeneity can be demonstrated in terms of uniform management system, similar soil type, and water quality. This feature is most important for keeping auditing costs under control as it allows for division of certification costs among a larger group thus reducing the individual burden (see under costs & benefits of compliance);
- For auditing purposes, all growers undergo annual internal audits conducted by the PMO or a national auditing team (see under auditing). In addition farmers conduct their own monthly audits and these are checked by the PMO farm inspector or external farm inspector if provision of this service has been contracted out. For the external certification audit, the auditor carries out a system check on the PMO (QMS audit) and audits 4-5 growers (blocks) for each depot (farm) chosen at random. If the all of the selected growers pass the audit then all growers pass, but if one grower fails then all growers supplying that depot fail. This feature helps to encourage internal policing by the growers as

everyone is contributing to the cost of certification and everyone stands to lose if one grower lets the side down.

The R8431 approach embodies sharing of management responsibility and costs of compliance with the emphasis being on getting the PMO to take the lions' share of the management responsibility and a substantial share of the initial investment costs, so as to maximise the chances of the scheme attaining certification and being sustainable on a long-term basis. To be effective the R8431 approach requires commitment from all parties, a good supporting institutional framework and an ability to adapt the new approach to blend into existing systems.

Management and control system for EUREPGAP

Organisation & legal responsibility

The core of a successful EUREPGAP scheme is the management and control system. In the case of small-scale farmers organised into groups to sell to Europe via an exporting company it is necessary to have a primary marketing organisation (PMO) The PMO may be the exporter as in the case of Jaksons Farms Limited and AMFRI Farms Limited in Uganda or the growers may form a secondary level marketing cooperative as in the case of LACCU in Zambia. The PMO takes full legal responsibility and ownership of the EUREPGAP management and control system, and operates the parts of the system dealing with produce handling and delivery for export, centralised inputs and CPP handling and centralised record keeping and traceability. The PMO will also provide extension advice, training and farm inspection or will sub-contract these services out to an external service provider if the PMO lacks the required skills in-house. As will be seen under infrastructure the PMO needs to have a centralised depot or depots in the area or areas where production activities are taking place. They are also likely to have a main office in town where copies of all documentation are stored. In Zambia the PMO appointed a dedicated EUREPGAP representative to take overall responsibility for running the system and taking disciplinary action where necessary.

The individual farmers must be organised into legally recognised groups, this is most easily done by registering farmer groups as primary production cooperatives (normal farmers' cooperative society), farmers must belong to the cooperative as a first step towards EUREPGAP. However, each farmer must also sign a contractual agreement with the PMO to abide by all of the conditions for EUREPGAP established in the PMO's management and control system.

Farming with EUREPGAP

In the system developed in Zambia each farmer is issued with a manual entitled "farming with EUREPGAP" that provides a production protocol (or protocols for the crop or crops being grown for export to EUREPGAP compliant markets) and covers all practical aspects of records and traceability, agronomic practices, pest control, IPM and pesticide management, food safety and hygiene, worker health and safety, environment and conservation, EUREPGAP standards and auditing procedures and transport arrangements for produce. This is a reference manual for farmers and is normally accompanied by individual books on food safety and spraying of CPP.

Work instructions in poster format for the farm

In addition to the farming manual, farmers are issued with laminated "A2" size posters giving pictorial guides to correct handling and application of fertilisers, harvesting rules, emergency procedures and food safety and personal hygiene. These posters are displayed in the workplace when activities are going on and are typically used to provide short refresher training for workers and to act as a visual aide me-moiré of good and

bad practice. In effect these posters translate the most important aspects of the working procedures contained in the farming manual into practical work instructions.

Crop diary

In terms of record keeping individual farmers maintain their own personal file at the farm, and must fill in the crop diary forms provided by the PMO. The crop diary summarises all essential information on production in a single table, and this information is then transferred to the growers farmer file held at the PMO depot so that traceability can be maintained. In the September 2005 pre-audit of LACCU some growers were found to keeping maintaining incomplete records and even when the crop diary was complete the farmer file contained omissions because the farmer failed to take their crop diary to the depot on a regular basis. This problem was solved by making a rule that farmers must take a fully completed crop diary to the depot whenever they wished to deliver produce. If the crop diary is incomplete or the farmer leaves the diary behind then the depot clerk cannot accept the produce as the next stage of documentation cannot be filled in.

Farmer files

Each farmer is assigned a file at the depot where centralised records for the grower are kept these files are clearly labelled with the farmers name and farm code number, and are only accessible by the farmer, depot clerk, PMO EUREPGAP representative and authorised farm inspectors and external auditors. The contents of the farmer file are as follows:

- Farm site profile (reduced version of the baseline survey) including farm map
- Annual cropping programme
- Staff organogram, including key names and allocation of responsibilities
- Quarterly (or half yearly) internal audit report
- Training records
- Soil profile & analysis + annual water quality test results

Per crop

- Planting summary sheet
- Scouting records
- Spraying records
- Collated harvest record

Depot files

In addition to the farmer files each depot/collection centre must have available for reference the following documentation:

Staff records Staff organogram Job descriptions Staff training records Crop husbandry Pagis food bygin

Crop husbandry Basic food hygiene Pesticide application First aid

 Pesticides
 List of permitted products for each crop grown List of products currently in store Copies of label for each of the products in store Approved application rates for each product and each crop Inspection and issue of protective clothing Receipt and disposal of pesticide containers

•	Advice to farmers	Advice notes:	Field labelling Crop history records Pesticide residue management Fertiliser application Use of manure Harvesting rules Cold chain management Product labelling
•	Crop husbandry	Production has Synopsis of pr	ndbook esentations at field days
•	Risk evaluations	new production sites Use of manure Hygiene	
•	EUREPGAP	Farm check sheets Depot check sheets (master & quarter audit reports) EUREPGAP requirements Maximum residue limit analyses (test results)	
•	Emergency procedures	Who to contact in the event of How to make contact	
•	Stores records	Stores receipt & issue records for: Seeds Inorganic fertiliser Crop protection products Cleaning agents & disinfectants	

Work instructions in poster format for the depot

As with the farm sites, each depot is issued with copies of laminated "A2" size posters giving pictorial guides to correct harvesting and handling rules, emergency procedures, food safety and personal hygiene, lifting of heavy loads, hazard classification for CPP and protective clothing requirements for CPP.

Management and control reference material (PMO main office & depot sites)

All of the information above deals with practical aspects of implementation of the management and control system at the farm and depot and records and traceability. However, from September 2005, EUREPGAP introduced a quality management system auditing checklist based on the requirements given in annex II of the General Regulations of the EUREPGAP protocol for fruits and vegetables. As a result of this it is necessary for the PMO to create reference files for the entire system. The types of files, with summaries of contents are given below:

Quality Management System (QMS) manual

The quality management system manual (QMS) is the master manual for the entire management and control system and contains copies of all policies, procedures, work instructions, record forms and other forms of documentation in a single manual divided into the 13 sections specified in the QMS checklist and 14 chapters of the main EUREPGAP protocol. In addition it is strongly recommended that a document be

created that summarises the type and location of all evidence of compliance and allocation of management responsibility within the scheme. This is very important as under the Zambian system responsibility for the scheme is divided between the PMO main office, depot and individual farm sites. The same document should make clear which control points are considered not applicable and justification must be given in each case and backed with self certification letters clearly stating for example that no genetically modified crops are grown on farm. Much time will be saved if the auditor has access to the document in advance and can plan the structure of the certification audit more successfully.

Quality Manual (QM)

The quality manual should cover 22 standard headings that would normally be found in any ISO compliant quality management system for produce handling. For relatively simple operations such as those found in the Zambian and Ugandan small-scale sectors many of these sections will appear irrelevant but it is important to show that the PMO management team is taking all factors into consideration and prepared for future development of the scheme. Currently non-functional sections of the QM should include a brief description of how the PMO would manage that section and then state that as this operation is not currently done by the company but has been taken into account to allow for future expansion of operations. The 22 titles with additional introductory sections are as follows:

- 0.1 Quality Policy Statement
- 0.2 Company Background
- 0.3 Amendment Record
- 0.4 Controlled Circulation List
- 0.5 Glossary
- 1.0 Management Responsibility
- 2.0 Quality System
- 3.0 HACCP
- 4.0 Contract Review
- 5.0 Design Control
- 6.0 Document and Data Control
- 7.0 Purchasing
- 8.0 Control of Customer-Supplied Product
- 9.0 Product Identification and Traceability
- 10.0 Process Control
- 11.0 Product Control
- 12.0 Inspection and Testing
- 13.0 Control of Inspection, Measuring and Test Equipment
- 14.0 Inspection and Test Status
- 15.0 Control of Non-Conforming Product
- 16.0 Corrective and Preventative Action
- 17.0 Handling, Storage, Packaging, Preservation and Delivery
- 18.0 Control of Quality Records
- 19.0 Internal Quality Records
- 20.0 Training
- 21.0 Servicing
- 22.0 Statistical Techniques

HACCP

Although it could be argued that HACCP does not apply to most aspects of primary production as good agricultural practice is essentially the application of a series of prerequisite programmes, EUEPGAP states that chapters 9 and 10 of the protocol dealing with harvesting and handling of produce are based on generic HACCP. For this reason it is essential to create a small HACCP manual as an adjunct to the quality manual. In the Zambian system, the HACCP manual was just 6 pages in length and provided hazard analysis charts and process flow diagrams for transfer of baby-corn cobs from harvest containers to transport sacks and quality assessment and transfer of cobs to the cold room for storage prior to transport to the exporters premises.

The design, implementation and maintenance of a EUREPGAP compliant management and control system represents' the greatest challenge for small-scale farmer groups. In the case of Zambia, the system was developed by NZTT and NRI, but implementation and maintenance can only be done by the PMO and the individual farmers, this requires a massive leap in understanding of modern management practices and capacity to relate large amounts of documentation to practical activities at the farm, depot and PMO office. LACCU have demonstrated that this is possible, but depending on the capacity and educational background of the people involved this can take many months to achieve and the growers will not be able to pass the certification audit until this task is complete.

Selection of farmers and primary marketing organisations

Two companies with small-scale grower groups exporting to Europe were selected in order to provide a contrast in market requirements (in September 2004), company capacity and current organisation of farmer groups. The key features of the two companies are given in the table below.

FACTOR	AMFRI	JAKSONS
Market	UK & wider EU retail and	UK, Netherlands & France
	wholesale	wholesale
Requirements	EC/852/2004 &	EC/852/2004 &
	EUREPGAP	EUREPGAP (as of March
		2005)
Company size	Medium – 15 tons / week	Small – 3 tons / week
Number of SSG	306 but only 21 involved in	85
	conventional production	
Location of SSG	Luwero, Mukono	Mpigi
	(conventional), Iganga,	
	Kamuli, Sugerere,	
	Najembe	
Products (conventional	Hot pepper, chilli,	Hot pepper, okra,
shown in bold and italics	matooke, apple banana,	matooke, apple banana,
for AMFRI)	pineapple, papaya, ginger	passion fruit, pineapple
Type of SSG	Slash and burn cultivation	Slash and burn cultivation,
	by individual growers, no	growers organised into a
	group structure and no	legally registered
	central facilities	cooperative, limited depot
		facilities
Existing systems	Well developed due to	Very limited but some
	organic certification under	elements in place, and
	EC2092-91	company willing to push
		forwards

AMFRI are a much larger company than Jaksons with a well developed organic sector and supporting infrastructure, whereas Jaksons Farms Limited are more typical of most Ugandan exporters in having limited facilities and personnel for supporting their farmer group. In the original proposal Jaksons had the further feature of only requiring minimum legal compliance for EU wholesale markets in contrast to AMFRI requiring EUREPGAP, but this had changed by March 2005 with two EU wholesale importers asking for Jaksons to obtain proof of EUREPGAP certification. A key criterion for selection of both companies was willness to adopt new systems, and the presence of viable export businesses to support investment in EUREPGAP compliant management and control systems.

Farm profiling & farmer commitment

As a starting point for upgrading production practices to the EUREPGAP standard, initial assessments were made of both companies by NRI & NZTT, followed by farm profiling of all active sites in the AMFRI and Jaksons small-scale grower schemes. Oral questioning was supplemented by a site visit to see what the true state of affairs on the farms was. AMA staff were trained by NZTT and NRI staff prior to conducting the farm profiling exercise. The farm profile questionnaire covered aspects of the farm sites and current agronomic practices, farm mapping and definition of field areas. Copies of the farm profiles were inserted into the farmers file held at the depot site and became known as the farm site summary. Data from the summary was used to identify potential food safety risks, infrastructural and training needs.

Following on from the farm profiles, EUREPGAP awareness meetings were held for the farmers using standard material developed in Zambia to explain the importance of EUREPGAP and the level of commitment required to attain compliance. Farmers were given the opportunity to sign up for EUREPGAP and also made to understand that joining the scheme was voluntary, but signing a written agreement to comply with the rules of EUREPGAP would mean that the farmer would have to follow certain practices and no exceptions to these rules would be tolerated. In Kangulumira, 13 out of 21 growers supplying AMFRI expressed a desire to sign up for EUREPGAP and in Nyanama, 20 out of 85 were ready to make a firm commitment with 40 more interested in considering joining at a later date. Of these 40, 20 have since expressed the desire to adopt EUREPGAP and have been placed on a list for the next phase of the Jaksons Farms EUREPGAP implementation programme.

Farmers who reported being ready to make the necessary commitment were asked to sign a standard commitment letter developed in Zambia as this was thought to be suitable for the purposes of EUREPGAP compliance. However, subsequent experience in Zambia (September 2005, pre-audit) showed that each farmer must sign a contractual agreement with the PMO to comply with the terms of the EUREPGAP protocol. This presented some problem in Zambia as LACCU and the primary cooperatives such as Buteko needed to amend their cooperative byelaws to allow their farmers to sign a contract with LACCU. In Uganda it should only be necessary to make minor amendments to the letter of commitment by renaming the document as a contract rather than just a commitment which does not fit the EUREPGAP terminology.

Signing the letter of commitment was considered as the first step towards attaining EUREPGAP, but farmers were told that they must demonstrate practical commitment by investing in construction of the necessary farm infrastructure and starting to keep compliant farm records. Letters of commitment were signed in April 2005, and by early August 2005 Jaksons had identified 4 farmers who were failing to meet the specified criteria. These farmers were suspended from the scheme and transferred to the reserve list. The farm and field codes assigned to these farmers were then re-assigned to 4 growers from the reserve list who had expressed the highest level of commitment to

attaining EUREPGAP certification. Farm profiles were updated to take account of these changes and modified in cases where farmers had opened new fields or completely abandoned existing sites.

The formal process of commitment to EUREPGAP compliance is essential as noncompliant activities by a single farmer can bring disaster at the time of the certification audit (see Zambian experience of the December 2005 internal audit under auditing). It is vitally important that only fully committed growers are allowed into the EUREPGAP scheme. Growers like the 4 farmers supplying Jaksons Farms Limited can be readmitted at a later date if they demonstrate the necessary level of commitment by voluntarily making infrastructural improvements and adopting the required record keeping practices.

Farm site infrastructure

The farm and depot site infrastructure are based mainly on structures constructed in Zambia, but examples from Uganda have been used to illustrate how easily compliant facilities can be constructed using local materials. The requirements for farm infrastructure are detailed below under a series of sub-headings:

Permanent field markers

Permanent field markers should be made and placed in the fields, these markers are usually made from metal, but large stones can be used if readily available. Wooden markers should be avoided as these are easily consumed by insects, if wooden markers must be used they should either be made from termite proof wood or kept in good condition and replaced as soon as insect damage becomes apparent. Markers should display the field number and field area and have space for painting on the date of planting, planting week, crop name and variety and first harvestable date when the field is in production. All markings on plot markers must be made with paint or permanent inks that will not fade in the sun. The use of paper, sticky tape, pencil and biros are not acceptable for plot markers.

CPP markers

Crop protection product spray markers must be placed at the four corners of the field by the spray-man upon completion of spraying. In Zambia, these markers contain details of the chemical sprayed, date of spraying, pre-harvest interval and first harvestable date as well as a danger sign. In Uganda where literacy levels are much lower a system of red flags has been instituted. In both cases the local community has been trained to be aware of the meaning of these markers, and no harvesting of crop or edible weeds is allowed until the markers are removed. Only the official spray-men are allowed to spray CPP, place the markers and authorise their removal. This is done to minimise the risk of accidental violation of the required pre-harvest interval.

Spray barriers

Spray drift from one crop to another is always a risk and fields having boundaries close to neighbouring land can be contaminated by chemical spraying beyond the control of the EUREPGAP compliant farmer. To minimise this risk farmers were encouraged to maintain a 1m gap between fields and to plant a spray barrier in this gap. Farmers in Zambia most commonly used tall grass or sun-hemp (an IPM plant) to create a suitable barrier. In Uganda tall grass was the favoured option for spray barriers as this grows quickly and requires the minimum effort to maintain. Only one farm in Uganda attempted to create a woven fence as a barrier and this was quickly abandoned as the labour input was too high.

Field toilet & hand-wash

A field toilet needs to be dug at each field site. A field toilet can be a very simple affair consisting of a long drop latrine with an enclosure made from locally made materials. The quality of the structure can be greatly improved by constructing a concrete footplate (requires 2 bags of cement per toilet). The toilet should be sited down hill of the fields (not more than 500m from the field) but away from water sources. A simple hand-wash station with running water and non scented soap needs to be provided at the toilet for workers to wash their hands after washing at the toilet and prior to working in the crop. Hand-washing stations of this type are available for sale in Kampala for 20,000 Ugandan Shillings per unit (~£7). A chunk of washing soap should be placed in a net bag and attached to the hand-wash station, as this will avoid the soap getting dropped on the ground or lost. Workers should be trained in how to wash hands correctly and to avoid putting their hands in the water discard bowl. In Zambia, some farms constructed more elaborate toilet blocks and hand-wash stations contained to the main farm water supply. These are very nice and much to be commended but in Uganda where resources are much more limited simple toilet blocks made from local materials are acceptable. Some concern was raised over the use of a log platform for toilet floor as insect damage might lead to a sudden collapse but assurances were given that the timber used was of a type that is resistant to insect attack. Only one farmer in Uganda had made the mistake of placing a field toilet near to the farm water source, but fortunately the latrine pit had flooded before the toilet could be completed thus causing the farmer to relocate the toilet well away from the water source and on slightly raised ground.

Field shelter

A field shelter is required for storage of produce and produce containers prior to transport to the depot. The field shelter can be of simple construction but must include simple benches around the walls so that produce and crates can be stored well clear of the ground to minimise the risk of contamination. In Zambia a wide range of field shelters were constructed by different farmers, one of the most interesting was a simple portable example that could easily be moved around the fields. In Uganda, some farmers built double shelters so as to provide their workers with a place to eat lunch and keep their personal possessions. This is a very wise move as produce shelters must not be used as worker picnic sites.

Chemical soakaway

Each farm site will need to have a chemical soak-away allow the CPP spray-team to safely dispose of surplus CPP when necessary. The soak-away consist of a pit ~1m square and 1.5m-2.0m deep having a layer of stones at the bottom, a thick layer of partially burnt crop residues such as maize stalks or charcoal and an upper (surface layer) of either stones or cement. If cement is used a hole must be left for chemical to drain into the soak-away. All soak-aways must be fenced to prevent access by animals or children and have a permanent hazard warning sign. Chemical soak-aways must be sited well away from any water source to avoid the risk of possible contamination;

CPP container disposal pit

Each farm must provide a disposal pit for empty CPP containers and other rubbish the pit should be enclosed with a fence and labelled with a hazard warning sign.

First aid kit

EUREPGAP mentions having a first aid kit at each farm site, this kit should contain basic plasters, bandages and antiseptic to deal with such minor injuries as might occur on the farm. First aid kits should be portable so that they can be taken into the field and kept at the produce handling shelter or with the supervisor at the field edge.



Figure 1. View to show planting in rows using ridges laid out with lines



Figure 2. View of calibrated containers for application of different types of fertiliser



Figure 3. Zambian field toilet with hand-wash station



Figure 4. View of an unacceptable hand-wash station on a farm in Zambia



Figure 5. Field toilet made from simple materials in Uganda



Figure 6. Field toilet made from simple materials in Uganda



Figure 7. View of a CPP spray barrier and crop separation on a farm in Zambia



Figure 8. View of a spray marker placed in a field in Zambia



Figure 9. View of a CPP soakaway pit on a farm in Zambia



Figure 10. View of a chemical container disposal pit on a farm in Zambia



Figure 11. View inside a first aid box on a farm in Zambia



Figure 12. Large field shelter constructed by one of the farmer groups in Uganda



Figure 13. Portable field shelter in use in Zambia

Depot site infrastructure

A EUREPGAP compliant produce handling depot requires the following features:

- A main building containing produce handling (with hand-wash facility) and storage areas and office for record keeping
- A separate storage area for fertiliser and seed
- A separate storage area for crop protection products (CPP)
- A separate storage area for protective clothing used when handling CPP
- Toilet and emergency shower
- A chemical soakaway, rubbish disposal pit and Silsoe incinerator

In Zambia, the produce depots already had a purpose built building for produce handling but this structure was not EUREPGAP compliant as CPP were stored under the same roof as fresh produce and inputs were being moved through the produce reception area. As a first step under project R8271 separate CPP stores were constructed (see below). Under project R8431 a partition wall was constructed in the entrance to the depot to separate the seed and fertiliser store from produce reception and storage. This was a low-cost measure consisting simply of a painted wooden partition. In establishing this partition an anteroom was created outside of the seed and fertiliser store. This area was used to store protective clothing in metal lockers and laminated posters were displayed on the walls giving instructions on lifting of heavy sacks, chemical hazards, appropriate use of protective clothing and depot emergency procedures.

CPP stores can be constructed as wither 1 or 2 roomed structures that must be entirely separate from the building containing produce, offices, seed and fertiliser. In the case of two roomed stores, one room in this building is used for storage of chemicals, empty containers, (if obsolete chemicals are kept in the store awaiting disposal they should kept separate from other materials and clearly labelled as obsolete material) measuring equipment and knapsack sprayers and the other for protective clothing, protective clothing must never be stored in the same room as the chemicals. The door to the chemical room must be bunded to a height of at least 6cm and the chemical room should have vents low down in the wall on one side of the building and high up on the wall in the other to create an airflow for ventilation. The ventilation holes must be covered with metal mesh or be of the airbrick type to prevent access by animals to the store. The chemical store will require metal or plastic covered shelving (non-absorbent) and all shelves must be properly labelled and liquids must NEVER be stored above powders. The door of the chemical store must have appropriate hazard warning signs and be kept securely locked. Access to the CPP store must be restricted to the spraymen and the depot co-ordinator. In Zambia single roomed chemical stores were used for storage of chemicals and sprayers as protective clothing was kept elsewhere. The basic (minimum) dimensions for a two room store would be as follows, height 2.8m, depth 2.1m, width of each room 1.4m, doorway 0.9x2.0m with a 0.06m bund on the door to the chemical store. The partition wall between rooms must extend to roof height so that there is no communication between the protective clothing store and room for storing chemicals and knapsack sprayers. A bucket of sawdust, shovel and broom must be kept in the chemical store for clearing up any accidental spillage of chemicals;

An emergency shower, needs to be installed at a point as close to the CPP store as possible (not exceeding 10m from the store). The minimum for an emergency shower would be a drum filled with water and raised on legs with a shower head and and simple pull string to trigger release of the water, a ball-cock mechanism (from a flush toilet can be used to control release of the water. A toilet with hand-wash facility is also needed and this can be of the VIP long-drop type or flush as available.

A disposal incinerator of the "Silsoe" type is required, this incinerator is based on a large metal drum with a mesh platform about a third of the way up from the bottom and a series of ventilation holes to create an airflow. Unlike simple incinerators that burn at a mere 200°C a Silsoe incinerator should reach ~1,000°C and thus be able to safely incinerate empty CPP containers with minimal release of fumes (operators should keep away from the incinerator to minimise inhalation of toxic vapour generated during burning of containers). The key feature of the incinerator is the size and spacing of the ventilation holes which must be done correctly in order for the incinerator to reach the correct operating temperature. If the incinerator is not set-up correctly or overloaded black smoke will be generated indicating that the temperature is too low. Containers awaiting incineration must be triple rinsed at the chemical soak-away prior to burning;

The centralised CPP area must also have a chemical soak-away of the same type as already described under farm site infrastructure and a disposal pit for CPP rubbish after incineration. The incinerator, soak-away and disposal pit must be fenced off and be labelled with hazard warning signs;

All chemicals must be purchased centrally and kept in the main CPP store, there must be no independent purchasing of CPP, and chemicals must not be kept at either farm sites or the homes of individual farmers. Centralised purchasing has the advantage of ensuring quality of chemicals and correct specifications for products and will also reduce costs and wastage of chemicals as all materials will be purchased in bulk and then applied centrally to all farm sites;

A central spray-team with two full time trained and qualified operators must be established to work from the central CPP facility, details of the professional requirements and qualifications of the spray operators are given in the section on personnel and training (see below). In practice farmers will carry out crop scouting and refer to the company extension officer or depot coordinator to visit the farm site and confirm the scouting (scouting record) and authorise spraying if appropriate. Authorisation will take the form of a spray instruction copies of which will be given to the farmer, the spray-man and a file copy for the farmers file at the depot. The spray-man will fill in a CPP application record, a copy of which will be given to the farmer, additional copies will be kept on the farmers file at the depot and with the spray-man. These records necessitate the use of duplicate books to make issuing of multiple copies easier and to ensure horizontal traceability. Farmers must understand that they must not apply CPP to export crops under any circumstances as this would be a violation of the EUREPGAP system.



Figure 14. Frontal view of Zambian CPP store at Buteko depot



Figure 15. Detail of ventilation bricks used in CPP store



Figure 16. Bucket of sawdust for dealing with CPP spillage



Figure 17. CPP and protective clothing poster in the CPP clothing storage area at Buteko



Figure 18. Buteko depot showing entrance before construction of the partition



Figure 19. Buteko depot showing partition to separate produce from inputs

Issues of basic agronomy in Uganda

EUREPGAP is primarily about good agricultural practice (GAP) and pre-supposes that certain basic features (from a European perspective) will be in place on farm. In Zambia, the small-scale farm sites were quite similar in layout to those found in Europe but on a much smaller scale, often relying on purely manual labour and having limited infrastructure (although all farms had access to borehole supplied overhead or drip feed irrigation systems) in place (at the start of project R8271). This coupled with the relatively high level of education of the farmers provided a good base on which to build a EUREPGAP compliant system and by the start of project R8431 the main concerns lay with fine tuning of the management and control system.

In Uganda the situation was quite different, all of the Ugandan farmers involved in growing hot pepper for export via AMFRI or Jaksons Farms were relying on slash and burn cultivation techniques in bush or forest clearings. These farms had the following features which were not compatible with GAP and required urgent attention to form a basis for adoption of EUREPGAP compliant farming systems, a summary of the issues is given below with brief comments on the approach taken to solving each problem:

Fields and field areas - Farm sites lacked any system of defined fields and farmers and PMO staff were unaware of planting areas thus making correct application of crop protection products (CPP) impossible;

Solution – As part of the farm profiling exercise fields were defined and areas recorded on farm maps, each farm and field were allocated unique code numbers, and these numbers and field areas were recorded on permanent metal markers placed in the fields. Details from the profiles were recorded in farm site summaries placed on the individual growers farmer file.

Planting practice - Planting was done at random rather than in rows, this makes inefficient use of available space, prevents accurate application of CPP and increases losses due to damage caused when workers move through the crop;

Solution – Training in the basics of GAP was provided by AMA to all growers as part of this training farmers were taught to create ridges and plant in rows with the correct spacing between each plant. On sloping ground farmers were taught to make the ridges parallel to the direction of the slope so as to reduce erosion

Source and maintenance of planting material - All plantings were derived from seed saved from previous crops (typically over a 5-10 year period), and furthermore farmers only saved seed from rejected fruits and poor quality plants as all of the best material was sold for export. This practice results in increasingly weak planting material, transfer of disease from crop to crop and maintenance of undesirable genomic traits in the planting material;

Solution – Ugandan growers find it difficult to afford to completely switch over to certified seed in the short-term so AMA and NRI provided training on selection of plants to provide good quality seed. Farmers were encouraged to think of the plants in their field like a beauty contest and mark the best plants with sticks for seed harvest and to collect seed early in the season.

Control of disease in the field - Most farmers left diseased plants standing in the field as they were unaware of the possibility of spreading infection, and in some cases diseased seedlings were transferred from the nursery bed into the main field. These practices increase losses due to disease and can cause the entire field to be lost in the case of diseases spread by flying insects from plant to plant;

Solution – As part of the training on planting material farmers were trained to identify, remove and burn diseased planting material as soon as possible, and not to allow diseased seedlings to be propagated.
Farmers' knowledge of plant diseases and appropriate control measures - Most farmers' knowledge of plant diseases and appropriate control measures was very poor. In one case a farmer incorrectly identified a viral disease as being due to insect damage and then recommended spraying a fungicide to control the insect infestation. Obviously in this case the farmer was not aware of the correct use of the various pesticides available for hot pepper. Incorrect identification of pests and inappropriate chemical controls increase losses due to lack of pest control and also waste costly chemicals. In addition the farmer may be tempted to increase the dosage of the pesticide thus risking violating EU restrictions on maximum residue limits (MRL) for chemicals in food;

Solution – Identification (including scouting techniques) and control of common plant diseases was covered as part the practical course on safe and effective use of CPP conducted in Uganda by NZTT.

Poor Crop Protection Product (CPP) practice – At the beginning of project R8431, all farmers were applying there own CPP, but farmers showed no knowledge of correct procedures, no knowledge of crop scouting, no evidence of protective clothing and were storing chemicals within their homes. A very limited range of chemicals was used continuously thus encouraging pest resistance, farmers were often knowingly violating pre-harvest intervals (PHI) with consequent risk of MRL violation in Europe. At some farm sites crops adjacent to the hot pepper field had been massively over sprayed. As these fields belonged to other growers, it was not seen as being possible to correct this hazard as the farmers were unaware of the possibility of planting tall grasses to act as spray barriers. Sprayed fields were not marked in any way, this not only increased the risk of PHI violations, but also increased health risks for local consumers as edible weeds were seen growing amongst the hot pepper plants and farmers reported that people enter the fields to collect these weeds for food use;

Solution – All aspects of correct use of CPP were covered as part the practical course on safe and effective use of CPP conducted in Uganda by NZTT. With regard to marking sprayed fields farmers were taught that the spray operator will place a red flag in the field, produce and edible weeds must not be taken from the field until the red flag is removed by the spray operator, for this measure to be fully effective farmers are being encouraged to sensitise the local community as to the meaning of the red flags.

Dumped containers – Discarded CPP containers were seen lying in the field or at the edge of paths at several farm sites. At one farm a child was playing with a toy made from a discarded CPP container and at another a chemical container had been refilled with paraffin. This is not acceptable practice for EUREPGAP and the case of the childs toy highlights the health and safety risk represented by leaving empty chemical containers lying around;

Solution – Following the visit by AMA, PMO and farmer representatives to Zambia, farmers within the two EUREPGAP schemes prepared container disposal pits and chemical soak-aways at all the farm sites.

Mulching & composting – Using crop residues as mulch improves soil structure and reduces water loss, incorporation of organic manures and composts replaces soil nutrients and has potential to increase crop yield. At the Ugandan farm sites water loss was a problem in many cases and virtually none of the farmers uses any form of fertiliser. Mulching and composting would appear advantageous but were not being used because the farmers are unaware of these practices;

Solution – AMA have provided training on mulching and composting for all growers within the EUREPGAP schemes as part of the basic GAP training programme.

Water source – All of the Ugandan farms rely on streams, small ponds or shallow wells at the lowest point of the land to provide water for irrigation. This water is applied using buckets. These water sources would raise concerns over possible biological risks, although it would be fair to say that hot pepper and chilli are very low risk crops due to the inherent need for thorough cooking;

Solution – It was not feasible to change the type of water source found at the farm sites within the life of the project, but given the low level of risk associated with hot pepper and chilli it was acceptable to continue with these water sources but provide training to farmers to always water at the base of the plant and never from above as part of the basic GAP training programme conducted by AMA.

Hygiene – Personal hygiene on farm was very poor as none of the farms had access to field toilets or hand-wash facilities, pre-grading was taking place on the ground at the farm or the homestead and most farmers lacked suitable containers for harvesting or transport of produce to the depot. In general there was a low level of understanding of personal hygiene, at one village a farmer urinated next to the communal waterhole that supplies water for the entire community. The low level of personal hygiene increases concerns over the risk of biological contamination of the produce although as stated above this risk is mitigated by the normal use of hot pepper and chilli in well cooked dishes;

Solution – Personnel from AMA the two PMO's and farmer representatives from the two farmer groups were training in Zambia by NZTT in food safety and hygiene to RIPH level 1, and how to apply the farmer to farmer peer group training approach. Each of the groups produced a set of 6-8 food safety and hygiene training posters as part of the course. In Uganda all farmers involved in the EUREPGAP schemes have constructed field toilets and field shelters and purchased hand-wash stations.

Education – The majority of farmers involved in the two export schemes were reportedly literate in Lugandan. However, when one group formed themselves into a legally registered cooperative, 4 out of 21 farmers signed their names with a thumbprint and 6 gave only their initials, the remaining 11 all used proper signatures. This information indicates that some of the farmers not literate and some others have only very limited levels of literacy. This presents a problem as even with centralised controls individual farmers need to be able to read and write in Lugandan (or any other language in common use in the production area) in order to maintain basic farm records and to demonstrate to an auditor that they can follow written procedures and work instructions issued by the PMO.

Solution – Basic literacy and numeracy are essential for EUREPGAP, in R8431 all documents were supplied to AMA as master templates in English and then translated into Lugandan for use on farm as this language is most widely understood by the farmers. Local auditors can use this language and English templates can be supplied to external auditors and clarifications provided where necessary by a local auditor accompanying the external auditor. Farmers were only admitted to the EUREPGAP scheme if they were able to demonstrate the required level of literacy.

Record keeping and traceability

A key feature of EUREPGAP for retailers is the creation of a system for ensuring vertical and horizontal traceability throughout the production chain. Vertical traceability refers to the ability to use a unique code to trace product from the field/plot through to the final consumer via all intermediate stages. Horizontal traceability refers to the use of the same unique coding system linked to production records so that all inputs (seeds, fertiliser, pesticide) used in production of the product can be traced and details found of quantities used, dates, operator names etc.

Most of the EUREPGAP compliant traceability system revolves around the maintenance of accurate records cross linked via the use of unique reference numbers to enable a full vertical and horizontal trace to be easily made if needed. However, the system also requires that all fields and containers of harvested produce be properly labelled. Compliant plot markers must be made of permanent materials (preferably metal or stone if desired, but wood may be acceptable if kept in good condition) and marked with the following details using paint or a permanent marker that will not fade in strong sunlight or be washed away by rain. Details required for a plot marker include, farm/plot code number, field area, crop name and variety and planting date. If a system of planting weeks is in use this information must also be recorded.

Sacks or crates of harvested produce must be labelled with a securely fixed tag carrying the farm code number, depot name, crop name & variety, planting week or planting date and date of harvest all clearly stated. Information must be written using permanent ink and never in pencil.

Although record keeping for EUREPGAP is a very wide area (see description of QMS system) the records required for traceability purposes can be sub-divided into those covering crop production, produce movement and stock control. The descriptions given below pertain to LACCU in Zambia as this system is fully operational.

Crop production records

Crop production records start on farm with the farmer keeping a compliant crop diary, the crop diary form records for each activity the day and date, farmer code, field code, field area, crop, activity carried out, materials used, materials used, materials source (with GRN number to link to input handling records – see below), amount used, work done by and comments including the number of man hours expended. Compounds such as fertilisers are applied using simple calibrated buckets that have painted markers and marker holes on the sides to determine commonly used volumes.

Information from the crop diary is transferred to the crop history record in the growers farmer file held at the PMO depot so that traceability can be maintained. The crop history record summarises all of the information for a given crop under the headings: land preparation, planting, fertiliser used, fertiliser used, organic manure/compost used, mulch and manure soup used. Farm and field codes, crop name, planting week and planting date are all recorded as are any GRN numbers for traceability of farm inputs such as seed and inorganic fertiliser. The farm file also contains crop scouting sheets and spray instruction and spray application records which are all cross-linked to the crop history record via the farm code, field code, crop name, planting week and planting date. In the case of baby-corn in Zambia a special record form was created to deal with application of bulldock as this is a granular formulation applied with a special applicator (developed under the R8431 project) rather than a knapsack sprayer. The spray/bulldock application records also record the pre-harvest interval and first harvestable date for the crop which can then be related by the depot clerk to labels on containers of produce coming in to see if the crop is compliant with the pre-harvest interval.

The final part of the production record is the collated harvest record on the farmer file which makes the link to the produce movement records, collated harvest records are described below under this section.

Produce movement records

From the farm –a produce receipt note (PRN) is generated on arrival at the depot with product. It records Depot name, date, farmer name, farm code, produce name, field number, plant week, number of bags, gross weight, net weight, Comments, delivered by, received by. A copy is kept by the farmer; the other is retained at the depot. Each sack has a label tied to the neck giving details of the product, farm code, farmer name, planting week and field number.

This information is written into a file, titled 'Collated Harvest Record' – retained in depot. The produce delivery sheet (PDS) is a collation sheet, with a unique number for that depot, is made up with the entire product stored for a single dispatch to the receiver. This can take 3-4 days. It is also the store record. It shows the date, PRN, code, crop, plant week, number of bags, gross weight, tare weight, net weight, for each grower in the store. The PDS are kept in bound form and act as cumulative depot stock records for the season.

The information recorded on the PDS is used to compose the produce delivery note (PDN). This document has a printed top sheet, with a duplicate sheet underneath. It indicates that the PDN is from LACCU coop, and gives the date, farmer name, farm code number, produce type, number of sacks, gross weight, tare weight, net weight. At the base of the document is printed 'prepared by' and date, plus received by, and date. The depot clerk accompanies the load to the exporters' depot. One copy is kept by the exporter, the second returns, still in its binding, to the depot.

The exporter sends a copy of the document listing the weight received from each farm and the weight of pack out from that part of the consignment. This is the produce delivery voucher (PDV).

As each document is linked to its predecessor by unique codes such as the individual document number (indicated with document type – for example PRN number) and the farm and field code full vertical traceability of product is possible to plot level from any point in the chain, and as the exporter carries this data through their own system, traceability to plot level could be initiated by the buyer in Europe. Horizontal traceability depends on the maintenance of crop production records (see above) and stock movement records as described below.

Stock (input) movement records

Stock control is a very important part of any horizontal traceability system, but which is often neglected or completely ignored by farmers and PMO's. The purpose of input control is to keep a record of the origin of inputs applied to a crop so as to avoid obsolete or sub-standard materials being used and reduce the opportunity for theft by workers resulting in insufficient amounts of fertiliser or CPP being applied. The Zambian system starts with a stock requisition (purchase order) duplicate book to record requests for inputs from farm to depot or depot to PMO. An approved order will result in release of a goods issued note (GIN) in duplicate (copies for farm and farmer file) and bearing details of farm and field codes. When inputs are received at the farm a goods received note (GRN) is released and this form records the GIN number so as to relate back to the original issue from store. GRN numbers are recorded in the crop diary and crop history record so as to relate the use of the inputs to the crop history, and GRN numbers are also recorded on the seed and fertiliser stock record and crop protection product stock records kept at the depot. In this way, stock records can rapidly be linked to crop history records via the GRN number.



Figure 20. EUREPGAP compliant permanent plot marker

43 14 MAN 61 11.05-18

Figure 21. EUREPGAP compliant produce container label

Training

A lot of effort is being put into supporting access to export horticultural markets in different parts of the world, but many projects have been criticised for their lack of impact and sustainability. The heavy focus of many projects on training has been heavily criticised by donors such as the World Bank because all to often the training programmes lead to almost no impact on the ground. In the view of the R8431 team these failings are mainly attributable to doing training activities in isolation rather than as part of an integrated approach, and the failure to make training sustainable by only employing short external inputs often from international consultants.

In project R8431, training was considered as a key component within a much larger systems based approach that addressed both management and control within the production chain and provision for the supporting institutional framework. The training programme developed had the following features:

- Sustained programme that is not project specific in remit or funding (does not depend on CPHP for continued activity);
- External consultants were used on a short-term basis to build local capacity to deliver in the longer term;
- Training covered service providers such as agrochemical dealers, sales agents and extension workers;
- A programme of monthly extension officer updates was initiated, partly to keep information updated but also to refresh the officers memories of key issues, allow opportunities for discussion of points raised by growers during the officers weekly farm visits and finally to give the officers a sense of active participation in the R8431 programme;
- A novel system for peer education was developed to enable farm owners and supervisors to provide ongoing training on the farm and thus keep reinforcing key messages;
- All the training activities were added to the diploma programme of NZTT with the result that during the life of projects R8271 & R8431 ~150 professional workers entered industry and public sector employment in Zambia equipped to support and manage involvement of small-scale growers in the export horticulture sector.

As part of project R8431, became the key provider of training inputs for both Zambia and Uganda. On the Ugandan side, a team from Uganda consisting of staff from AMA, the two PMO's and farmer representatives from both farmer groups travelled to Zambia to receive training in food safety and hygiene to RIPH level 1, and then to be trained as trainers so as to be able to apply the peer group farmer to farmer training system developed under project R8271. Later a team from NZTT visited Uganda to provide practical training on safe and effective use of pesticides and practical record keeping and traceability for key players in Uganda.

The CPP training course was especially interesting as this was the first time that farmers had participated in a genuine practical course. Under normal circumstances CPP training had been conducted in a classroom with limited practical demonstrations and no hands on practice for the farmers. The NZTT approach was to move the course to the farmers own fields and get farmers using their own equipment. Water sensitive paper was used to show farmers how wasteful and inefficient their methods of spraying were, and then they tried the new techniques and saw a dramatic improvement in targeted delivery of spray. Such obvious cost savings act as a powerful incentive to farmers to adopt better techniques.

Art work

Pictures are a valuable way of capturing attention and conveying a training message This is particularly important when dealing with groups of trainees with variable and often initially unknown levels of literacy and fluency in the language of delivery.

Pictures can also be used to good effect to personalise training particularly when the picture and trainee are closely related and the trainee can look and say 'that's me'.

Note: The visual memory of trainees in this region of Africa is very well developed and the learning impact of words is increased enormously when the message is reinforce with pictures.

Art work for the project was generated locally. Initially an art master in a local government school was selected and taken to the farm sites to see the types of picture that were required. Latterly pictures have been added to the picture bank by participants on training courses who have been inspired to create their own images to support the training message that they wish to convey. Either method generates pictures of local situations and people at reasonable cost to the training provider. Art work is presented:

- As black line drawings to facilitate photocopying by the end user who may wish to use the picture to create their own training messages and materials.
- Colour can also be added by the end user who can match the colours used to the trainees own situation, e.g. Yellow overalls where yellow overalls are worn.
- Presentation on disc allows the end user to select the pictures of his/her choice and adjust the size to suit his/her requirements

Note: Each picture can be used in many ways to support or convey a range of messages.

Rationale behind the design of training courses

Key factors to consider when designing training courses for the industry include:

- What trainees needs to know and understand, (Taken from job analysis & trainee performance)
- Where common course material can be used for different target groups
- What level of responsibility will be taken by the trainee
- What length of time is needed to deliver the material required
- What length of time is available for training
- Who can, should, will deliver the training
- How the material can be presented in a user friendly, learner friendly and cost effective manner.

Auditing

Private sector standards such as EUREPGAP incorporate annual audits as a means of independent verification that all criteria are being met by the grower, this builds confidence with the buyer as they have an assurance that certification is not simply a paper or one off exercise. In practical terms EUREPGAP compliant production facilities must conduct their own internal audits at least once per year using the full EUREPGAP checklists, and one independent external audit per year. It is also possible to get external certifying bodies to conduct a pre-audit but this adds significantly to the cost. Internal and pre-audits can be conducted by anyone who has followed an internal auditors course to ISO 19,011, but certification audits can only be undertaken by a EUREPGAP approved company able to demonstrate accreditation to ISO Guide 65 or EN45011 whose auditors will operate to the ISO 19,011 auditing standard.

The export horticulture sectors in Zambia and Uganda are still too small to support an EN45011/ISO Guide 65 accredited certifying body in country hence growers looking for certification need to bring in auditors either from a neighbouring country or from Europe. In the case of Zambia most of the large commercial farms have been certified by SGS-

South Africa and in Uganda very few audits have taken place (Maiyre Estates was certified by Africert Kenya in 2005).

The costs of auditing have proved highly variable, EUREPGAP has fixed rates for certification but the certifying body is free to set their own charges for time inputs. In Europe these charges follow recognised scales, but most certifying bodies in Africa vary their rates from client to client according to how much they think they can get. If a donor is involved audit costs increase dramatically sometimes by 4-5 times the price offered to farms without donor support (NRI experience of EUREPGAP certifications in Ghana). This is very poor business practice, and is also unsustainable as donors typically only pay for the initial audit, annual audits must be borne by the grower so if charges are set very high the grower will be forced to drop out of EUREPGAP. This happened in Ghana where small-scale growers were unable to maintain certification because audit costs were equivalent to 70% of their annual profit margin, even though a Ghanaian certifying body was being used. Price is not the only factor to take into account when choosing a certifying body, as it also necessary to determine if the certifying body has the authority to conduct the audit, this is particularly important for option 2 as not all companies are accredited to conduct this type of audit.

In the system developed under R8431, the PMO or external service provider has staff qualified as farm inspectors who work with the farmers to conduct a simple internal audit each month. This simple farm inspection uses a much shorter checklist and copies of the results with proof of corrective actions are kept on the farmer file at the depot and by the farmer on their own farm file. At least once per year the farm inspectors conduct a full internal audit of the entire system using the EUREPGAP QMS checklist and EUREPGAP control points' checklist. The internal audit follows the same format as an external certification audit to give farmers and PMO staff experience of practical audit conditions. Records of the internal audit are kept at the PMO office, as these are required as part of the certification audit.

For the certification audit it is necessary to select a suitable company bearing in mind the issues raised above. Once a suitable company has been identified, the PMO must register for auditing sufficiently far in advance to allow time for 3 months harvest records to be collected post registration but pre-certification. In the case of LACCU it was necessary to register in December 2005 in order to hold a certification audit in July 2006, as the old season is complete and the new season does not begin until February 2006 with first harvest due end of March or early April 2006, thus in July 2006, 3 months worth of compliant records will be available and harvesting will be ongoing so as to allow the auditor the opportunity to see the whole system in operation.

The process of the audit is as follows:

Audit of QMS	=	0.5 day
Audit of centralised depot facilities	=	0.5 day
Audit of each farm site	=	0.25-0.5 day per farm
Report writing (to back the checklist)	=	1.0 day

For 10 farm sites the auditor will usually visit 4 sites, but could decide to visit all 10 if they believe this to be necessary. In the case of large groups of growers, EUREPGAP specifies taking the square root of the total, but the auditor will often choose to visit fewer sites especially if the sites visited are satisfactory.

For the QMS management team it is highly advisable to lay out all documents in a logical sequence on a large table or on the floor of the meeting room, post-it pads are most useful for identifying sections more easily. The PMO management team should appoint two runners to be ready to select documents and pass them to the

management team on demand during the audit. It is vitally important to be fully conversant with the documentation of the system and to ensure that real life practice mirrors that found in the documents. The QMS audit is highly complex as ~400 documents are in play and need to be easily accessed and discussed to avoid non-compliances.

For the depot audit, it is vital to make sure that the depot clerk is fully conversant with the system and that everything is compliant on the day of the audit. It is important for PMO staff and members of the external service provider to make a check 1-2 days beforehand and for all staff to be full briefed on what to look out for and what the consequences of the failing the audit will be. All farm sites must be checked in a similar way, all farmers must be briefed and made aware of the nature of the audit and the consequences of failure. This is a major task and farmers need to make a final check on farm before the auditor arrives to ensure that the environment is tidy and no non-compliances are apparent to the auditor. Farmers must be able to explain their everyday activities and these explanations need to match the material found in the documentation. Zambian experience suggests that several internal audits are necessary prior to the certification audit to give all personnel sufficient practice of handling questions and ensuring infrastructure and documentary compliance.

Internal audits in Zambia

With the support of the EU-COLEACP PIP, a EUREPGAP pre-audit was arranged for LACCU in September 2005 conducted by a well known Kenvan auditing company. An African service provider was chosen to encourage the development of regional capacity rather than relying on European certification companies. If the pre-audit was successful it was anticipated that the same Kenyan company would be commissioned to conduct a certification audit by the end of 2005. This audit was most useful for LACCU, the farmers, NZTT and NRI in providing a full and independent audit of the management and control system. Many weaknesses and failings were revealed in the QMS system although basic infrastructure at the farm sites was 100% compliant in most cases. As part of the exercise two experienced auditors working for NRI were commissioned to observe the audit, unfortunately their observations revealed 15 major examples of poor practice (non ISO 19,011 practices) by the Kenyan auditor and the audit was not properly conducted or completed. The Kenyan company failed to provide a proper report of the pre-audit thus destroying the confidence of the R8431 team to employ this company for the certification audit. This weakness in local auditing capacity could be addressed by creating a mentoring scheme to link new companies and auditors to more experienced companies and personnel with proven track record until the new companies are able to operate independently.

In Zambia, it was decided to register LACCU for external certification by IMO in July 2006, and to conduct a full independent internal audit under R8431 in December 2005, and hopefully arrange for a final internal audit in April 2006 with PIP support.

The LACCU internal audit was conducted between12-16th December 2006 and fully reported to LACCU with outcomes, non-compliances and recommendation listed in separate reports. A summary of the percentage compliance is given in tables 6-8 below. These results show that LACCU is very close to passing a EUREPGAP certification audit. To pass the EUREPGAP certification audit LACCU needed to score 100% for major musts and 95% for minor musts and 100% for both the QMS and farm inspector checklists. LACCU attained very high scores and the non-compliances on the QMS were mostly of a simple nature that can easily be solved.



Figure 22. Selection of documents required for the QMS audit

Table 6. Table to show percentage compliance for the main EUREPGAP checklist

 achieved by LACCU in the December 2005 internal audit

	QMS checklist	Applicable to LACCU	Compliant	% compliant
Total number of control points	214	171	162	95%
Major musts	49	35	34	97%
Minor musts	99	85	81	95%
Recommended	66	51	47	92%
Not applicable	NA	43	NA	NA
to LACCU				

NA = not applicable

Table 7. Table to show percentage compliance for the EUREPGAP QMS checklist achieved by LACCU in the December 2005 internal audit

	QMS checklist	Applicable to LACCU	Compliant	% compliant
Total number of control points	85	80	71	89%
Not applicable to LACCU	NA	5	NA	NA

NA = not applicable

	Farm inspector checklist	Applicable to LACCU	Compliant	% compliant	
Total number of control points	9	7	7	100%	
Not applicable to LACCU	NA	2	NA	NA	

Table 8. Table to show percentage compliance for the EUREPGAP farm inspector checklist achieved by LACCU in the December 2005 internal audit

NA = not applicable

The major failing occurred with just one of the major musts in the main checklist (CP 1.1) and its sister control point in the QMS checklist (2.9.1) that ask "Is EUREPGAP registered product traceable to and traceable from the registered farm where it has been grown?". On the day of the audit 5 sacks of baby-corn had been accepted by the depot clerk and placed in the export side of the produce store that had no product identification label and merely had the farm identification code written on each sack. This is a clear breach of the EUREPGAP protocol as traceability is lost because there is no record of field number, planting date/week or harvest date or crop name and variety.

This was a very simple and easily avoidable error and completely unacceptable on the part of the farmer and the depot clerk, in a certification audit this would result in the whole scheme failing with consequent loss of certification, loss of market and waste of the cost of a certification audit (~£2,000 wasted) for the entire scheme. In this case both parties received official warnings from LACCU management, but this illustrates how easy it is for one farmer or clerk to bring down the whole system.

Fortunately the December audit was purely internal, and it is hoped that the farmers and LACCU management profit from the lessons learned during these audits and ensure that such mistakes are avoided in future audits.

Costs and benefits of EUREPGAP certification

This section has been divided into 3 sections to look at investment and recurring costs of certification in general terms, certification costs and immediately identifiable benefits of EUREPGAP compliance. It is not intended to provide a detailed cost benefit analysis for the scheme in Zambia as this data is not yet available (activity funded under the joint DFID/NRI/IIED project and scheduled for March 2006) and the Ugandan schemes were not complete as of December 2005.

Investment and recurring costs

In the Zambian scheme most of the major infrastructure (depot buildings, CPP equipment and protective clothing was already in place, thus reducing the initial investment costs. However, individual growers still had to make personal investments in labour to dig field toilets, construct field shelters, hand wash stations and chemical soak-aways. In addition approximately £5,000 of funding was obtained from the PSDP to cover costs training of spray teams, first aid training and first aid kits, crop scout training, development of record and traceability systems including stationery costs and analysis of water samples from each farm. If these costs had been met by the SSG's the cost per individual would have been £78. In Uganda, Jaksons farms were fortunate in having access to a reasonable depot building at Nyanama village that only required cosmetic improvements such as cleaning and pest screening to become compliant for the requirements of EUREPGAP. The major investment for Jaksons was the construction of centralised CPP store, and all farmers had to purchase metal plot

markers at a cost of \pounds 7 per marker and one hand-wash station per grower at a cost of \pounds 7 per station.

AMFRI Farms limited and the Kamazi Farmers Cooperative Society Limited were in the more difficult position of lacking any form of depot facility, although the prospective site did at least have 2 sets of VIP type toilets and washing facilities. Like Jaksons AMFRI and the Kamazi Farmers Cooperative Society Limited had to purchase metal plot markers and hand-wash stations, but had the additional expense of investing £3,700 on construction of a depot building with access to borehole water and £700 for a two roomed CPP store (one room for chemicals and the other for protective clothing).

Certification costs

In December 2005, IMO GmbH provided a quote to conduct a EUREPGAP audit under option 2 for 10 SSG's centred around Buteko depot near Lusaka in Zambia during 2006, following the approach of considering the scheme as a single farm with each grower as a block within the main farm. Given the number of grower sites it was agreed that field visits would be made to 4 growers.

The total price quoted was €2,345 (£1,608) broken down into the standard EUREPGAP fee and costs for time and travelling by IMO staff given that the audit would take 4.5 days to complete. The breakdown was as follows:

EUREPGAP system check:	€20
Registration fee per grower €5 x 10	€50
Fee per grower site visited €20 x 4	€80
Total fee to EUREPGAP:	€150
IMO fees	€2,195

The costs of certification work out at ~£161 per grower. This is a relatively high cost per grower and highlights the importance of having a sufficiently large group ready for certification so as to reduce the cost per grower for the certification audit. If for example LACCU had 60 growers ready for certification, the cost per grower would have been reduced to a more affordable £27 per grower. PIP have agreed to cover these costs, but for sustainability LACCU must have sufficient growers not only to reduce individual costs, but in order to bring in sufficient income as a group to pay the ongoing costs of maintaining the EUREPGAP system such as training and extension costs that are most unlikely to be donor subsidised beyond the next 1-2 years.

Immediate benefits of compliance with the EUREPGAP standard

It is not possible yet to quantify the benefits of certification set against initial investment and recurring costs as the small-scale scheme in Zambia will not be certified until July 2006. However, during the implementation phase the following beneficial points were apparent for the SSG scheme in Zambia:

- Improved understanding of costs of production and levels of income has enabled farmers to assess the profitability of their operations, reduce losses due to theft and negotiate more effectively with the export company;
- Farmers involved with EUREPGAP are taking pride in their success and have developed a confident commercial/professional mentality that was not evident at the start of the project;

- Reduced costs for fertilisers and crop protection products as improved practices reduce the quantities used via more targeted applications and better scouting procedures in the case of CPP;
- Growers receive a better return on their production as the exportable percentage has risen and the percentage of rejects decreased, this has been observed by LACCU farmers selling to their exporter;
- Growers have a more reliable and stable relationship with the European buyer as approved suppliers as proof of safety and quality is embodied in the EUREPGAP certificate and in practice problems on the farm are much less likely to occur;
- There are indications that EUREPGAP certification should enable LACCU to access the high value South African retail sector which is demanding proof of EUREPGAP certification as a de facto requirement for market access;
- Improved levels of hygiene on farm and greatly improved awareness of personal and food hygiene, farmers claim to adopted better hygiene measures in their homes, and it was interesting to note that during a recent ETI SA8000 social audit improvements were seen in food hygiene in farm houses when compared to previous audits;
- The environmental impact of export production is reduced as less agrochemicals are being used and greater care is being taken over correct disposal of tank washings, empty containers and obsolete chemicals;
- There is potential for improved farm safety as growers and workers are much more aware of risks associated with agrochemicals, and on farm facilities such as first aid kits, emergency procedures, trained staff and safe storage areas have all been much improved.

Key requirements for success

This section is divided into those factors that pertain to successful compliance with EUREPGAP by small-scale growers & primary marketing organisations and key factors for successful implementation of projects such as R8431 and R8271.

Key factors for small-scale growers and primary marketing organisations to attain EUREPGAP certification

- The farmer group must have access to an existing market to provide the income stream and incentive for investment in EUREPGAP compliance. The EU buyers must be flexible enough to allow sufficient time for implementation of the management and control system whilst still purchasing from the farmers as interrupting the market demoralises the farmers and makes investment difficult.
- Farm or group income must be sufficient to meet the initial and ongoing costs of implementing EUREPGAP, this income will be a function of crop value, available area, market size and stability, contractual stability and stability of the national economy. If the group is not financially viable it is extremely unlikely that donor intervention will lead to a financially viable system.
- Farmers and supporting personnel such as depot clerks and spray operators must have basic literacy and numeracy in order to cope with the written documentation associated with EUREPGAP.

- Individual farmers must be willing and able to make the technical and financial commitment to adoption and maintenance of EUREPGAP compliant systems.
- Farmers need to be organised into a legally recognised grouping such as a primary cooperative with definite management structure and operating rules.
- The PMO must be willing and able to make the technical and financial commitment to adoption and maintenance of EUREPGAP compliant systems, and must recognise the need for the PMO to take control of most of the QMS system, and be willing to support the individual growers.
- The PMO and the individual farmers must have access to sufficient staff, who either already have the capacity (and time) to be able to cope with the implementation process or the ability to successfully complete training programmes to upgrade necessary skills.
- The national supporting institutional framework must have the capacity to understand the requirements of EUREPGAP and have the ability to provide the necessary level of input supply, extension, training, auditing and laboratory services.
- Depot sites should be defined as "farms" and individual growers gardens as "blocks" within the depot farm, as this greatly reduces certification costs, and introduces an incentive for farmers to monitor neighbours activity as the certification audit targets 4-5 blocks from the group, if these pass the group passes, if one block fails the group fails.
- The farmer group and PMO need access to competitively priced and technically competent external auditing services for the certification audit, so that certification costs do not become an insurmountable barrier to accessing EUREPGAP compliant markets.

External donor support can be invaluable in assisting small-scale growers and exporters to meet the stringent requirements set by private standards such as EUREPGAP, but interventions need to be made wisely to ensure that the system is truly self sustaining and does not collapse when donor support is withdrawn. Projects should always ensure that they are supporting a commercially viable group, and interventions should be aimed at improving capacity of the various players to achieve the required standard or provide necessary support to the industry as members of the supporting institutional framework. Quick fixes involving reliance on short term training programmes by outside consultants, upgrading of laboratories without ongoing support and payments for infrastructure or certification costs without reference to commercial viability should be avoided at all costs.

Key factors for successful implementation of project R8431

- Integration of strategic research & development in the field Research is not a linear process, an iterative system is needed of ongoing research feeding back to development in field, with feedback from field guiding further research until a fully operational cost effective system is developed and implemented.
- Involvement of all parties in market chain from day 1 It is essential to work with farmers, processors, buyers & end-users to understand the technical,

economic & social issues for effective problem solving, rather than developing theoretical systems without reference to the future owners of the outcomes of the research.

- Multi-disciplinary partnerships There is a need for a wide ranging skill-base, to cover all the issues related to good agricultural practice, and thus players may include national & international research institutions, extension services p(public or private), training institutes, commercial partners, farmers, and farmer organisations.
- **Commercial approach** Technical feasibility is not enough, research ideas must make business sense, and be cost-effective and sustainable.
- **Private sector as driver for change** In commercial systems such as export horticulture, the private sector is clearly the driver for change and key players and owners of the research outcomes. Public and non-governmental institutions have a valuable and necessary role in providing support to the market chain in the form of training, extension support, system development, independent auditing and laboratory services.
- Integration into national system Project based approaches frequently end with the project, the R8431 approach was to integrate into existing national systems by working with national players and existing systems, and creating structures whose funding and rationale for existence is independent of the project.

Section D Outputs

The following is a very brief bulleted summary of the main outputs from R8431:

A refined cost effective modular management and control system for EUREPGAP compliant production and handling of fresh fruits and vegetables was developed, that includes a quality management system, quality manual, farmer manual, training & training material package, on-farm advice package, farmer profiling package, essential infrastructure package, system for risk assessment, farm inspection and internal auditing package, traceability & record keeping package and a system for division of management responsibility between farm, produce handling sites and PMO office. The system is complete in all respects and could readily be transferred to new groups of small-scale growers in countries other than Zambia & Uganda. However, implementation must always involve some modification of the material to suit the circumstances of grower scheme, type of product and local regulations and operating conditions. These modifications are also important for developing an understanding of the system rather than just trying to convince an auditor of compliance with a smoke screen of off the shelf paper documents.

In Uganda, the capacity of AMA to function as a service provider was strengthened through exposure to more appropriate training techniques and materials involving practical and visual approaches, and improvements to capacity in food safety and hygiene, record keeping and traceability, all aspects of crop protection products, farm profiling, risk assessment and formation of much closer links with farmer groups and primary marketing organisations.

In Zambia, LACCU and 10 small-scale growers at Buteko have demonstrated the capacity to meet the complex requirements of EUREPGAP. In an audit conducted in December 2005, LACCU scored 97% on applicable major musts and 95%

compliance for applicable minor musts. The scheme was let down by two noncompliances in the traceability system which can easily be rectified. There is no reason to doubt that LACCU could score 100% in the final certification audit scheduled for June 2006.

In Uganda, work with 2 export companies and 33 small-scale growers centred around two collection sites has shown that the basic infrastructure and agronomic practices required for EUREPGAP can be successfully applied by slash and burn cultivators without incurring high levels of costs as long as materials available on farm (such as wood, mud bricks & thatch) are used. The most expensive requirements for individual farm sites are metal plot markers and hand wash stations all costing ~£7 (20,000 Ugandan Shillings) per item, with most farm sites requiring 1 hand-wash and 1-4 markers depending on the number of fields. Crop protection and produce handling facilities need to be centralised with suitable facilities costing ~£2,500 per depot for construction if a purpose build depot building and separate CPP store is required. EUREPGAP compliant record keeping and quality management systems represent a much greater challenge which was still being addressed at the conclusion of project R8431.

Research under projects R7528, R8271 & R8431 has improved understanding of the key constraints to attaining compliance with sophisticated standards such as EUREPGAP by highlighting weaknesses at various points in the innovation system, these can be summarised as follows:

Production and marketing chain

- Lack of understanding of the workings of EUREPGAP
- Failure to understand the thinking behind EUREPGAP
- Lack of knowledge of cost effective and appropriate ways to attain EUREPGAP compliance
- Absence of close links between export companies, small-scale sector and supporting institutions (rectified in Zambia & Uganda by CPHP projects)
- Problems with access to information (in an understandable form) on EU regulatory and market requirements

Supporting institutional framework

- Lack of understanding of many of the EU regulations and private standards at government level (for example much confusion was found in Uganda over the mistaken belief that EUREPGAP is an EU regulation)
- Lack of knowledge of cost effective and appropriate ways to attain EUREPGAP compliance
- Some service providers are using information and training materials orientated almost exclusively to the needs of large-scale commercial growers which are inappropriate for use with small-scale growers. For example in Uganda many small-scale growers had been given information (translated into Lugandan) showing aspects of tractor boom spraying and operation of large commercial pesticide storage facilities. As these farmers use purely manual methods in forest clearings and only own 1-2 small containers of pesticide at any time, these materials were completely inappropriate
- Absence of close links between the small-scale sector and supporting institutions (rectified by CPHP projects)
- Problems with access to information (in an understandable form) on EU regulatory and market requirements

Standard owner (EUREPGAP & EU buyers)

- EUREPGAP claims to be a global partnership taking account of local needs via benchmarked local schemes such as Kenya-GAP, Chile-GAP and China-GAP. The development of the annex II quality management system checklist for group schemes has been advertised as being developed with small-scale growers in mind. However, there are clearly failings in this process as the annex II ISO compliant quality management system is too complex and demanding for implementation and maintenance by many SSG groups. There is clearly a need not only to involve institutions with experience of supporting small-holder groups, but also to answer the question as to whether a full ISO compliant document control system is really necessary in order to ensure either food safety or good agricultural practice.
- Lack of control of certification costs is a major weakness on the part of the standard owner. EUREPGAP operates a transparent and fair system of charges payable to the standard holder in Germany. However, the costs of individual certifying bodies are unregulated. Some certifying bodies provide transparent easily understood quotations with apparently fair pricing structures, while others are far from transparent and have upwardly flexible pricing especially if donor support is recognised by the certifier. Some local certifying bodies have offered quotes 1.5-4 times higher than EU based certifiers and this does not make sense. In these cases certification fees become an impossible barrier for small-scale growers who cannot meet the costs from income derived from fresh produce sales.
- Much interest has been shown in supporting the creation of certifying bodies in sub-Saharan Africa in the belief that improvements in local capacity will be beneficial in terms of reduced costs and improved understanding of local conditions. However, when project R8431 called in a well known Kenyan firm to conduct a pre-audit fro LACCU (Zambia) in September 2005, the Kenyan certify proved to be un-professional in their approach and the auditor lacked the necessary experience to conduct a EUREPGAP audit successfully. An independent assessment of the Kenyan auditor revealed 15 major items of poor practice that violated the ISO19,011 auditing standard and the firm failed to provide the necessary (contracted) report for LACCU. It was clear that this company would benefit from a mentoring scheme allowing for support from one of the more experienced firms that have an established track record of dealing with both EUREPGAP and small-scale schemes such as IMO or EFSIS.
- In the experience of projects R8271 & R8431 some buyers have shown understanding towards small-scale schemes but others have taken the more common approach of all or nothing demands with unrealistic arbitrary timescales that result in exclusion from the market place. Experience in Uganda has shown that loss of market results in poor morale among growers, economic problems and makes it difficult for growers to justify investment of time, effort and money in attaining EUREPGAP certification. There is a need for flexibility and understanding by EU buyers on time-scales for compliance with EUREPGAP which should be based on objectively verifiable time-bound action plans leading towards compliance. These action plans should be based on an understanding of actual risks associated with a given crop and individual actions should be prioritised accordingly.

Donor support

The major failing in donor support is a heavy reliance on short-term training programmes that often fail to include follow-up and technical support as integral parts of the programme and in some cases use different consultants for each part of the work leading to a fragmented approach. The key here is to invest in improving the capacity of local service providers and supporting external organisations to provide ongoing mentoring support over several years until suitable practices are firmly in place and sufficient experience gained for fully independent operations. This should not be considered as a purely north-south exercise. In project R8431, NRI provided north-south support, but NZTT (Zambia) support for project partners in Uganda was a good example of south-south collaboration and mentoring. Given the problems associated with some inexperienced auditors and auditing companies mentioned above, it is important to consider supporting mentoring programmes for certifying bodies

A. How the outputs have been made available to intended users? – In Zambia all outputs were developed in close collaboration with the end users and thus the quality management system, quality manual, training materials, manuals and plans for upgrading of farm and depot infrastructure were all provided to the users and implemented within the life of the project, and NZTT acted as the main supporting institution for the Zambian farmers. In Uganda most of the material was modified by AMA in collaboration with NZTT & NRI and transferred to the export companies and farmer groups during the life of the project. AMA have been the main institutional partner but with additional support from NZTT and NRI. The quality management system was only introduced into Zambia in September 2005 following the changes to the EUREPGAP protocol and required extensive modification and development to achieve practical implementation in time for the independent audit in December 2005. For this reason the QMS was not transferred to Uganda until January 2006, when NZTT and NRI felt that the system was ready for use in Uganda.

B. What further stages will be needed to develop, test and establish manufacture of a product by the relevant partners? – Following the successful independent internal audit in December 2005, LACCU registered with IMO (a EUREPGAP approved certifying body) in Switzerland for EUREPGAP external certification to take place at the end of June or early July 2006. This timescale was necessary as the rules of EUREPGAP state that the farmer scheme must be registered (with EUREPGAP) and have at least 3 months worth of compliant harvest records available before an audit takes place. The 2005 babycorn season was complete in December 2005 and the new season will not commence until February 2006 with harvesting beginning late March to early April 2006 thus allowing for certification to occur at the end of June or early July 2006 for farmers at Buteko cooperative and possibly for farmers at Makeni and Lusaka South cooperatives if their depots can be upgraded in time. The remaining four cooperatives require more time for upgrading of depots and introduction of systems at the individual farm sites and thus will not be ready for certification until the last quarter of the 2006 season.

The Ugandan farmer groups and export companies supported by AMA have made good progress towards implementation of EUREPGAP but have had much less time than the Zambian group for uptake and have not yet had opportunity to deal with the quality management system as development and validation of this part of the management and control system (in Zambia) was not completed until December 2005. The next step for the Ugandan partners is to meet with NZTT and NRI to assess progress and plan for the next stage of the work going beyond the life of the CPHP project. This is likely to involve conducting a full internal audit using an independent external auditor to itemise the current level of compliance and itemise the measures necessary to complete introduction of the Zambian system. Once realistic time-scales have been agreed it should be possible to revise the current implementation plans and register with a certification body such as IMO in readiness for certification audits in the latter part of 2006.

From the NRI perspective the next stage of the work within the EU is to provide a system designed to meet the needs of farmers and exporters wishing to supply markets that only require proof of compliance with the legal minima specified under the new EU harmonised regulatory framework of SPS measures. In addition NRI is working on the policy level implications of the work at both national (UK) and European Commission level, this is of especial concern as concern has been raised by a group of developing countries at the WTO over the legality of EUREPGAP under criteria specified under Article 13 of the WTO administered SPS agreement.

C. How and by whom, will the further stages be carried out and paid for? – Broadly speaking the same partners will continue to work together in this area. In Zambia, LACCU, NZTT & NRI have funding from PIP to continue work on EUREPGAP and LACCU and NZTT have funds to support additional cooperatives provided by USAID. In Uganda, AMA and the Ugandan exporters and farmer groups have support from PIP for continued work with external service inputs by NRI and NZTT. For the work on policy implications NRI has entered into partnership with the International Institute for Environmental Development (IIED) and DFID with DFID acting as both a donor and a partner in work aimed at minimising the adverse impacts of standards on market access for African/developing country producers and exporters of fresh fruits and vegetables. This work focuses on supporting dialogue with the standard owners, provision of information (impact of standards & cost-benefit analysis) and promoting good practice (promotion of strategies for implementation of standards by small-scale growers to key players such as EU standard holders and regulators).

D. Have they developed plans to undertake this work? If yes, what are they? If **not**, why? – The various partners' plans for further work with details of sources of funding have been described in parts "B" & "C" of section D above.

Section E Purpose

The purpose of this project was a general one provided by CPHP management and stated as "New knowledge is generated and promoted into how national innovation systems can be mobilised to sustain uptake and adoption of CPH knowledge for the benefit of the poor".

In addition at the time of proposal development (August 2004) the CPHP call for concept notes categorised project R8431 as coming under research theme 3 which was stated as "Matching CPHP information to demands of intermediary organisations with specific focus on synthesis, up-scaling and promotion of proven research outputs in appropriate formats to identified intermediary organisations outside the location where the knowledge was originally generated". Project R8431 was developed to address this theme and contribute towards the purpose by taking forwards the successful outcomes from project R8271.

Overall the project was highly successful in developing and implementing a refined version of the EUREPGAP compliant management and control system started under project R8271. This system has been successfully adopted by Zambian small-scale growers working through LACCU. These growers attained compliance scores of 97 and 95% respectively for major and minor musts in an independent audit in December 2005. NZTT has become closely integrated with LACCU and Crop-Serve a local

agrochemical supplier have taken on the role of repackaging chemicals in smaller containers, maintaining stocks, providing technical advice and disposing of empty containers for the LACCU depot sites. This service will apply to all crops which is an important step forwards in making the supporting institutional framework work for the benefit of the growers.

In 2006, the Zambian developed management system was transferred to Uganda in an exercise involving a Ugandan private sector service provider, two export companies and two groups of small-scale growers involved in growing crops for export to Europe. This exercise was highly successful not only in terms of demonstrating that the management system could be readily adapted to work under the different conditions found in Uganda, but also it provided an excellent example of cross regional south-south collaboration on the transfer of knowledge with exchange visits and joint training activities integrated into the work programme. The Ugandan organisations and farmers benefited from visiting Zambia as they were able to see the advantages gained from organising farmers into commercial cooperatives, farmer approaches for dealing with EUREPGAP and to gain first hand experience of the best features of NZTT as a key service provider to the Zambian industry. AMA have taken advantage of this in adopting features of the NZTT approach to forming much closer partnerships with the private sector companies and farmer groups.

LACCU is continuing its programme for EUREPGAP compliance beyond the end of project R8431 via funding from the PIP and USAID. Both companies in Uganda have PIP action plans that will enable the EUREPGAP compliance work to continue, NRI, NZTT and AMA are PIP service providers so the Ugandan work should continue. However, for wider impact it will be necessary to seek funding to introduce more local service providers to the new management system and improved training and extension practices so as to cover a wider range of export companies and small-scale farmer groups. Funding to support a service provider mentoring programme would be a great advantage for building up capacity for long term sustainability.

Section F Goal

The project goal specified by the CPHP was stated as "National and international crop post-harvest innovation systems respond more effectively to the needs of the poor". In the context of export horticulture the innovation system can be divided into four parts, namely:

- Production and marketing chain
- Supporting institutional framework
- Standard owners & EU buyers
- External donor support

These four parts are obviously closely inter-related as the production chain cannot operate effectively in the absence of a properly organised institutional framework and the EU buyers and standard owners (such as EUREPGAP and the European Commission) have control over content of the standards, flexibility in terms of timescales for compliance and interpretation of the standards to ensure equivalence of system or equivalence of risk outcome. External donor support has the potential to assist the most vulnerable players within the innovation system to cope with changes in market requirements but most of the major donor initiatives are focussing on short term fixes such as un-supported training programmes or getting model groups of growers certified without adequate consideration of issues of commercial sustainability rather than addressing the real issues of longer-term appropriate support for the national innovation system and ways to have a positive influence on the thinking of the standard owners and EU buyers. At the start of the project changes in EU regulations and private sector standards were identified as the major threat facing small-scale growers wishing to export fresh produce to the European Union, EUREPGAP compliance was singled out as the most important barrier to continued market access for many SSG's but it was also recognised that the introduction of the new EU harmonised regulatory framework for SPS measures would have a significant impact on all growers regardless of their target market within the EU. Research under R8271 highlighted some of the weaknesses present in the national innovation system of Zambia that impacted adversely on small-scale growers' chances of meeting the requirements of EUREPGAP. Project R8431 found similar problems in Uganda with the added problem that all aspects of the export horticulture innovation system were less developed than in Zambia making it more difficult to successfully transfer systems and concepts developed in Zambia to Uganda. In addition weaknesses in the approach taken by standard owners, EU buyers and donors were more fully explored.

As a direct result of the intervention under R8431, the production and marketing chain and supporting institutions in both countries have become much more closely linked. especially in the small-scale sector. Cost effective and appropriate management systems and procedures for SSG's to attain EUREPGAP have been developed and validated, and material has been converted into an easily understandable form and linked to a novel system for peer education that ensures more effective uptake of training messages in the field. The successful outcomes of project R8431 have proved successful in dealing with some of the wider issues behind the failure of the national innovation systems in Zambia and Uganda to meet the challenge of EUREPGAP, and a start has been made on bringing the wider issues of standard owners, buyers and donors to the attention of both UK and EU government officials via participation by NRI in discussion meetings convened by both DFID in London and DG-SANCO and DG-Trade in Brussels. In these meetings practical experience from projects R7528, R8271 and R8431 has proved invaluable for illustrating arguments over these issues. DFID has commissioned a policy level project involving NRI to look more closely at these issues, and NRI has contributed towards the inclusion of standards compliance in the 3rd white paper on international development (under development in January 2006). The European Commission convened a meeting between public and private sector players in December 2005 for initial discussion of these issues, and NRI was invited to make a presentation on practical experiences including those derived from CPHP funded research.

Section G Project effectiveness

This section of the evaluation report uses the rating criteria for the purpose and your outputs previously used in your annual reports.

	Rating
Project Goal	Х
Project Purpose	2
Project Output 1.	1
Project Output 2.	2
Project Output 3.	1

- 1= completely achieved
- 2= largely achieved
- 3= partially achieved
- 4= achieved only to a very limited extent
- X= too early to judge the extent of achievement (avoid using this rating for purpose and outputs)

Section H – Uptake and Impact

Organisational Uptake

- NZTT in Zambia have adopted the systems and concepts developed under projects R7528, R8271 & R8431 for use in all their activities teaching and training activities for the wider horticultural industry in Zambia.
- NZTT have adapted the farmer to farmer training technique for use in their schools outreach programme whereby young people from local schools have an opportunity to grow cabbages under commercial conditions and receive practical training on key issues such as food safety and hygiene that are essential for the commercial horticultural industry and also directly relevant to everyday life. The scheme is ongoing but has already involved ~500 students from local schools.
- In Zambia, USAID has expressed interest in supporting the wider implementation of the EUREPGAP compatible management system by the other 7 primary cooperatives within the LACCU scheme with potential for initial impact on 500 SSG's. If successful this work could be extended to schemes operating around Kitwe that have expressed interest in high value vegetable production for high-value local and regional markets.
- In Zambia, Zimbabwe, Ghana and India institutions involved in the CPHP funded project on informally vended foods (R8433) have adopted the farmer to farmer training approach for vendor to vendor training in street marketing of informally vended food. The modular approach for development of food safety management and control systems initiated under projects R8271 & R8431 has been adopted by the R8433 coalition as the basis for developing a system for food safety management of informally vended food that has potential to feed into national food control systems and impact on several million vendors operating in the project countries.
- AMA in Uganda have adopted the systems and concepts developed under the CPHP funded horticulture projects and have started to use them in their work on other donor funded initiatives in Uganda.
- As part of their work with the EU-COLEACP funded Pesticide Initiative Programme (PIP), NRI have applied techniques and concepts derived from the CPHP funded work for PIP interventions in Uganda and Ghana involving ~800 SSG's feeding into 4 export companies in two countries.

End user uptake

With the demise of Agriflora in mid 2004, operations by the Zambian small-scale growers around Lusaka have been quite disrupted with some loss of confidence in production for the export market. However, LACCU working with York Farms have maintained operations and Buteko depot with 10 small-scale growers are ready for certification within three months of start of harvesting during the next production season (Certification target date is June 2006). Having completed a successful internal/pre-audit in December 2005, LACCU have registered the depot and farmers for certification by IMO a Swiss based certification firm. Some 4 other growers are ready for certification at Makeni but their depot site is non-functional. Working with USAID, LACCU is planning to build on the success of the small group of farmers at Buteko and extend EUREPGAP to all 8

cooperatives in the second half of 2006 thus potentially impacting on ${\sim}500$ small-scale farmers.

- Twenty farmer members of the Awaggwa Ekku Cooperative Society Limited in Mpigi District, Uganda exporting via Jaksons Farms (Uganda) Limited have signed commitments to comply with the criteria specified in the EUREPGAP protocol, a further 20 farmers are on a waiting list to become involved and most of the remainder of the 85 members of the cooperative have expressed positive interest in becoming involved although a small number have reported that they cannot see the point of EUREPGAP.
- Thirteen farmers in Kangulumira, Mukono District, Uganda have formed a legally registered cooperative society (Kamazi Farmers Cooperative Society Limited) and signed commitments in order to access a EUREPGAP compliant export market via AMFRI Farms (Uganda) Limited. Some fifteen other farmers have attended awareness meetings but have not yet made definite commitments to EUREPGAP.
- Jaksons Farms (Uganda) Limited have adopted EUREPGAP as a result of requests from two European buyers to demonstrate compliance and have been very enthusiastic in pushing forwards with upgrading their produce collection depot and centralised CPP spray facilities. A dedicated clerk has been employed to maintain EUREPGAP compliant records, and two dedicated spray operatives have been employed and trained to the required standard by staff from NZTT in Zambia. Training programmes have been initiated with AMA & NZTT as part of the CPHP project covering all members of the scheme. Although Jaksons is working with 85 growers most of whom are enthusiastic for EUREPGAP they have decided on a phased approach for introduction in batches of 20. Participation is voluntary but with 40 requests to become EUREPGAP compliant there has been no shortage of interest from the farmers' side.
- AMFRI Farms (Uganda) Limited lost access to one of their conventional markets (AMFRI has substantial organic markets that are unaffected by requests for EUREPGAP and involve growers that are geographically separated from their conventional counterparts by a distance of ~60km) in early 2005 and thus had a powerful incentive to push forwards with getting EUREPGAP certification for all their conventional operations. AMFRI have established 23 hectares of conventional production within a 130 hectare conventional main farm site at Kyampisi (~20km west of Luwero) which is being developed as a EUREPGAP compliant operation from first principles. They are also supporting the Kamazi Farmers Cooperative Society Limited at Kangulumira and have put in place a dedicated clerk for the smallscale operations and centralised produce handling and CPP facilities at a site in Kangulumira town. AMFRI are supporting the small-scale growers on the understanding that they will become self-sustaining within an 18 month period.

Knowledge

New Knowledge includes:

- Refined modular management and control system for EUREPGAP compliant production and handling of fresh fruits and vegetables, including a quality management system, quality manual, farmer manual, training & training material package, on-farm advice package, farmer profiling package, essential infrastructure package, system for risk assessment, farm inspection and internal auditing package, traceability & record keeping package and a system for division of management responsibility between farm, produce handling sites and PMO office;
- Improved knowledge and understanding of training and extension skills amongst AMA and NZTT personnel especially regarding SSG friendly techniques using visual and practical approaches;
- Improved knowledge of food safety and hygiene, record keeping, traceability and all aspects of CPP among Ugandan service providers, farmers and export companies involved in project R8431;
- Improved knowledge and understanding of ISO compatible QMS and QM systems among managerial personnel within LACCU;
- Improved knowledge and practical experience among NZTT and LACCU staff and individual farmers in Zambia of external audits to EUREPGAP standard under option 2 of the protocol including organisation, preparation and handling of questions by a EUREPGAP auditor, staff at NZTT have gained valuable experience of auditing techniques;
- Personnel at Jaksons, AMFRI and AMA are equipped to conduct farm profiles, prepare risk assessments of new and existing farm sites and prepare and implement action plans for adoption of EUREPGAP;
- Zambian SSG's supplying to LACCU have a complete understanding of the requirements for EUREPGAP and have demonstrated the ability (through external audit) to meet these highly demanding professional criteria;
- Ugandan SSG's supplying AMFRI & Jaksons have gained a greatly improved understanding of basic agronomy and modern professional farming techniques adapted to meet the needs of slash and burn cultivation systems. Growers have successfully put in place the basic infrastructural requirements for implementation of the EUREPGAP protocol.

Institutional

Successful implementation of option 2 (group certification) of EUREPGAP by SSG's requires strong team-work within the farmer group and an institutional framework equipped with the necessary skills to support implementation and maintenance of EUREPGAP. In Zambia, outcomes from projects R8431 and R8271 helped to empower the SSG's to create a second tier cooperative (LACCU) that evolved into a primary marketing organisation capable of negotiating with buyers and managing the EUREPGAP implementation process. During 2005, the LACCU management team have risen to the challenge of implementing and maintaining the complex ISO based quality management system (QMS) specified in the new (September 2005) annex II checklist of EUREPGAP. In Uganda both farmer groups have become organised into legally registered cooperative societies as part of the outcomes of R8431, and

have established personnel for centralised record keeping and handling of CPP. Individual farmers have signed a commitment to compliance with EUREPGAP and are now operating to a common set of procedures and work instructions (a major step forward for SSG's in Uganda).

The supporting institutional framework in Zambia for extension advice and training was already highly developed in the form of NZTT, during the year the capacity of NZTT staff has been further enhanced through exposure to travelling and working in a third country under unfamiliar conditions. Crop-Serve (Zambia) have agreed to provide a chemical selection, repackaging and container disposal service for the SSG's using the centralised depot facilities established under the EUREPGAP scheme. In Uganda private service providers were already working to support the export horticulture industry, but thanks to links made between NZTT and AMA, and exchange visits by Zambian and Ugandan personnel, AMA has been exposed to new and more effective approaches and techniques for provision of extension and advice and training programmes for the SSG sector.

Policy

In Zambia and Uganda, the commercial policies of the export companies remain positive towards sourcing from SSG suppliers. Jaksons Farms (Uganda) Limited especially, have shown an increased level of practical commitment on the ground associated directly with the need to implement EUREPGAP as a result of revised requirements from European buyers that became apparent in March 2005. During the year EU policy makers and regulators have become concerned that EU private sector standards could represent an unjustified barrier to trade having most impact on developing countries and less well resourced suppliers (SSG's & smaller exporters) within those countries. In December 2005, Dr Graffham of NRI was invited to an internal meeting of the European Commission in Brussels (attended by key Directorate Generals and private sector standard owners) to make a presentation on the impact of private sector standards and EU regulatory requirements on African suppliers of fresh fruits and vegetables. This presentation drew heavily on the experience from Zambia, Uganda and Zimbabwe gained under R8271 & R8431. Governmental concern over potential negative impacts of private sector standards is being driven by several factors. Developing countries have raised concerns over EUREPGAP and asserted that the EU has responsibility for regulating private standards under Article 13 of the SPS agreement administered by the World Trade Organisation (WTO). This could become more of an issue in the light of outcomes from the Hong Kong round of WTO trade negotiations held in December 2005. In addition some countries have started to offer compliance with EU private standards as part of official control systems. If recognised this brings the private standard within the remit of the EU's Food and Veterinary Office (FVO). The outcomes from projects R8431 and R8271 offer practical systems to minimise the negative impact of EUREPGAP on SSG's and offers pointers for the development of alternative simplified management and control systems to meet the needs of growers and exporters who simply require minimal legal compliance with current and future EU regulations rather than full implementation of EUREPGAP.

Poverty and livelihoods

As previously reported (Graffham, *et al.*, 2004) according to LACCU implementation of EUREPGAP by Zambian SSG's resulted in improved incomes due to an increase in output per unit area of crop deriving from implementation of good agricultural practices specified in the EUREPGAP criteria and this situation has continued to pertain during 2005. LACCU and individual growers have been able to identify improvements by comparing production and harvesting records from before and after implementation of EUREPGAP. In Uganda it is evident that implementation of proper

planting programmes, crop husbandry (especially seed selection & destruction of diseased stock), correct selection and application of CPP, introduction of organic manures and mulches and improved post-harvest handling practices will lead to increased yields of exportable crop. However, it is too early in most cases to obtain reliable data and the issue is further complicated by the fact that farmers kept no records (or no usable records) prior to the start of R8431 and thus it will be impossible to make direct quantitative comparisons between old and new practices. Some data will be able to be derived from the records of the export companies and qualitative perceptions of individual growers.

Environment

EUREPGAP is a sophisticated protocol for good agricultural practice and thus implementation of the control points will help preserve the environment by ensuring correct storage, application and disposal of CPP, agronomic practices that help to prevent erosion and maintain soil fertility, good field hygiene, correct disposal of waste products, efficient use of water for irrigation, crop rotation and adoption of practices that encourage natural predators of plant pests and thus reduce reliance on chemical pesticides. Independent audits of 10 farms and 1 depot site in Zambia in September and December 2005 showed that LACCU farmers involved in the project are meeting all the environmental criteria specified under EUREPGAP. This is a big change from the situation pertaining when the original baseline surveys of farm sites were conducted under the previous project (R8271) in October 2003 thus making the Zambian farming operations more environmentally sustainable. An assessment of Ugandan SSG's supplying produce to Jaksons Farms and AMFRI Farms showed that the Ugandan SSG's were not informed of virtually any aspect of good agricultural practice. Examples of poor practice with implications for the environment included random planting on steep slopes thus encouraging erosion, improper selection, storage, application and disposal of CPP, absence of crop husbandry resulting in encouragement of the spread of plant diseases and no attempt to use organic fertilisers and mulches to maintain soil fertility and reduce water loss. Assessments in August and September 2005 showed that many farmers were beginning to adopt improved practices in line with the EUREPGAP criteria. Particularly encouraging was the introduction of planting in rows and the use of parallel ridges on steep slopes to reduce erosion, creation of chemical soakaways and disposal pits at the farm sites and planting of spray barriers in a few cases. Jaksons and AMFRI had both made investment in construction of centralised facilities for safe storage of CPP and spraying equipment. Following the practical course for Ugandan farmers and service providers on CPP in October 2005 there was encouraging evidence of improved understanding of CPP issues by farmers and willingness to adopt improved techniques.

Date: 15th January 2006

Core Partners:	Mr A. Shivji (Amfri Farms Limited)
	Mr F. Kato (Awaggwa Ekku Growers Cooperative Society Ltd)
	Mr J. Kavuma (Jaksons Farms Limited)
	Mr S. Sserunjoji (Kamazi Farmers Cooperative Society Ltd)
	Mr D. Moyo (LACCU)
	Dr R. Zulu (NISIR)
Managing Partners:	Dr A. Graffham (NRI)

Mr R. Bush (NZTT) Mr F. Ssango (AMA)

ANNEX 1: Project Logical Framework

Narrative	Objectively	Means of	Risks
Summary	Verifiable	Verification	
	Indicators		
Goal			
National and international crop-post harvest innovation systems respond more effectively to the needs of the poor.	By 2005, a replicable range of different institutional arrangements which effectively and sustainably improve access to post-harvest knowledge and/or stimulate post-harvest innovation to benefit the poor have been validated in four regions.	Project evaluation reports. Regional Coordinators' Annual Reports. CPHP Annual Reports. CPHP Review 2005. Partners' reports.	National and international crop-post harvest systems have the capacity to respond to and integrate an increased range of research outputs during and after programme completion. National and international delivery systems deliver a range of services relevant to poor people in both focus and non-focus countries. Livelihood analysis provides accurate identification of researchable constraints or opportunities that lead to poverty reduction.
Purpose			
New knowledge is generated and promoted into how national innovation systems can be mobilised to sustain uptake and adoption of CPH knowledge for the benefit of the poor.	 By 2006, evidence- based strategies on how to facilitate the exchange of knowledge/information between supplies and users documented within >2 regions, and disseminated to intermediary organisation in four regions. By 2006, CPHP outputs under all five research themes demonstrate self- sustaining extension and impact on a wider scale in >2 regions each. By 2006, evidence- based insights on how research innovations can be introduced sustainably into local knowledge systems are disseminated to intermediary organisations in 4 regions. By 2006, thematic synthesis of CPHP's technical outputs are disseminated to intermediary organisations in 4 regions. 	 Independent evaluation of data from Uganda and Zambia collected before and after the introduction of CPHP research outcomes to assess if institutional framework has responded positively with changed approaches to research. Independent evaluation to see if research outcomes have been integrated into ongoing programmes of activity of supporting institutions and end users to determine if apparent uptake is limited to life of project or represents a genuine change in approach. Independent evaluation by an innovations system expert to extract the insights and lessons learned from the CPHP research projects on export horticulture on successes and failures in integrating research outcomes into national systems. Assessment of dissemination of standard packages as determined by records of access and downloads from the NRI horticulture and AMA web- pages. 	 1.0 Fresh fruits and vegetables for export to the EU have offered a lucrative livelihood opportunity for SSG's in LDC's for nearly 25 years, but recent developments in EU regulations and private sector standards have already caused exclusions and placed a strain on systems such as that found in Uganda that rely heavily on SSG's. There are indications that the European Commission is planning to further strengthen existing legislation for all foods and food ingredients traded within the EU (includes imports), full vertical and horizontal traceability to plot level is likely to become mandatory within 2 years, and the EC has already published regulations on requirements for equivalence of national food safety and hygiene in food production that have disturbing implications for all countries but especially for LDC's. If these developments are carried through to their logical conclusion most SSG's will be excluded from access to EU markets by 2008, and many countries will

	5. By 2006, databases of partners and organisations involved in, and processes involved in management of innovation and knowledge by the CPHP are made available to intermediary organisation in 4 regions.	5. Compilation by CPHP of data of networks developed during the horticulture projects, and processes in management of innovation and knowledge with details confirmed by current managing partners.	that they have a national food control system equivalent to that of the EU.
Outputs			
1.0 Standard modular packages on management systems, training approaches and supporting frameworks for access by small-scale growers to export horticultural markets developed, and mechanisms for wider dissemination of knowledge via Pesticide Initiative Programme (PIP) and Crop Life International (CLI) explored.	Copies of packages (listed below by activity number) prepared and dispersed to stakeholders as follows: 1.1 paper format = 50 copies, CD = 250 copies, plus webpage access dispersal to growers, PMO's and supporting institutions in Zambia and Uganda complete by Oct 05; 1.2 paper format = 500 copies plus webpage access and article for Euro Fruit magazine, dispersal to growers, PMO's and supporting institutions in Zambia and Uganda complete by Feb 05; 1.3 paper format = 100 copies, plus webpage access, dispersal to PMO's and supporting institutions in Zambia and Uganda complete Mar 05; 1.4 paper format = 50 copies plus webpage access, dispersal to supporting institutions in Zambia and Uganda complete Mar 05; 1.5 Set of eleven different training packages, paper format 500 copies each giving total 5,500 copies, plus webpage access, dispersal to growers, PMO's and supporting institutions in Zambia and Uganda complete by Apr 05. 1.6 100 copies of training film with manual dispersed to PMO's and supporting institutions in Zambia and Uganda complete by Apr 05. 1.7 Copies of quarterly electronic newsletter available in Mar, Jun, Sep and Nov 05 respectively.	1.0 Copies of all packages and materials generated under output 1(1.1-1.7) made available to CPHP with nearest quarter report following the dispersal date given in the output OVI column.	 1.0 There are no factors outside the control of the project that are likely to prevent the packaging and dissemination of packages under activities 1.1-1.6. 1.1 Wider dispersal through integration of project outcomes with CLI and PIP as envisaged under activity 1.7 will depend on how well the outcomes of the CPHP funded project fit into the work plans of CLI and PIP and the willingness of these programmes to assist in dispersal of this material. 1.2 It is also fair to say that uptake of ideas will depend on the willingness of stakeholders to adopt new ideas and approaches, activity under output 2.0 will help to promote the ideas on management systems and supporting frameworks but the final choice rests with the stakeholders and thus is beyond the control of the project team.

2.0 Potential for transfer (with modifications) of small-scale grower management systems, training approaches and improved institutional framework from Zambia to Uganda assessed.	2.1 Re-evaluation (Oct 05) of the baseline data on status of SSG's and supporting framework in Uganda indicates a positive change towards improved systems. Internal audits (2.2) will cover changes in the standards of the SSG's, changes among the service providers will be evaluated on the basis of successful uptake of modified versions of the standard packages developed in Zambia, where assessment of the modifications is used to gauge understanding and commitment to the new approaches.	2.1 Re-evaluation report (available in Nov 05) in comparison to original baseline survey report and reports from the inception workshop and initial awareness meetings with farmers.	2.1 SSG's in Uganda have comparatively little experience of group marketing when compared to Zambian who often form cooperatives to grow traditional crops for local markets, this could slow down adoption as a change of thinking is required.
	2.2 Internal audits in Uganda of two groups of SSG's of ~30 farmers per group with one group heading towards EUREPGAP and the other towards the legal minimum for continued access to EU wholesale markets have reached or are close to reaching the required standard by Nov 2005.	2.2 Internal audit reports for SSG's linked to AMFRI (aim = EUREPGAP) and Jaksons (aim = regulatory compliance for continued access to wholesale markets).	2.2 Private sector companies in Uganda decide that increasingly strict EU regulations and standards make SSG's unattractive and switch to smaller numbers of larger commercial farms. Some exporters in Uganda are already doing this, but it is hoped that the project outcomes will show that cost effective management systems can be developed to allow companies to continue to work with SSG's.
	2.3 A minimum of 50 grower members of four first level cooperatives (Makeni, Lilayi, Lusaka South & Buteko) under LACCU in Zambia attain EUREPGAP certification under option 2 by August 2005.	2.3 External auditors report, and detailed internal audit report and copy of EUREPGAP certificate for LACCU as PMO with at least 50 individual growers listed by name, location and plot size on page 2 of the EUREPGAP option 2 certificate.	2.3 LACCU's exporter is unable to continue trading for reasons that cannot be foreseen by the project team.
3.0 Project coalition managed effectively to ensure timely delivery of all project outputs.	 3.1 All sub-contracts signed and first advance of funds completed by first week of Feb 2005. 3.2 Reconciliations of advances made by Mar 10, Jun 10, Sep 10 with satisfactory completion of activities to allow for 	 3.1 Signed copies of sub- contracts received by all partners. 3.2 Copies of reconciliations available with requests for next advance, backed by satisfactory written reports 	3.1 – 3.4 Output 3 is a project management output as such is not directly linked to delivery of the project purpose.
	 smooth advance of further funding. 3.3 Project final report and project completion summary sheet sent to programme by 20th 	and copies of relevant materials (such as raw data, attendance registers, photographs etc) to demonstrate satisfactory completion of activities. 3.3 Copies of PFR and PCSS available by December 15 th 2005.	
	project completion summary sheet sent to programme by 20 th December 2005 to ensure	PCSS available by December 15 th 2005.	

	timely release of final payment of funds. 3.4 Quarterly reports from national managing partners received with copies of technical reports relevant to each quarter, by 10 th March, 10 th June and 10 th September respectively.	3.4 Copies of quarterly reports backed with technical reports and materials as described under 3.2 available to managing partners by dates specified under output OVI 3.4.	
Activities	Activity Milestones – derived from output level OVI's		
1.1 Creation of a resource package of information for access by growers, PMO's and supporting institutions involved in horticultural exports to EU markets.	1.1.1 Information package available in each of partner countries, copies to be kept by NZTT, ZEGA, LACCU, AMA, AMFRI, Jaksons, CPAU & NRI (end Q4 – January 2006)	1.1 Copies of resource information package containing details of legal and market requirements and other useful information available in paper and electronic formats by Oct 05. Information will also be provided on ways to obtain updates (post CPHP)	No perceived external risks for activity 1.1, but it is fair to say that the limited amount of time available for this project mean that any unexpected problems such as national power shortages or disruption of export markets would have a serious impact on ability to complete the activities in time.
1.2 Creation of an awareness package on regulatory and market requirements for access to different types of EU markets.	1.2.1 Awareness package on regulations and standards prepared and issued to small-scale farmers via project briefing meetings in February 2005.	1.2 Copies of awareness package on regulatory and private sector standard requirements for access to EU markets available by Feb 05.	No perceived external risks.
1.3 Creation of a modular awareness and training package dealing with management systems for small-scale growers and PMO's.	1.3.1 Awareness package on management systems for SSG's, initial version (based on Zambia experience) issued to managers of SSG groups at project briefing meeting in Kampala in February 2005.	1.3 Copies of training package dealing with management systems for small-scale growers available Feb 05.	No perceived external risks.
1.4 Creation of a modular awareness and training package dealing with key requirements for, and ways to improve institutional frameworks for supporting the development of an export horticulture industry.	1.4.1 Awareness package on requirements for an extension service to support SSG exporters. Outline issued at briefing meetings in February 2005, final package released in October 2005.	1.4 Copies of initial version of training package taking account of Zambian and Zimbabwean experience available Feb 05, and final revised version incorporating Ugandan experience available Oct 05.	No perceived external risks.
1.5 Creation of a set of awareness, training and information support packages for use for service providers, growers and PMO's to enable systems for food safety and quality management to be introduced that provide equivalence of risk outcome for regulatory requirements and equivalence of system in the case of EUREPGAP.	1.5.1 Training packages for: Training of Trainers (Training skills), Training of extension staff, farmer training packs, working with and adapting training packages to local conditions (final versions available end Q4 – January 2006).	1.5 Copies of all training packages with supporting materials available by Apr 05.	No perceived external risks.

1.6 Preparation of a suite of short awareness and training videos on key aspects and issues for access to export horticultural markets.	1.6.1-1.6.2 Training film (30 minutes duration) showing 10 problem areas commonly associated with "safe food" production in the SSG sector and local solutions to these problems (complete by end of Q3 – October 2005).	1.6 Copies of training film available on disc in CD, VCD and DVD format and printed guide for trainers available by Oct 05.	No perceived external risks.
1.7 Development of enhanced links with PIP and CLI to explore potential for much wider dissemination of the packages developed in activities 1.1-1.6 and approaches for management of small- scale growers and improving effectiveness of institutional frameworks.	 1.7.1 Quarterly briefings of wider stakeholder community via electronic newsletter with general access via the horticulture webpage on the NRI website (also available on AMA site) running for life of project completing January 2006. 1.7.2 Development of uptake pathways for wider dissemination of project outcomes via CLI and PIP (complete by end of Q4 – January 2006). 	1.7 Copies of quarterly newsletter available via direct access to NRI horticulture webpage, starting in Mar 05. Copies of reports of discussions held with PIP and CLI available by Sep 05.	No perceived external risks.
2.1 Review of approaches to management of small- scale growers, training approaches and supporting institutional frameworks using case- studies from sub-Saharan Africa.	 2.1.1 Zambian team and NRI visit Uganda for project inception meeting in February 2005, and to visit Ugandan project sites to evaluate current conditions. 2.1.2 Evaluation of local support and extension services available in Uganda 2.1.1 – 2.1.2 complete by end of Q1 (April 2005). 	2.1 Copies of visit programme and report of visit with evaluation of Zambian situation available Mar 05.	No perceived external risks.
2.2 Assessment of current status and needs analysis of the export horticulture sector in Uganda to cover both producers/exporters and the supporting institutional framework.	 2.2.1 Training (in Uganda) of local staff to conduct baseline survey and supervision of initial work, 4 staff per company, minimum of 2 staff from independent service provider. 2.2.2 Baseline survey carried out, approximately 30 farmers (2 groups) per exporter. 2.2.3 Needs assessment of current situation with reference to requirements of chosen market outlet. 2.2.1 – 2.2.3 complete by end of Q1 (April 2005). 2.2.4 Action plan developed to meet needs identified in 2.2.3 2.2.5 Zambian team leaders trained for region wide support so as to replace current expatriate leader and improve sustainability of training and support systems 	2.2 Workshop programme, attendance register, report of farm and system profiling workshop to include workshop evaluation available by Mar 05, copies of survey reports by Apr 05, needs assessment report and farmer profiles by May 05 and copies of farm action plans by May 05.	No perceived external risks.

	2.2.4 – 2.2.5 complete by end of Q2 (July 2005).		
2.3 awareness creation on regulatory and market requirements for access to different types of EU markets.	 2.3.1 Open meeting for farmers and exporters in Uganda dealing with regulatory and market standards for access to EU markets. 2.3.2 Training for local service providers to provide ongoing awareness creation for Ugandan fresh produce export sector, one day briefing, one day supervised delivery to exporters / farmer groups. 2.3.3 Planning meetings with partner exporters to agree practical approach to project activities, organisation, management, monitoring and service provision agreed (one day per exporter). 2.3.1 – 2.3.3 complete by end of Q1 (April 2005). 	2.3 Attendance registers and report on awareness creation on regulatory and market requirements by Mar 05, and copies of agreed structures for management, monitoring and service provision agreed.	No perceived external risks.
2.4 Visit to Lusaka by representatives of Ugandan farmers groups, export companies, service providers and agrochemical association that are partners in the project to see the Zambian institutional framework, EUREPGAP small-scale management system and to exchange experiences with the Zambian team (especially commercial growers from LACCU & training and extension staff).	 2.4.1 5 day visit to see 2.a.1 5 day visit to see 2.ambian fresh produce export sector and support services and to meet peers in the sector 2.4.2 Evaluation of Zambian situation and lessons for transfer to Uganda, reference to extension services, training for farmers, mechanisms used to monitor adoption of procedures and practices at farm sites. 2.4.1 – 2.4.2 complete by end of Q2 (July 2005). 	2.4 Report of visit by Ugandan team to Zambia and report of evaluation of Zambian situation with analysis of lessons for transfer to Uganda available by Jul 05.	No perceived external risks.
2.5 Initial training activities for Ugandan personnel by Zambian personnel using packages developed under activities 1.3-1.5.	 2.5.1 Training of Ugandan extension and training staff and supervision of the pilot delivery of training, food safety (10 days), use of pesticides (10 days) 2.5.2 Evaluation of current local system and use and adaptation of existing documentation and training packages to suit local situations, Records and traceability, cold chain, hygiene risk management 2.5.3 Development of procedures and documentation for the local Ugandan situation by the Ugandan team, with Zambian supervision (10 	2.5 Training programmes, attendance registers, workshop programmes and workshop evaluations available in Jun, Sep and Oct 05, copies of procedures and record system adopted for EUREPGAP and compliance to EU minimum available by Sep 05, Copies of farm audit reports by Oct 05.	No perceived external risks.

	days)		
	2.5.1 – 2.5.3 complete by end of Q3 (October 2005).		
	2.5.4 Training of Ugandan internal auditors, 10 days, 10 people		
	2.5.5 Introduction of internal auditing system into both participating SSG schemes, activity ongoing beyond life of CPHP project.		
	2.5.4 – 2.5.5 complete by end of Q4 (January 2006).		
2.6 Ugandan service providers (with external verification by NZTT & NRI) provide training and support to two groups of small-scale growers and their PMO's to adopt food safety management systems appropriate to their target market.	 2.6.1 Development and delivery of the agreed programme of training (complete by end Q3 – October 2005). 2.6.2 Evaluation of training provision provided by the local service and extension team after the project intervention, trainer/extension training skills, farmer and farm practice improvements (complete by end Q4 – January 2006). 	2.6 Copies of training programmes available by Jun 05, and copies of training records available Sep 05, copies of instructor evaluation report by Oct 05, copies of record of farmer's opinions on training and changes to farm practice available Oct 05.	No perceived external risks.
2.7 Zambian evaluation of additional features added to the management system and institutional framework post project R8271, and modification of Zambian system to take account of the change in PMO from Agriflora to LACCU.	 2.7.1 Development of revised policies and operating procedures for LACCU (activity required because R8271 material was designed to work with Agriflora as the PMO). 2.7.2 Briefing for SSG members of LACCU cooperatives regarding the new system. 	2.7 Copies of revised LACCU operating procedures, QA and management manual available Mar 05. Copies of farmer training programmes and attendance registers available by Mar and Jun 05, copies of all analytical results and conclusions by Jun 05, pre-audit report by Jun 05 and copy of EUREPGAP certificate by Sep 05.	 2.7.1 If current exporter was to stop purchasing from LACCU this would disrupt exports, but this is unlikely given current performance by LACCU growers and a contract has been signed that will run until Feb 06. 2.7.2 If the current exporter was to follow Agriflora into receivership this would have a disastrous effect on activity 2.7, but current indications suggest a very low probability of this occurring.
	 2.7.3 Introduction of the SSG members to the concept of getting through EUREPGAP, with LACCU as the PMO. 2.7.4 Revision of Zambian SSG training in food safety assurance. 2.7.5 Confirmation of food safety standards by water and produce analysis for presence of <i>E.coli</i> as an indicator of faecal contamination, this is essential to provide evidence to back the risk 		2.7.3 External audit by European certifying organisation is disrupted by a change in the regulations regarding application of ISO Guide 65. This is not likely, but problems were encountered during R8271 when a South African certifier had to withdraw at short notice because their Belgian parent company was no longer able to do audits for EUREPGAP option 2, due to changes in the legal interpretation of the validity of

	scale scheme and thus win the confidence of the buyers in the EU. 2.7.6 Completion of depot refurbishment to meet market requirements. 2.7.7 Internal pre-audit and external certification audit for EUREPGAP. 2.7.1 – 2.7.7 complete by end of Q4 (Japuary 2006)		the Belgian companies accrediting body for ISO Guide 65.
2.8 Formation or continuation of linkages with EU buyers and retailers buying from LACCU and AMFRI for direct negotiation for flexibility and understanding over deadlines for EUREPGAP compliance and interpretation of equivalence of system with regard to key features such as homogeneity of grower groups and understanding of farms and blocks.	2.8.1 Formation or continuation of linkages with senior management of specific EU importers and retailers to negotiate on behalf of growers and exporters on deadlines and approaches for achieving equivalence of risk outcome (complete by end Q4 – January 2006).	2.8 Copies of reports of meetings with buyers and retailers detailing the limits of flexibility and general level of support for SSG's to get EUREPGAP available in Jun 05 and Oct 05.	2.8 In theory retailers and buyers might be unwilling to accept interference from project personnel in their business relationship with the exporter and grower in Africa. In reality experience under R8271 showed that retailers and major importers are happy to discuss issues, appreciative of grower concerns over implementation of EUREPGAP and willing to be flexible on deadlines and approaches for achieving compliance. They are not willing to compromise on equivalence of risk outcome which is fully understandable.
3.1 Horticulture coalition managed effectively in Zambia, Uganda and United Kingdom to ensure timely completion of all project activities and delivery of project outputs.	 3.1.1 Issuing of sub- contacts to partners in Uganda and NISIR in Zambia. 3.1.2 Advance of funds and reconciliation of previous advances. 3.1.3 Project inception meeting in Kampala. 3.1.4 Quarterly progress meetings in Kampala & Uganda and quarter report to CPHP. Project management activities run throughout life of project completing in January 2006. 	3.1 Copies of subcontracts by February 2005, and quarterly reconciliations of advances for all partners, quarterly management reports to CPHP, project inception report (Mar 05) and PCSS and PFR to CPHP by Dec 31 st 2005.	No perceived external risks.

ANNEX 2: Partner (user) organisations workplan for adopting project outputs

Project R8431 followed on directly from project R8271 and thus took an integrated approach of combining research with uptake in the field from day 1 of the project. Overall R8431 used an iterative system rather than the old fashioned linear process of research followed by dissemination and uptake. This was essential as the development of an appropriate and cost effective system for implementation of EUREPGAP in Zambia and the process of transfer with modifications to Uganda could only be carried out by a team that included supporting institutions, small-scale farmers and export organisations to field test ideas and suggest relevant improvements. At the end of R8431, the Zambian farmers underwent a full internal audit by an independent external auditor. The results of this audit demonstrate that the Zambians will be ready for external audit in June 2006 (earliest period in the next harvest season when at least 3 months compatible records can be made available post initial registration date). In Uganda good progress had been made but more time is required in order to complete transfer of the final version of the Zambian system. The following paragraphs offer short summaries of ongoing activities by the various partners in R8431.

LACCU & NZTT: - LACCU has formed close operational links with NZTT and has sourced funds from PIP and USAID to support completion of the work initiated under the CPHP. In December 2005, LACCU registered with IMO (a EUREPGAP approved certifying body) in Switzerland for EUREPGAP external certification to take place at the end of June 2006. This timescale was necessary as the rules of EUREPGAP state that the farmer scheme must be registered (with EUREPGAP) and have at least 3 months worth of compliant harvest records available before an audit takes place. The 2005 babycorn season is complete, the new season will commence in February 2006 with harvesting beginning late March to early April 2006 thus allowing for certification to occur at the end of June or early July 2006. PIP have agreed to support this process and USAID have agreed to support the roll out of the system to the rest of LACCU's primary cooperatives after the first certification audit is complete.

AMFRI, Jaksons, Awaggwa Ekku Cooperative Society Limited, Kamazi Farmers Cooperative Society Limited & AMA: - The Ugandan farmer groups and export companies supported by AMA have PIP funding to support completion of the EUREPGAP implementation process. As an initial step a meeting is planned between the Ugandan partners, NZTT and NRI to assess progress and plan for the next stage of the work. This may involve conducting a full internal audit using an independent external auditor to itemise the current level of compliance and itemise the measures necessary to complete introduction of the Zambian system. Once realistic time-scales have been agreed it should be possible to revise the current implementation plans and register with a certification body such as IMO in readiness for certification audits in the latter part of 2006.

NRI: - The next step for NRI focuses on promoting the Zambian system at policy level within the EU. NRI has funding from DFID to explore the policy aspects of these issues and has linked with two of the EC Directorates in Brussels to look at issue of smallholder compliance with both EUREPGAP and EU regulatory requirements. There is scope to modify the system developed for EUREPGAP to meet the criteria specified for minimum legal compliance for entry into the EU.

ANNEX 3: Feedback on the process from Partners(s) and users (where appropriate)

The LACCU group of small-scale growers in Zambia had the greatest experience of implementing EUREPGAP due to having been involved in projects R8271 & R8431 over a 3 year period. These farmers have adopted EUREPGAP compliant farming practices for all their crops, the following is a bulleted summary of the reasons given by individual farmers for this change:

- EUREPGAP has provided me with better control of farm inputs (reduced theft & more efficient use of materials) due to keeping of records and having a system to know where things came from and how they were used (traceability system)
- EUREPGAP has helped us to understand farming as a business and we know now how much profit we can get from a crop (detailed records of production and input usage)
- Farming the EUREPGAP way has increased exportable yield (improved farm management, planting plans, crop rotations & good crop husbandry)
- Thanks to LACCU we are better organised for price negotiations (EUREPGAP inspired ISO compatible management and control systems ensure that LACCU and the primary cooperatives are operate to the highest professional standards with maximum information available for negotiation purposes)
- We are proud of farming to the EUREPGAP standard (The Zambian farmers have proved that small-scale growers can put the necessary systems in placed on farm and have a right to take pride in the high standards achieved)
- Food hygiene training has proved useful at home (this is a general comment received from many participants in the level 1, and farmer to farmer training programmes in food safety and personal hygiene which reflects the wider scope of this type of information where such information is not being provided through conventional educational routes)

NZTT, NRI & AMA agree with all the farmer observations, and would like to add a few additional points on the process of EUREPGAP implementation:

- EUREPGAP offers an excellent and comprehensive due diligence defence against the requirements specified in the new EU harmonised regulatory framework of SPS measures
- In Zambia, worker safety & food safety aspects of pesticide handling were much improved
- In Zambia, on farm hygiene (sanitary & phytosanitary) was much improved
- The December 2005 audit demonstrated that full vertical and horizontal traceability with compliant record keeping systems was possible to plot level within the Zambian small-scale farming system
- A high level of management and control was achievable through the introduction of EUREPGAP
- In Zambia & Uganda, implementation of the necessary farm infrastructure (field toilet, hand-wash, plot markers, spray markers, field shelter and first aid kit) was not a problem for committed farmers
- In Zambia & Uganda basic good agricultural practice presents few difficulties for committed farmers as long as input storage, pesticide application, main record keeping, produce handling and overall management and control are centralised)
- In Zambia, compliant record keeping proved feasible but took almost a year to fully implement, and relied heavily on the level of understanding of farmers and staff capacity (central record clerk and farmer record keepers) to maintain appropriate records. Full time record clerks are essential and these must be properly trained and supervised. In Zambia the best kept farm records were those maintained or closely supervised by the farm owner. Farm owners who relied on a subordinate to keep records with little or no supervision often had poor records because the record keeper did not understand the importance of keeping full and complete records and possibly had little interest in the record system
- NZTT & NRI have no problem with the overall content of the EUREPGAP protocol as it provides all the advantages given above
- However, the extremely detailed ISO based quality management system for farmer groups specified under annex II of EUREPGAP and the associated QMS checklist issued in September 2005 represents a huge challenge for small-scale farmer organisations such as LACCU. Experience in Zambia suggests that organisations such as LACCU cannot implement or maintain the QMS checklist without extensive external support. Although the checklist contains many useful points, it does contain considerable duplication of material already covered by the main EUREPGAP checklist and the additional material covering aspects such as legality of group registration, ISO compatible document control procedures and control of the use of the EUREPGAP trademark make no contribution to either good agricultural practice or food safety

ANNEX 4: Disseminated outputs

Reference Type (as in NRIL green citation	Citation Details	Yes/No [*]
guidelines)	Croffbarr, A. I.	
vvorksnop	Gramam, A. J. Humphries, G. and Kachapulula, B.	resQ1
	(2005). Joint CPHP workshop on ED regulations	
	and private sector standards and practical	
	approaches for EUREPGAP compliance. Granu	
	norticipante from expert industrice former	
	participants from export industries, farmer	
Oral Dragontation	Croffbam A. L. (2005) Degulations and standards	Vec O1
Oral Presentation	for according European freeb produce markets	resQI
	Dowership European resh produce markets.	
	Powerpoint presentation at the joint CPRP and PIP	
	standarda and practical approaches for FURERCAR	
	standards and practical approaches for EUREPGAP	
	Ligende Z th April 2005	
Depart	Oganda, 7 April 2005	
Report	Grainani, A. J. Humphnes, G. and Ssango, F.	resQZ
	(2005). Initial assessment and recommended	
	linked to Jakoona Forma (Laondo) Limited to attain	
	actification under antion 2 of the FUDEDCAD	
	protocol for freeb fruite and vegetables, 49 pages	
Poport	Croffbam A. L. Humphrian C. and Saanga E	Voc O2
Report	(2005) Initial accomment and recommended	res QZ
	(2003). Initial assessment and recommended	
	linked to Amfri Forms (Lloondo) Limited to attain	
	cortification under option 2 of the ELIPEDGAP	
	protocol for fresh fruits and vegetables 41 pages	
Report	Ssango F. Sempa L and Kaggwa LL (2005)	Yes O2
Kepon	Enabling small-scale growers of hot pepper linked to	103 Q2
	laksons Farms (Ilganda) Limited and Amfri Farms	
	(Liganda) Limited to attain certification under ontion	
	2 of the EUREPGAP protocol for fresh fruits and	
	vegetables – progress report for the period April-	
	June 2005 27 pages	
Report	Akiyaga, F. (2005). Summary of findings for a	No
	FUREPGAP pre-audit of LACCU in Zambia between	110
	19-21 September 2005 by Africert Limited. 6 pages	
Report	Ssango, F. (2005). Weekly progress report (1) for	No
	the CPHP funded NRI/NZTT/AMA project in Uganda	-
	for the period 25 th July to 2 nd August 2005.	
	7 pages	
Report	Ssango, F. (2005). Weekly progress report (2) for	No
	the CPHP funded NRI/NZTT/AMA project in Uganda	
	for the period 5 th September to 9 th September 2005.	
	4 pages	
Report	Ssango, F. (2005). Weekly progress report (3) for	No
	the CPHP funded NRI/NZTT/AMA project in Uganda	
	for the period 12 th September to 16 th September	
	2005. 9 pages	

Reference Type (as in	Citation Details	Yes/No [*]
NRIL green citation		
guidelines)		
Report	Ssango, F. (2005). Monthly progress report (4) for	No
	the CPHP funded NRI/NZTT/AMA project in Uganda	
_	for the period September to October 2005. 5 pages	
Report	Ssango, F. (2005). Weekly progress report (5) for	No
	the CPHP funded NRI/NZTT/AMA project in Uganda	
	for the period 30 th October to 12 th November 2005.	
Boport	Saanga E (2005) Manthly programs report (6) for	No
Report	the CPHP funded NPI/NZTT/AMA project in Liganda	INO
	for the period November to December 2005	
	10 nages	
Report	Legge A P (2005) Detailed notes for EUREGAP	Νο
	internal audit of LACCU QMS. Buteko Depot & farm	
	sites around Buteko conducted between 12 th to 16 th	
	December 2005. 36 pages	
Report	Legge, A. P. (2005). Lubulima Agricultural and	No
-	Commercial Cooperatives Union (LACCU) –	
	Summary of non-compliance items for the	
	EUREPGAP internal audit conducted between 12 th	
	to 16 th December 2005. 5 pages	
Report	Legge, A. P. (2005). Lubulima Agricultural and	No
	Commercial Cooperatives Union (LACCU) –	
	Summary of recommendations for the EUREPGAP	
	internal audit conducted between 12" to 16"	
Manual	December 2005. 5 pages	NL-
Manual	Lubulima Agricultural and Commercial Cooperatives	INO
Manual	Union (2005). Farming with EUREFGAF. Tos pages	No
Martual	Linion (2005) Quality Manual (Version 1.1), 86 pages	INO
Manual	Lubulima Agricultural and Commercial Cooperatives	No
Marida	Union (2005), HACCP Manual, 6 pages	
Handbook	Lubulima Agricultural and Commercial Cooperatives	No
	Union (2005). Summary of evidence of compliance.	_
	39 pages	
Manual	Lubulima Agricultural and Commercial Cooperatives	No
	Union (2005). Sample Farmer File. 15 pages	
Manual	Lubulima Agricultural and Commercial Cooperatives	No
	Union (2005). Quality Management System Manual.	
	366 pages	
Manual	NZTT (2005). Safe and effective use of crop	No
	protection products training manual. 25 pages	
Manual	NZTT (2005). Safe use of pesticides on farm – a	No
Destar	spray operators guide. 24 pages	Nia
Poster	NZTT (2005). Fertiliser Application Instructions – a	INO
Doctor	NZTT (2005) Lifting Hoovy Loods / Kunyomula	No
L O21GI	Volema – a nictorial quide in English & Nyanga	
Poster	NZTT (2005) Pesticide Hazard Classification /	No
	Cheniedzo Za Ukali Wa Mankhwala – a nictorial	
	quide in English & Nyanga	
	ganae in Englion a riyangan	1

Reference Type (as in NRIL green citation	Citation Details	Yes/No [*]
guidelines)		
Poster	NZTT (2005). What to Wear When Handling	No
	Chemicals / Zofunika Kuvala Pamene Mugwilisa	
	Nchito Mankhwala – a pictorial guide in English &	
	Nyanga.	
Poster	NZTT (2005). Emergency Procedures – a pictorial	No
	guide in English.	
Poster	NZTT (2005). Zochita Panthawi Yangozi	No
	(Emergency Procedures) – a pictorial guide in	
	Nyanga.	
Poster	NZTT (2005). Rules for Harvesters – a pictorial	No
	guide in English & Nyanga.	
Poster	NZTT (2005). Set of six farmer to farmer food safety	No
	training posters covering the following subjects: (1)	
	Importance of Food Safety (2) Foreign Bodies, (3)	
	Sources of Bacteria, (4) Effects of Bacteria, (5)	
	Harvesting Rules and (6) Personal Behaviour.	
Poster	Jaksons Farms (Uganda) Limited (2005). Set of	No
	eight farmer to farmer food safety training posters	
	covering the following subjects: (1) Sources of	
	Contamination, (2) Personal Behaviour-I, (3)	
	Personal Behaviour-II, (4) Foreign Bodies, (5)	
	Sources of Bacteria, (6) Effects of Food	
	Contamination, (7) Importance of Food Safety and	
	(8) Harvest Rules	

* Yes / No indicates whether dissemination output has been previously reported in project quarter reports, with reference to report number.