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Impact of EurepGAP on small-scale vegetable growers in Zambia

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View of a centralised input storage and produce handling facility at Buteko Cooperative near Lusaka, illustrating the high level of donor support provided for small-scale growers in Zambia (Picture by Andrew Graffham).

All other pictures by Andrew Graffham and Alan Legge, Natural Resources Institute, United Kingdom.

Glossary

ABF	Agri-Business Forum
ADF	African Development Fund
ACP	Africa Caribbean and Pacific countries
APS	Assured Produce Scheme (United Kingdom)
AWB	Airway Bill
BRC	British Retail Consortium
CB	Certifying Body
CFU	Colony Forming Unit
COMESA	Common Market for Eastern and Southern Africa
CPHP	Crop Post Harvest Programme
CPP	Crop Protection Product (Pesticide)
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
IIED	International Institute for Environment and Development
IMO	Institut Fűr Marktokologie GmbH
IPM	Integrated Pest Management
ISO	International Standards Organisation
JICA	Japanese Government Development Aid
LACCU	Lubulima Agricultural Commercial Cooperatives Union (Zambia)
MRL	Maximum Residue Limit
NGO	Non Governmental 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
PHI	Pre-Harvest Interval
PIP	Pesticide Initiative Programme (EU funded programme)
PMO	Primary Marketing Organisation
PRN	Produce Receipt Note
QM	Quality Manual
QMS	Quality Management System
SPS	Sanitary and Phytosanitary (human and plant health)
SSG	Small-Scale Grower
USAID	United States Agency for International Development
WHO	World Health Organisation
WTO	World Trade Organisation
ZATAC	Zambian Agribusiness Technical Assistance Centre
ZEGA	Zambian Export Growers Association

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Summary

Zambia is a double landlocked country situated a long way from the lucrative EU market. The Zambian export industry is quite small (but well organised) with just two exporters, a small number of large commercial growers and one smallholder scheme. Lacking easy port access, the Zambian export industry has only been able to compete by supplying high-value exotic and out-of-season fresh and minimally processed vegetables to EU retail markets. Zambia is not an economically viable supplier for EU wholesale or other low value markets and therefore must rely on accessing retail markets (particularly involving UK supermarkets) that demand compliance with the European retailers' private standard for Good Agricultural Practices, EurepGAP, as the absolute minimum for market entry.

Much of the evidence for problems with EurepGAP is anecdotal and for this reason a detailed cost-benefit analysis of EurepGAP implementation by small-scale growers is being conducted in Kenya, Uganda and Zambia. In Zambia the fieldwork was conducted by NRI and IIED working in collaboration with the NRDC-ZEGA Training Trust (NZTT). The overall objective was to identify, quantify and assess the range of costs and benefits associated with compliance with the EurepGAP standard in order to design policies for donors and standards-setters that are pro-poor and sustainable. (rolled out in Kenya with a much larger survey – see Fresh Insights #6).

Between 14-24 March 2006, managers and small-scale growers in the smallholder scheme were surveyed. The timing of the visits was important since the EurepGAP audit was planned for June 2006 and cooperative farmers were planting baby-corn in accordance with an arrangement with the exporter, for harvest before June 2006 to comply with the EurepGAP protocol requirements for fresh fruits and vegetables, version 2.1, January 2004.

The experiences of compliance with EurepGAP can be summarised as follows:

Positive

- Increases farm efficiency and yields;
- Improves plant health and food safety of products and food safety and hygiene training has spin-off benefits as workers apply knowledge in the home;
- Improves the health and safety of farm workers, especially those involved in handling crop protection products;
- Builds buyer confidence in the professional standards of the farmers (EurepGAP certified SSGs in Zambia used EurepGAP as a marketing tool to access high-value local, regional and EU retail markets);
- Transfer of new 'soft' technologies to the farmers, including a range of land and business management skills, and exposure to and experience with working with cooperative structures, including negotiation and resolution management, which have spin-offs as farmers apply these to their entire farm;
- Builds up grower confidence in opportunities for market growth and financial reward, developing incentives for growth, stimulating innovation and enhancing efficiency;
- Establishment of the centralised facilities required for option 2 of EurepGAP allows for cost savings through bulk purchases of farm inputs and makes it easier for the farmer group to access credit and loan facilities.

Negative

- Significant costs are associated with EurepGAP - for a group of 25 SSGs in Zambia compliance costs amounted to per grower contributions of £4,664 for initial investment and £938 per annum for maintenance costs. These levels of cost were untenable given the low number of SSGs involved and the poor level of income achieved from export vegetable sales during the 2005 season;
- The relative significance of SSG investment in EurepGAP compliance is high – approximating to the level of income in rural Zambia;

- SSGs cannot establish or maintain EurepGAP without sustained financial and technical support from external agencies;
- Continued improvements to the EurepGAP standard are raising costs and barriers to market entry.

Could do better

- Cooperative management is one key element of compliance that requires investment of time and resources by all members. Key principles are that it remains democratic, works proactively for its members, practices equitable distribution of costs and benefits' and develops and sticks to its business plan;
- Incomes of farmers who are compliant with EurepGAP have reduced by half since 2002 and margins are being further squeezed. Better access to market opportunities and efficiency savings on farms are needed;
- Less than 3 per cent of SSGs involved in supplying the UK market with export horticulture in 2000 are still doing so today.

1 Introduction

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 1 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 involve over 3.5 million people directly in production and another 7 million in supporting services. Small-scale growers (SSG) play a significant role in this process; in Kenya, 46,000 tonnes were exported in 2002, and approximately 50 per cent of this came from SSGs.

Table 1. Sub-Saharan African countries involved in fresh produce exports to the EU (major exporters in bold)

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***

In many of these countries, small-scale growers make a major contribution to export production and derive significant levels of income in return. In Zambia where rural household incomes are often less than £100 per annum, small-scale growers have made incomes of between £1,000 and £7,500 from vegetable exports (2003-2004 figures).

Stricter food regulation in the EU during the 1990s and the need for access to a due diligence defence drove retailers to develop strict commercial standards culminating in the introduction of the European retailers' protocol for Good Agricultural Practice (EurepGAP). Since its inception, EurepGAP has been the main driver for change in producer and exporter practices. Currently, thirty of the retailer members of EurepGAP control 85 per cent 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. Large-scale commercial growers have found it relatively easy to comply with EurepGAP as they already have access to the necessary financial, infrastructural and human capacity. In contrast, small-scale growers find EurepGAP a major challenge as they lack the necessary infrastructure and trained personnel and do not have the finances to support adoption and maintenance of EurepGAP without external help.

In September 2006, there were 41,000 EurepGAP certified suppliers (options 1 and 2) in 78 countries around the world. The EurepGAP family of standards covers fruits and vegetables, combinable crops, flowers and ornamentals, livestock, aquaculture, livestock feed, green coffee and tea. The number of certified (options 1 and 2) suppliers in sub-Saharan Africa is summarised in table 2.

Table 2. Number of EurepGAP certified (options 1 and 2) suppliers[1] of fresh fruits and vegetables in sub-Saharan Africa, September 2006

Country	No. of certified suppliers
Cote d' Ivoire	19
Ghana	85
Kenya	386
Senegal	3
South Africa	1,448
Tanzania	20
Uganda	1
Zambia	4
Zimbabwe	14
Total	**1,980**

[1] – This does not represent the number of farms as option 2 schemes can represent anything from 10-2,000 individual growers per scheme.

Zambia is a double landlocked country situated a long way from the lucrative EU market. The Zambian export industry is quite small (but well organised) with just two exporters (formerly three), a small number of large commercial growers and one small-scale grower scheme. Lacking easy port access, the Zambian export industry has only been able to compete by supplying high-value exotic and out-of-season fresh and minimally processed vegetables to EU retail markets. Zambia is not an economically viable supplier for EU wholesale or other low-value markets and therefore must rely on accessing retail markets (particularly involving UK supermarkets) that demand EurepGAP compliance as the absolute minimum for market entry. In order to tell a coherent story of the impact of EurepGAP on the Zambian small-scale growers it is necessary first to have an understanding of the EurepGAP protocol for fresh fruits and vegetables.

1.1 EurepGAP

In order to tell a coherent story of the impact of EurepGAP on small-scale growers it is necessary first to have an understanding of the current version (version 2.1-January 2004) of the EurepGAP protocol for fresh fruits and vegetables.

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 eleven 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 offered 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 membership has evolved with time. By September 2006, the number of retailer members had increased from 11 to 31 countries (including one Japanese retailer). In its first decade, EurepGAP has developed into a global standard with over 40,000 certificates in 85 countries around the world. National standards (Kenya-GAP, Chile-GAP and Mexico-GAP) have been developed, modelled on the original EurepGAP protocol and benchmarked against the EurepGAP standard to ensure system equivalence. Chile-GAP and Mexico-GAP were approved as of July 2007 and Kenya-GAP was at the applicant stage under TSC review.

All respondents in Kenya and Zambia stressed the importance of EurepGAP for food safety assurance, and smallholders especially were highly positive about the many advantages and benefits of EurepGAP compliance, but all believed that the costs of compliance were too high.

At the time of writing, EurepGAP is being re-designed with the intention of launching version 3 in March 2007. For the new version, a single standard for a wide range of food commodities is intended to replace the current scenario of several different mutually incompatible EurepGAP protocols to cover different products. The layout of the new integrated farm standard is shown in figure 1.1. Under the new system a fruit or vegetable grower will need to comply with the all farms base module, the crops base module and the fruits and vegetables protocol. The new standard will offer many advantages for EurepGAP compliant farms practicing mixed agriculture with, for example, dairy, pigs, barley and a horticultural crop on one farm. For most of the growers overseas and all of the small-scale operations the layout of the new standard is unlikely to have any real impact as they only produce fruit or vegetables for export to EurepGAP compliant markets in the EU.

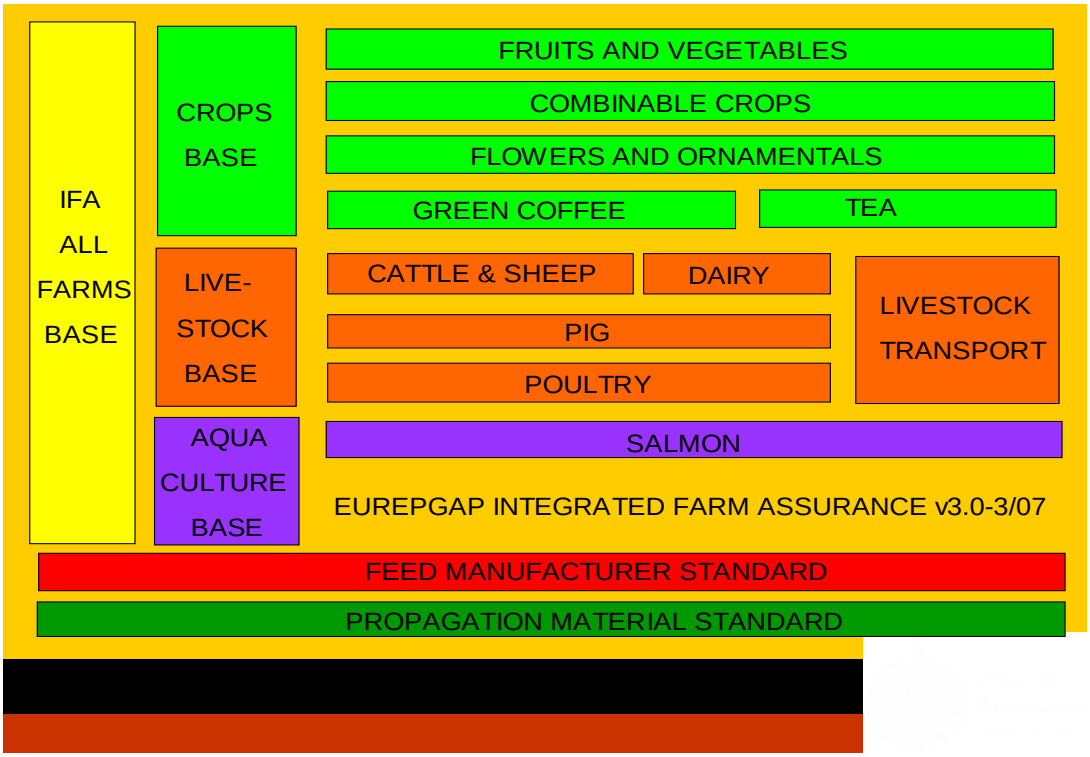


Figure 1.1 Layout of the EurepGAP integrated farm assurance standard v3.0-3/07

At the EurepGAP meeting in Prague in September 2006 many changes to the content of the standard were discussed. However, it remains to be seen what the final content of the new standard will be.

1.2 EurepGAP for small-scale growers (SSGs)

In order to understand why the smaller farms face such a challenge in meeting the requirements of EurepGAP, it is essential to understand the workings of the EurepGAP standard. In this report EurepGAP is taken to mean the fresh fruit and vegetables protocol 2.1-Jan 2004, which was introduced in September 2003 and became mandatory from January 2004. This version of EurepGAP is divided into fourteen 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 per cent 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 per cent of these

control points at the time of the audit and 100 per cent within one month of completion 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 four 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 – minimum one per annum
- External audit – minimum one per annum

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

- PMO = group with legal structure, 100 per cent 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 one per annum all sites
- PMO annual system check by CB
- CB audit square root of farm sites e.g. 100 farms, audit 10 per annum

Most large-scale commercial growers go for option 1 of EurepGAP, but most small-scale 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 as a result of inadequate technical and financial resources. The favoured option for SSGs is option 2 whereby groups of small-scale growers are certified as operating under a common management system.

Option 2 uses the same set of control points as option 1 but farmers must be grouped under a primary marketing organisation (PMO). The PMO takes legal responsibility for overall management of the scheme and compliance with EurepGAP and each individual grower must sign a legally binding contract agreeing to comply with all of the requirements specified under the EurepGAP protocol. Annual audits are made of the PMO system and a number of randomly selected farm sites chosen by the auditor. For audits of schemes involving large numbers of growers the number of farm sites chosen for audit is often the square root of the total number of sites (the auditor may choose to evaluate more or less sites). If the chosen sites pass then the whole scheme is deemed to have passed. If one or more sites fail the whole scheme may be deemed to have failed depending on the seriousness of the non-compliance. If the auditor is satisfied that the scheme is compliant but one grower has failed on audit, that grower will be suspended from the EurepGAP scheme until the time of the next audit.

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. To pass the certification audit the farmer group must demonstrate 100 per cent 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 and provision of suitably qualified farm inspectors is a major challenge for smallholder groups lacking access to external support from a large exporter or local service provider with experience in this area. Auditing of the QMS involves the management of the PMO being able to understand and explain the interrelationships between a large number of documents.

Independent commentators have suggested that many of the smallest farmers have been excluded from EU retail markets due to high compliance costs and insufficient capacity for standards compliance. In this study we sought to investigate the reality behind smallholder involvement with EurepGAP.

1.3 Objectives and approach for the current study

Much of the evidence for problems with EurepGAP is anecdotal. For this reason the decision was made to conduct a detailed cost-benefit analysis of EurepGAP implementation by small-scale growers in Ethiopia, Kenya, Tanzania, Uganda and Zambia. In Zambia, the fieldwork was conducted by NRI and IIED working in collaboration with the NRDC-ZEGA Training Trust (NZTT). The overall objective is to identify, quantify and assess the range of costs and benefits associated with compliance with the EurepGAP standard in order to design policies for donors and standards-setters that are pro-poor and sustainable. The research questions were:

- What impact do standards imposed on supply chains for export horticulture in Africa have on producers?
- What changes in industry incentives occur from rising standards?
- What productive impact at the farm level results from rising standards at farm level?
- What are the keys to inclusion for small-scale producers in view of rising standards?
- How can donors intervene to increase opportunities for successful inclusion of small-scale producers in these supply chains?

The approach taken was:

- Using the concept of export horticultural development as a continuum – with each country studied being at a different level of "maturity", in ascending order: Ethiopia, Kenya, Tanzania, Uganda and Zambia. Certification issues mirror this level of maturity in scale and challenges.
- Research team: joint techno-economic team of an economist working with a standards compliance expert, relying on face-to-face semi-structured interviews.

Zambia was selected as a pilot owing to it being well studied over the past three years by NRI, providing easy access to sources, industry participants and information. It is expected that the methodology developed here will inform future surveys in Ethiopia, Kenya, Tanzania and Uganda.

Between 14-24 March 2006, researchers[1] visited Zambia and surveyed eight small-scale growers (SSG) in the Buteko Cooperative, the LACCU management team, NZTT, and York Farms. The timing of the visits was important since the EurepGAP audit was planned for June 2006 and cooperative farmers were planting baby-corn in accordance with an arrangement with the exporter, for harvest before June 2006 to comply with the EurepGAP protocol requirements for fresh fruit and vegetables, version 2.1-January 2004.

No formal questionnaire was used; rather a semi-structured interview process was used to elicit answers, views and reflections on:

- Financial costs and benefits from personal reports and accounts as kept under EurepGAP;
- Production changes – quantities, methods, volumes and other crucial aspects;
- Comments on experience, challenges and opportunities with the EurepGAP compliance process;
- Non-financial changes and benefits.

[1] The authors plus two trainers, Perry and Hamakuni, from NZTT who are responsible for training the farmers in EurepGAP compliance for two years.

The survey covered SSGs producing 75 per cent of the volume of baby-corn produced by Buteko Cooperative for export.

The following is a detailed report of findings derived from fieldwork conducted by NRI and IIED in Zambia in March 2006. This document is one in a series of reports: country reports for Kenya/Tanzania and Uganda are due for release on 31st November 2006 and 28th February 2007 respectively; a comparative report dealing with the different approaches for EurepGAP compliance adopted in Zambia, Kenya and Tanzania will be released on 15th December 2006. A final report on the cost-benefit analysis work drawing together lessons from the individual countries will be released on 31st March 2007.

2 A short history of SSG involvement in exports from Zambia

The history of Zambian small-scale grower involvement in export horticulture is a donor-supported process that has gone through two phases. In the first phase (1999–2004) the SSGs were linked to a major exporter (Agriflora). In the second phase (since 2004) the farmers established an independent marketing cooperative (LACCU) to sell produce to both local and export markets.

2.1 Agriflora Small-Scale 1999–2004

In 1999, the Zambian Agribusiness Technical Assistance Center (ZATAC) formed a partnership between small-scale growers around Lusaka, Agriflora (a major exporter of horticultural produce) and several donor organisations (ADF, JICA and USAID) with the objective of facilitating SSG access to high-value export markets. The donor organisations agreed to provide a loan facility of US$375,000 (c.£200,000) repayable over three years (at interest rates of 10 per cent per annum) to support provision of irrigation facilities on individual farm sites and the construction of seven sets of depot facilities for centralised handling of agricultural inputs and produce from the farms. ZATAC took responsibility for linking farmers to the exporter and administering recovery of individual loans from the farmers. Agriflora formed a separate company (Agriflora Small-Scale) to provide technical and managerial support for the farmers. In addition, Agriflora agreed to deduct payments from produce sales at source and pay directly to ZATAC so as to ensure that loans were repaid.

The SSG export scheme consisted of approximately 500 small-scale growers located within 50 km of the exporter's packhouse facility near Lusaka. Growers were organised into seven primary cooperatives (primarily geographically chosen) registered with the Government of Zambia and having elected officers for administrative purposes. A site was chosen in each of the cooperative areas for construction of an elaborate input and produce handling facility (see section 3.2), where inputs (seeds, fertiliser, etc.) could be stored and produce collected and graded prior to shipment to the exporters packhouse. The exporter took responsibility for appointing and training depot staff to manage the depots, providing extension support and controlling application of crop protection products via professional spray teams based at the depot. In addition, a central office, stores and training facility were established close to the exporter's packhouse. The central office provided all of the management systems associated with a primary marketing organisation.

This Agriflora Small-Scale model for SSG management was based on experience of systems used by Homegrown in Kenya and Hortico Agrisystems in Zimbabwe and provided for a very high level of management control by the exporter thus limiting risks that might otherwise arise from the farmers taking responsibility for selection, sourcing or application of crop protection products. Using this system, Agriflora was confident enough to allow farmers to grow high-risk crops such as sugar-snap and mangetout peas as well as baby-corn in rotation. This system proved successful and at the peak of success of the Agriflora scheme (2003-2004) a group of 121 farmers were making incomes of between £1,000 and £7,500 per annum with most growers achieving incomes of £2,000–£3,000 per annum.

2.2 Market demands for EurepGAP compliance 2003

During 2000–2002, Agriflora Small-Scale supplied baby-corn and various types of peas to three of the major UK retailers via two of the multiples based in the UK. Although EurepGAP was not considered an issue at this time, other standards were, with all supplies from Zambia having to meet specifications stipulated by the individual retailers. As indicated above Agriflora had established management and control systems for the small-scale scheme that met all of the retailer specifications prior to 2002. However, in May 2002, one of the multiples started talking of requiring EurepGAP certification for all suppliers within one year. All of the suppliers in Zambia realised that a surprisingly large amount of

effort would be required to meet the requirements specified in the EurepGAP protocol and Agriflora Small-Scale would represent the biggest challenge.

A new partnership was formed between Agriflora Small-Scale, the Zambian SSGs and a consortium of service providers jointly managed by the NRDC-ZEGA Training Trust (NZTT) in Zambia and NRI in the UK. Funding was obtained from the Crop Post Harvest Programme (CPHP) under the former Renewable Natural Resources Research Strategy (RNRRS) of DFID to conduct research on development and implementation of a cost effective management and control system to enable SSGs to meet the requirements of EurepGAP.

The system conceived by NZTT and NRI was designed to work under the conditions pertaining in 2002-2003 where 447 growers were involved in supplying Agriflora and income levels were at least £2,000 per annum and increasing. The high level of support by Agriflora Small-Scale and existing depot facilities was factored into calculations of viability at the start of the project in early 2003. Following detailed baseline assessments, farm and depot profiles and stakeholder discussions, three depots (Buteko, Makeni and Lusaka South) and 64 SSGs (of 121 active growers) agreed to make the commitment to EurepGAP compliance.

NRI helped to negotiate with the UK buyer for greater flexibility with timing to allow for implementation to be completed ready for certification in June-July 2004. Over the course of one year, extensive upgrading of infrastructure, documentation and capacity of personnel took place, and new EurepGAP compliant approaches to management and control were developed and implemented. In May 2004, 62 SSGs were deemed ready for certification but the auditing process was disrupted by the sudden bankruptcy of Agriflora Limited in July 2004.

The demise of Agriflora deprived the SSGs of market access and destroyed the PMO and therefore made EurepGAP certification impossible. In addition, Agriflora failed to make payments for produce received prior to the collapse and this undermined the confidence of the small-scale sector in export horticulture. Immediately following the collapse a large amount of opportunistic theft occurred, stripping the depots of much of their equipment and stocks of agricultural inputs. The professional staff at the depots were no longer paid their wages and were forced to look elsewhere for employment. At this time most of the SSGs who had been working towards EurepGAP withdrew from the certification scheme as they realised that market access was not stable enough to ensure a return on their investment.

2.3 LACCU 2004-to date

In July 2004, it seemed as though involvement by Zambian SSGs in export horticulture was about to come to an end. However, the growers working with ZATAC had already been working to establish a secondary level management cooperative known as the Lubulima Agricultural Commercial Cooperatives Union (LACCU). LACCU was registered in June 2003 and became active in February 2004 with the intention of providing a body to represent all seven primary cooperatives in negotiations with Agriflora on commercial issues such as product price, rejects policy, payments and transparency on recovery of the irrigation loans.

ZATAC had intended that LACCU would become a commercial business with an elected board of directors drawn from the farming membership of the primary cooperatives and a management team of salaried professionals to manage the day-to-day affairs of LACCU. However, following the collapse of Agriflora, LACCU decided to rely on the elected board of volunteer staff to provide the management team. This was not unreasonable given the fact that the three farmers concerned were all retired senior managers from the banking and government sectors and thus experienced in management. LACCU worked with ZATAC to form a partnership with York Farms to continue

exporting produce to the EU. Six of the primary cooperatives remained with LACCU and one cooperative chose to break away and become a supplier of Borassus Estates (another exporter).

York Farms was willing to buy baby-corn from LACCU but was not willing to become involved in management or technical support of the SSG scheme. For this reason LACCU had to take on the role of primary marketing organisation (PMO) and put in place EurepGAP compliant management and control systems in order to meet demands for compliance by October 2005. Three cooperatives (Buteko, Makeni and Lusaka South) and 32 growers remained interested in obtaining EurepGAP during the 2005 season. During 2005, this number gradually decreased until only ten growers were ready for certification in June 2006.

The 2005 season proved difficult as LACCU worked to re-establish the systems lost when Agriflora collapsed. Farmers were only allowed to grow baby-corn and tonnages were much reduced on previous years leading to a dramatic fall in income from export vegetable sales (see section 5.0). The reduction in tonnage is mainly a reflection of the need to build confidence with a new exporter. In March 2006, York Farms said that they had been very happy with produce supplied by LACCU in 2004-2005 and the efforts being made to get EurepGAP and would have been willing to double the size of the baby-corn contract in 2006 if economic conditions had been favourable (see section 8.2).

In terms of EurepGAP certification, DFID funding continued during 2005 and enabled NZTT and NRI to work with LACCU to create a farmer-run PMO and deal with the quality management system (QMS) requirements introduced by EurepGAP in September 2005. Pre-audits were conducted in September and December 2005 and some farmers withdrew or were excluded after these audits as they were unwilling or unable to meet the full requirements of EurepGAP. In June 2006, an external certification audit was conducted for Buteko and Makeni cooperatives and ten farmers under those cooperatives. Lusaka South depot was not ready for auditing at that time and had to withdraw from certification.

3 The LACCU small-scale grower model

3.1 Zambian small-scale growers involved in export horticulture

The term 'small-scale grower' is very amorphous as it often lumps together people of very different educational backgrounds with considerable differences in financial and technical capacity to meet the requirements of the EurepGAP protocol. In effect, the only thing that most small-scale growers have in common is the small area of land available for cultivation. Even land sizes and levels of infrastructure can vary widely. In Zambia, land areas for export crops vary from one to four hectares, whereas in Zimbabwe the Hortico Agrisystem's scheme operated areas of 0.1–0.2 hectare and in Kenya many of Homegrown's growers have 0.01–0.02 hectares.

Thus, to understand the LACCU SSG scheme in Zambia it is first necessary to know something about the people who own the farms. Under previous DFID-funded research, detailed profiles were prepared for 64 farmers preparing for EurepGAP and updated as necessary. Table 3 contains selected profile data for the ten Zambian small-scale growers who went for EurepGAP certification in June 2006.

The data for these ten growers can be summarised as follows:

- All growers were situated within 25km of the exporters' packhouse;
- All growers were literate and 80 per cent had completed secondary level education;
- Only one grower had a formal agricultural qualification;
- Most of the growers were aged between 51 and 70 years;
- Land areas varied from 0.75 to 3.0 hectares but most growers were using approximately two hectares for export crops;
- Thanks to the ZATAC loan facility, all farms had access to borehole water and irrigation (overhead or drip-feed);
- Export horticulture was a secondary source of income for most of the growers and none of the growers relied on export horticulture as their primary source of income;
- The growers employed between four and fifteen workers with an average of ten workers per farm.

In summary, the Zambian growers are all well-educated, mostly retired or re-trenched professionals with relatively large land areas and excellent infrastructure, positioned close to the exporter's packing facility. There is no doubt that the education and professional background of the Zambian SSGs was a great advantage for dealing with EurepGAP. Access to irrigation made reliable production for export easier. It is interesting to note that access to an agricultural qualification proved a major advantage, as the only grower to possess such a qualification routinely produced yields twice as high as any other grower in the scheme and had much higher overall productivity due to better planning on crop rotations so as to maximise use of available land.

Table 3. Profile of the ten Zambian SSGs growing baby-corn for export who were EurepGAP certified in June 2006

Criteria										
Cooperative	**MAKENI**			**BUTEKO**						
Farm code	8122	8140	8150	9103	9106	9107	9108	9109	9112	9113
Land area registered for EurepGAP (hectares)	2.4	2.1	1.0	2.27	2.0	2.7	3.0	2.0	0.75	2.15
% of total land used for export crops	30-50%	30-50%	>50%	>50%	>50%	>50%	30-50%	30-50%	>50%	30-50%
Farmer age	51-60	51-60	26-50	51-60	61-70	61-70	51-60	51-60	51-60	26-50
Farmer sex	Female	Female	Female	Male	Male	Male	Female	Female	Male	Female
Formal education (grade 12 denotes completion of secondary education)	Grade 12	Grade 12	Grade 12	Grade 12	Grade 12	Grade 12	Grade 10	Grade 9	Grade 12	Grade 12
Agricultural education	None	None	None	Diploma	None	None	None	None	None	None
No. of family on farm	9	5	0	5	4	6	8	4	7	7
No. of family working on farm	1	1	0	1	2	2	2	2	3	1
No. of permanent workers	6	5	4	5	3	4	6	3	0	3
No. of casual workers	4	0	3	8	5	4	7	2	1	10
Income 1*	Business	Cattle	Pension	Local crops	Local crops	Local crops	Local crops	Local crops	Local crops	Business
Income 2*	**Export crop**	Poultry	**Export crop**	**Export crop**	**Export crop**	**Export crop**	**Export crop**	**Export crop**	**Export crop**	Local crops
Income 3*	Goats	Local crops	Local crops	N/A	N/A	N/A	N/A	N/A	N/A	**Export crop**
Income 4*	Local crops	**Export crop**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Income 5*	N/A	Pension	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

* - Income sources have been listed in order of importance

In terms of EurepGAP compliance, the LACCU model relies on transfer of many of the EurepGAP control points to the depots (3.2) and centralised management facility (3.3). However, farmers still sign a contract to comply with all requirements specified under the EurepGAP management and control system and are responsible for all aspects of crop production through to harvesting and delivery to the depot. Farmers must ensure that the following items of infrastructure are in place on farm:

Permanent field markers (Figure 1)
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 (Figure 2)
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. 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 one-metre 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.

Field toilet and hand-wash (Figure 3)
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 two bags of cement per toilet). The toilet should be sited downhill 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. In Zambia, some farms constructed more elaborate toilet blocks and hand-wash stations contained within the main farm water supply. These are very nice and much to be commended but go well beyond the minimum required to attain EurepGAP compliance.

Field shelter (Figure 5)
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.

Chemical soak-away (Figure 4)
Each farm site will need to have a chemical soak-away to allow the CPP spray-team to safely dispose of surplus CPP when necessary. The soak-away consists of a pit ~1m square and 1.5m-2.0m deep with 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 by 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.

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 necessary 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 and 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, 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. The general features should remain the same but names of forms will typically vary from system to system as will overall organisation.

Figure 1. EurepGAP compliant field marker

Figure 2. EurepGAP compliant CPP warning notice

Figure 3. Elaborate field toilet and hand-wash station

Figure 4. Chemical soak-away for rinsing out CPP sprayers

Figure 5. Portable field shelter as used on several Zambian farms

Crop production records

Crop production records start on farm with the farmer keeping a compliant crop diary, which records for each activity the day and date, farmer code, field code, field area, crop, activity carried out, 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 grower's 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, 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 that 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 rather than a knapsack sprayer. The spray/bulldock application records also list 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

The following sections deal with records kept at the depot site, but they have been placed here to ensure continuity of the description of the traceability system. 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 and received by. The farmer keeps one copy and 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 and is made up with the entire product stored for a single dispatch to the receiver. This can take three to four days. It is also the store record. It shows the date, PRN, code, crop, plant week, number of bags, gross weight, tare weight and 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 and net weight. At the base of the document is printed 'prepared by' with date and 'received by' with 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 PMOs. 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.

3.2 Primary cooperatives and centralised production facilities (depots)

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 soak-away, rubbish disposal pit and Silsoe incinerator

In Zambia, the produce depots already had a purpose built building for produce handling built prior to the implementation of EurepGAP (Figure 6). The produce depots were quite elaborate structures built with funding from JICA. Each depot consists of a concrete base with metal roof and breeze block walls constructed so as to allow the insertion of two 20-foot containers at one end. One container has cooling facilities to allow for refrigerated storage of produce. The other is a simple container intended for bulk storage of farm inputs such as seed and fertiliser. The space in between the containers is enclosed with a wooden partition and door to make an office for the depot clerk.

However, these structures were 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 separate CPP stores were constructed. 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 one or two-roomed structures that must be entirely separate from the building containing produce, offices, seed and fertiliser. In Zambia, single roomed chemical stores were used for storage of chemicals and sprayers as protective clothing was kept elsewhere (Figure 7).

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 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 a third of the way up from the bottom and a series of ventilation holes to create airflow. Unlike simple incinerators that burn at about 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 is 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 the quality of chemicals and correct specifications for products and also reduces costs and wastage of chemicals as all materials are purchased in bulk and then applied centrally to all farm sites.

Figure 6. View of the main building at Buteko Depot

Figure 7. CPP store at Buteko Depot

The cooperative depots serve several roles within the LACCU system. These include:

- Centralised storage of farm inputs purchased in bulk by LACCU on behalf of the individual growers
- Centralised storage of protective clothing and equipment for spraying of crop protection products
- Refrigerated storage of produce prior to transport to the exporter's packhouse
- Centralised record keeping including maintenance of a master set of all farm records in individually coded files so as to facilitate traceability and auditing of the system.

3.3 Secondary cooperative (centralised management facility)

As described in section 2.3, the Zambian growers established a secondary or management cooperative to provide a central point for negotiations with Agriflora in February 2004. The secondary cooperative, known as the Lubulima Commercial Cooperatives Union (LACCU), has three volunteer executive staff (chairman, secretary and treasurer), a salaried office manager and a vehicle driver for cooperatives produce truck. LACCU operates an office at the premises of the Agri-Business Forum (a farmer support NGO) in Lusaka. In 2005–2006 this office space appeared to be given on a free basis but this may change in the future.

LACCU membership consists of the six primary production cooperatives around Lusaka. The major roles of LACCU as a management cooperative are:

- To establish a common policy for SSG involvement in high-value markets;
- To identify new market outlets for the members of the primary cooperatives;
- To provide a single point for negotiations with buyers, input suppliers, financial organisations and government institutions;

- To negotiate for pre-financing and credit on bulk purchases of farm inputs for the members of the primary cooperatives;
- To make bulk purchases of agricultural inputs and ensure distribution of inputs to the depots of the primary cooperatives;
- To provide transport for delivery of agricultural inputs to the depots and collection of produce from depots for delivery to buyers' packing or processing facilities;
- To manage issues of standards compliance to meet the requirements of buyers, and specifically to take legal responsibility for compliance with the requirements of the EurepGAP protocol.

With regard to transport linkages, prior to July 2004, Agriflora provided trucks to collect produce from the cooperative depots but the demise of Agriflora severed the transport link. LACCU needed a truck to provide economies of scale and efficient transport of produce to York Farms as the individual deliveries by the farmers created chaos and were not considered desirable by the exporter.

ZATAC obtained a grant from USAID to import an ex US-Army 10-ton open truck valued at £12,000 (c.100 million kwacha). This truck was given to LACCU and ZATAC established a system to amortise the truck so that LACCU could ensure funds for replacement after five years. LACCU and ZATAC developed a budget to cover fuel, maintenance and monthly payments to a facility account established within the ZATAC investment fund so that LACCU could accumulate funds for replacement. ZATAC suggested monthly payments of 2,777,778 kwacha (£524) over 36 months, starting in April 2005. LACCU were unhappy with this arrangement and wanted to create an independent set-aside account. The ZATAC account was created but LACCU do not appear to have made any payments into the account. ZATAC have explained the financing model for the truck to the membership of the primary cooperatives and a model was agreed for transport payments by each farmer to cover the funding of the truck. These payments are being made by the farmers using a system where a fixed fee is levied for each visit to the depot by the truck and then sub-divided by the number of farmers wishing to send produce to the exporter on a given day. Thus it pays farmers to be organised on planting and harvesting to ensure that the maximum number of farmers use the truck on any given day although in practice utilisation of the truck appears inefficient with individual farmers bearing an unnecessarily high transport cost due to poor planning on the part of the farmers, the cooperatives and LACCU.

In terms of EurepGAP compliance, LACCU have replaced Agriflora in the role of Primary Marketing Organisation (PMO) for EurepGAP certification under option 2. This means that LACCU are legally responsible for ensuring that all produce sold by the SSG scheme is EurepGAP compliant. In order to satisfy this requirement the central office must demonstrate compliance with all of the control points specified under the EurepGAP Quality Management System checklist provided given as Annex II of the protocol for fresh fruits and vegetables. To demonstrate compliance it was necessary for LACCU as the PMO to create a set of reference files or manuals for the management and control system. A brief description of the types of files / manuals with summaries of content is provided 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 thirteen sections specified in the QMS checklist and fourteen 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 twenty-two standard headings and five introductory sections 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 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 is 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.

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 pre-requisite programmes, EurepGAP 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 is just six pages long and provides 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 carried out by the PMO and the individual farmers (with support from NZTT), 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.

3.4 External agencies

Prior to July 2004, Agrilfora provided a high of technical support in the form of full-time company extension workers to conduct training and advisory programmes for the farmers, as well as internal auditors (known by EurepGAP as farm inspectors) to conduct internal audits of the farm and depot sites to assess progress towards compliance with EurepGAP. Following the collapse of Agriflora, LACCU took on the role of the PMO but lacked the technical or financial capacity to provide these services for the growers.

For this reason, LACCU entered into a donor-supported partnership with the NRDC-ZEGA Training Trust (NZTT), whereby NZTT would continue to develop materials such as the QMS manual for LACCU, provide training and technical support for the growers and provide suitably qualified farm inspectors to conduct internal audits of the LACCU management and control system. The farm inspectors 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 a 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.

There is nothing wrong with relying on external agencies as long as their role is clearly stated in the QMS manual for audit purposes. However, there is some concern over the sustainability of the Zambian system as it seems unlikely at the present time that LACCU has sufficient revenue to afford

to pay for the services of NZTT at the rates paid by the large commercial farms for training and extension services.

Although York Farms as exporter has played little active role in managerial or technical support of LACCU, involvement with the exporter has still allowed LACCU to make cost savings on their EurepGAP system by formalising connections with York Farms in the QMS manual. For example, LACCU do not conduct their own testing programme for pesticide residues but rely on York Farms. As pesticide residue tests cost £85-£150 per sample and at least ten samples would probably be required each year, making use of York Farms data is a major saving. This is an entirely acceptable procedure (approved by the external auditor in June 2006) as LACCU market via York Farms and full traceability can be demonstrated from the field to fork via the inter-linking of the LACCU and York Farms traceability systems. York Farms shares tests results with LACCU who keep copies on file. If any violations of EU regulations were detected York Farms would immediately inform LACCU so that they could take the necessary corrective actions defined in the QMS manual.

4 Implementation of EurepGAP by SSG in Zambia

The following section provides some brief comments on the EurepGAP implementation process in Zambia so as to highlight which areas went smoothly and where difficulties occurred.

4.1 Basic infrastructure

At the start of the EurepGAP implementation process in July 2003, Agriflora provided a list of 121 active growers with potential to attain EurepGAP certification. However, following discussions with the farmers, only 72 growers remained interested in EurepGAP and only 64 of these signed agreements to comply with the requirements of the EurepGAP protocol. The biggest reason for not being involved at this early stage was an unwillingness to upgrade farm infrastructure. The key sticking point for most growers was the requirement to provide a field toilet. The effort and expense required to dig a pit for the field toilet was enough to dissuade many growers from participating in EurepGAP in 2003 as this standard had never been required before as a pre-condition for market access and farmers could not justify why such things were suddenly required.

For the farmers that made the commitment to EurepGAP, putting in place upgrades to basic farm infrastructure and improving agricultural practices did not present significant problems and farmers were very happy with the indirect benefits derived from these upgrades (see section 7.3). Upgrading of depot infrastructure to meet the requirements of EurepGAP was also straightforward and presented no difficulties due to the provision of donor support to meet additional costs for a separate CPP store, shower and toilet block, CPP disposal area and modifications to the main depot building.

4.2 Advanced (records documentation and QMS)

The real challenge for the individual growers was compliant record keeping. NZTT and NRI created a system of farmer files with simple records to meet the requirements of EurepGAP. Farmers were impressed with the idea of being able to see their business efficiency and profitability more readily but took time to become used to the concept of filling in all of the boxes on the form. Farms with the least number of problems with record keeping were those directly managed by the owner. Farms where a more junior member of staff was expected to complete the forms generally had problems with partially completed or blank records. From the farmers' point of view some of the information required by EurepGAP was irrelevant so they did not bother to fill in those sections. However, incomplete records will result in failure at the time of the certification audit. This problem was solved by making a rule whereby farmers had to show their farmer file at the depot each time they delivered their produce on the understanding that if the records were incomplete or obviously falsified their produce would be refused. Following the introduction of this measure the standard of record keeping improved dramatically and farmers became used to and eventually proud of keeping records to a high standard. Overall the process of getting farmers to complete records properly took six to eight months in some cases.

At the level of the PMO, the greatest challenge for EurepGAP certification was demonstrating an understanding of the EurepGAP ISO type quality management system (QMS). For the QMS audit the PMO team at LACCU needed to show an ability to understand and explain the inter-relationships between approximately 400 different documents required by EurepGAP under the Annex II QMS for option 2. The main system had 150 documents including 36 types of record and 35 sets of advice notes for farmers on policies, procedures and actions all controlled under an ISO type document control procedure.

The QMS audit took half a day to conduct and presented a great challenge for the LACCU management team. The major failings in the September and December 2005 pre-audits were

attributable to difficulties with answering questions relating to the QMS system. Often the team knew the answer to the question but were unable to express their answers in the correct way and failed to refer properly to the documents in the QMS system. In June 2006, the LACCU proved they could handle the QMS with support from the NZTT team and it was realised that in future it would be better to sub-contract much of the QMS system to an organisation such as NZTT to reduce the potential for failure during a certification audit. It is interesting to note that one of the features of the management system used by Gomba Estates in Tanzania is to establish an separate organisation for QMS control so that farmers do not get involved in this complex and difficult area.

4.3 Pre-audits

With the support of the EU-COLEACP PIP, a EurepGAP pre-audit was arranged for LACCU in September 2005 conducted by a well-known African 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 African 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 fifteen major examples of poor practice (non ISO 19,011 practices) by the African auditor and the audit was not properly conducted or completed. The African company failed to provide a proper report of the pre-audit thus destroying the confidence of LACCU and NZTT 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.

A second internal audit was conducted from 12th to16th December 2005 by an auditor appointed by NRI 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 4-6 below. These results show that LACCU was very close to passing a EurepGAP certification audit by December 2005. LACCU attained very high scores and the non-compliances on the QMS were mostly of a simple nature and were easily solved prior to the external audit in June 2006.

Table 4. 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 to LACCU	NA	43	NA	NA

NA = not applicable

Table 5. 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

Table 6. Table to show percentage compliance for the EurepGAP farm inspector checklist achieved by LACCU in the December 2005 internal audit

	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

NA = not applicable

4.4 Audit

In June 2006, an external audit of the LACCU SSG scheme was conducted by an auditor from the Tanzanian regional office of a Swiss based EurepGAP certifying body known as IMO (Institut fur marktokologie). The audit lasted for six days and included audits of the QMS system operated by LACCU as the PMO, the depot facilities at Buteko and Makeni, six out of ten SSG farm sites offered for certification and NZTT's farm inspectors. The cost of the audit was paid by the EU COLEACP Pesticide Initiative Programme (PIP) as part of the good company practice component of PIP.

All of the centrally managed parts of the LACCU system passed the audit successfully as did all but one of the individual farmers. The non-compliant farmer had used an unauthorised crop protection production on the baby-corn and even though accurate records were kept this constituted unacceptable major and minor non-compliances' under chapter 8 of EurepGAP. This single act resulted in four major non-compliances (8.2.1, 8.2.7, 8.3.4 and 8.3.10) and four minor non-compliances (8.1.1, 8.3.6, 8.3.7 and 8.3.8). This farmer was immediately suspended from supplying EurepGAP certified produce but would be re-admitted if they could demonstrate full compliance at the time of the next audit. The rest of the LACCU scheme passed and are now EurepGAP certified.

4.5 How long did it take for the SSGs to get EurepGAP certification?

The process of getting EurepGAP in Zambia really began with meetings of farmers in October 2003 to discuss participation in a EurepGAP compliance scheme. On a purely linear basis, ten of the farmers completed the EurepGAP certification audit almost 2½ years later. However, in practice the compliance process did not flow smoothly. Initial enthusiasm and strong support from Agriflora bought 64 farmers almost to the point of compliance by July 2004, but the collapse of Agriflora disrupted the compliance process and eliminated nearly all of the management and control systems leaving just the basic farm and depot infrastructure and a collection of obsolete records. Thus the 32 farmers that remained interested in EurepGAP had to start again from first principles in October 2004. These farmers were approaching compliance by July 2005, but the arrival of the new QMS system in September 2005 made the compliance process more complex and delayed certification. Pre-audits in September and December 2005 highlighted areas of the system requiring attention and it was not until June 2006 that certification could take place.

If the process were repeated in a more stable environment, experience would suggest that it should take a maximum of eighteen months to certify a farmer-led PMO and SSG scheme under option 2. If the PMO were run by a major exporter already operating EurepGAP compliant large commercial farms with experienced technical staff, the compliance process should take between six and twelve months. In both cases, the speed of certification depends on how quickly infrastructure can be put in place, and how readily the various stakeholders understand and implement the complex management and control systems. Transfer of ownership of systems takes time as the PMO and farmers need to both understand the various systems and controls and incorporate them into their daily activities to a point where they can easily discuss any part of the system with an external auditor.

5 Issues taken into consideration for the Zambian eurepgap cost benefit analysis

The objectives, research questions and methodology for this survey were outlined in Section 1.3. The survey was representative, covering SSG producing 75 per cent of the volume of baby-corn produced by Buteko Cooperative for export. Survey responses were then used to develop models of typical farms for analysis. Engagement with the remainder of the domestic supply chain for EurepGAP horticulture enabled formation of a picture of the supply chain and corroboration of responses.

5.1 Context to this analysis

5.1.1 Methodological

Traditional 'cost-benefit analysis' works well when one can identify and attribute all costs and benefits to appropriate stakeholders. The core of the survey is on the financial implications of establishing the EurepGAP compliance system. In addition, qualitative responses have been collected and informed the analysis. This proves key with farmers reporting the most important benefits to them being non-financial.

A range of methodological issues arose when assessing the impact of EurepGAP in Zambia:

1. **Identifying cost centres**. The research here has identified almost all of the costs of EurepGAP but still 18 per cent of investments in the system remain unattributed.
2. **Differentiating impact.** It is not always straightforward to attribute impacts or costs and benefits.
   a. Multiple code compliance exists: Other private standards, including Tesco's Nature's Choice, overlap these standards making it more difficult to differentiate the impact of EurepGAP from those impacts/ actions that might have occurred anyway.
   b. Before and after: Ideally we want a data 'paper-trail' from pre-export horticulture through the EurepGAP inception, implementation and on to compliance. In practice, there is limited good data on *before* and it remains difficult to use backward scoping for farmers (large and small).
   c. Public intervention: The government often subsidises the rural economy to ease poverty and transfer some costs to urban areas and relatively wealthy constituents. For instance, agricultural diesel is often provided cheaply to assist with market opportunities for rural farmers and the full cost of local infrastructure development is not paid directly by local people.
   d. Donor intervention: Some aspects of donor investment can be costed and are a matter of public record; for instance, direct support of a defined group (e.g. in provision of irrigation or other localised infrastructure). Yet more often, donor investment has indirect impacts in supporting the wider rural economy (e.g. provision of micro-credit). The extent of the private benefit from the former aspect is a matter of financial costing, but it is more difficult to identify the impacts of the latter.
   e. Timeframe for assessing sustainability**:** There is no consensus on what is a typical timeframe for analysis of the sustainability or economic viability of a farm in Zambia.
3. **Non-participants**. Those previously involved in EurepGAP certification and those who did not participate were not analysed in this study.
4. **Missing information.** Much remains unclear about the Zambian export horticulture sector, limiting the power of our analysis and limiting our insights, including:
   a. Drivers within the domestic sector, particularly the trends and functioning of markets and rural economies are unclear.
   b. Drivers within the international market, particularly the full economic value to farmers of being able to access export opportunities. In addition the complementary relationship

between floriculture products and horticulture, where an apparent cross-dependency of supply between cut flowers and high-value FFV in transit (cargo and bellyhold) exists. If, as in Kenya, floriculture sector growth ignites horticulture exports, this driver appears to herald a positive future for exporters of FFV since the money the UK spends on flowers is growing (it is currently £28 per capita or £2.2 billion). For instance, flowers are increasingly bought on non-special occasions. In comparison, Europeans per capita spending is more than twice that of the UK.

c. Informal and invisible. The vast majority of economic activity in rural Zambia operates in the informal sector and this includes significant elements of the rural agriculture sector.

5. **Attributing private costs and benefits from investment.** Direct and indirect costs and benefits are intimately interwoven. Future opportunities can be a factor solely of current investment, although the lineage is often unclear.
6. **Farms.** While considerable emphasis is now placed on agriculture, there is still difficulty worldwide in modelling the finances of individual farms. Few non-large farms turn a profit on paper! A survey tool is limited in precision since we are asking for perceptions. There are a number of reasons for farmers to understate their turnover and inflate their costs.

5.1.2 External issues

There are further issues when assessing the rest of the supply chain:

- **Political issues**: a range of concerns will have impacted incentives to stay in the industry, including:
  - Political meltdown in Zimbabwe creating trained farmer immigration;
  - Risk of similar land policies to Zimbabwe's being copied elsewhere;
  - Perception of horticultural exports being a white-owned industry;
  - Desire to reduce the country's reliance on the copper industry by promoting alternatives, including agriculture.
- **Appreciation**: The kwacha has increased in value since January 2005 by 35 per cent against the USD and UK£ (Mulinda, 2005), with exporters reporting that their margins have been squeezed by at least 70 per cent as both inputs and outputs are negatively impacted. There is no consensus on the driver(s) for this (see Box 1). However, the impact on export horticulture is clear: escalating costs – relatively lower prices for sales and relatively higher prices for inputs.
- **New taxes**: For a range of reasons, the following new taxes were introduced in the 2006 budget:
  - VAT was introduced on a range of goods;
  - A 45 per cent 'witholding tax' was introduced on non-registered business transactions.

  Taxes distort the incentives facing industry participants, and both the above were reported as significant threats to the viability of export horticulture in Zambia, yet their impact can only be quantified later.

Box 1 Zambia's exchange rate appreciation - underlying causes and impacts:

A number of theories have emerged over why the exchange rate has appreciated, including:

- Political reasons: Forthcoming presidential election in November 2006
- Debt: HIPC debt relief:
  - *Central coffers*: Zambia's coffers are US$150 million richer after having its debts slashed by G8 countries last year, but despite calls for the opening of the spending taps, the government has adopted a prudent approach to poverty alleviation (*The Zambian*, 2006a, 21/3/06)
  - *Lower repayments*: According to the Jubilee Debt Campaign, a global advocacy group that campaigned for debt cancellation, Zambia's debt repayments to the IMF alone cost $25 million in 2004 - more than was spent on education (*The Zambian*, 2006a, 21/3/06).
- Economic: inward investment:
  - Increased international confidence in Zambia as it becomes more attractive than its neighbours.
  - payment of substantial donor grants for the fight against HIV into the Bank of Zambia.
  - laundering of illicit funds from abroad through the Zambian banking system.
  - Record copper prices (Mulinda, 2005) inspiring prospecting and inward investment. Vedanta Resources, a UK-based metals conglomerate that acquired Konkola Copper Mines in early 2006 made a record single investment in the country.

Yet, these theories are also countered by other economic factors. For instance, why have the three-month imports of maize from RSA (over 160 tonnes of maize imported by the Millers Association of Zambia and the Food Reserve Agency from South Africa) not reduced the strength of the kwacha? (*Times of Zambia*, 2006a, 20 March). Plus, the rents from mining are chiefly appropriated outside of Zambia.

Yet, regardless of its source, a strong kwacha is having a range of domestic implications:

- Exporters:
  - Reduction in export competitiveness (paprika, cotton, horticulture)
  - Reduction in total volume exported as farms and outgrowers respond by high-grading of produce for export, selling excess on local markets and cultivating non-export crops
  - Lower margins due to increased price of inputs
  - New markets sought; regional markets are more important (particularly RSA)
  - Value-adding by farmers (where possible) to increase their profit margins
- Zambian consumers:
  - Cheaper produce is available throughout Zambia as exporters shift some land into domestic market cultivation and relatively cheap imports of produce compound this situation
- Political: Requirements for ZRA and government to manage this economic situation more closely:
  - IMF Managing Director Rodrigo De Rato, who was in Zambia earlier this month, warned Zambia and other low-income countries against "misplacing" the money (*The Zambian*, 2006a, 21/3/06; *Times of Zambia,* 2006a, 20 March)
  - Praise from the UK for channelling into education and health sectors (Sianjalika, 2006)

6 Costs and benefits associated with EurepGAP compliance

This section will examine the costs and benefits at production and process for SSG involved with EurepGAP compliance. Section 6.1 will examine the production impacts of EurepGAP compliance using a static cost-benefit model. Section 6.2 will examine the process impact of EurepGAP compliance using a dynamic linear programming model. During the 2005 harvesting season (1/5/05-19/1/06), the Buteko Cooperative supplied 90.7 tonnes of baby-corn from its depot to York Farms. Eleven small-scale growers (SSG) were involved in this supply chain and this survey interviewed eight.

6.1 Production impacts

Production fundamentally changes when export horticulture is supplied from a farm. Before, productive land would be employed entirely for local crops for sale and household consumption. Evidence from this survey shows that approximately half of the productive land has been changed to grow crops for export. This change signals that farmers perceive benefits from the change. It also alerts us to the existence of ongoing changes; to farm management, to local employment patterns, to service provision, and to current and future financial flows and economic activity and growth in the surrounding rural economy.

The difficulties in identifying, assessing and analysing the costs and benefits of rural farming in developing countries have been well-documented elsewhere. This project focused solely on the baby-corn produced currently under planned EurepGAP compliance conditions.

6.1.1 Typical farm characteristics

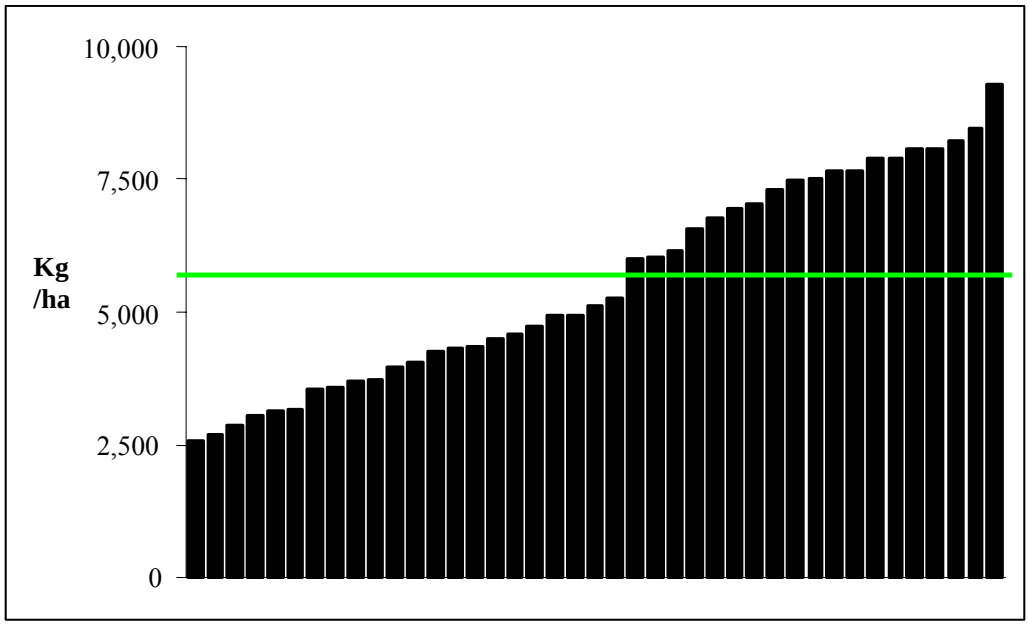
The farms are in the most part heterogeneous, enabling construction of a model of a representative, average or typical farm.

Table 7. Typical farm production characteristics, Buteko Cooperative, 2005/6:

Factor	Number
Total land of farm (ha)	6.23ha
Productive land (ha)	1.91ha
Land planted under EurepGAP (+1 planting) (ha)	1.55ha
Land under local crops (%)	52%
Productivity of baby-corn (kg/ha)	5,561kg/ha

On average (Table 7), farms surveyed have six hectares of land, of which one-third is suitable for cultivation and approximately one-half of this is used for cultivating crops for export. Cultivation is in lima blocks (approximately 0.25ha). Rotation is practiced, hence land planted under EurepGAP can exceed productive land. On average, productivity is 5,561 kilograms of baby-corn per hectare, ranging between 2,500 kg/ha and 9,300kg/ha (see Figure 8).

Figure 8. Productivity of SSG land under baby-corn, kg/ha:



6.1.2 Basic costings and income for 2005

Production changes require investment of time and resources by the farmers. The survey collected information from respondents on their investment in achieving compliance.

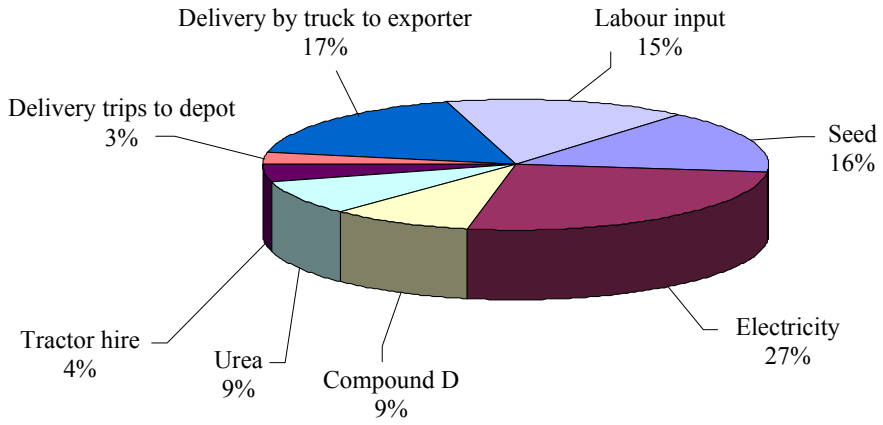
Inputs

Table 8. Inputs to baby-corn cultivation, typical farm [per hectare]:

Input	**Volume**	**Cost (£)**
Seed	39kg	58.74
Electricity	2,498KwH	99.92
Compound D	178kg	33.73
Urea	148kg	32.94
Tractor hire		16.11
Delivery trips to depot	12 trips	11.63
Delivery by truck to exporter		66.00
Labour input	**Man days**	
Land preparation	7.00	3.85
Planting	1.00	0.55
Fertiliser application	6.00	3.30
Irrigation	5.00	2.75
Weeding	5.00	2.75
Scouting	5.00	2.75
CPP application	-	-
Harvesting	77.00	42.35
Total		377.37

Table 8 indicates that the cost of physical inputs to production appears high, at £377 per hectare and £642 per farm.

Figure 9. Proportion of input costs to production of baby-corn:



Although we cannot observe the difference between costs of production for local crops and export crops, analysis of the inputs indicates higher costs (Figure 9). New categories, delivery by truck to exporter and delivery to depot (20%) and higher valued categories, electricity (27%, mostly to power irrigation) mean higher revenue will be required to cover these.

Outputs

Table 9. Typical farm income statement for baby-corn production and marketing (1.55ha farm):

Factor	Cost/ Benefit (UK£)
Inputs	-642.62
Sales	1056.23
Est. income per farm	413.61
Est. income per hectare	266.84
Est. income per lima	66.71

Once again, there are considerable variations among the farms. Yet, all make a positive estimated income. The attractiveness of involvement in export horticulture for farmers is evident. Income from one hectare of baby-corn is equivalent to the average rural wage in Zambia. We do not have data on the income statement for local crops. As mentioned in Section 5.2, understanding the financial flows in any farm is difficult; in a subsistence farm it is even harder with the added complexities of the informal and subsistence economy to deal with.

6.1.3 Efficiencies and improvements

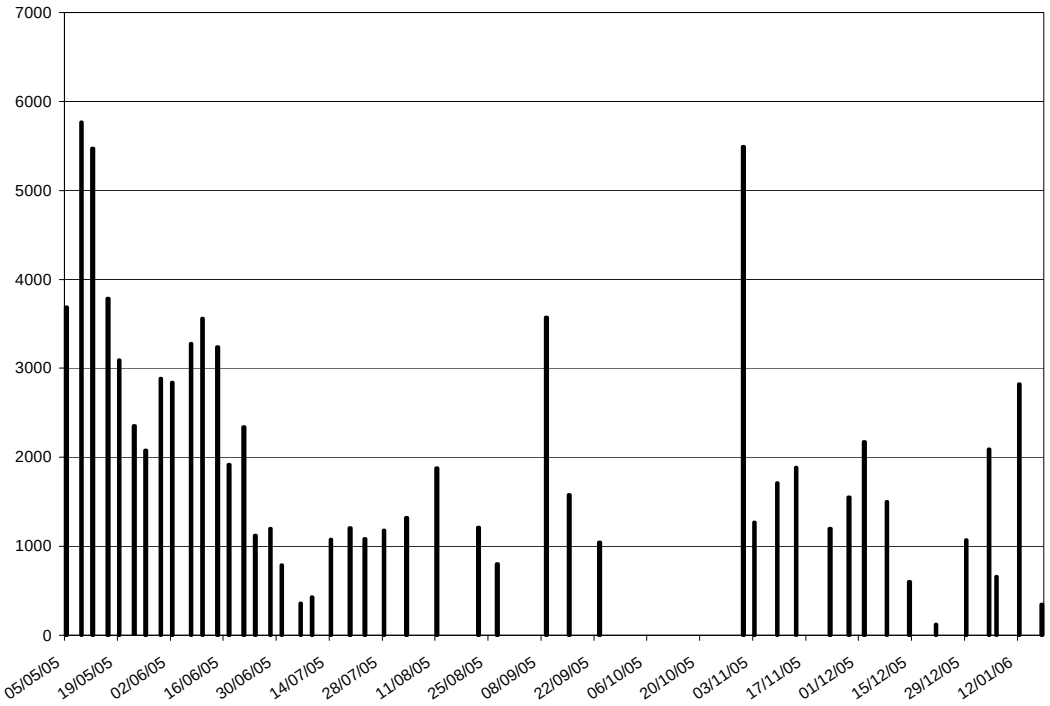
Table 10. Productivity and transport costs for farmers:

Factor	1	2	3	4	5	6	7	8	9	10	11	TOTAL
Transport cost	926,714	389,286	457,095	594,048	182,000	757,000	154,476	236,000	384,667	146,000	1,172,714	5,400,000
Production	6,394	18,698	4,093	12,121	4,864	12,180	5,721	5,185	11,482	6,874	3,080	90,692
Hectare	1	2	1	1	1	3	2	3	3	2	1	21
Prod/ha	6,394	8,130	3,411	12,121	6,080	4,060	2,861	1,571	3,827	3,437	3,080	4,403
TC/kg	145	21	112	49	37	62	27	46	34	21	381	60

Productivity
Table 10 shows the variations in productivity among actual farms studied. Improvements in training, access to good seeds and other aspects of management could enhance on-farm productivity.

Depot logistics
Each trip by truck from the depot to the exporter costs Kw120,000, giving a total cost of Kw5.4 million (approximately USD1,800) for 45 journeys, at an average of Kw60 per kilo transported (Figure 10).

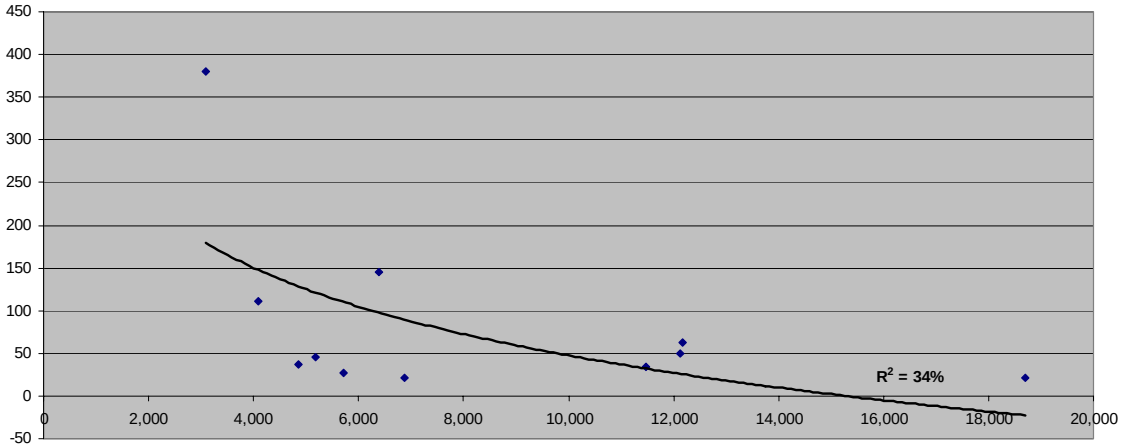
Figure 10. Transport volumes and frequency of supply from Buteko cooperative depot to exporter (kg):



The current attribution of transport costs from the depot to the exporter is inequitable and penalises the smaller cooperative members. The cost is distributed among the farmers whose produce is being carried on each journey. Table 10 indicates that the transport costs per kilo of produce transported came to an average of Kw60/kg and ranged from Kw21/kg to Kw381/kg. There is a strong relationship between the volume of production and transport costs per kilo (see Figure 11, trendline

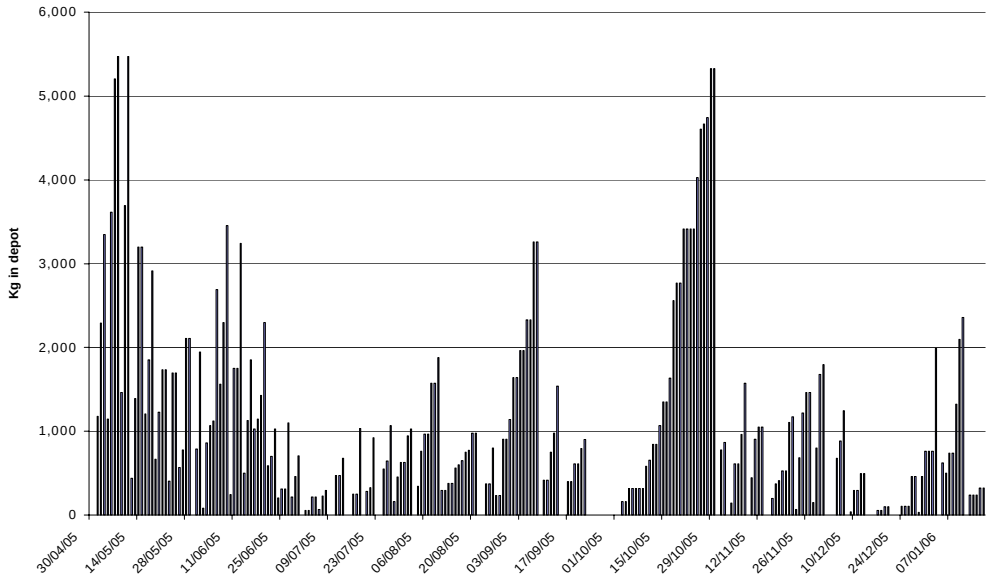
r^2=34%), providing incentives to harvest more, and meaning the smaller producers in the cooperative ultimately subsidise the transport costs of the larger producers.

Figure 11. Correlation between volume of production and transport cost per unit:



There are incentives to ensure that produce does not spend more than one day in the depot. This principle does not always appear to be adhered to at Buteko (see Figure 12). However, better depot logistics (management of truck use and inventory held) at the depot could generate efficiencies for the cooperative, reducing transport costs per kilogram. For instance, a regular service of the truck, say twice a week, would mean that all producers, and not just larger producers, could reap the benefits of economies of scale.

Figure 12. Inventory levels at the Buteko Cooperative depot, May 2005 to January 2006:



6.2 Process impacts

Section 6.1 presented the results from the static modelling of the Buteko Cooperative's production of baby-corn. Here, we present initial outputs from a dynamic model, using linear programming, over five years and with forecasts and policy recommendations for the following years.

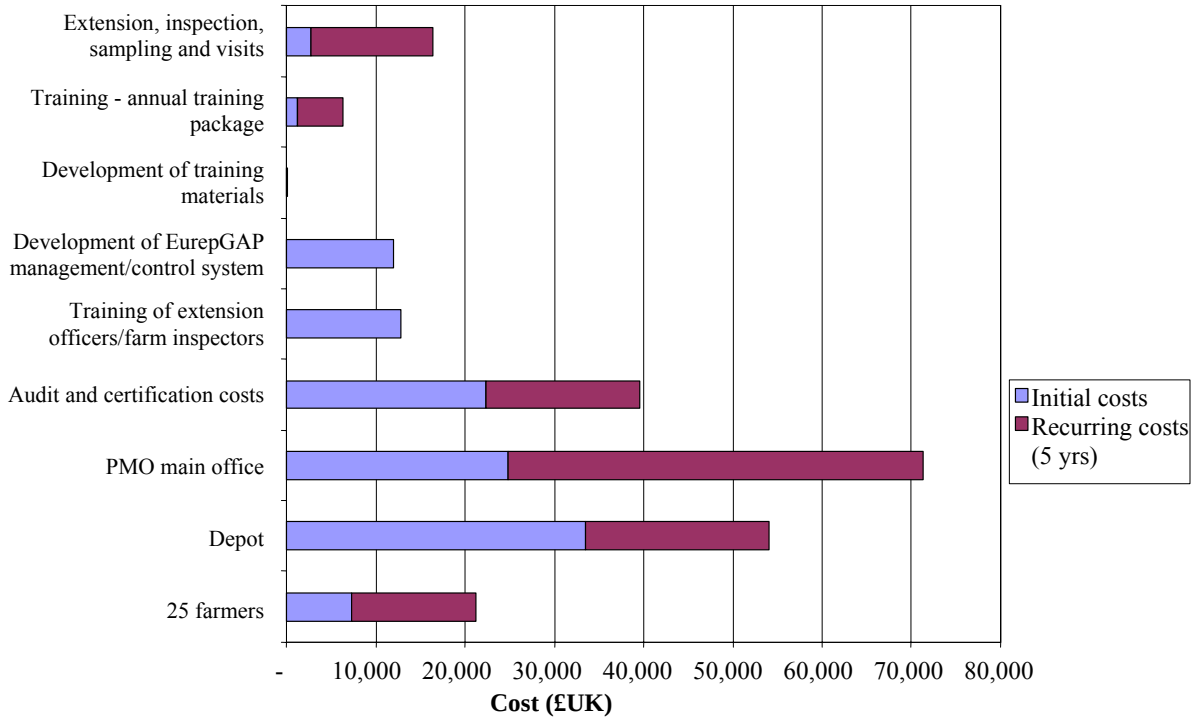
6.2.1 Cost of implementation of EurepGAP over five years

Our research estimates that the total cost of EurepGAP compliance in Zambia over the first five years will be £233,886 to certify 25 farmers (see Table 11), including several key costs (see Figure 13).

Table 11. Costs (initial, annual recurring and over five years) of EurepGAP compliance (UK£):

	Initial costs	Annual recurring	5 years
25 farmers	7,196	2,800	21,196
Depot	33,535	4,109	54,080
PMO main office	24,731	9,316	71,311
Audit & certification costs	22,320	3,455	39,595
Training of extension officers / farm inspectors	12,845	-	12,845
Development of EUREPGAP management & control system	12,005	-	12,005
Development and preparation of training	108	-	108
Training - annual training package	1,150	1,042	6,360
Extension, inspection and sampling visits to depot and individual farm sites	2,731	2,731	16,386
TOTAL	116,621	23,453	233,886

Figure 13. Costs over initial five years of establishing and running EurepGAP compliance system in Zambia (UK£):



Initial investment (i.e. Year Zero) is approximately half of this total, at £116,621 and a further 10 per cent per annual run-on cost, at £23,453. A number of key facts can be drawn from these results, which are presented up front to provide some context to the sustainability of this model in Zambia:

- Investment of £10,000 per SSG during the first five years
- Annual recurring cost of operating the system of £1,000 per farmer from year six onwards
- Annual recurring cost at farmer level of £122 (£2,800 for all 25 farmers), which is only 12 per cent of the system cost.
- Income to the Buteko Cooperative in 2005/6 was £10,800 (£120 per tonne for 90 tonnes)
- The extra costs at farm level reduce the margin to £280 per farm for baby-corn.

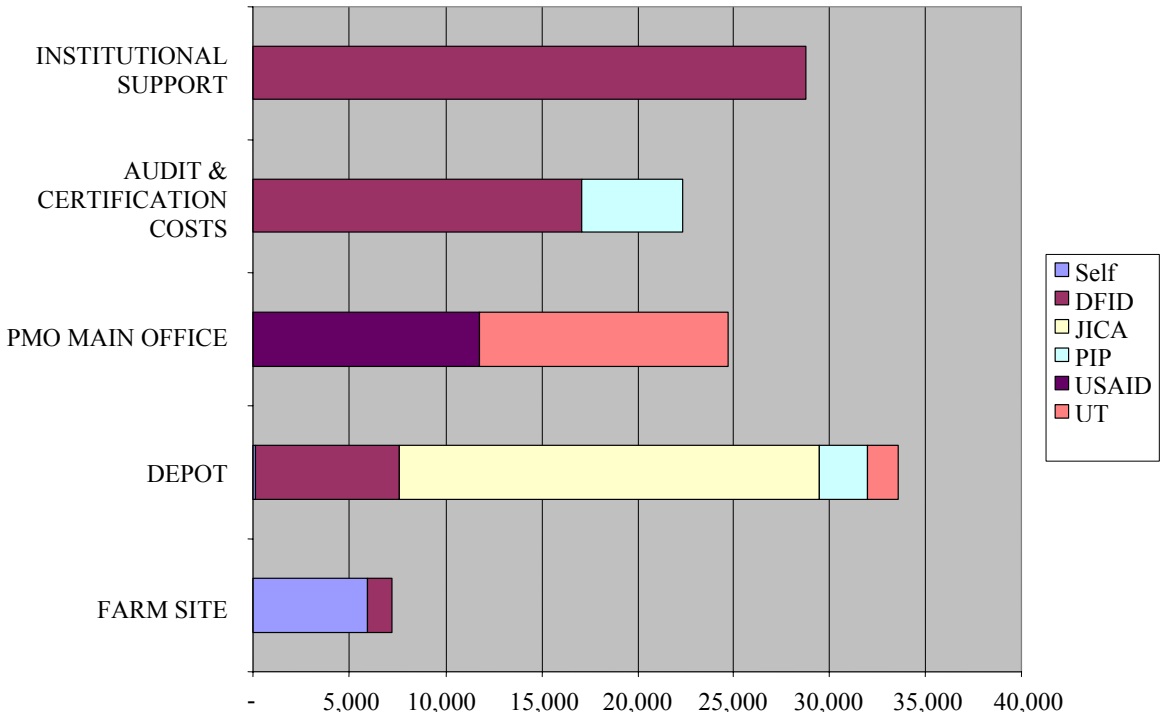
Zambia did not have the national capacity to manage the accession to EurepGAP or to train farmers, so the training packages contribute significantly to the initial costs (£26,000 or 22 per cent of initial costs), but fall to 4 per cent of recurring costs (£1,042 per annum). In countries with emerging export horticulture sectors or in regions without access to skills and such, similar schemes will need to be replicated to ensure successful compliance with these exacting standards.

6.2.2 Initial costs

Table 12. Distribution of initial cost by investor and cost centre:

FUNDER	FARM SITE		DEPOT		PMO MAIN OFFICE		AUDIT & CERTIFICATION COSTS		INSTITUTIONAL SUPPORT		TOTAL	
Self	5,960	83%	106	0%	3	0%	-				6,069	5%
DFID	1,235	17%	7,466	22%			17,105	77%	28,731	100%	54,537	47%
JICA			21,911	65%			-				21,911	19%
PIP			2,502	7%			5,215	23%			7,717	7%
USAID					11,765	48%	-				11,765	10%
UT			1,550	5%	12,963	52%	-				14,513	12%
Total	**7,196**		**33,535**		**24,731**		**22,320**		**28,731**		**116,513**	

Figure 14. Distribution of initial cost by investor and cost centre:



Investment from within Zambia was 5 per cent of the total initial costs, with donors paying the remaining 95 per cent or £110,000. Yet this masks the reality. External investment is vital in developing new markets and expertise where none exists. With this in mind, donor funding paid for the institutional support, initial audit and certification costs, established the depot and the PMO main office.

Each SSG farmer invested £238, 83 per cent of the entire investment in EurepGAP compliance system at farm level. This is significant when viewed in light that it matches the annual per capita average wage for rural Zambian citizens, estimated at £250 in 2004.

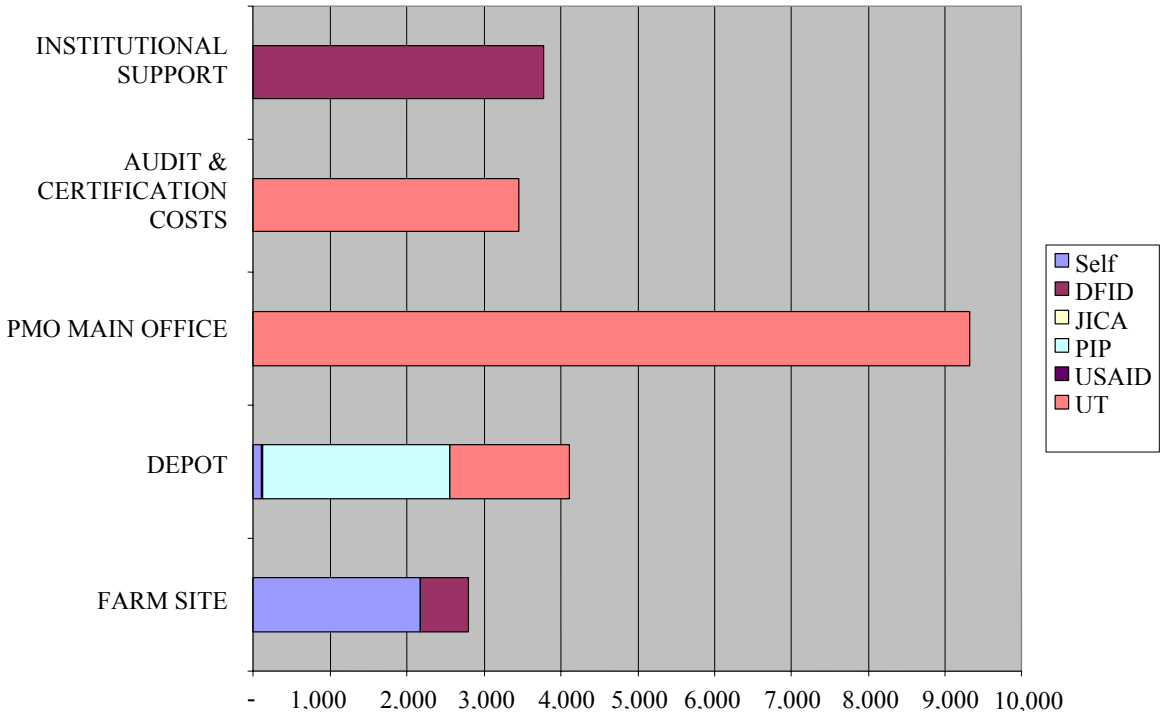
The five donor agencies have shown their propensity to invest in different aspects of the establishment of the EurepGAP compliance system.

6.2.3 Recurring costs

Table 13. Distribution of initial cost by investor and cost centre:

FUNDER	FARM SITE		DEPOT		PMO MAIN OFFICE		AUDIT & CERTIFICATION COSTS		INSTITUTIONAL SUPPORT		TOTAL	
Self	2,175	78%	103	3%							2,278	10%
DFID	625	22%	25	1%					3,773	100%	4,423	19%
JICA											-	
PIP			2,431	59%							2,431	10%
USAID											-	
UT			1,550	38%	9,316	100%	3,455	100%			14,321	61%
Total	**2,800**		**4,109**		**9,316**		**3,455**		**3,773**		**23,453**	

Figure 15. Distribution of annual recurring cost by investor and cost centre:



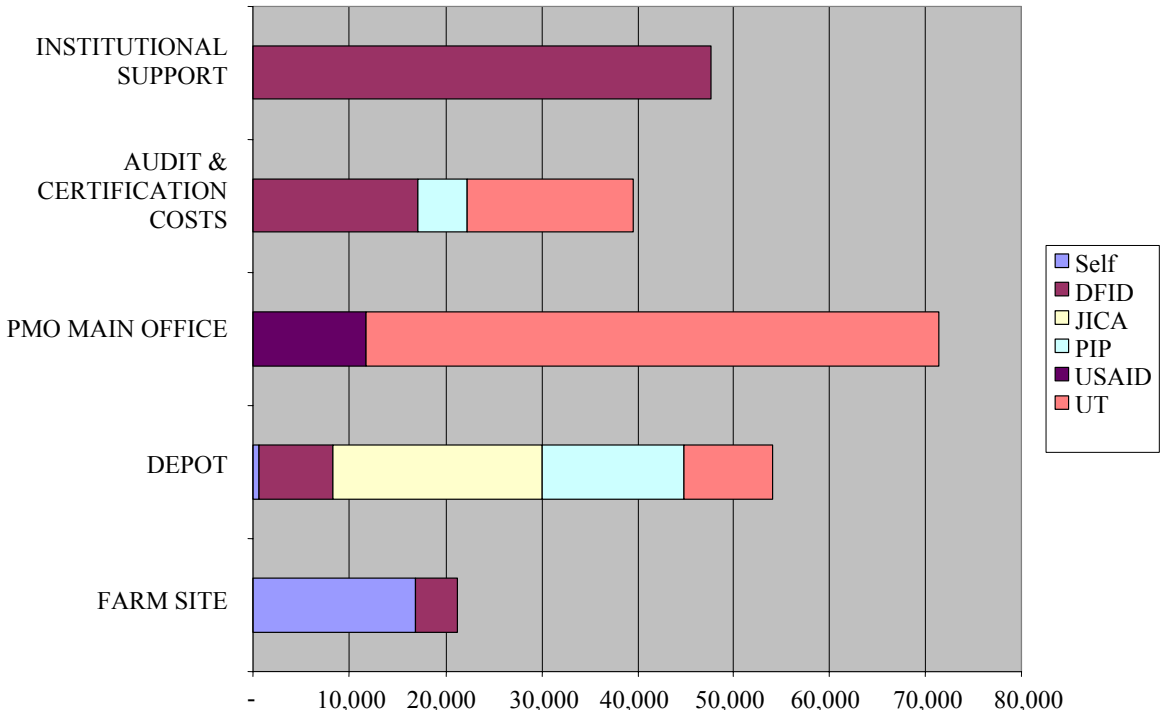
Currently, each farmer is investing almost £100 annually in supporting the implementation and development of the EurepGAP compliance system.

6.2.4 Total process costs over five years

Table 14. Distribution of total establishment cost over five years by investor and cost centre:

FUNDER	FARM SITE		DEPOT		PMO MAIN OFFICE		AUDIT & CERTIFICATION COSTS		INSTITUTIONAL SUPPORT		TOTAL	
Self	16,835	79%	621	1%	3	0%	-		-		17,459	7%
DFID	4,360	21%	7,591	14%	-		17,105	43%	47,596	100%	76,652	33%
JICA	-		21,911	41%	-		-		-		21,911	9%
PIP	-		14,657	27%	-		5,215	13%	-		19,872	9%
USAID	-		-		11,765	16%	-		-		11,765	5%
UT	-		9,300	17%	59,543	83%	17,275	44%	-		86,118	37%
Total	21,196		54,080		71,311		39,595		47,596		233,778	

Figure 16. Distribution of total establishment cost over five years by investor and cost centre:



The significant investment over the initial five years is by the farmers themselves, making 96 per cent of domestic investments in this compliance system. Each farmer will make approx £673 of investment over five years, an average of £134 annually.

6.2.5 Sustainability of the system

Assuming no further donor input, can the system survive? Currently, annual production benefits (from Section 7) are £413.61 per farm for baby-corn. Extra non-productive investment in EurepGAP compliance is £134 per farm per annum annualised over five years. This leaves £280 per farm margin. The marginal benefit to the farmer is the extra benefit the farmer receives from the land by investing in baby-corn production, so this £280 should be reduced by the nearest alternative. We do not have this figure and for illustrative purposes shall assume that all alternatives are zero – that the land each farm has devoted to baby-corn is best used for subsistence crop cultivation. Subsistence strategies are a mix of risk management, household consumption and opportunities for cash conversion, amongst other things.

At the end of the donor input, in year six and onwards, the entire recurring costs will have to be covered by the rents from baby-corn sales. Recurring costs of £23,453, or an extra £826 per farmer do not make financial sense with a gross revenue of £280 per farmer. Without changes, the Laccu system is not sustainable without continued external support from donors or the national government. Several insights arise from this finding that are pertinent to the entire system:

- More farmers make better economic sense
- Expansion of production
- Reduction in transaction cost?
- Better marketing and market segmentation
- Greater use of ancillary service providers
- Increase in productivity. The current average of 5.5 tonnes/ha could be expanded to at least 8 tonnes/ha with appropriate technical expertise and training.

6.3 Benefits of EurepGAP compliance

A farmer's viewpoint on EurepGAP will see current financial benefits and positive internal rates of return. During the initial five years, the IRR for farmers is 140 per cent, but this falls sharply in years 6 and 7 to -5 per cent as the full scale of the necessary inputs (the extra £826 per farm) to support the entire system are included.

Economically, there are undoubted benefits from expanding export horticulture:

- Local economic development from relatively large inflows of funds, particularly into poor rural areas
- National economic development as foreign exchange is earned, international trade increases and the country tries to attract other sectoral investments to capitalise and inflate inward investment. In Zambia, tourism is one such sector.
- Plus, there are substantial non-financial benefits, training, efficiency savings, and formalisation of the informal sector.

Theory tells us that private voluntary standards deliver two key modifications to supply chains – greater efficiency and altered willingness to pay.

Respondents provided no evidence of higher unit prices being paid to farmers for supplying produce that was EurepGAP compliant. Indeed, one comment received from a farmer respondent, in jest, was: "Should I be asking for higher prices?" Yet, higher unit prices are only one way in which farmers can receive higher returns from crops. This project received qualitative evidence of greater efficiency at farm level, including:

- Inputs. Firstly, lower input costs, particularly for fertiliser and seeds. Secondly, access to better quality inputs, higher rates of germination. Thirdly, baby-corn cultivation provides the opportunity to grow the crop for local maize if the market conditions are favourable by not harvesting for the export markets.
- Access to factors including credit (see Box 2) that helped to increase margins.
- Management benefits. Here respondents noted a range of spillovers of technology into enhancing productivity of local crops, cleaner hands, management and sequencing of labour and cultivation and input reduction through more judicious use.
- Efficiency. Those who remain in the export supply chains, note increasing overall efficiency of their farms.
- Stability of income, particularly enabling planning when prices are known in advance.

Box 2 Indirect financial benefits of access to credit for SSG

Ensure access to credit. Investments by farmers of £642 is significant and, although the income received from produce sales compensates for this, it raises the question of how a rural SSG raises such capital and what is the cost of this. The time from acquiring seed to being paid for the produce can be as long as five months, although most inputs will be paid on short timeframes, particularly harvesting labour. If we assume that a farmer has insufficient capital and needs to finance production through loans, Table 15 indicates a range of scenarios that show how this £642 can grow by as much as 21 per cent (a further £134) before being paid for the produce.

Table 15. Loan repayments under different scenarios:

Lender	Annual rate	Actual payback (£)
National bank	10%	661
Rural bank	16%	673
Local moneylender	70%	777

In practice, farmers will likely make use of more than one type of credit. One benefit of growing for EurepGAP is reported to be access to trade credit for selected inputs, often leveraged by the exporter through a preferred supplier. This contributes to reducing input costs and of course expanding margins. It might help with trade credit on other products, once the SSG has proved itself to be "trustworthy". Credit is a key outcome that farmers are looking to any system to provide. The more widely accessible, relevant to their needs and flexible in light of their threats, the more likely credit access is to contribute positively to the compliance system.

Continual monitoring of the supply chain logistics is necessary to ensure both a cohesive and equitable business model of a cooperative can be built. In LACCU, the example of regressive taxes on smaller members is creating internal conflicts.

7 Key informants viewpoints (positive and negative) on EUREPGAP

The following is a brief summary of some of the comments and viewpoints gathered during interviews of stakeholders in the field. Many of these were common to many respondents. The general position from Zambia was as follows:

- All respondents stressed the importance of EurepGAP for food safety assurance and good agricultural practice;

- Zambian farmers involved in the EurepGAP compliance scheme were highly positive about implementation of EurepGAP on the farm, and were clear about the benefits of good agricultural practice and proper record keeping. Some concerns were expressed over the high cost of upgrading infrastructure by some farmers;

- Complaints over compliance costs were minimal due to the high level of donor financial and technical support provided for the SSGs in Zambia;

- At the start of the EurepGAP implementation phase, 447 SSGs were involved in export horticulture via Agriflora; 326 of these were excluded by the exporter in 2003 as being those identified through stakeholder meetings as being unwilling or unable to meet the requirements for EurepGAP certification. Following the collapse of Agriflora, changes in market conditions reduced the number of growers interested in EurepGAP to 32; the rest felt that market conditions no longer justified the level of investment required for EurepGAP certification. By July 2006, only 10 growers were ready for certification, the rest had either withdrawn voluntarily (19) or been excluded (3) during the pre-audits (September 2005 and December 2005);

- EurepGAP cannot be seen as being primarily responsible for loss of access to EU markets by Zambian SSGs. The bankruptcy of the exporter (Agriflora) eliminated the SSGs schemes network of managerial and technical staff and deprived the growers of access to markets for high value commodities such as peas. Many growers lost confidence in export horticulture as a reliable source of income in late 2004. There were signs of recovery during the 2005 season, but the artificial strengthening of the kwacha in late 2005 and proposals for severe taxes on agricultural inputs and produce sales caused many growers to revert to production for informal markets where no record keeping is required. These markets provide low returns but pay cash and are difficult for the revenue authorities to control.

7.1 Exporter and service providers' positive views

- Implementation of EurepGAP is good business practice as it offers a strong due diligence defence against EU regulatory requirements and retailer product specifications. Exporters with EurepGAP compliant suppliers believe the risks of being caught out on pesticide residues, microbial contamination or quality related issues are very low.

- In Zambia, the exporter, farmers cooperative and major service provider had no issue with the current content of the EurepGAP protocol as they felt that good agricultural practice was important and delivered many benefits, especially in terms of: good vertical and horizontal traceability, improved hygiene (sanitary and phytosanitary) and better levels of worker safety.

- EurepGAP certification raised the exporters' confidence in the suppliers' ability to meet the EU retailers' requirements but the exporter had clearly defined limits to his reliance on EurepGAP certification as a guarantee of product safety. In Zambia, the exporter minimised

any remaining risk by only allowing SSGs to grow baby-corn, which is classified as a low risk crop from the point of view of chemical and microbial contamination.

- All farmers were capable of putting in place the required level of farm infrastructure (field toilet, hand-wash, plot markers, CPP hazard markers, field shelter and first aid kit). The sophistication of structures varied from farm to farm with some farmers going for the minimum possible whereas others had invested in elaborate permanent structures for field toilets and shelters. In these cases farmers felt that investment in the farm was important and EurepGAP was simply seen as a good reason for initiating activity rather than the only reason for upgrading.

- Compliant record keeping was possible for all of the Zambian farmers due to the high level of literacy and numeracy of both farm owners and workers. All farm owners were proficient in English but many workers preferred signage to be in Nyanga or Bemba languages. Comprehensive record keeping took time to develop as farmers needed to understand the system and build staff capacity in this area. The most readily compliant farms had strong managerial input from the owner; problems normally occurred where owners were absent and responsibility for implementation of EurepGAP had been left to junior staff.

7.2 Exporter and service providers' negative views

- In Zambia, the exporters' level of confidence in EurepGAP certified small-scale growers still had limits. The exporter was happy to purchase baby-corn as this is considered a low-risk crop (little pesticide applied and low risk of microbial contamination) but would not buy peas from the small-scale sector. The exporter felt that the management and controls offered by EurepGAP were insufficient to control chemical and microbial risks. The solution to this problem would be for the exporter to introduce their own control measures in the form of active participation by company technologists, advisers and managers in the EurepGAP scheme. However, this was not seen as cost-effective given the current economic difficulties in Zambia.

- The EurepGAP (ISO type) quality management system for option 2 of the protocol (Annex II introduced in September 2005) is seen as over-complex and demanding and a real challenge to implement for small-scale grower schemes. In Zambia, the farmers' cooperative posed the question of whether all this was really necessary to ensure food safety and good agricultural practice on the farm. The precise level of difficulty in meeting the requirements was related to the approach taken by the exporter and farmer groups. In Zambia, the farmers were operating their own PMO in the form of a secondary level (management) cooperative known as LACCU. The QMS presented problems at the pre-audit stage as the half-day QMS audit was found to involve demonstrating an ability to understand and explain the inter-relationships between ~400 different documents. This exercise proved to be beyond the capacity of the management team to demonstrate effectively. The solution for the certification audit was to transfer responsibility for QMS operations to the main Zambian service provider (NZTT) which is part of the Zambian Export Growers Association (ZEGA) to which all the growers belong.

7.3 Farmers' positive views

- The creation of centralised facilities in Zambia was seen as beneficial by farmers' as they saved money on inputs such as seed, fertilisers, chemicals and protective clothing via bulk purchasing agreements. Farmers recognised that the Agriflora controlled schemes with centralised spray teams had provided additional savings on infrastructure and materials for crop protection. However, since the collapse of Agriflora, this system had been ceased to

function and been replaced by individual farmers spraying crops using equipment and chemicals held at the cooperative depot.

- In Zambia, group organisation and improved management had been used to improve credibility for accessing credit for purchase of inputs.

- In Zambia, the cooperative management team used EurepGAP as a marketing tool to access high value local and regional markets. EurepGAP compliance was seen by potential buyers (food processing industry, local and regional supermarkets) as an indicator of a professional approach and reliability of the growers in terms of quality and safety. In March 2006, farmers reported that COMESA was talking about introducing a "green-card" for agricultural exports. Holders of EurepGAP certificates would automatically be issued with a green-card as EurepGAP certification is considered proof that the grower has shown evidence of meeting international standards for good agricultural practice.

- Good agricultural practice has improved efficiency and profitability of farming operations as yields and product quality have increased and wastage of chemicals has been reduced due to following proper crop protocols.

- EurepGAP compliant record keeping has enabled farmers to evaluate the profitability of farming as a business and reduce theft of inputs by farm workers.

- Creation of traceable plots with coded markers linked to records has enabled farmers to calculate the cost of production per plot and hence to obtain a further measure of profitability.

- Introduction of proper crop rotation has improved soil fertility and reduced the number of pests seen in the crop.

- Hygiene requirements and training have been transferred to households within the community and farmers believe personal hygiene has been improved.

- Correct storage of farm chemicals, handling of pesticide washings and disposal of empty chemical containers has reduced health risks through spillage and inappropriate use of empty containers (water carriers and children's toys). Some farmers believe that correct handling of pesticides is also good for the environment.

- Safe and effective use of pesticides has reduced the risk of contamination of the spray operator and some claim to have noticed health benefits from reduced exposure to pesticides.

- Improved understanding of pesticide selection, access to approved lists with application details, and training on crop scouting and correct techniques for application has eliminated the risk of crop loss due to inappropriate chemical selection and reduced wastage as pesticides are only sprayed following proper scouting and spraying is better targeted due to improved levels of competence of the spray operators.

7.4 Farmers' negative views

Zambian farmers made no complaints about EurepGAP although some did raise complaints over purely local issues such as problems with payments and release of inputs within the cooperative. The reason for the lack of complaints over EurepGAP is quite simply that unlike most of the option 2 schemes in Kenya, the growers in Zambia had a very high level of financial and technical support from the donor community. Farmers only paid for on-farm infrastructure and this proved affordable for all of the growers in Zambia. Farmers were not consciously aware of the large amount of money

required for all of the supporting activities and centralised management systems and therefore only really saw the many benefits of EurepGAP without experiencing the true costs of implementation.

Under current economic conditions in Zambia, SSG involvement in export horticulture is not tenable. However, should exports revive in the future, cost structures for the SSG scheme would need to be re-evaluated as without some external support the growers could not maintain EurepGAP with less than ~500 active growers in a dynamic high-value market.

8 Conclusion

8.1 Is EurepGAP responsible for Zambian farmers becoming excluded from retail markets or changing from one marketing channel to another?

During the implementation phase, some growers withdrew from the export market due to concerns over the need to upgrade farm infrastructure or keep detailed and accurate production records. However, EurepGAP cannot be seen as being primarily responsible for loss of access to EU markets by Zambian SSGs. For the small-scale growers much prestige was associated with being linked to a major exporter; farmers liked having a reliable monthly income via written contracts and were initially paid in foreign currency, which was seen as a major attraction. Agriflora also took care of all transport logistics and provided a network of managerial and technical staff. The bankruptcy of Agriflora in July 2004 eliminated all of these advantages and also deprived the growers of access to markets for high value commodities such as peas. It is not surprising that many growers lost confidence in export horticulture as a reliable source of income in late 2004.

In 2005, following the establishment of a relationship with York Farms, confidence began to recover and there is little doubt that York Farms' promise to increase orders by at least 50 per cent for the 2006 season would have bought more farmers back into the export scheme. However, between December 2005 and January 2006, several drastic changes occurred to the economic environment in Zambia that made exports of fresh vegetables to the EU uneconomic.

Issues external to the horticulture industry have proved significant:

- FOREX. In December 2005, the Zambian kwacha started to gain value against the US dollar (see Box 1). As the horticulture industry is based on foreign exchange payments for inputs and sales the change in rate was a major blow to the economic viability of the export horticulture industry.
- Fuel. Unstable conditions in the Gulf States have spurred a continuing rise in fuel costs resulting in steep increases in the cost of airfreight. Falling sales (due to the change in exchange rates) and the demise of Agriflora (the biggest exporter) have conspired to reduce the number of cargo flights from Lusaka from seven flights per week in 2005 to just one flight per week in March 2006.
- Tax. Within Zambia, the January 2006 budget proposed levying 17.5 per cent VAT on all agricultural inputs (other than those for maize) and all food sales other than maize meal. A 45 per cent withholding tax was proposed for businesses.

All of Zambia's export industries have been badly affected by these conditions and the horticulture industry has reduced volumes by more than 50 per cent and laid off over 1,000 workers (affecting the livelihood of ~10,000 people). Exports have been maintained at a low level in order to retain market links in the hope that economic conditions will improve by December 2006. York Farms had no need to involve LACCU until conditions improved but were generous in giving a token export contract (see section 8.2) to enable LACCU to complete their EurepGAP certification in June 2006.

In interviews with farmers in March 2006, it became clear that many were currently uninterested in the export market as the need for detailed records and production contracts would render them liable to VAT. Although the local markets offer poor prices and unreliable sales they do operate on a cash-in-hand basis at the farm gate (hence no transport costs) with no records or receipts thus making taxation difficult.

8.2 Is EurepGAP certification viable in Zambia?

Turnover, margins, expected future demand and certified farm numbers are all falling.

In 2005, LACCU had a contract to supply York Farms with 845 tonnes of baby-corn. Given an average export percentage (for LACCU) of 13 per cent, this contract had a potential value of £114,200 per annum. Eighty-five growers (25 of whom were going for EurepGAP certification) were involved in this contract and they managed to deliver 700 tonnes of baby-corn, which given an export percentage of 13 per cent was worth £91,000. LACCU charged each grower a 2 per cent levy on all produce sales and thus made £1,820 to assist with running the PMO. If this were distributed equitably each farmer would have a gross income of £1,049 per annum. However, when eight farmers (of the ten going for EurepGAP) were interviewed in March 2006, gross incomes varied from £555 to £2,462 per annum and net incomes from export sales varied from £37 to £1,317 per annum with most making between £300 and £700 per annum at net income from sales of baby-corn for export. This is a drastic reduction in the net income figures of £1,000 to £7,500 per annum seen during the 2003-2004 season with Agriflora.

In 2006, York Farms had planned to increase the value of the contract by 50 per cent giving a potential income of £170,000 from produce sales and a levy return of £3,400 for the 2006 season. However, due to harsh economic conditions (see section 8.1) this contract was never issued. Instead, York Farms gave LACCU a contract to supply 90 tonnes of baby-corn worth £12,870 over six weeks simply to enable LACCU to complete EurepGAP certification in June 2006.

The EurepGAP system implemented by LACCU cost £116,621 for initial investment and £23,453 per annum to provide a farmer-led PMO with relatively sophisticated produce handling facilities and external technical support from NZTT to cover training, extension advice, farm inspection and internal auditing and development and maintenance of the QMS and documentation systems for EurepGAP. Given that 25 growers were participating in the EurepGAP scheme in 2005, the cost per individual grower would have been £4,664 for initial investment and £938 annually to maintain the system. However, if the ten growers who went for EurepGAP certification in June 2006 had met all the costs, the figures would have been £11,662 per grower for initial investment and £2,345 per grower to maintain the system. Given these constraints, it would have been unfeasible.

Given the farmers' levels of income from export sales these figures are obviously untenable. Massive levels of donor support made it possible to achieve EurepGAP but as donor support only has a limited life it would not be possible to maintain EurepGAP certification unaided.

It must be remembered that when the EurepGAP implementation process was started in 2003 nearly 500 SSGs were involved and incomes levels varied from £1,000 to £7,500. In addition, extensive support was received from Agriflora. Even without support from Agriflora the costs for EurepGAP would be much reduced if a larger number of growers were involved. For a system based on the LACCU model but involving 300-500 growers the individual investment costs would be £974 and £584 per annum respectively and recurring costs would range from £463 to £225 per annum depending on whether 300 or 500 growers were involved in the scheme.

In addition, savings could be made by removing some of the more luxurious components of the system. The depot buildings for example, which cost £21,470, could be reduced to about £1,500 if a very simple structure was used without access to refrigerated containers. Even the hand-wash stations used were a high cost item at £33 each. A similar type of hand-wash cost £7 in Uganda and in Kenya the leaky tin type hand-wash cost less than £1 per unit.

Overall, for EurepGAP to be viable for SSGs in Zambia there would be a need for a much larger group of certified growers with a considerably higher and more stable income and ideally a strong partnership with an exporter, where the exporter would play a major role in cost sharing and management of the SSG scheme. The current focus on a single relatively low value crop to just one

main market is not sensible. The LACCU farmers do grow crops for sale into local wet markets but much more could be achieved by more aggressive marketing of the cooperative and associated diversification into other high value market opportunities such as local supermarkets, tourist hotels and the local processed food factory.

In retrospect it could be argued that LACCU was not the wisest investment of donor funds. LACCU was seen as a catalyst for wider improvement via an initial group of 500 smallholders chosen for their geographic location, economic and social background as likely to succeed in the export market. There is some evidence that lessons learned with LACCU will be transferred by NZTT to smallholders in the copper belt targeting higher value local markets. However, the LACCU investment has not been especially successful although it has illustrated how fragile the export market is in Zambia and how easily the activities of weaker players such as LACCU can be disrupted by external factors.

8.3 Lessons learned from the Zambian experience

The experience of LACCU in Zambia shows that compliance with the requirements of option 2 of the EurepGAP protocol for fresh fruits and vegetables version 2.1-January 2004 is technically feasible for small-scale growers with the possible exception of some elements of the QMS system.

It was also shown that under certain circumstances it might be possible for farmers to create and manage their own PMO, but problems at LACCU revealed management weaknesses and highlighted the importance of hiring a professional management team and providing business management training for the farmer-run management executive.

Establishment of EurepGAP necessitates development and implementation of a new system of working and the main costs (90 per cent+) of establishing such are not incurred at farmer level, but as part of the development of new protocols in the supply chain.

The Zambian experience illustrated that with the exception of un-reasonably high costs, EurepGAP was a very beneficial process for the growers and resulted in dramatic improvements in operating efficiency, yields, worker safety and both plant and human hygiene. The Zambian SSGs had a very positive view of EurepGAP as a standard and are firmly convinced of the benefits of good agricultural practice. Yet, the economics of the system are currently pushing these SSGs away from export, or at least, away from exporting EurepGAP compliance. Other markets, such as South Africa, are becoming more attractive and the standards regime to enter these markets is less severe. But without external help and dotage, accessing these opportunities and reaping decent returns is unlikely to lead to sustainable farms or livelihoods.

Annex I. List of interviews

Most of the material used in this report was collected during the personal interviews listed below which were conducted during the visit of the NRI/IIED team in March 2006. However, as NRI (Dr A. Graffham & Dr A. Legge) had been working with LACCU, NZTT and their former exporter Agriflora on DFID funded projects since 2002 it was possible to have access to records and other material from the Agriflora period and a detailed understanding of previous DFID inputs into LACCU's activities.

Lubulima Agricultural Commercial Cooperatives Union (LACCU)

- Mr D. Moyo (Chairman)
- Mr Perry (Secretary)
- Mr A. Muleya (Treasurer)

Buteko Cooperative

- Mr Kafwata (Farmer 9103) (Chairman of Buteko Cooperative)
- Mr Muleya (Farmer 9106)
- Mr Kasapatu (Farmer 9107) (EurepGAP Coordinator for LACCU)
- Mrs Kangombe (Farmer 9108)
- Mrs Munzele (Farmer 9109)
- Mr Nketani (Farmer 9112)
- Mrs Liywali (Farmer 9113)

Makeni Cooperative

- Mrs Muyuni (Farmer 8122)
- Mrs Hakamanangwe (Farmer 8140)
- Mrs Mutoni (Farmer 8150)

Lusaka South Cooperative

- Mr Kelvin Sikagoma (Depot Clerk – Lusaka South Depot)

Former member of LACCU

Mr R. Divecha (formerly farmer 9111 in Buteko Shorthorn Cooperative). This cooperative withdrew from LACCU after the collapse of Agriflora to sell independently to Borassus Estates. In March 2006, the strong kwacha and government proposals for heavy taxation of farmers made export horticulture unattractive due to poor returns and the disadvantages associated with having detailed records. Thus, Mr Divecha and other members of Buteko Shorthorn relied on farm gate sales into local wet markets.

York Farms

- Mr Nigel Pollard

NZTT Training Trust

- Dr Glenn Humphries
- Mr Perry Ngoma
- Mr Hamakuni Lubaba
- Mr Robert Bush

Agribusiness Forum (ABF)

- Mr Felix Chisuka
- Ms Brenda Kachapulula

Zambian Agribusiness Technical Assistance Centre (ZATAC)

- Mr Likando Mukumbuta
- Mr Guy Kahokola
- Mr Brian Mwanamambo

Annex II. Checklist used as the basis for data collection in Zambia

For the Zambian fieldwork a preliminary checklist was developed for semi-structured interviews and examination of documentary evidence such as detailed farm and cooperative records kept as part of the EurepGAP quality management system (see below). In practice, this list was used as a guide and supplemented with additional questions as new factors were identified such as the operation of the shared produce truck operated by LACCU. Interviews with ABF and ZATAC focussed mainly on gaining a better understanding of who was responsible for paying the costs associated with introducing EurepGAP to LACCU. Following the Zambian study the original checklist was developed into a spreadsheet for cost benefit analysis that was used with minor modifications for all the work in Kenya.

COST-BENEFIT ANALYSIS

Points to consider
Option 1 versus Option 2
determine unit cost per farmer
Differentiate between capital and recurring expenditure
Who paid the bills (donor distortions & viability)
Sub-contracting of services to external organisations

For each cost point how many units are required per farmer

FARM INFRASTRUCTURE

Permanent plot markers (1 per field)
Field toilets (within 500m of field)
Handwash stations (field edge & toilet)
Field shelter (min 1 per farm)
Field gaps & spray barriers (between fields)
CPP spray markers (4 per field)

FARM / DEPOT INFRASTRUCTURE (CENTRALISED FACILITIES)

Chemical soak-away (1 per farm or depot)
CPP container disposal pit (1 per farm or depot)
Silsoe type incinerator
Seed & fertiliser store
CPP store
Toilet (1 per depot)
Emergency shower (within 10m of CPP store)
CPP protective clothing store
Office for record keeping
Produce store (normally refrigerated)
Handwash station (1 for depot toilet & 1 for depot produce handling area)
Crate washing facilities (where crates used)

EQUIPMENT & ANCILLARIES
Knapsack sprayer with nozzles
CPP protective clothing (overall, boots, gloves, mask with replaceable filter cartridges & goggles)
First aid kit (1 per farm or depot)
Metal shelving for CPP store
Equipment for CPP spillage (bucket, sawdust & shovel)
Disinfectant for cleaning toilets & floor of produce handling area)
Storage bin for empty CPP containers

Measuring equipment for CPP (volumetric containers & calibrated dispensers)
Measuring equipment for fertiliser (calibrated buckets)
Harvest & transport containers

PERSONNEL
Depot clerk for record keeping
Farm clerk for record keeping
Extension officer
CPP spray operator
Farm inspector
Internal auditor
EurepGAP coordinator
PMO clerk

FARMING PRACTICES
Planting in rows with correct spacing
Creation of field gaps (~1m between fields)
Correct application of inorganic fertilisers
Correct use of organic manures & mulches
Correct application of CPP
Crop scouting
Good crop husbandry (removal & destruction of diseased material)
Good harvesting techniques

TRAINING
CPP training for depot clerk
CPP training for spray-operator
Basic CPP training & crop scouting for all farmers
Food safety and hygiene level 1 training for depot clerk and each farmer + peer group training skills
First Aid training for depot clerk
Records & traceability training for depot clerk & each farmer
Internal auditing skills for farm inspector & internal auditor
Farm inspection training for each farmer
EurepGAP awareness for all farmers
Farmer to Farmer training on food safety & hygiene for all workers includes harvesting rules

DOCUMENTATION
Development of materials for QMS manual
Implementation of QMS manual
Maintenance of QMS manual
Development of materials for QM manual
Implementation of QM manual
Maintenance of QM manual
EurepGAP compliant records
EurepGAP compliant farmer files
Development of materials for farming with EurepGAP manual
Implementation of farming with EurepGAP manual
Maintenance of farming with EurepGAP manual

EXTENSION ADVICE
Provision of at least monthly (prefer weekly) visits to farm sites to provide advice on GAP to EurepGAP standards

TRAINING & EXTENSION MATERIALS
CPP training manual

CPP user handbook
Food safety & hygiene training manual
Food safety & hygiene user handbook
Records & traceability training manual
Records & traceability user handbook
Internal auditing training manual
Internal auditing user handbook
Farm inspection training manual
Farm inspection auditing user handbook
EurepGAP awareness training materials
Farmer to farmer food safety training posters (set of 6)
Harvesting rules poster
Emergency procedures poster
Correct application of fertiliser poster
Lifting heavy loads poster
Chemical hazards classification poster
What to wear when handling chemicals poster
Visitor notice (farm & depot versions)
Hazards signs and notices for depot facilities
Toilet cleaning rota sheet

LABORATORY ANALYSIS
Soil analysis (1 per farm, 1 off test)
Water analysis (1 per farm, annual)
MRL analysis for CPP residues (several per farm or per scheme on an annual basis)

EUREPGAP ACTIONS
Farm profiles
Risk assessments
Legal registration of groups
Farm inspection
Internal audits

CERTIFICATION
FoodPlus GmbH fees (with breakdown)
Certifier fees (with breakdown)
Travel & subsistence costs

Farm Income
Interested in farm income before and after implementation of EurepGAP; difficulty is getting pre-EurepGAP records in many cases.

Need to look at productive land area, capacity of land versus actual production and value of any "contracts" to supply, value of crop (high/low) is price stable or does it fluctuate. This information is important in determining the potential income of the farm and therefore ability to pay for EurepGAP. If farm operates below capacity need to look at reasons for this.

Need to take account of non-EurepGAP factors, i.e. in Zambia current economic issues of currency valuation are having adverse impact on horticultural exports.

In farming terms, this exercise involves developing a crop budget (a normal practice) and then collecting data from farms to see what the real income is.

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