2012

PGRO

Annual Report

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AN INTRODUCTION TO PGRO

Since its formation in 1944, PGRO has provided research and technical services to growers and processors of legume crops in the UK. It is funded by (a) *voluntary* grower levy collected by the merchants and processors who purchase the produce, and (b) contracted trials work commissioned by both commercial companies and government agencies. As a registered charity and company limited by guarantee, it is managed by a Board of Trustees appointed from the National Farmer's Union, relevant food processors, and other related industries. This Board meets three times a year and four Board members also form, with the CEO, the Management and Finance Committee which meets to review operational issues every two months. A management team of the four senior members of staff, chaired by the CEO, meets monthly to manage the day-to-day decisions.

PGRO's purpose is to provide a comprehensive technical service to the growers and processors of legume crops in the UK. Its mission is -

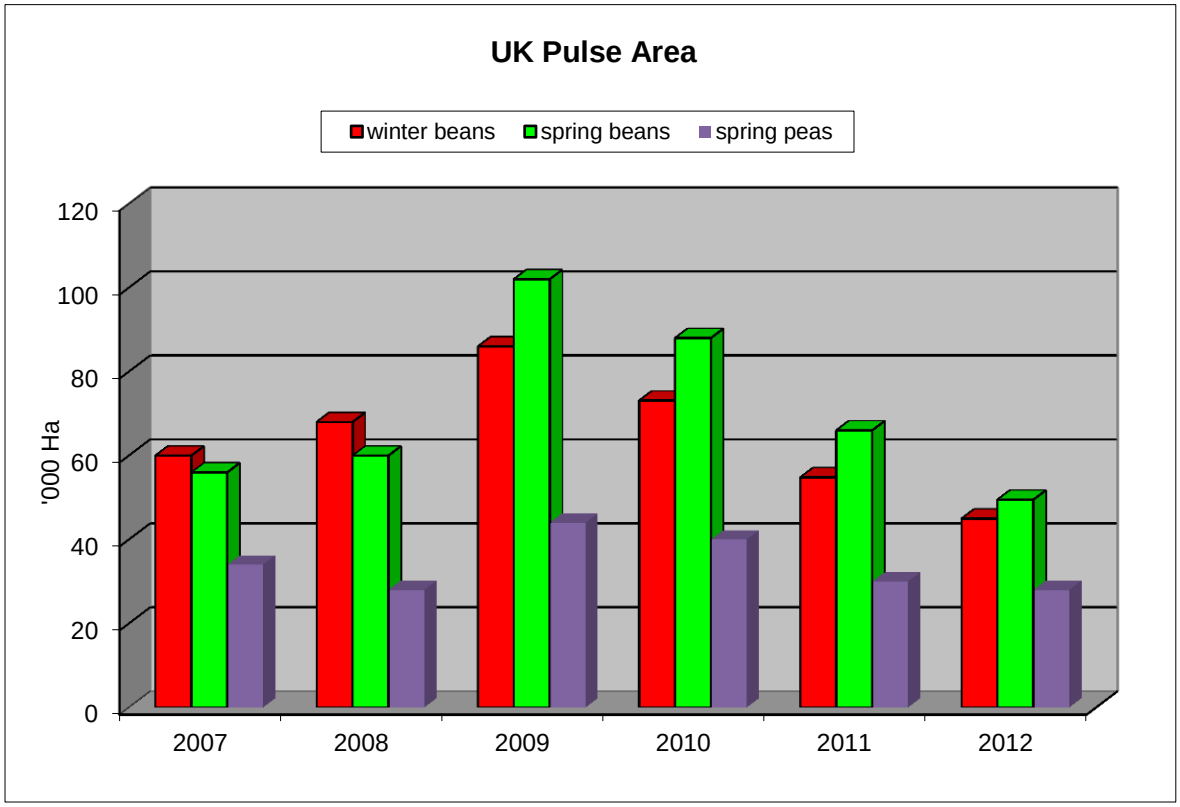
"To provide a responsive, independent technical service to voluntary levy paying members for legume and other selected vegetable crops. To ensure members have access to (a) timely, accurate information, and (b) staff who are competent, enthusiastic, and lead the sector."

PGRO remains one of the few UK sources of sound, independent technical advice, at a time when food production, quality and provenance have never been more scrutinised, both locally and globally.

2012 LEGUME CROPS IN UK

2012 began with the continuation of dry weather and a warm late winter period. Below average rainfall for several months began to lead to concern for water supplies with much discussion about priorities and the official declaration of drought status. At the end of March / early April the weather pattern broke and a period of cool and very wet weather continued to dominate right through the spring with unprecedented levels of rainfall throughout the remainder of the year culminating in one of the coldest winters on record. The growing conditions through the spring and summer were poor and as a result significant yield potential was lost to both vining pea and combinable pulse crops alike. Some crops were simply abandoned due to the impossibility of reaching them for harvest. Yields were significantly impacted further reducing the potential levy income on top of an already depleted crop area. 2012 saw the smallest area of pulses drilled for over 35 years, the crop area being just 60% of that sown only 3 years previously.

With peas in short supply the market prices for growers were strong and near to the end of the calendar year product for human consumption was well over £450 per tonne. Bean prices were good too with a significant premium over feed wheat for feed beans of around £90 per tonne with a further £50 available for product for human consumption in the export markets of Northern Africa. Good prices continued in the market right through the season with wheat commodities rising strongly and soya rising still further. An ever growing demand from the Far East maintaining a firm base price to commodities. Despite the good prices and the probability that pulse growers in 2012 once again enjoyed some of the best gross margins available, the impact of lower yield had a negative effect on many growers, (especially pea producers) who for two years in a row had a troublesome growing season. Combining peas in the UK are in danger of being seen as a specialist crop for growers in the East on light soils with the market focus on marrowfat types and blue peas for human consumption. The agronomic benefits for growing pulses are strong and numerous- the message is compelling. However where growers do not directly connect the benefits of a preceding pulse to the success of the subsequent cereals and focus on short term margins alone, then the wheat rape rotation appears attractive. Despite this fact, in the long run the problems the practice cultivates could be very significant. Pulse growers need to have a good season or two with reliable yields and fair prices and for the agronomic benefits of pulses in the rotation to be fully appreciated for their agronomic benefits.



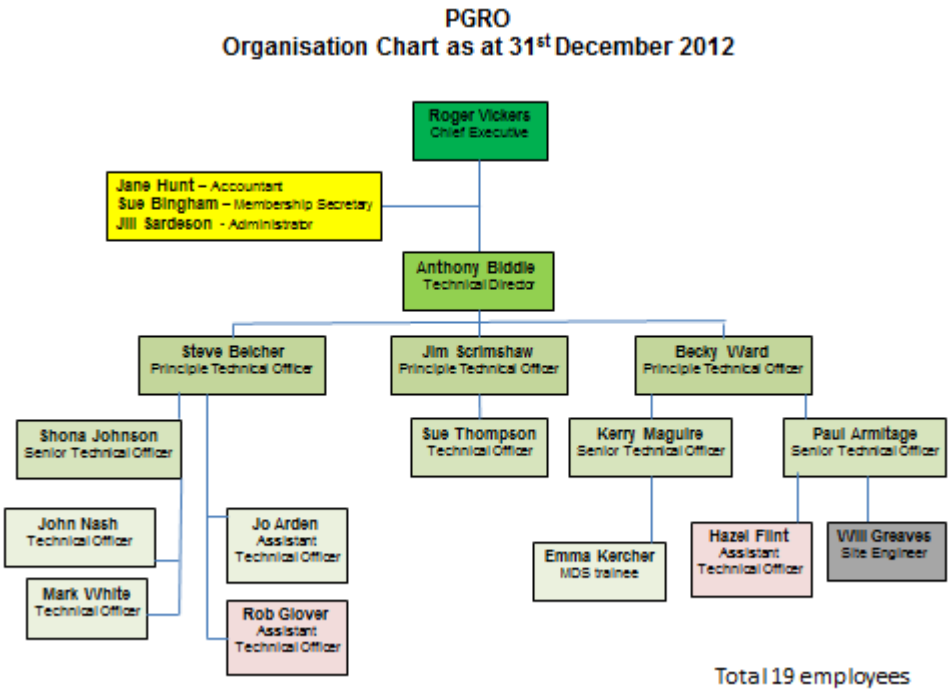
STRATEGIC PROGRESS

PGRO continued the pursuit of the path set out in the 2011 "Strategic Review 2012-2014 ", with the continued focus on levy funded research supported by supplementary income from research contracts. Following a reduction in income from both sources the strategy will be under review in 2013.

Value for the Levy payers remains core to the PGRO existence and the realisation of this strategy is revealed in the proportion of funds spent on research compared to levy income.(see page 5)

Success in application for grant funded research peaked in 2012 adding significantly to income but with associated increases in costs in research execution.

STAFF STRUCTURE & PERSONNEL



Dr Kerry Maguire joined PGRO in May 2012 from NIAB and took primary responsibility for Plant Pathology at Senior Technical Officer level. This appointment was fulfilled an identified strategic need.

Emma Kelcher joined as an ATO on a 6 month contract from the MDS graduate agronomy training scheme. Jo Arden began maternity leave in July and Shona Johnson returned from maternity leave in August.

Anthony Biddle formally announced his intended retirement date for the end of March 2013.

Funds from the Geoffrey Gent Bursary scheme were used to fund both a trip to Canada for Becky Ward and Anthony Biddle. The bursary had almost £7k remaining at the end of 2012.

FINANCES

In 2012 pulse levy fell as a result of smaller crop area with appalling weather conditions reducing yield. Total levy shortfall compared to the previous year was circa £90k.

Levy and membership income was £422k as opposed to £512k the previous year. Contract income was also down £60k following the failure of certain vegetable trial contracts to materialise. Technical research income totalled £179k as opposed to £249k in 2011.

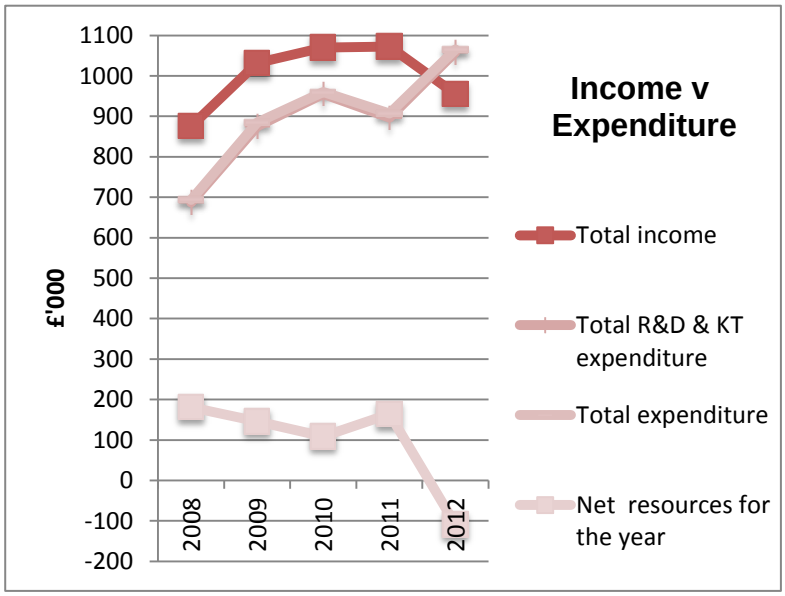
Costs rose significantly during the year, 18% in total (£162k).Employment costs rose circa 11% (£63k) this included one off costs for the new CEO in recruitment and the hand over period. Travel and subsistence rose £10k to £43k, with significant cost increases in fuel.

Project costs rose by 51% to £225k but were significantly offset in part by project income.

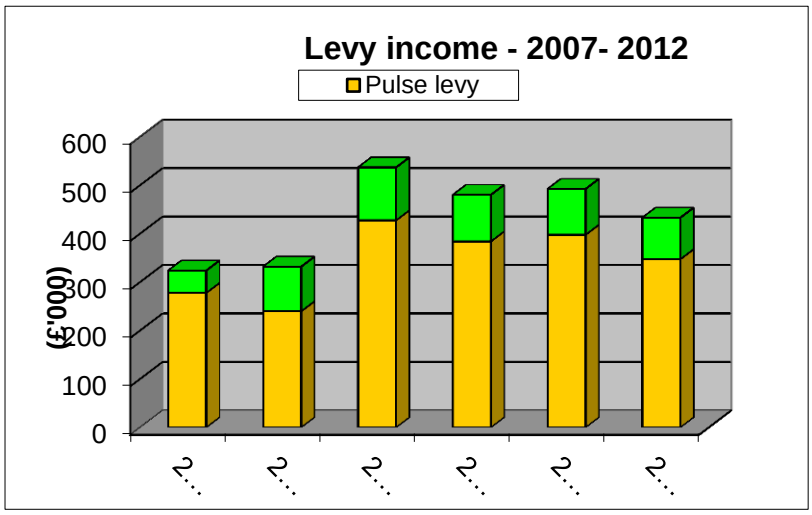
Conferencing income improved in 2012, but the seed lab was 11% below budget and 2011 performance.

The last remaining defined benefit pension liability was resolved and no longer appears on the balance sheet.

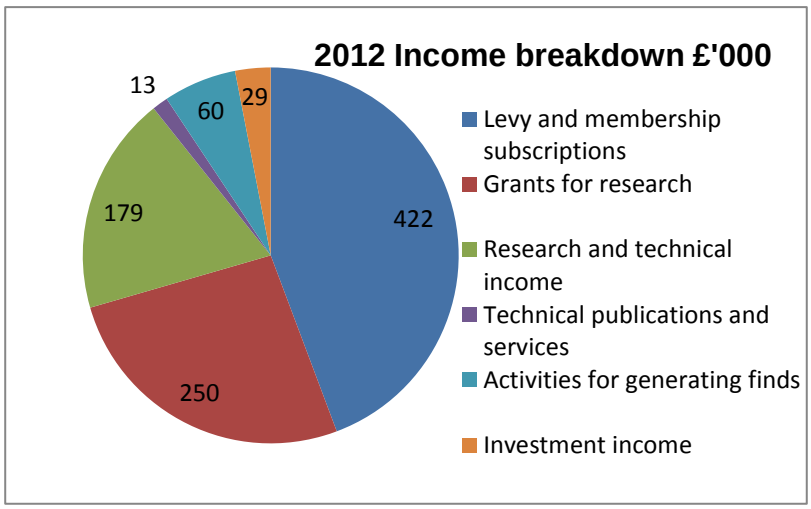
PGRO's longer term investments ended the year at £603k and increase of approximately £43k following a stronger stock market performance. Total funds carried forward were £1.2m.



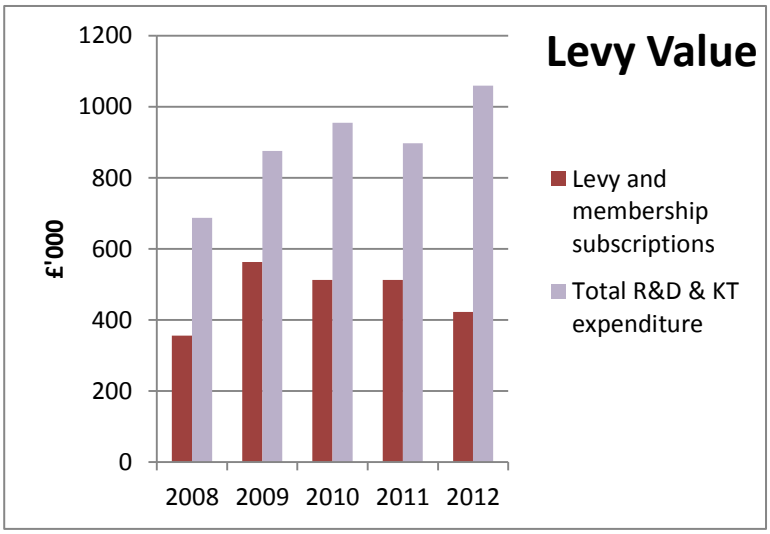
The final balance on trading showed a net surplus of £41k but after restatement of the 2011 accounts to accommodate the removal of provisioning facilities the net outgoing resources for the year totalled £109k.



Levy income has a declining trend with a 4 year low in 2012. The largest drops and most volatile sector being the dried pulses. With increased Spring crop area and the assumption of a normal harvest in 2013 this should improve next year.



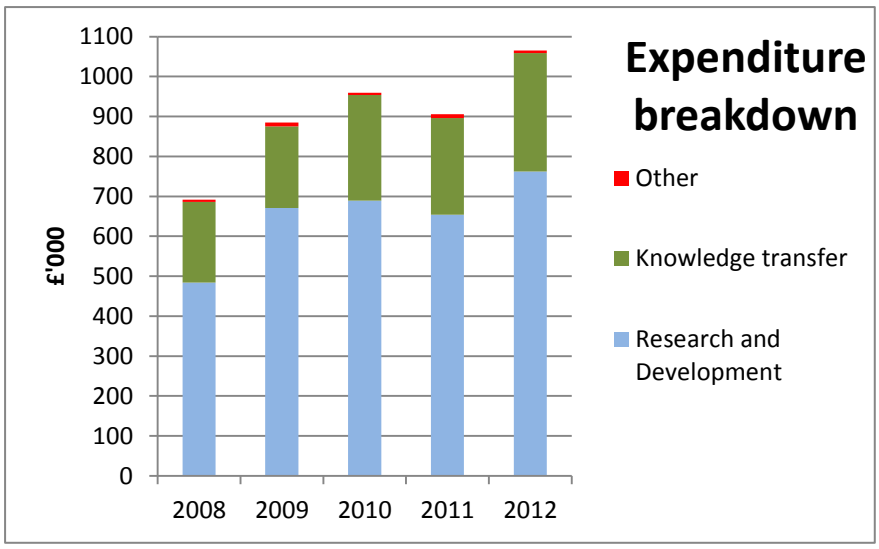
2012 income breakdown Pie chart clearly shows that levy formed less than half of the total PGRO income during the year. Very significant contributions came from research grants, contract research services and other activities for generating funds complimenting the levy receipts.



The ratio of the levy to the total spent on R&D has for the last two years increased such that in 2012 for every £1 in levy received, £2.5 was spent on research.

COMMUNICATIONS AND KNOWLEDGE TRANSFER (KT)

The continued engagement of a PR agency, shared with BEPA, has helped to raise the profile of PGRO with the press and has attracted a good range of journalists to all our events.



The transfer of knowledge gained from collaborative projects and levy funded research remains a central objective within PGRO and the organisation makes a considerable effort to reach out to the levy payers at every opportunity. The delivery of the latest findings information and advice is a high priority. A significant proportion of total expenditure is allocated to Knowledge transfer annually.

The following KT activities can be listed for 2012.

a. Advice and literature was produced throughout the year with much of the technical information made available through the web site.
b. Marketing reports were collated in conjunction with BEPA and distributed monthly throughout the year.
c. Thirteen crop bulletins were issued throughout the season.
d. PGRO and BEPA were present at the Cereals 2012 event with displays and plots of peas and beans.
e. Pulse road-shows were held at 5 locations in January and February in conjunction with Syngenta Crop Protection.
f. Technical staff contributed to a number of grower/merchant and Ag-chem. meetings.
g. All three issues of PGRO Pulse Magazine were distributed through Farmers Weekly with a distribution of around 23,000.
h. The PGRO Pulse Agronomy Guide was produced in January 2012 and the PGRO Recommended Lists of peas and beans were announced in November.
i. The PGRO Vining Growers Guide including the vining pea descriptive list was produced and published in November.
j. Conventional press/media were used extensively to ensure pulses and vegetable legumes received good coverage in a market expressing strong interest in spring cropping.
k. Two open trials day events at PGRO were held for Vining Peas and Pulses.
l. PGRO supported Open Farm Sunday at Thorney
m. PGRO supported AICC at their annual conference.
n. A series of factsheets have been prepared based on previous HDC and PGRO funded work on the following topics
   -Irrigation
   -Pea aphid
   -Silver Y moth
   -Pea bruchid.

RESEARCH & DEVELOPMENT PROJECTS 2012

The two crop sector panels met during the year to discuss and prioritise research needs for processing legumes and pulses.

SUMMARY OF 2012 PULSE LEVY SPONSORED PROJECTS

1. VARIETY EVALUATION

The 2012 trials programme consisted of spring peas and spring and winter beans for Recommended Lists. Recommended Lists are produced for Spring Peas, Spring Beans and Winter Beans and trials are arranged in all the major production areas.

a) Peas
Some pea sites suffered in the wet conditions. The site at Chatteris, Cambs yielded 7.4t/ha in 2011, while in 2012 this was only 2.75t/ha. Other sites in Kent and Essex yielded very well and gave good quality. Overall trial yields (4.06t/ha) of peas were well down on the 5 year (4.99t/ha) average.
In the ***white category***, variety Salamanca (LS Plant Breeding), gained a full recommendation for 2013.
Kenzzo progressed to 2nd year provisional recommendation.
Outclassed Ragtime and Kayanne were from the list.
In the ***large blue category***, Stratford (Limgrain UK) was added to the list and Bluestar was withdrawn by the breeder.
The ***marrowfat*** *category* saw a number of changes. Variety Neon (Limagrain UK), gained full recommendation for 2013. P1 recommendation was given to Bibao (IAR Agri) and Strada progressed from P1 to P2. Outclassed varieties Falstaff and Kahuna were removed from the RL. Scholar was withdrawn by the breeder.

b) Winter beans
Trial yields (3.51t/ha) were well down on the 5 year (4.54t/ha) average. No real changes to the RL other than pale hilum variety Honey (Wherry's progressed from P1 to P2 recommendation.

c) Spring beans
Spring beans suffered less than most and trial yields (4.11t/ha) were only marginally down on the 5 year average (4.26t/ha). Inoculated disease trials (new for 2012) and some field trials gave good downy mildew data this year.
Renewed interest in spring cropping has coincided with an exciting time for spring beans.
There was one new full recommendation and 2 new high yielding provisional recommendations. Variety Babylon (Limagrain UK), gained a full recommendation for 2013 and after gaining National Listing, Boxer was added to the 2012 RL with a P2 recommendation.
Two new pale hilum types, Vertigo and Fanfare (both LS Plant Breeding) gained P1 recommendations
White flowered, tannin free Tattoo moved to the Outclassed category. Obelisk was considered for P1 recommendation, but was not added. Tic bean Maris Bead remains fully recommended as the only variety of this type and Fabelle was withdrawn by the breeder.

2. SCOTTISH PULSES
(with SAC)

Spring beans
SAC conducted two spring field bean variety trials in 2012. Due to excessive wet weather, the trial at Edinburgh was not harvested and only data from the Perth site was available. Results were presented as a separate table, including the 5 year means in the PGRO Agronomy Guide

3. VARIETAL SUSCEPTIBILITY OF COMBINING PEAS TO DOWNY MILDEW (Peronospora viciae)

As part of the series of trials to assess the relative susceptibility of combining peas to downy mildew, two disease observation trials were carried out by PGRO in conjunction with those carried out by NIAB. Nineteen varieties in the Recommended List trial and sixteen varieties in the NL series were planted at Holbeach, Lincs and Chatteris, Cambs. Data with those from NIAB were collated to provide a rating for the PGRO RL for combining peas.

4. PULSE CROP GENETIC IMPROVEMENT NETWORK (PCGIN)

(with JIC and NIAB)

The network, formed in 2005, is based on collaboration between a strong research base and the UK plant breeding industry to promote development of peas, beans and lupins and therefore assist with the more sustainable development of the arable sector. The network has created stakeholder groups to interact within the network and to provide links with the EU research community. PCGIN is managed by JIC, PGRO, NIAB and Defra with input by the commercial sector. This was the third year of the current funding.
The objectives are to identify key phenotypic and performance characteristics within peas and beans, to develop genetic maps in pulse crops to provide novel germplasm and marker traits for commercial development of varieties.
The final report of PCGIN was prepared and is available from John Innes Centre.
In 2012, seed from 160 of the 300 lines was planted in a replicated trial at Thorney and the remainder were planted at NIAB Cambridge for further multiplication. A combination of pest and severe waterlogging at Thorney reduced the numbers of lines available for harvest data and will need to be repeated in 2013.

5. WEB BASED FORECASTING SCHEME FOR DOWNY MILDEW IN SPRING BEANS

(with FERA, York)

The automated system at Fera was available for forecasting downy mildew monitoring from 15 sites from April until late June.

Updates about the infection risk at each monitoring site were posted weekly on the Spring Beans page on the CropMonitor website (www.cropmonitor.co.uk).

6. BRUCHIDCAST

(TSB supported project with PGRO,R-RES, Syngenta, Frontier and OECOS)

The project comprises four main parts:

a. Pheromone evaluation and trapping: Previous work indicated that bruchids were attracted to plant volatiles and trapping with synthesised volatile lures were used in a field trial at Rothamsted. However, temperatures at the trial site had a significant adverse effect and more work using lab based bio-assays are in progress.
b. Field trapping: Observations in commercial crops indicted an earlier infestation of adults and crops were about two weeks ahead in growth stage development at the beginning of the summer. Growth developments and temperature data were collected for the main varieties of winter and spring beans.
c. Crop damage - Surveys of crops from across the UK were carried out and damage analysis showed damage to be similar to 2011. Most damage occurred to crops in the East and South, with no damage in northern crops.
d. BruchidCast - A growth development model is being constructed using data from the winter and spring bean variety trials at Thorney and Kings Lynn.

7. GREEN PIG (LINK)

(with SAC, Uni Nottingham, NIAB and partners)

The UK pig feeding industry relies heavily on imported protein feedstuffs, primarily soybean meal. Whilst soybean meal has an excellent nutritive value for pigs, its possible environmental impact and price fluctuations are of growing concern for the sustainability of the UK pig producers.
Green Pig brings together plant breeders, crop growers, pig nutritionists and pig producers to assess the potential of using home grown legumes (peas and faba beans).
A greater use of home grown peas and faba beans in growing and finishing pig diets has the potential to reduce environmental impact without penalizing pig performance.
Life Cycle Analyses of UK pulse and imported soya bean meal indicate that around 25% reduction in the carbon footprint may be achieved through the use of peas or beans rather than soya bean meal.
The chemical composition of a range of varieties of peas and beans show no significant differences in amino acid composition between varieties.
Both small scale and large scale growth trials showed no adverse effects in feeding pulses as a soya replacement in balanced diets. The project ended in October the results being disseminated at conferences and literature and articles during 2012.

8. MINIMISATION OF NITROUS OXIDE INTENSITIES IN ARABLE CROP ROTATIONS

(LINK supported project with ADAS, SAC and partners)

The first year of the rotation fertiliser experiments were conducted by ADAS, PGRO and British Sugar at Terrington St Clement. The crops managed by PGRO included vining peas, combining peas, winter and spring beans. N2O was measured before, during and after harvest with or without crop residues.
Data are currently being analysed.

9. MANAGEMENT OF DOWNY MILDEW IN SPRING BEANS

In the second year, two trials were established to manage the disease using varieties which have moderate (Fuego) and low resistance (Pyramid) to disease. Seed treatment was compared with a spray programme. Data were available from one of the sites this year. Late Folio sprays reduced disease levels significantly compared to the untreated and Wakil treated seed alone. A late spray plus a seed treatment did not improve control. However there was a slight increase in yield.

10. OPTIBEAN

(TSB supported project with NIAB TAG, Wherrys and industrial partners)

The first year of this project to optimise the inputs for field beans whilst maximising the outputs. PGRO work involved agronomy studies to assess the yield response to time of sowing and plant populations of both winter and spring beans. In addition, a series of trials examining the response to fungicide applications for chocolate spot and aphicide applications for pea and black bean aphid were carried out. At a further 10 sites, soil SNS was determined following beans and oilseed rape as a comparison and N uptake of the following winter wheat was assessed. Results are currently being analysed.
A third agronomy component is being undertaken by NIAB TAG spray applications unit in examining the potential for inter row weeding using a guided weeder and glyphosate.
Bean feeding studies are being carried out by meat, poultry and fish producers and a Life-Cycle Analysis for bean feed is being constructed by North Energy Ltd.
The genetic basis for yield stability is being studied by NIAB TAG.

11. LUPINS FOR UK AGRICULTURE AND AQUACULTURE

(TSB supported project with IBERS, NIAB TAG and industry partners)

This three year project is investigating the potential for lupins for use in poultry and fish production and is based on breeding lines developed by IBERS from the LINK project. PGRO evaluated a range of commercial varieties in a trial in Worcs. Weather conditions delayed the maturity of the crop but all varieties were harvested and samples collected for feed analyses values. Preliminary feeding trials were begun in fish and egg layers.

SUMMARY OF PROJECTS FUNDED BY PGRO VEGETABLE LEVY, HDC AND OTHER PUBLIC FUNDING IN 2012

1. VARIETY EVALUATION

1. **Vining Peas**

a. Screening trial. Thornhaugh

Varieties are submitted by breeders for evaluation against standard varieties. The varieties are tested for one year.

b. Preliminary trial. Thornhaugh

With the agreement of the breeders, candidate varieties from the preliminary trial are tested for a further year.

c. Main trial. Thornhaugh and Holbeach (Extension trial site at Holbeach is funded by HDC)

The best performing varieties from the preliminary trial are tested for two years with the results of all trials reported in the PGRO **Descriptive List of Vining Pea varieties**.

2. Green Beans

a. Screening trial. Thornhaugh

b. Preliminary trial. Thornhaugh

c. Main trial. Thornhaugh

Varieties were evaluated and chosen as above with results reported in the PGRO **Descriptive List of Green Bean varieties.**

2. VINING PEA PLANT POPULATION TRIALS

2 sites: Thornhaugh and Holbeach

Using Oasis, Bik Top and Waverex performance from a Range of plant populations was trialled. The first year results were affected by the dry conditions and uneven populations. The populations giving the best financial return were determined using average seed costs and produce prices. The trial will continue for two further years.

3. HDC FUNDED PROJECTS

1. Vining Pea Varieties at Optimum Timings

A three year project running to 2013 harvest. In 2012 at Thornhaugh two sowing periods for earlies and second earlies, early main crop and maincrop varieties were trialled.

2. Vining Pea Extension Trial

All main varieties sown at Thornhaugh were repeated at Holbeach on a silt soil type.

3. Tenderometer / Dodman Standardisation

Re calibrating the Dodman tenderometer with the Master Martin TR during the 2012 season confirmed the reliability and stability of the Dodman digital tenderometer and achieved the objective of including the Dodman as part of the PGRO TR Standardisation Service.

Since the approval of the project, discussions have taken place between PGRO, Dodman, CBRI, Anglia Pea Group and Ardo regarding the suitability of the Campden Canned Peas as a pre-season checking method. Further work on evaluating alternative approaches is in progress.

4. Critical P for Vining Peas

(with NIAB TAG)

A four year project with harvest trials in years 2-4.

2 sites Norfolk and N Lincs were selected to evaluate the response of vining peas to phosphate fertiliser. In year Year 1 sites were established. In 2012, two trial sites were maintained by TAG with PGRO monitoring crops until harvesting. Plots were harvested sequentially from each site over 5 - 6 day period (5 harvesting days)

4. DEFRA FUNDED LINK PROJECTS

1. Min-No

Minimising nitrous oxide emissions in arable cropping (MIN-NO)

As part of a large project monitoring emissions from a range of arable crops, PGRO is managing winter beans, spring beans, combining peas and vining peas at a trial site at Terrington St Clements (Norfolk). The project is lead by ADAS and this is the second and final year of field trials. The project is due to be completed in 2013.

2. Perennial Margins

(HortLINK supported project) (HDC FV334)

"Perennial Field Margins with combined agronomic and ecological benefits for vegetable rotation systems". The project is examining the role of plants in perennial field margins in reducing the risk of infestation of certain crop pests. Several vegetable crops are being studied in this project, including vining peas. PGRO has a role in the project management and the Knowledge Transfer.

3. Management and Control of Sclerotinia in Vegetable Crops

(with ADAS)

Progressing to its final year this is the final year of this 3 year project lead by ADAS. PGRO is managing field evaluation trials in vining peas and green beans. The objective is to evaluate a model system for forecasting infection and spray timing.
The PGRO trials include sclerotial monitoring and spray trial in vining peas (Holbeach) and green beans (Norfolk)

4. Quality Determinants in Pea Seed (QDiPS)

(with JIC, CBRI and FERA)

2012 was year two of the four year project to determin the genetic basis for factors affecting the quality of pea seed such as colour, taste and texture. PGRO involvement includes a small plot trial at Thornhaugh, Harvested at dry stage for seed multiplication. Vined samples of Cabree, Avola and Waverex grown at Holbeach were harvested at a range of TR values for sensory evaluation.

5. EU FUNDED PROJECTS EU FP7

ABSTRESS

Year 1 of this five-year, three-million Euro project is set to revolutionise the way in which new plant varieties are produced. Molecular and computational techniques will be used to identify processes associated with the way drought and disease combine to make matters much worse than either alone. The project will also identify novel genes and biochemical pathways that improve the resistance of peas to drought and *Fusarium spp.* infection.
PGRO involvement consists of KT and the development of a stakeholder database, newsletter production and dissemination meetings. In the final year, there will be a demonstration trial with drought tolerant and *Fusarium spp.* resistant peas.

RESEARCH STRATEGY

In 2012 PGRO in conjunction with HDC lead the Processed Legume Industry Panel, in formulating a Research and Development Strategy for Vining Peas, Green Beans and Broad Beans. That strategy will be used for the direction of Levy sponsored projects at the PGRO for the period 2012- 2015 and is reproduced in the table below

Objective 1: Ensuring adequate and sustainable crop protection measures are available for the key pests, diseases and weeds of each crop/category				
Target	**Initiative examples**	**Previous, pipeline, or current work**	**Priority**	**PLiP Co-ordinator**
Pea weevil/thrips/ bean seed fly	**Vining Peas:** Development of seed treatment delayed	FV 58: Evaluation testing in collaboration with chemical company	HIGH	
Aphids in beans	**Vicia faba:** Improved control and optimisation of product use	TSB 10182: Improving the availability of UK sourced protein feed through new faba varieties, production and utilisation systems – Sustainable Protein Crops		
Bruchid beetle	**Broad Beans:** UK crops at risk with severe losses in 2006/7 Control strategy required	FV 184: Broad beans: monitoring and control of bean seed beetle (Bruchus rufimanus) FV 322: Broad beans: Management and control of Bruchid bean seed beetle TSB 100871: A novel Monitoring and Forecasting System for the Integrated Management of Bean Seed Beetle *Bruchus rufimanus*	HIGH	
Pea bruchid risk assessment	Risk assessment and mitigation strategy. Options for prevention. Communication needed following completion of RA	HDC fact sheet	MEDIUM	
Slugs	**Vining Peas:** Improved control Industry initiative (AHDB) needed	FV 230: Vining peas: reducing risk of slug contamination FV 379: Leafy salads and Brassicas: Slugs - A review	MEDIUM	
Downy mildew	**Vining Peas:** Improved control of secondary disease required as currently reliant on seed treatments. Further varietal tolerance studies and screening for foliar fungicides required	FV 215: Peas: downy mildew control	HIGH	
Sclerotinia	**Vining Peas:** Development of improved control strategy as disease becoming more frequent	FV 361 (SA Link SA563/LK09130) Sustainable Arable Link: Reducing the impact of Sclerotinia disease on arable rotations, vegetable crops and land use	HIGH	
	Green Beans: Development of improved control strategy as disease becoming more frequent	FV 361 as above	HIGH	

Objective 1 (Cont): Ensuring adequate and sustainable crop protection measures are available for the key pests, diseases and weeds of each crop/category				
Target	**Initiative examples**	**Previous, pipeline, or current work**	**Priority**	**PLiP Co-ordinator**
Pigeon control	To be raised at AHDB by HDC for industry action. Potential for investigation of bitterness genes		HIGH	
Chocolate spot	**Broad Beans:** Limited approved products and severe infection in 2008	FV 355: Broad beans: Fungicide programme for chocolate spot control TSB 10182: Improving the availability of UK sourced protein feed gthrough new faba varieties, production and utilisation systems – Sustainable Protein Crops	HIGH	
Ascochyta fabae	**Vicia faba: development of improved control strategy**	TSB 10182: Improving the availability of UK sourced protein feed through new faba varieties, production and utilisation systems – Sustainable Protein Crops	Medium	
Root diseases	**Vining Peas:** An increasing problem with no chemicals available. An evaluation of cultural methods of suppression is required and the use of mustard bio fumigant cover crops. Build BBSRC proposal with WCC on bio-fumigants.	Proposal submitted to HDC rejected for funding	HIGH	
Weed Control	**Vining Peas:** Volunteer potatoes - No herbicides available for peas. Post emergent product being evaluated. FV307a extension including pea row width to adapt spot weeder.	FV 307a FV 243: Vining peas: the use of mechanical weeding techniques	HIGH	
	Vining Peas: Post emergence broad leaved weed control - Limited products available. Evaluation of potential products and management of existing products is required	FV 181: Volunteer oilseed rape control in vining peas and broad beans	HIGH	
	Vining Peas: Loss of pre and post emergence herbicides with limited number of products available. Screening of potential products for both pre and post and management of applications and product use required	FV 256c Continuation - solutions to the loss of active ingredients for weed control in vegetable crops	HIGH	
	Green Beans: Loss of pre emergence and limited post emergence products available		HIGH	

Objective 2. Increase returns on investment through efficient use of resources.				
Target	**Initiative examples**	**Previous, pipeline, or current work**	**Priority**	**PLiP Co-ordinator**
Nutrition	**Vining Peas:** More information needed on P and K requirements	FV 345: Establishing Best Practice for determining soil nitrogen supply - addition of field Veg sites to HGCA project 3425 FV 354 Dwarf green beans: Evaluation of Rhizobium inoculant for nitrogen fixation FV380: Identification of critical soil P levels TSB 10182: Improving the availability of UK sourced protein feed through new faba varieties, production and utilisation systems – Sustainable Protein Crops	HIGH	
Potato apples in vining peas		Investigate options for processing control	HIGH	
Pea maturity		Investigate possible options for current cross check standards and validation of products	HIGH	
Mechanisation	Vicia faba: Inter-row weeding using precision spraying equipment Harvesting technology for Mange Tout peas	TSB 10182: Improving the availability of UK sourced protein feed through new faba varieties, production and utilisation systems – Sustainable Protein Crops	HIGH	
Crop storage				
Efficient use of water resources	Drought tolerance in vining peas.	FV 363 HortLink: developing precision irrigation for field scale vegetable production, linking in-field moisture sensing, wireless network CP 54 Rhizobacteria to reduce water use and enhance crop quality (HDC Studentship)	HIGH	
Efficient use of energy	• Alternative energy sources? • Cold storage			
Waste management	• Recycling of crop covers • Composting and use of pack house waste			
Staff management	Labour efficiency	FV 298 - Production of increased labour efficiency models in field veg		
Resource management	Direct drilling/ non-inversion in vining peas			

Objective 3: To supply consistent quality product and continuity and to achieve customer satisfaction				
Target	**Initiative examples**	**Previous, pipeline, or current work**	**Priority**	**PLiP Co-ordinator**
Vining Pea Varieties	• Variety evaluation - Limited sites for trials Site on a silt soil type now running at Holbeach • Variety performance at optimum sowing times, • Optimum sowing density for varieties - Only limited indications that this may be necessary • Drought tolerance • Pre-germinated seed	• FV 154, 154a, b & c: Vining Peas: Evaluation of new and established varieties sown at appropriate commercial timings • FV 340 Vining Peas: Extension of variety evaluation 'trials	HIGH HIGH LOW	
Broad Bean Varieties	No variety trials undertaken since 1999 Broad bean variety evaluation trial for fresh market	• FV 182: Evaluation of new and established broad bean varieties for processing • FV 369 Broad bean: evaluation of varieties	HIGH	
Sugar snap varieties	Variety evaluation for stringiness. Screening trial for 2013.			
Production continuity	The balance of supply and demand is crucial to determining market price: • Forecasting supply and demand. • Techniques to alter crop maturity i.e. delay or bring forward harvest. • Improved storage techniques.			
Improving product quality	• Influencing agronomic and pre-harvest factors.	• FV 295: Carbon dioxide as muscle relaxant for removal of invertebrates in salad crops • FV 351: Understanding Quality Determinants in Pea Seeds		
Improving the quality of flavour/ nutritional aspects	• Flavour and colour	FV 196: Vining peas: commercial assessment of near infrared (NIR) spectroscopy for measuring pea maturity		
Shelf life and storability				

Objective 4: Develop technologies and practices that will keep the sector ahead of changing EU and government legislation that affect agriculture and horticulture				
Target areas	**Initiative**	**Current or previous work**	**Priority**	**PLiP Co-ordinator**
Minimise risks of diffuse pollution (nitrate, phosphate, pesticides, silt)	• Is horticulture making a substantial contribution to diffuse pollution? • Fertigation techniques to minimise N and P pollution. • Improved drainage management • Efficient use of N,P & K • Precision farming, variable rate application	FV 345		
Waste management				
Securing water supplies	How to define the footprint – understanding required	Factsheet 07/05 'Securing your water supply for the future' (Abstraction and Supply issues)		
Minimise climate change impact	Minimisation of nitrous oxide emissions in a range of crop types including vining peas and Vicia faba – in addition to establish the impact of returning crop residues	DEFRA Link LK09128–*Minimising nitrous oxide intensities of arable crop products (MIN-NO)*		

Objective 5: To provide information which can be used to promote the consumption vegetables				
Target	**Initiative**	**Previous or current work**	**Priority**	**PLiP Co-ordinator**
Encouraging Consumption	• Review of health benefits of legume vegetables to be used to promote consumption. • High Collaborative approaches to Legume/vegetable promotion.	HDC Board-funded promotion to encourage consumption of seasonal British produce		

ADDITIONAL PROJECTS

There are a number of other projects which are not included in this strategy with which PGRO is associated. They were funded by the HDC and are listed as follows.

1. VINING PEAS

FV 58: Pea midge: pest monitoring and development of synthetic pheromone to aid control

FV 90: Vining peas: threshold for control of pea aphid (Acyrthosiphon pisum)

FV 63: Vining peas: seed transmission studies with pea seed borne mosaic virus

FV 72a: Peas, broad beans and green beans; evaluation of air assisted spray application technique

FV 90a: Determination of pea aphid thresholds in vining peas

FV 192: Vining peas: monitoring and control of silver Y moth (Autographa gamma)

FV 58a: Vining Peas: monitoring and control of the Pea Midge (Contarinia Pisi)

FV 231: 3D Farming: making biodiversity work for the farmer (LINK)

2. BROAD BEANS

FV 91: Broad beans: effect of foliar diseases on yield

FV 72a: Peas, broad beans and green beans; evaluation of air assisted spray application technique

FV 347: Biopesticide product gap analysis and evaluation to support development policy for biopesticides for use in integrated vegetable crop production

3. OTHER BEANS PRIOJECTS

FV 72a: Peas, broad beans and green beans; evaluation of air assisted spray application technique

FV 175: Runner beans: development of pre-emergence herbicide treatments

FV 252: Dwarf green beans: strategy for the control of pod rot by Botrytis cinerea

FV 354: Dwarf green beans: Evaluation of Rhizobium inoculant for nitrogen fixation

4. GENERAL PROJECTS

FV 334 Perennial field margins with combined agronomical and ecological benefits for vegetable rotation schemes

FV 347: Biopesticide product gap analysis and evaluation to support development policy for biopesticides for use in integrated crop production

CP 61: Cross-crop benefits: developing crop combinations to promote conservation biological control in horticulture (HDC Studentship)

PGRO LABORATORY SERVICES

The plant clinic received 82 samples of plant seed or soil which required laboratory work for identification or diagnostic purposes as part of the PGRO advisory service. Pea moth spray date predictions were made available through an automated telephone service and 13 crop bulletins were issued by email. Seed and soil testing continued as a fee paid service, maintaining the number of samples of seed for testing from overseas producers. 765 seed samples were tested in the period August 2011 – July 2012 compared to 1011 in the previous 12 months.

PGRO continued to operate the tenderometer standardisation service although far fewer were carried out continuing the reflection of the reduction of processing factories (23 tests in 2012 compared with 35 in 2010 and 74 in 2007).

CONTRACT TRIALS

As well as running the levy and grant/ award funded programmes of research and development, PGRO also carry out a number of privately funded trials and projects which include variety evaluation and agrochemical screening in the field, glasshouse and laboratory. PGRO is GEP accredited and officially recognised by CRD to carry out efficacy trials with pesticides for agricultural and horticultural crops. Whilst this work continues each year, the volume fluctuates and "Research and Technical Income" from these activities can vary from year to year.

ACKNOWLEDGEMENTS

The Organisation is grateful to the many seedsmen and agrochemical manufacturers for the provision of considerable quantities of seed and agrochemicals.

The assistance and co-operation of Mr. Brian Redrup of Velcourt who manages the arable land at Walcott Estates where the PGRO home based trial ground is sited and the owner, Mr. Darby Dennis is gratefully acknowledged. The cooperation of Mr Michael Sly of Park Farm Thorney is also acknowleldged in allowing part of his land for PGRO off-site pulse trials.

In addition, the help of the growers for provision of additional outside trial sites, and of the many commercial concerns and individuals too numerous to mention by name, is hereby also gratefully acknowledged.

Appendix I

PGRO BOARD OF TRUSTEES

Secretary – S.J.Potter $ **

Elected by the British Edible Pulse Association:

P.E. BARRETT	Askew & Barrett (Pulses) Ltd.
P.J. RIX	Dunns (Long Sutton) Ltd

Elected by the AIC (Agricultural Industries Confederation)

M . DICKINSON	Princes Ltd

Elected by the National Farmers Union:

S.W. BUMSTEAD$	Ouse Bank Farm, Great Barford, Bedford
S.J. FRANCIS $ (Vice Chairman)	The Old Farmhouse, Church End, Old Leake, Boston.
J .FENTON	Springwell House, Elmswell, Driffiled, N.Yorkshire
R.J. HIRST	Manor Farm, Ormesby, Gt. Yarmouth
M.R. LEGGOTT $ (Chairman)	Rectory Farm, Sutton Road, Beckingham, Lincoln
R.T.THOMAS	Whatoff Lodge, Quorn, Loughborough

Elected by the UK Frozen Food Federation:

S.P. MARX$	1, The Courtyard, Stamford,Lincs
J.A.YOUNG	Birds Eye Ltd

Elected by the Board:

J.HALLETT	British Growers Association Ltd.
P.J. SMITH #	Wherry & Sons Ltd.
W.A. van der HAVE+ $	Limagrain UK
A.G. BURY	Frontier Agriculture Ltd

$ member of the Management & Finance Committee

nominated by AIC

+ nominated by BSPB

** Mr Salvador Potter retired from the post of CEO and secretary to the Board in December and was replaced by Mr Roger Vickers.

GOVERNANCE

The Vice Chairman, Stephen Francis, replaced the Chairman, Mark Leggott, by rotation at the Board meeting of 4th July 2012 and Bram Vander Have was elected Vice Chairman. Bram van der Have replaced Stephen Francis by rotation as Chairman of the Management and Finance committee. The AGM was held on the same day when James Hallett and John Fenton were elected to the Board.

Appendix II

INDUSTRY PANELS

PROCESSING LEGUMES INDUSTRY PANEL

S Ashton	Pinguin Foods Ltd
W. Bradley	Green Pea Company Ltd
C Brewster	Horticultural Development Council
M. Brown	A.P. (East Anglia) Ltd
R. Corfield	Aylsham Growers
K. Costello	Princes Ltd
S. Dawsont	National Farmers Union
R. Fitzpatrick	Holbeach Marsh Cooperative
S. Francis	Fen Peas Ltd
I. Grant	Bishop Farm Partners
J. Grant	J.W. Grant & Co
M. Hayward	Swaythorpe Growers Ltd
M. Heading	A. & E.G. Heading Ltd
R Hirst	Anglian Pea Growers Ltd
E. Jadin	Ardo
P. Langley	Sandfields Farms Ltd
A. Leatham	Scottish Borders Produce Ltd
A. Lee	A.L. Lee & Sons
M. Leggott	West Fen Peas Ltd
A. Lenson	Wootton Marsh Farms Ltd
T. Mudge	BGA
N. Murray	W.P. Bruce
R. Pinder	Raymond Caudwell Produce
K. Taylor	K.H. Taylor Ltd
J. Thompson	Beeswax Farming (Rainbow) Ltd
P. Waldock	Mack Multiples
I Watson	Stemgold Peas
A. Whiting	Birds Eye Ltd

PULSE PANEL

J. Ogborn	Crop Protection Association
M. Buurman	Limagrain UK
D. Cooper	Dept. of the Environment, Food and Rural Affairs
K. Costello	Princes Limited
S Cree	British Edible Pulse Association
R. Pickard	Abbots Ripton Estates
D. Robinson	Crop Dynamics
M.Sly	Cambridgeshire Grower
J. Taylor	Federation of Agricultural Co-Operatives
J. Wallace	Agricultural Industries Confederation
Mark Wells	Leicestershire Grower
D Wherry	BSPB

Appendix III

LEVY COLLECTION

1. *PULSE CROPS*

2 Agriculture Ltd.
Acorn Arable Ltd.
Adams & Howling Ltd.
ADM Direct
S.C. Andrews & Son
Robin Appel Ltd.
Argrain Ltd.
Armstrong, Richardson & Co. Ltd.
Askew & Barrett (Pulses) Ltd.
Atlas Fram Group
H. Banham Ltd.
Bartholomews (Chichester) Ltd.
Henry Bell & Co. (Grantham) Ltd.
Andrew Bird (Seeds & Services)
Bodle Bros. Ltd.
Campbell & Penty Ltd.
Cherwell Valley Silos Ltd.
Chilton Grain Ltd.
W.A. Church (Bures) Ltd.
Cotswold Agricultural Merchants
A.L. Cox & Sons
Criddle & Co. Ltd.
Crop Marketing (Groups) Ltd.
Dalmark Grain Ltd.
J.E. & V.M. Dalton Ltd.
G. O. Davies (Westbury) Ltd.
Dengie Crops Ltd.
Dodson & Horrell Ltd.
Dunns (Long Sutton) Ltd.
John Ebbage Seeds Ltd.
Ellingham Grain Ltd.
Elsoms Seeds Ltd.
Fengrain Ltd.
Fengrain (Services) Ltd.
John Foad & Co.
Frontier Agriculture Ltd.
Glasson Grain Ltd.
Gleadall Agriculture Ltd.
Glencore Grain UK Ltd.
Peter Glossop Seeds
GrainCo Ltd
Grain Harvesters Ltd.
Grainlink Ltd.
Grainmonitor Ltd.
Harlow Agricultural Merchants
Heart of England Grain Co. Ltd.
Henson & Jackson Retail Ltd.
Hubbards Seeds
J.S. Hubbuck Ltd.
I'Anson Bros. Ltd.
A. Inglis & Son
Charles Jackson & Co. Ltd.
Robert Kerr Agriculture Ltd.
Limagrain UK Ltd.
W.N. Lindsay Ltd.
Marriage's Specialist Foods
Masstock Arable UK Ltd.
Maviga Europe Ltd.
James Mortimer Ltd.
Nidera UK Ltd.
Openfield Agriculture Ltd.
Openfield Marketing Ltd.
Organic Arable Marketing Co. Ltd.
Premium Crops Ltd.
Saxon Agriculture Ltd.
Scotgrain Agriculture Ltd.
Senova Ltd.
Simpson Malt Ltd.
Soya UK Ltd.
David Trethewey Seeds
United Oilseeds Marketing Ltd.
R.W. Warnock Ltd.
Wellgrain Ltd.
Wessex Grain Ltd.
Westland Horticulture Ltd.
Weston Mill Farming Co.
Wherry & Sons Ltd.
G. Williams & Co. (Grain) Ltd.
G. Williams & Co. (Seeds)
Witney Grain Ltd.
Charles Wright & Sons Ltd.

2. *VEGETABLE CROPS*

Anglian Pea Growers Ltd.
Aylsham Growers Ltd.
Beeswax Farming (Rainbow) Ltd.
Bishop Farm Partners
W.P. Bruce Ltd.
R. Caudwell (Produce) Ltd.
Fen Peas Ltd.
J.W. Grant & Co.
The Green Pea Co. Ltd.
A & E G Heading Ltd.
Holbeach Marsh Co-Operative
Mack Multiples
Romney Marsh Viners Ltd.
Scottish Borders Produce Ltd.
Stemgold Peas Ltd.
Swaythorpe Growers
K.H. Taylor Ltd
Birds Eye Ltd and their growers
West Fen Peas Ltd.
Wootton Marsh Farms

Appendix IV

ASSOCIATE MEMBERS

The following were Associate Members of the Organisation at 31st December 2012

UNITED KINGDOM

Acorn Seeds
Agrichem (International) Ltd.
Agrii –
A trading division of Masstock Arable UK Ltd.
Agrii –
A trading division of United Agri Products Ltd.
Agrivice Ltd.
Agrovista UK Ltd.
Allen Agriculture Ltd.
A.P. (East Anglia) Ltd.
Bartholomews Agri Food Ltd.
BASF Plc
Bayer CropScience Ltd.
BCS Agriculture Ltd.
Belchim Crop Protection Ltd.
Birds Eye Ltd.
British Society of Plant Breeders Ltd.
Certis Europe
Chelmsford & W Essex Training Group
Coles, K.S.
Coy, C.R.
Dodman Ltd.
Doug Balderson Agriculture Ltd.
Du Pont (UK) Ltd.
Elsoms Seeds Ltd.
Eurofins Agrosciences Ltd. *
Exeter, University of *
Field Technique Ltd.
Finlays Fresh Produce UK Ltd.
Freemantle, M.J.
Frontier Agriculture Ltd.
Harper Adams University College
Hartpury College
Headland Agrochemicals Ltd.
H.L. Hutchinson Ltd.
I'Anson Bros. Ltd.
J.S. Frozen Foods Ltd.
Knight, R.
Lanwin Pulses Ltd.
Limagrain UK Ltd.
Lincoln, University of
L.S. Plant Breeding Ltd.
Mack Multiples
Makhteshim-Agan (UK) Ltd.
Monsanto UK Ltd.
Norman & Spicer (Agrochemicals) Ltd.
Nottingham, University of
NuFarm Ltd.
Pinguin Foods UK Ltd.
PMC Harvesters Ltd.
Prime Agriculture LLP
Princes Ltd.
Procam UK Ltd.
Pro-Veg Seeds Ltd.
REA Agronomy
Royal Agricultural College
Sandfields Farms Ltd.
SAC FBS Office
Scottish Borders Produce Ltd.
Syngenta Crop Protection Ltd.
David Trethewey Seeds
Trevan Cropcare Ltd.
A.L. Tozer Ltd.
United Phosphorus Ltd.
G. Williams & Co. (Seeds)
Woodhall Growers Ltd.
Woodheads Seeds Ltd.
Writtle College

OVERSEAS

Agis, Germany
Agro Seed Services bvba, Belgium
Alterra SA, Greece
Brett Bros. Ltd., Eire
W. Brotherton Seed Co. Inc., USA
Canterbury Seed Co. Ltd., New Zealand
Crites Seed Inc., USA
Dept. of Industry & Investment – Primary Industry & Investment, Australia
Findus Sveridge, Sweden
Hans-Georg Lembke KG, Germany
Holland Select BV, Holland
Inagro VZW, Belgium
Massey University, New Zealand
Midland Seed Ltd., New Zealand
Novozymes France S.A.S., France
Nunhems Netherlands BV, Holland
PGG Wrightson Seeds Ltd., New Zealand
Plant & Food Research, New Zealand
Ploeger Machines BV, Holland
Pop Vriend Seeds BV, Holland
Toft Plant Breeding, Denmark
Van Waveren-Saaten GmbH, Germany
Vegras CVBA, Belgium
Vilmorin SA, France
Charles R. Wynne Ltd., Eire
Yaadim Development Corporation, Israel

* Joined during 2012