Consultancy Services to Assist in the Preparation of a Strategy to Minimise Pesticide Residues in Food

For

THE FOOD STANDARDS AGENCY

SUMMARY REPORT
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CONTENTS

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SUMMARY OF STAKEHOLDERS VIEWS

The FSA recognises that consumers prefer not to have pesticide residues in their food and is working with producers, importers and retailers to develop an appropriate action plan that will guide the Agency and its stakeholders towards minimisation of pesticide residues. The main aim of this project was to consult widely with stakeholders to ensure that the FSA was fully informed and up-to-date with relevant policies and initiatives, which might have an impact on pesticide residues in food. ADAS Consulting Ltd carried out this consultation project in March and April 2003, and the feedback from stakeholders is summarised in this report.

Some of the most-commonly expressed concerns of stakeholders are detailed below. Some are contradictory as might be expected from a wide consultation, and they are not in priority order. Positive suggestions from stakeholders, that could lead to reductions in pesticide residues, are also listed.

Main concerns

- Detection of pesticide residue levels, what is zero? Analytical tests are improving all the time and becoming increasingly sensitive, so it will be impossible to reach a target of zero residues.
- Objective of minimising residues is realistic but zero is not.
- Who is driving this initiative – is it retailers, consumers or NGOs? Other surveys show that consumers are not that concerned about residues in their food but they are about appearance of produce and price.
- Retailers are using pesticide residues and consumer fears to develop a competitive edge, which goes against previous agreements to collaborate over food production standards.
- Retailers have driven the expectations of consumers for perfect produce.
- Farmers and growers are confused by the proliferation of standards, controls and different protocols, depending on their market and customer. Unified standards with agreed levels would go a long way to helping the industry to reduce pesticide residues. They need leadership and direction.
- There is a general lack of research into alternative techniques to pesticides, and it is unrealistic to expect farmers and growers to change practice without some technical support.
- Soil-borne diseases in horticultural crops and the use of sprout suppressants for potatoes were seen as critical areas for new techniques, and were likely to be the most difficult to solve, even in the long-term.
- The cost of developing new pesticides in a hostile market and regulatory system is too high for some companies and they will limit their investment in crop protection for UK crops in future.
- There is also very little investment in novel, biological chemicals because of the cost of registration.
- The lack of suitable chemicals for the horticultural industry has been a long-running problem and this is now starting to impact on the broadacre arable crops, as pesticides are reviewed and removed from use.
- Changes to pesticide regulations and potential EU minimisation policies are causing major concerns.
- MRLs for pesticide residues are the legal regulatory requirement, so why are farmers and growers being asked to go further to minimise residues when there is no scientific justification. Will this disadvantage UK producers compared with European counterparts.
- Retailers are more likely to increase their imports of fresh produce if they cannot get the quality of produce they want in the UK, rather than invest money in alternative techniques for UK growers.
- UK growers are expected to carry the risk of reducing pesticide residues without any extra premium for their produce.
- There was support for a Pesticide Tax from some stakeholders and not from others.
- Concerns were raised over the PRC surveillance programme and the brand-naming initiative.
- Many stakeholders felt that the FSA was the right organisation to lead this initiative, others thought that the FSA had given into 'green pressure', and was developing a strategy without scientific justification that would put the regulatory process at risk.

Positive suggestions

- ICM, good agricultural practice and the Voluntary Initiative will all help to lower pesticide use, which will impact indirectly on pesticide residues, as will better monitoring, forecasting and use of decision support systems.

- Greater awareness of residues occurring in food, understanding the issues and market demands, and direct targeting of those pesticides which cause the most frequent problems, will have a large impact on reducing residues.
- Education, training, research into alternative strategies or improved management followed by demonstration and technology transfer will help improve uptake and reduce residues.
- Crop specialists are important for the fresh produce crops.
- A new extension service would encourage greater uptake.
- Assurance schemes have a role in raising and setting standards across the industry. They could also be used for technology transfer for new research ideas and raising awareness of issues.
- Pooling residue information and sharing across the industry would raise awareness, standards and reduce costs.
- Market drivers from processors and retailers are likely to lead to greater reduction of residues. The brand-naming process in PRC reports has raised the stakes, as retailers do not want to appear on the list.
- Breeding of new varieties has a high potential role to reduce pesticide use, but uptake is usually poor in the fresh produce sector. GM technology could offer great potential but has low consumer acceptability at the moment. However, it could be used to show what is possible, to be followed by conventional breeding.

INTRODUCTION

The Food Standards Agency accepts the use of pesticides in food production so long as any residues which occur in food:

- do not result in consumers exceeding safety standards; and,
- are the minimum that is appropriate for effective use, even if higher levels would not be harmful.

The FSA recognises that consumers prefer not to have pesticide residues in their food and is working with producers, importers and retailers to develop an appropriate action plan that will guide the Agency and its stakeholders towards minimisation of pesticide residues.

The FSA held a Stakeholders' meeting on 30 April 2002, to discuss the feasibility of minimising pesticide residues in food. At the Open Board Meeting on 13 June 2002, the Board was strongly of the view that the Agency should adopt a pesticides minimisation policy with the aspiration of eventually achieving residue free food.

A report was commissioned to critically review the scientific literature to inform policy development in this area. The academic consultants preparing that report have highlighted a number of key areas where further work with stakeholders is necessary so that the final targets set in the strategy are achievable and practical. These include areas such as:

- post-harvest storage of fruit and potatoes,
- fungicide and growth regulator use in agriculture and horticulture,
- the role of assurance schemes and other approaches in supporting best practice and uptake of Integrated Crop Management approaches
- impacts of reduced pesticide use on food quality and appearance
- potential for development of new chemistry more focused on residue reduction.

A summary of this report is given in Appendix IV.

The second phase of this work was to hold a range of meetings to take forward discussions with stakeholders in these and other areas, to help to guide the development of the strategy. ADAS Consulting Ltd carried out this consultation project in March and April 2003, and the feedback from stakeholders is summarised in this report.

METHODOLOGY

Project objectives

The main aim of this project was to consult widely with stakeholders to ensure that the FSA was fully informed and up-to-date with relevant policies and initiatives, which might have an impact on pesticide residues in food.

The contractor, ADAS, was asked to liaise with other Government Departments and Non-Departmental Public Bodies to identify their current and anticipated policies with regard to pesticides. ADAS was also asked to consult with producers, assurance schemes, agronomists, pesticide manufacturers, retailers, consumer representatives and other Non-Government Organisations (NGOs) to identify:

- What initiatives are currently in place with regard to pesticide management, and what is planned?
- How successful these initiatives have been in changing practice?
- What are the main drivers for changes in pesticide use?
- What are the main barriers to adoption of practices leading to a reduction of pesticide residues?

Timescale

The project started on 10 March 2003 and consultations were held with stakeholders between 24 March and 25 April 2003. A consultation report was sent to the FSA on 2 May 2003, so that stakeholders' views could be incorporated into a progress report for the FSA Board meeting on 12 June 2003.

Process

A list of key stakeholders was drawn up and agreed with the FSA Project Management Group. A total of 94 stakeholders were consulted. It was recognised that it was not possible to consult fully with all the relevant stakeholders, who might have an interest in pesticide residues in food, given the short timeframe and the level of resource that would have been needed. This initial consultation process was set up to identify the main policies and initiatives, and the key crops or pesticides that should be targeted as part of the FSA's action plan to minimise pesticide residues in food. If the FSA Board approves the proposed action plan, the aim will be to consult further with stakeholders to help evolve practical strategies for specific crops that the industry can adopt and implement.

Of the 94 stakeholders, 29 were interviewed by ADAS, 2 were interviewed by SAC, 3 were invited to a meeting at the FSA and 60 were sent proformas by post or email. A detailed breakdown of the stakeholder consultation contact list is given in Appendix I. All the stakeholders were sent the same information – a copy of the proforma, background information on the FSA strategy and a two-page summary of the scientific literature review (Appendices II, III & IV). The interviewed stakeholders were asked the same questions as detailed in the proforma, and a report was completed for each stakeholder in the same format.

A total of 47 reports was completed (50 % of stakeholders), comments or other documentation were received from 6 stakeholders (6.4%) and a 'not applicable' response was received from 6 stakeholders (6.4 %). The overall response rate was 62.8 %.

Stakeholders expressed a wide range of initiatives, views, opinions and concerns, and these are summarised in the next section of this report. The current and planned initiatives are attributed to individual stakeholders, other comments are identified to group only.

STAKEHOLDER CONSULTATION FEEDBACK

A: Government Departments

Those consulted:

Defra – Arable Crops Division
Defra – Horticulture and Potatoes Division
Pesticides Safety Directorate
Cabinet Office – Regulatory Impact Unit
Plant Health & Biotechnology Branch, Countryside Division, Welsh Assembly
Department of Agriculture and Rural Development, Northern Ireland

(i) Current and anticipated policies

Policy

- Environmental impact of pesticides used in agriculture and horticulture.
- Minimisation and optimisation of pesticide use – indirect effect on reducing pesticide residues.
- EU minimisation policy being developed which could affect pesticide use overall, but UK policy to reduce impact not use specifically.
- Some departments would prefer to have a voluntary policy on minimisation of pesticides rather than mandatory.
- A tax on pesticide use in Northern Ireland could lead to smuggling and illicit use.
- EU Directive 91/414 – minimum effective dose for new pesticides being registered in the EU, and also includes re-registered and renewed approvals, which will eventually be part of the UK policy and will drive residues down.
- No specific targets for minimisation of pesticide residues in food, policy to keep residues within MRLs, not specifically to reduce residues.
- Legislation to provide information on pesticides used on crops after harvest (post-harvest labelling) may result in less pesticide being applied post-harvest to avoid the labelling requirement, but could result in higher inputs being applied in the field or glasshouse.
- Code of Practice for pesticide use 'owned' by PSD, but is not too specific about reducing residues.

ICM

- Policy and research interests in optimised pest and disease control, with an overriding interest in Integrated Crop Management (ICM) and alternative means of reducing pesticide use. This also ties in with Sustainable Agriculture initiatives and the Voluntary Initiative. The Pesticides Forum has a role to promote responsible pesticide use.
- PSD also fund research for specific problems with pesticide use, such as fungicide use in orchards, which could help minimise pesticide residues.
- ACD and HPD interested in production aspects of pesticide use and impacts, PSD has the regulatory responsibility for pesticide residues.
- Support organisations working on related subjects which could impact on residues, through LINK e.g. HGCA, HDC, NABIM.

Assurance schemes

- Defra departments do not have a specific input into the crop assurance schemes but do keep a watching brief and provide information updates. Assurance schemes, especially Assured Produce, are seen as a possible way of transferring up to date research information direct to farmers and growers, through the annual review process.

Organic farming

- Support in Defra for organic farming lies with the Environment Group, ACD and HPD do input into organic issues but at a low level.
- The Welsh Assembly is very supportive of organic farming and wishes to promote Wales as 'clean and green'. They also wish to adopt the most restrictive policy possible towards pesticides, and as well as actively encouraging the uptake of organic farming they are looking at organic practices which might

transfer to the conventional sector. They also have a policy objective to develop a paper on organic pesticides and will be commissioning research.
- DARD believe that organic farming is not a realistic approach for the majority in Northern Ireland, and uptake is very low.

(ii) Concerns and views

Regulatory issues
- Questionable whether it is reasonable to press for pesticide residues below MRLs without offering alternative strategies.
- Does the FSA want a general reduction in total levels of residues, or a safer alternative with less impact or risk to health? Fundamental clarification is needed from the FSA, with clear objectives.
- The legal limits of MRLs set permitted residues levels on crops and food, FSA are asking growers and farmers to go beyond the legal limit, which could affect the basis of the regulatory approvals process.
- What level of detection is appropriate – detection or determination. There may come a point when any residue can be detected.
- Are the FSA effectively asking farmers/growers to do the equivalent of driving at 50 m.p.h. in a 70 m.p.h. speed zone, and will this disadvantage them in relation to other producers in Europe.
- The public benefit to be gained from reducing residues on food should be weighed against the costs of implementing the policy, food shortages and increased imports.
- There is concern about the ability to produce food, farmers need pesticides to avoid uneconomic loss of crops. However, the horticulture and cropping sector in Northern Ireland is small.
- The FSA should avoid cutting across regulatory or minimisation efforts, and it is important that they continue to stick to the safety line. PSD and FSA policies need to be 'joined up'.
- PRC residue surveillance is unlikely to change to meet the needs of the FSA unless it fits in with PRC plans.
- Resistance strategies, which have to be submitted for new approvals, may increase pesticide use overall.
- Any policy on reducing pesticide residues needs to be based on evidence and science.

Technical and uptake issues
- Potentially higher health risks from crops with lower residues and organic crops from contamination caused by plant diseases, pests and toxins.
- Pesticides used in organic production can still have environmental impacts.
- The cost of alternative strategies to pesticide use and reducing residues could be high with no recompense to the producer, and they may not see the justification either.
- The pesticide withdrawal policy in Europe is causing some problems where no alternative chemicals or strategies exist – needs a pragmatic approach.
- Biggest barrier in Northern Ireland will be changing the perceptions and attitudes of farmers (average age 57) who are reluctant to change.
- Advertising from agrochemical companies is attractive and persuasive, whereas independent technical advice is much less attractive – dry text, so uptake can be poor.
- Innovative strategies are too costly to develop, so potentially sustainable alternatives are being lost. Could the need to put bio-pesticides through the regulatory process be revoked, as in Italy?
- GM technology – no perceived benefits at the moment. Other gene therapy techniques could prove to be more acceptable if genes are not from alien species. GM breeding could show the potential benefits of different genes, which could then be developed through conventional techniques.

Issues with assurance and the Voluntary Initiative
- Retailer/assurance schemes are not considered to be effective because of poor QA and policing (view from one stakeholder).
- Some concern about the Voluntary Initiative and the slow initial progress.
- Disadvantages of a pesticides tax are huge – not a lot of revenue would be generated and it would be extremely complex to run, plus smuggling issues as mentioned above.

Consumer issues
- Consumers are unlikely to pay a premium for a middle standard between conventional and organic production.

- By promoting the minimisation of pesticide residues, the more pesticides are seen as ‘nasty’, and weight is added to unsubstantiated consumer fears. Do not want publicity to create food scares, which could be a problem when the public is not well-informed about food issues.
- The cosmetic appearance of produce is a major issue. Retailers have raised the expectations of consumers for blemish-free goods, costs and residues would be lower with lower appearance standards. What about educating the consumer?
- Scarcity of produce does change retailers’ perceptions of quality and residue standards.

External issues

- Imports are likely to be higher if the quality standards cannot be met in the UK.
- Supply chains in developing countries are likely to be hardest hit by this aspiration.

B: Government Committees, Commissions and Agencies

Those consulted (* responses received):

Advisory Committee on Pesticides*
Pesticides Forum
Pesticides Residues Committee
Advisory Committee on Consumer Products and the Environment*
Sustainable Development Commission*
Environment Agency*
English Nature *
Countryside Agency*

The ACP, PRC and the Pesticides Forum were consulted on an informative basis. Details of the consultation process were sent to the various Secretariat's so that information could be passed to committee members, and they were given the option to comment if they wished. Limited comments were received back from three of the stakeholders.

ACP – personal observations were received from the Chairman, Prof. David Coggan

ACCPE
They did not complete the proforma as they do not have a remit to look at the use of pesticides in food production, and they have not considered the issues. However, they have suggested we contact the UK Chemical Stakeholder Forum (CSF), as the principal function of the Forum is to advise Government (Defra) on how industry should reduce the risks from hazardous chemicals to the environment and human health through the environment.

Sustainable Development Commission
The proforma was not returned as it was not relevant to them. Although, they have a Food & Farming work programme, they have not carried out any specific work on pesticides. However, as part of their principles for a sustainable food chain, their aim is to:

- Produce safe, healthy products in response to market demands, and ensure that all consumers have access to nutritious food and to accurate information about food products.

Agencies

(i) Current and anticipated policies

Policy
- Main concern of EA is chemicals in the environment. They issue consents for the release of chemicals (including pesticides) on the basis they are of minimum risk to the environment and human health. They monitor and model the fate of chemicals in the environment, and provide advice to the ACP.
- The Science Group in EA is being restructured and will deal with bio-active substances, including their accumulation and persistence, as well as their presence in food.
- The EA is recruiting more human health specialists to ensure policies are underpinned by hard data.
- The role and strengths of the EA are complementary to those of the FSA: with the EA concentrating on environmental levels and routes of exposure; and the FSA looking at the implications of exposure for humans.
- The objectives of EN are for a reduction in environmental impacts/risks from the use of pesticides rather than food residues, and they support the adoption of economic measures, which discourage unnecessary pesticide use, and encourage greater use of more selective products.
- The CA has been working with Defra, EA and EN to encourage the assurance schemes, through AFS, to adopt a number of basic environmental standards relating to the use of pesticides and the control of pests, diseases and weeds. They also wish to ensure that consumers are able to make informed choices when purchasing their food.

Farming issues

- One of the EA's targets for land quality is to improve the sustainability of agriculture.
- The EA and EN are involved in the Voluntary Initiative and the Pesticides Forum.
- EA operational staff visit farms to check on the storage and usage of chemicals, and to encourage best practice e.g. EA Best Farming Practices Manual.
- Pesticide washings are approved for disposal on land to the crop they are approved for use on, care has to be taken that maximum application rates are not exceeded.
- The EA would like to see more 'green' chemistry, environmentally friendly products being used, but is not funding research into this at the moment.
- EN encourage and promote organic farming, integrated farming and farm produce assurance schemes where there are benefits to wildlife.
- The CA would like to see the adoption of more sustainable practices by a large proportion of the farming industry.

(ii) Concerns and views

Regulatory issues

- The EA have 10 years of experience and activity on reducing impacts of chemicals in the environment, which would provide a sound base for food residue initiatives. Build on this rather than reinvent the wheel, review current environment activities and identify those, which will also provide food residue benefit.
- It is important that efforts to reduce residues remain compatible with measures required to enhance biodiversity.
- Agri-environment schemes are likely to help reduce pesticide use and residues in food indirectly.
- It may be possible to reduce pesticide residues but will not get to zero, because of better detection techniques, the persistence and ubiquity of pesticides in the environment, and contamination from long/medium distance transport.
- The CA view is that if the industry wants to avoid the regulatory approach, then they will need to use other methods to ensure adoption of best practice more widely. The suspicion is that without the threat of legislation, there is no incentive for them to ensure these practices are adopted.

Technical and uptake issues

- Main barrier to reducing pesticide usage is persuading farmers to take up the ideas voluntarily, what is their incentive for adoption of new measures.
- The EA could provide experience of changing farmer practice – what has worked and what has not, creating the right mixture of voluntary/regulatory/fiscal instruments to benefit food and the environment.
- Scientific uncertainty and the link between change in practice and environmental outcome could be a barrier.
- Organic farming and ICM are likely to have the biggest impact.
- EN has concerns about GMO releases, although both EN and EA can see the potential benefits for reduced pesticide use.
- Working with retailers and assured produce schemes offers a highly effective way of reducing residues in food by requiring farmers and growers to comply with good practice or lose their market – the economic argument.
- The CA would like to see the AFS adopt a greater number of basic environmental standards, and they have been disappointed by the actions agreed so far, but hope that more progress will be achieved with AFSII.
- The objective should be to have farmers consistently applying best practice in use of pesticides, then it might be opportune to consider long-term objectives for little/no pesticide residues.

Consumer and other issues

- Need to consider the cost-benefit ratio, and make the costs and benefits explicit to consumers.
- The EA have expressed their willingness to assist and work with the FSA in developing the strategy and action plan.

C: Non- Departmental Public Bodies – Levy Boards

Those consulted (* responses received or returned as not applicable):

British Potato Council*
Home-Grown Cereals Authority*
Horticultural Development Council*
British Beet Research Organisation
Meat & Livestock Commission
Milk Development Council (na)

(i) Current and planned initiatives

BPC

- Residues on potatoes are seen as a high priority issue in terms of delivering quality products of the right specification to the consumer.

Current initiatives include:

- BPC funded projects on improved formulations of CIPC and post-harvest fungicide use.
- Application techniques for the distribution of CIPC in stored ware, effect on residues, and what is happening to CIPC in the store environment.
- Store management guidelines.
- Blight campaign technology transfer initiative.
- Aphid monitoring for improved targeting of insecticide sprays, and biocontrol of aphids.
- Work on potato cyst nematode (PCN), developing decision support systems and product stewardship, and biocontrol.
- Run a 'Treater Group', looking at best practice pesticide application in crop and store.
- Test new varieties for pest and disease resistance.
- Support ICM and also involved in organic potato production, but on a limited scale as only 1000 ha grown in the UK but 50,000 tonnes consumed (50 % imports).
- Development of appropriate disease diagnostics to support improved risk assessment for ICM.
- Raising awareness of research that relates to best practice.

Planned initiatives include:

- Discussions with NPTC to improve their module on CIPC fogging and looking to have it included in revised protocols for Assured Produce.
- Volatile detectors – store management aid within 3 to 5 years.
- Laser technology being developed as a possible means of surface sterilisation for seed tuber surfaces, which may be suitable for ware storage in 5 to 10 years.
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HGCA

- High priority as now more interested in the whole grain chain – seed to finished product – more joined up thinking.

Current initiatives include:

- Information provider to growers, especially on legislation relating to MRLs.
- R&D projects on the use of chlormequat in wheat and oats and the effects on residues.
- Sponsor work on optimised disease control, including decision support systems, but not specifically on strobilurins and the relationship with the use of pre-harvest glyphosate.
- Storage of cereals – have funded research in the past and produced the HGCA Crop Storage Guide, which is currently being revised to take account of latest research on storage techniques and possible alternatives to chemical fumigants.
- Have funded research on ICM and provide continued support through the HGCA/Defra Arable Cropping and Environment Guide.
- Sponsor some research on organic cereal production but this is limited.
- Involvement with the assurance schemes – Crop Storage and ACE Guides required reading.
- Fund variety evaluation testing.

Planned initiatives include:
- Contaminants workshop, which will include pesticide residues, is planned for 2003, to bring together all interested groups in the cereal food chain.
- Discussing future work on organic production with Defra for the LINK programme.

HDC
- High priority as HDC needs to be responsive to its levy payers and is therefore seeking to address residue issues in its R&D and SOLA programmes.

Current initiatives include:
- 60-70% of levy spent on crop protection work, which covers Integrated Crop Management, including, biological control, pest and disease forecasting, use of pheromones, synergistic fungi, companion planting, IPM and conventional chemical approaches including the SOLA programme, breeding and variety evaluations for pest, disease and weed resistance/tolerance etc.

Action needed on:
- Understanding of soil microbe/ecology organism interactions aimed at soil-borne diseases.
- Sound scientific research on organic production.
- Joint technology transfer initiatives involving HDC, Defra and others, to make the most effective use of existing knowledge.

(ii) Success in changing practice

- Changes in application technology (fogging) for CIPC on potatoes have shown a decrease in residue occurrences in PRC surveillance reports.
- PCN modelling information positively changed industry attitude towards ICM approaches for population management.
- Considerable progress has been made with IPM in some horticultural crop sectors, particularly in protected salad production.
- Work on pest and disease models and forecasting is progressing well, which has delivered reduced pesticide usage in the majority of crops and seasons.

(iii) Drivers for change

- All have the remit to ensure the production of food safe for the consumer.
- Pesticide residues and supply chain issues are moving up the political and commercial agenda.
- Changes to meet retailers' specifications, and processor and consumer requirements.
- Making sure due diligence to meet the requirements of the Food Safety Act.
- Changes to meet the requirements for new applications and markets for cereals, and making sure UK cereals are of the highest quality.
- There is a conscious wish in some sectors of the horticultural industry e.g. protected salads, to move towards zero residues, or even zero pesticides in produce, as soon as possible.

(iv) Barriers to adoption

- Better consumer education about GM technology.
- NGOs to be made more aware of industry implications.
- UK good at implementing the Assured Produce scheme but questions over level of monitoring.
- New varieties of potatoes have had limited impact because current breeding programmes have focussed on pest and disease resistance rather than consumer attributes on which purchase decisions are made.
- Changing farmers' perception of consumer wishes in the cereal sector. Farmers tend not to have a relationship with their customers nor understand their needs beyond the basic crop quality parameters. Big growers will be more receptive to change, but many farmers will not want to hear the message. Uptake will depend on the success of research and technology transfer.
- Difficult to produce wheat of the right quality without the use of pesticides. Pre-harvest glyphosate is particularly used in Scotland and Northern Ireland to speed up crop ripening. Strobilurin fungicides are used as much for their yield-enhancing effects as they are for disease control, so it may be difficult to persuade farmers to drop them, when profitability is so poor.

- Soil-borne diseases are a major problem in the horticultural area, lack of basic knowledge of soil web/ecology, and difficult to see short-term solutions.
- Some aerial borne diseases will remain difficult to control without fungicides.
- Need to develop/assess novel control options but reticent about extensive funding in view of potential lack of commercialisation due to costs of registration and other set up costs.

(v) Concerns and views

- AP protocols are seen as the minimum-operating standard. Producer protocols from retailers will result in reduced residues.
- The Voluntary Initiative will also help reduce use of pesticides, as will the changes to arable payments.
- Producer protocols based on sound science must be fundamental to the adoption of new practices.
- Difficulties with the issues of consumer views on pesticide residues – whose views are they?
- UK is the only country in Europe where the supplier is named where residues are below MRLs. Difficult to see the justification for publishing that sort of information, which places a lot of pressure on the supply side of the industry.
- Nil residues are a movable target.
- Supplying potatoes with no post-harvest chemical residues could have an impact on a huge number of jobs in the UK as crops could not be stored, and would have to be replaced by imports, with no guarantee on residues. This issue also applies to fresh product.
- PCN has major impact on sustainability of potato production in the UK and nematicides are a major pesticide input with environmental and some residue effects. Removal of these pesticides could have a serious effect on future production.
- GM technology probably offers the best opportunity for PCN control.
- Diseases in horticultural crops present greater challenges for control than pests, and soil-borne diseases in intensive and perennial crop systems present major problems.
- Protected cropping seen as potentially 'easier' for zero residue production as environment is controllable to a greater degree than in field crops.
- Urgent changes needed in development and commercialisation of novel control techniques.
- BPC would want to be involved in developing an action plan for potatoes.
- Any initiatives should work with farmers rather than being heavy-handed, HGCA has the skills and experience to help and would like to be involved.

D: Pesticide companies and related organisations

Those consulted (* responses received):

BASF plc (* response not published as requested by stakeholder)
Bayer CropScience Ltd *
Dow AgroSciences *
Du Pont (UK) Ltd
Makhteshim-Agan (UK) Ltd
Monsanto (UK) Ltd *
Syngenta Crop Protection UK Ltd*

Crop Protection Association (* comments only received, full consultation done by SAC)
British Crop Protection Council (BCPC) *
UK Agricultural Supply Trade Association (UKASTA) *
BASIS Ltd *

(i) Current and planned initiatives

Agrochemical companies

Bayer CropScience

- Reduction of pesticide residues is recognised by Bayer CropScience as an emerging requirement by consumers and the food chain, and therefore gives the issue high priority.
- Fully dedicated stewardship department for the food industry – liaising with stakeholders in the food chain such as retailers, food manufacturers and processors, e.g. discussions with processors like McCains about how processing removes residues.
- Committed to minimisation of residues through best practice, the Voluntary Initiative, training, education and good advice e.g. training in use of nematicide and equipment calibration.
- They are involved in the Assured Produce scheme, and contribute data when particular issues arise.
- Funding research on the effect of best practice on residues - for potatoes and aldicarb. First time there has been this focus on residues and food chain issues. They have also funded work on organic farming and ICM.
- As a company they are committed to ICM, and aim for best practice in the use of their products in all countries.

Dow AgroSciences

- Minimising pesticide residues is a high priority, with significant investment in R&D to discover highly active, low rate and low toxicity compounds.
- Involvement in the Voluntary Initiative, through training, Crop Management Plans, product stewardship and Environment Information Sheets (EIS).
- Funding into the LINK SAPPIO research programme, looking at PCN control, 3D farming (biodiversity), wheat blossom midge and weed management (in the context of research into optimising inputs and developing integrated control methods).
- Development of EISs to promote good agricultural practice and care of the environment
- Risk assessment guides for pests and diseases, integrated control measures for volunteer potatoes, and product guidelines to ensure statutory requirements are met.
- Development of low active ingredient, highly active chemical groups.

Monsanto

- Guidance to promote the application of best practice and minimise the misuse of products.
- Breeding and development of new varieties of wheat and oilseed rape.
- Aim to introduce genetically modified plant varieties.

Syngenta

- They endeavour to develop new pesticides with lower application rates and residues.

- Residue reduction has become a major concern to them, even though it is a commercial issue and not one of safety to the consumer. However, some resources are now allocated to investigating minimisation of residues without reducing product efficacy.
- They work closely with the Value Chain and are aware of the issues involved in the current policies to minimise residues. They give help where they can to those who have to implement the policies.
- Syngenta Seeds develop new varieties, which are often resistant to many pests and diseases.
- They are involved in the promotion of decision support tools to help growers optimise the timing of their pesticide applications e.g. potatoes and vegetables.
- Actively develop and promote application technology.
- Actively promote best practice for products and support initiatives based on ICM principles.
- Promote understanding of residues by producing and promoting booklets such as 'Gaining Consumer Confidence'.

Related organisations

CPA
- The Voluntary Initiative
- Responds to concerns from growers, especially fresh produce growers and provide information.
- Informative leaflet on pesticide residues.
- Making sure pesticides are used responsibly, so residues are minimised through best practice.

BCPC
- Recruited National Consumers Association as a corporate member, and their members are making inputs into the BCPC programme.
- Workshop planned for 2003 on registration of biopesticides in the UK, and steps that would be needed for a fast track process.
- Contribution to the best guide for insecticide selection as part of the Voluntary Initiative.
- Development of the BCPC nozzle classification scheme with updates to tie in with the crop assurance schemes.
- Planned session on residues in food and risk assessment at Congress 2003 or as a standalone meeting during 2004.

UKASTA
- Firmly committed to a reduction of pesticides in food and supports this by involvement in assurance protocols, and their own Trade Assurance Scheme for Combinable Crops (TASCC).
- Promotion of best practice especially technical developments, varieties, ICM, storage and process development.
- Signatory to the Voluntary Initiative and prime mover in the development of the BASIS register for crop protection advisers.

BASIS
- Professional body for certification of crop protection advisers.
- Involved in ICM courses and supporting the Voluntary Initiative.
- Through the UK pesticide industry and related bodies, actively trying to responsibly minimise pesticide use.

(ii) Success in changing practice

- Limited feedback here, but Dow report good progress on developing Environmental Information Sheets, technical guides and input into the Voluntary Initiative.
- Indications of progress can be seen in the rapid uptake of new application technologies.

(iii) Drivers for change

- Strong commitment for responsible care in all sectors, and need to be actively involved to secure sales in the food supply chain, and to meet the needs of their customers, advisers, growers, processors and retailers.
- The need to adapt and change to market demands is essential for any business if it is to survive.
- Would like to educate the consumer of the value of crop protection products.

- Recognition of the pressure to reduce residues from the consumer (?), retailers and/or the campaign groups.
- Secure, sustainable food supply, which will come from a balanced approach to agricultural production.
- Principle function of BCPC to provide an inter-professional forum and network for organisations and individuals interested in crop protection/production and put the information generated into the public domain.

(iv) Barriers to adoption

- 'Name and shame' policy – retailers set zero pesticide policies they may live to regret, as analytical techniques improve, the goal becomes harder to achieve.
- Some pesticide residues need to be there to work especially when used at harvest or in store.
- The cost of regulation and bringing a pesticide to market is massive – the first victim of increasing costs will be minor crops (potatoes are a small crop on a global scale). Lack of appropriate chemicals is already a major problem.
- The current regulatory climate is so hostile that there is too great a risk in developing new active ingredients.
- Pesticide choice will shrink to such an extent that UK and European food security will be put at serious risk.
- There may be extra costs involved with alternative strategies, which could disadvantage the UK farmer/grower. Generally, there are no premiums for producing crops to higher standards.
- Barriers can be from sectors of the value chain that are slow to realise that sustainable solutions are the future.
- Proliferation of ill-informed NGO approval schemes. This increases the costs of regulatory approval by reducing market potential for new product development.
- High cost of communication tools.
- Little perception by consumers of how high quality standards are achieved and maintained.

(v) Concerns and views

- All interested parties should work together – not one organisation forcing others to do what they think is best.
- More stringent product stewardship control with particular emphasis on end-user training and qualification criteria, in particular observance of correct harvest intervals will help reduce residues.
- Minimisation should be left to the food industry and market forces, not forced through by law.
- Many companies, especially retailers, now view this as a competitive issue and this is driving the whole initiative.
- Relaxation in retailer/consumer expectations may allow longer harvest intervals, which could lower residues.
- UK growers require economic yields and quality from their crops, and they should be on a level playing field with the rest of Europe.
- Where does the drive for minimisation stop, and is a zero residues policy really achievable, with evermore sensitive equipment.
- The need to minimise residues is not clear from a scientific point of view, and is not being driven by objective criteria following risk to benefit analysis of actions. MRLs are the key guiding measures of residues, and are the regulatory limits.
- Large amounts of scarce resources will be needed to reduce the presence of contaminants that cause no risk to human health when these resources could be spent in other ways to improve the safety of food and encourage healthy eating.
- In surveys, the vast majority of consumers are not concerned about pesticide residues, but NGOs are, and they seem to be driving the debate.
- One of the main ways to alleviate consumers' concerns about residues would be to educate them with the facts about pesticides and the regulatory process.
- Keen that pesticide residues are put into perspective, and it is recognised that the vast majority of residues that do remain are below the set MRLs.
- The PRC should publish only MRL exceedances to avoid negative publicity from lobby groups.
- If pesticides in water are a regulatory issue, what about food.

- Improved agricultural practices and ICM will give the quickest wins, and need more support from government for research into pest, disease and weed thresholds.
- Technology transfer to producer groups and development of trust between them and marketing organisations.
- Unhappy about decision of FSA to pursue the policy, especially the aspiration for zero residues (CPA).

(vi) Suggestions

- Several companies are keen to work with the FSA and other stakeholders to achieve their goal of minimising residues.
- COLEACP project, funded by Brussels, looking at production of exotic produce in the African, Caribbean and Pacific countries, delivering training in best practice and know-how.
- The BCPC could input technical expertise, meetings, publications as well as foresight and actions into this initiative.
- UKASTA could have an input if producer groups for technology transfer were formed.

E: Agronomists/research/breeders (selection only)

Those consulted (* responses received):

Association of Independent Crop Consultants (AICC) *
SAC
ADAS *
Morley Research Centre *
Stockbridge Technology Centre Ltd
Silsoe Research Institute*
British Society of Plant Breeders (BSPB)
Agricultural Engineers Association *

(i) Current and planned initiatives

AICC

- Very strong interest in the implementation and promotion of ICM but no specific objectives to reduce pesticide use.
- As part of their work for farmers they seek to reduce the use of pesticides to reduce costs i.e. the maximum yield of crop with the minimum amount of pesticide.
- They are involved in evaluating decision support systems in the field e.g. DESSAC for management of wheat diseases.

ADAS

- ADAS consultants only recommend pesticides after a risk assessment has been carried out to show that their use is justified, and after also ensuring that their clients' customers, who are often the multiples, permit their use. Approved products are chosen to minimise any risks to the operator, environment and food commodities, with the rates applied being the minimum appropriate to achieve the desired level of control.
- ADAS consultants promote the adoption of GAP to minimise pesticide residues. Techniques used may include the selection of resistant varieties where available, appropriate and commensurate with the market requirement, the implementation of ICM, the use of decision support systems where available and appropriate and best practice in the application of any pesticides recommended.
- All front line consultants delivering agronomy advice to clients are BASIS and FACTS qualified and are involved in CPD training activities to keep abreast of latest developments in ICM and GAP, and relevant in-house and other research.
- Support for the Voluntary Initiative

Morley Research Centre

- Much of the research work is spent on minimising the use of pesticides (but not directly residues).
- Morley is a LEAF demonstration farm.
- They produce practical field guidelines on how to reduce pesticide use in ways that can be practically adopted on farm e.g. pesticide application workshops, grain storage workshops, variety testing, identifying inputs required by individual varieties, when to use plant growth regulators.

Silsoe Research Institute

- Optimising the use and delivery of pesticides by improved application and targeting methods, currently with an environmental remit.
- Alternative techniques such as mechanical weed control through guided hoes, and crop storage with temperature and moisture controls.
- Decision support systems and automatic pesticide use recording to improve traceability.
- Fruit and vegetable storage – improving the uniformity of treatment to produce in store.

AEA

- Committed to accurate application of pesticides and the development of application technology.
- Key promoters of the National Sprayer Testing Scheme (NSTS) as part of the Voluntary Initiative.
- Provision of training for spray operators.

(ii) Success in changing practice

- Considerable progress has been made in research to minimise the use of pesticides and the promulgation of that information to farmer members.
- ADAS has been at the forefront of developing awareness and knowledge of ICM farming systems through the provision of training courses for vegetable and salad farmers in the 1990's, and helping farmers achieve Assured Produce and Tesco Nature's Choice membership through the provision of pre-audit advice on relevant ICM and GAP.

(iii) Drivers for change

- Economic pressures on farmers/growers to reduce costs.
- Production of high quality food commodities that the general public value.
- Paid by farmers to achieve their objectives.
- Engineering and physical science research can deliver technologies.
- The Assured Produce, Tesco Nature's Choice and ACCS assurance schemes with independent audits to ensure compliance have been strong drivers for change in the horticultural and agricultural industry in ensuring GAP and ICM is followed.
- The customer demand for minimal pesticide residues in food is the primary driver for change.

(iv) Barriers to adoption

- Difficult to achieve the perfection in produce required by retailers without pesticides.
- Uptake by farmers and growers, especially when they are risk-averse in the current economic climate.
- Ability and success of new cultural techniques in reducing pesticide requirements.
- Good progress has been made in identifying technological advances but commercial adoption and uptake can be limited by other factors including economics.
- Lack of information relating pesticide application parameters to food residues.
- How to encourage the uptake of sprayer testing – through assurance schemes perhaps.
- The funding needed for further research and development of resistant varieties that are acceptable to the market.
- Independent consultants/consultancies are providers of advice to their clients primarily, and thus, other farmers and growers are not recipients of advice on GAP and ICM, which was delivered in the past by a government funded advisory service for all farmers and growers.

(v) Concerns and views

- Comparative risk analysis is seen as an interesting approach, ref: PAN UK.
- It would help if the large agrochemical companies would get involved in developing bio-agents.
- More sophisticated decision support systems are needed but who will pay for their development.
- ICM and GAP is the way forward but funding is needed to enable the successful transfer of knowledge to all farmers and growers.
- Consultants, who work right across the industry, could have a key role as information providers but would need resource to target the industry as a whole and not just clients.
- Research farms could have a greater role as centres for knowledge transfer and as demonstrators of best practice.
- Greater awareness by farmers/growers of the pesticides found in food, so that alternative control strategies or different pesticides can be used as appropriate, built into overall messages on environment and cost of production. Demonstration plots could be used to show farmers that it is possible to reduce residues and maintain yield and quality.
- Initiatives, which will provide UK farming with a market advantage without significant cost, will guarantee uptake.
- Imports of food commodities like grain could be brought in from Australia with very low residues but at what environmental cost.
- FSA is working to a non-scientific agenda, and has given in to political and 'green' pressure.
- Pesticide residue-free food is a ludicrous notion – with ever increasing standards of detection, it is an impossible objective.
- The person who sells pesticide should not advise on crop requirement.

(vi) Novel ideas

- Heat treatments for insect control and soil sterilisation.
- Radiation.
- Surfactants to modify insect /fungal to surface interaction.
- Physical abrasion to modify insect/disease behaviour.
- Increasing the use of contact-acting chemicals with short half-lives with greater crop coverage.
- The development of trap cropping, crop barrier technology and techniques to minimise pest and disease damage through the use of cover crops.

F: Farmer/grower organisations

Those consulted (* responses received):

National Farmers Union (NFU) *
Linking Environment and Farming (LEAF) *
Fresh Produce Consortium (FPC) *
Barfoots of Botley Ltd *
Humber VHB *
KG Fruits Ltd *
MBM Potatoes Ltd *
WorldWide Fruits Ltd *
Farmers Union, Wales
National Farmers Union, Wales

(i) Current and planned initiatives

NFU

- Residues in food are high priority for the NFU's members, a lot of work has been done on the availability of pesticides and promotion of best practice.
- The NFU had a major role in setting up and sponsoring Assured Produce and Assured Food Standards.
- Involved in the Voluntary Initiative, which will not tackle residues directly, but will encourage better practice and environmental care, which may have indirect effects on residues.
- Adoption of ICM is part of NFU policy.
- NFU also acts on behalf of the industry to educate retailers and processors on what is achievable.

LEAF

- LEAF actively promotes ICM and GAP, which advocates the introduction of approved pesticides where justified, best practice for pesticide use, handling and storing produce, adoption of alternative strategies, technological solutions and biological control where appropriate.
- LEAF is a member of and actively involved in the Pesticides Forum and Voluntary Initiative, and works with many other bodies to continually develop ICM practice, and also developed the ICM BASIS certificate for advisers.

FPC

- The FPC supports and promotes any initiatives that lead to the reduction of pesticide residues, and the development of systems that minimise or that may avoid the use of pesticides altogether.
- The FPC have a Pesticides Committee which provides a forum for 45 stakeholders from the industry to meet on a regular basis to discuss and explore issues such as minimising pesticide residues and loss of active ingredients.
- Resource is devoted to publications to inform and advise on best practice and responsibilities, which has fed into APS
- A major initiative has been to increase awareness in developing countries about pesticides and the review process, and to encourage the development of ICM.
- The focus of FPC initiatives is on the supply chain, making the producer implement safety management systems, standardise record keeping and making sure the systems put in place are effective.

Barfoots - growers of semi-exotic vegetables

- High priority as they recognise that there is customer driven pressure to produce residue free food, and significant resource is devoted to various activities aimed at reducing pesticide residues. They batch test all produce for residues.
- They have a large and highly skilled technical team, with more agronomists working on the imported product supply chain than the UK crop side.
- ICM and GAP management practice is fundamental to the business, with minimal intervention with pesticides and minimal residues.
- Barfoots are members of APS, Tesco's Nature's Choice (Gold award winner), LEAF and LEAF Marque Scheme members, and are a LEAF Demonstration Farm. They are in the Countryside Stewardship Scheme and are now a Defra demonstration farm.

- Techniques used include: selection of air assisted sprayers, application of correct spray droplet size, observation of harvest intervals and label recommendations, regular crop walking and monitoring. Marginal areas of production and fields are not targeted for fresh produce crops. Their two most important initiatives are their concentration on best crop irrigation and fertility management techniques and practice. Soil and sap analyses are taken regularly to monitor crop growth and health. New biological products such as milk, garlic oil and citrus have been tested in trials. Resistant varieties are selected where possible.
- Post-harvest pesticides are avoided by good refrigeration and environmental control in store.
- Barrier and mechanical techniques are used to control weeds, beneficial insects are encouraged in cropping areas, fleeces are used for pest prevention.

Humber VHB – growers of tomatoes, cucumbers and herbs
- Reduction of pesticide residues is very high priority. They are members of APS.
- Their whole system of production is geared to the reduction of pesticide residues, and they regularly test crops for residues.
- Humber VHB is an active Tomato Growers Association (TGA) member, and they have signed up to their initiative for zero pesticide use in 10 years.
- Any pesticides that may cause residue problems are not used, and the number used is being constantly reduced, but this does depend on the growing season. The use of pesticides has also to fit in with predator control of insect pests.
- Resistant varieties are used wherever possible, depending on the customer requirements, grafting can be used to overcome some problems like Verticillium wilt.
- The use of biological control methods is fundamental in glasshouse cropping.
- New glasshouses are fitted with state of the art environmental controls, which reduce humidity and associated disease problems.
- Seminars have been put on by Humber VHB for their customers to explain the control of residues process being carried out, and what successes or problems have been found.

KG Fruits – major supplier of soft fruit, especially strawberries
- Very high priority as they supply M&S and work to their Red and Amber pesticide lists.
- Workshops and initiatives with grower members to encourage better monitoring of crops, pest and disease recognition, ICM, appropriate use of pesticides.
- In-house trials programme to look at bio-control agents, bio-pesticides, phytonutrients, plant enhancers, environmental management, varieties.
- Programme to encourage growers to use protected cropping to achieve better fruit quality and more control over pests and diseases.
- Joint working groups with retailers to examine issues and potential solutions

MBM – major player in UK potato production
- Up until a year ago, legal pesticide residues were not a major issue, but the brand-naming programme in PRC reports has had a major impact. Customers wish to avoid being named, so this area has now become high priority.
- MBM have written to all their growers with a prescribed list of approved chemicals for the toughest retailer specification, and they run their own residue monitoring programme based on risk groups.
- 99 % of their growers are in APS and protocols are strictly adhered to.
- Trying to adapt sprout suppressant treatment programmes to minimise residues.
- Largest new variety evaluation programme in the UK for potatoes.
- Trying alternative techniques and novel chemicals. Sit on research institute committees and stress the importance of alternative methods, and lobby the British Potato Council on residue issues and minimisation.
- Provide growers with technical support, training and demonstration on key issues such as application, damage awareness and store management. BPC storage course was run at their main facility last year.

WWF – major supplier of apples and pears

- The priority to reduce pesticide residues is very high, stimulated by their key customers, M&S being the most proscriptive but others like Sainsbury's still aiming for zero residues.
- Variety evaluation, but great difficulty in persuading multiples to list new varieties.
- Investigating alternatives to post-harvest treatments.
- Monitoring suppliers' production and participating with customers in joint initiatives to identify measures, which would facilitate reduced residues in fruit.
- Research has shown value of rot risk assessment, and that no post-harvest fungicide need to be used if a series of other measures is carried out, there is a worry about the knock-on effects to growers on the economics on production.

(ii) Success in changing practice

- All residues are virtually all within MRLs.
- Must deliver demonstrable year on year progress to zero residues.
- Limits of 75% of MRL are set for pesticide screening. If exceeded react to it and investigate what has happened. Rarely reach 75% limit very often.
- Progress is being made with top fruit, but not as quickly as retailers might like. WWF are working to a 5 – 10 year timescale but all the easy options have been used to get residues to where they are now. Further significant reductions will require significant changes and new crop protection products.

(iii) Drivers for change

- Implicit in ICM is a need to understand consumer aspirations. LEAF works with a wide range of the leading stakeholders to address the issue of pesticide residue reduction through the adoption of ICM best practice.
- For FPC the main reasons were a legislative requirement to do so, and strong NGO and consumer interest leading to retailer responses and pressure to minimise residues. The FPC operates in a transparent way and supplies interested stakeholders with information freely.
- Revocation of many pesticide approvals in 2003 is also a major issue.
- Cost of pesticides is huge and want to be more efficient.
- Responding to the customers' wishes.
- Staff do not want to work with treated crops in glasshouse situations.

(iv) Barriers to adoption

- Money, especially cost of technology, residue testing, capital investment.
- Lack of new products, especially on horticultural crops, and cost of producing residue packages for SOLAs for minor uses, and developing novel biological products. Also lack of up to date information on pesticides, websites not as good as should be. Information is crucial for due diligence requirements and for developing zero residue strategies.
- Lack of a replacement for CIPC in potatoes is a serious problem, and could result in loss of jobs in the processing industry if the UK cannot supply potatoes 52 weeks of the year, as raw and processed products may be sourced overseas.
- Technology transfer and the need to demonstrate new technology in a credible commercial situation for top fruit.
- Difficulty in persuading farmers to adopt ICM.
- Farmers knowledge of the risk of pesticide residues and safe harvest intervals in arable crops.
- In the current economic climate, growers are even more averse to risk in adopting new technology in the top fruit sector, but also applies to some others.
- Appalling regulatory position for pheromones and disrupters, and other biological products in UK but not in Europe.
- Different approaches to pesticide minimisation in different countries, so not all working to the same standards.
- EU harmonisation of pesticide regulation, whilst theoretically good, the progress to date is perceived as a shambles and of no help to the industry or consumers.

- The time taken by PSD to assess new materials and the costs are major inhibitors to the introduction of new products, a more efficient, cost-effective, appropriate and swift system is needed.
- Too many standards, need to rationalise existing schemes.
- A whole range of problems in developing countries from communication, training, to lack of access to residue testing.
- Cost of meshes to keep pests out is a problem.
- No useful forecasting systems for the more minor crops.
- Multiple retailers are holding up the adoption of new resistant varieties.
- Growers need to develop better techniques to manage biological control methods more effectively.
- Soil-borne disease and disorders pose major problems, especially in strawberries.
- In top fruit, the impact of climate on production, leading to year to year variation, especially for pests and diseases.
- All risk in introducing methods aimed at zero residues is taken by the primary producer where margins are already slim or non-existent.
- No evidence of joined up thinking on relevant R&D between various organisations.

(v) Concerns and views

- Horticultural growers have put a lot more investment into technical expertise in their production processes to reduce production inputs and costs, and residues. Each crop has its own association and lead experts, but research funding is low.
- Funding the research and development that supports ICM, plus the dissemination of information is a key requirement.
- The Assurance Schemes have a role to play but are set at a basic level for most growers, although they could be strong drivers for reduced pesticide residues.
- The Voluntary Initiative is too complicated and would prefer to see the measures incorporated into the assurance schemes.
- Retailers can source produce from other countries to meet their specifications, but they had all formally agreed to source as much UK produce as possible. Retailers are also producing different lists of their approved pesticides which is going away from a general agreement to have a common list, so it is difficult for growers to know which specification to grow for.
- The multiples have unfortunately trained consumers to demand blemish-free product of top quality. It is impossible to turn the clock back.
- The FPC and leading stakeholders are all working together to reduce pesticide residues. This is a whole supply chain approach
- Some organic techniques are moving into conventional production e.g. use of fleece to deter insect pests, but costs are high and there are waste disposal issues, needs joined up thinking from the Government.
- Concerns that the objective to reduce pesticide residues is led by public opinion and not sound science.
- Worried by consumer confidence in products resulting from NGO campaigns and 'exposure' of practices. WWF see a clear need for education on what are the safety issues and what are the benefits of increased fruit consumption.
- Would the cost to the grower of implementing reduced residues, produce an increased benefit to the consumer.
- Changes have to be funded out of existing margins, as retailers are offering no premium returns for zero residue fruit.
- A proposed project to pool residue data could have an important role to play in information provision and in helping improve the understanding of pesticide residues.
- GM technology does have great potential to reduce pesticide residues in produce, but consumer acceptability is low, and this will prevent the UK from being a leader in this new technology, to the detriment of the fresh produce industry.
- The 'name and shame' policy has been a key driver in raising awareness of pesticide residues, and in prompting corrective action, but at what cost. It is basically a clumsy means of achieving the aim and would prefer to see a more co-ordinated structured approach.
- There needs to be a whole industry approach with all stakeholders freely sharing information and concerns about pesticide residues.
- Positive release of zero residue products, USA brand name 'Nutriclean' is run as an accreditation service, which is being considered by at least one UK retailer.

(vi) Other

- Barfoots could have a role as a publiciser of best practice as they are committed to pesticide residue minimisation. As a Defra and LEAF demonstration farm they have a story to tell, and perhaps a role to play.
- Humber VHB is happy to promote best working practice, working with other growers and the TGA to reduce residues.
- KG is happy to participate in any future initiative aimed at working towards zero pesticide residues.

G: Processors

Those consulted (* responses received or returned as not applicable):

National Association of British and Irish Millers (NABIM) *
Seed Crushers & Oil Processors Association (SCOPA)
The Maltsters Association of Great Britain
Association of Cereal Food Manufacturers
Food and Drink Federation (FDF) *
Chilled Food Association (CFA) *
British Sugar plc
Unilever/Birds-Eye Walls *

(i) Current and planned initiatives

NABIM
- Reduction of pesticide residues in food is seen as a medium to high priority.
- Active programme to reduce pesticide residues in cereal products, with a monitoring programme which has been operating since 1988, which tests raw grain from millers based on volume throughput.
- Co-operation with agrochemical companies so that they consult NABIM before new products are released, to check whether there will be any adverse effects on bread-making properties and to highlight any residue issues.
- Strongly supports the assurance schemes for cereals. Growers supply pesticide passports to clearly identify any post-harvest treatments that have been applied to the grain.

FDF
- Initiatives are carried out by member companies, rather than by the FDF (see Unilever/Birds-Eye Walls).

CFA
- A document on 'Pesticide Due Diligence' was issued in May 2002, as a result of a 15 month project to develop guidance on the use of pesticides for suppliers of food to chilled food manufacturers. Full traceability is paramount. Suppliers are required to produce Pesticide Warranty Statements, declaring the list of pesticides that could have been used on the crop, and residue testing is done down through the supply chain to end product.
- Disseminate pesticide alerts to its membership base.
- Regular meetings with PSD on policy, alerts and practical issues.

Unilever/Birds-Eye Walls
- Sustainable Agriculture Initiative for key crops, peas, spinach, palm oil, tea and tomatoes, which includes practices such as – resistant varieties, ICM & IPM, cultural techniques, pesticide profiling system using a standard set of selection criteria, resulting in a specified list of permitted pesticides, using pesticides based on the company's own trials, testing alternative strategies including natural products, bio-pesticides, pheromones etc., and good pesticide use practice.
- Pesticide profiling is being implemented in all key crops along with guidelines for sustainable management.

In the frozen peas area:
- Exclusive breeding programme, focussing on disease resistance, and trials programme to investigate novel methods.
- Full-time field staff to support growers.

(ii) Success in changing practice

- Data on residue testing in wheat show that residues of fungicides, insecticides and herbicides are not commonly found in wheat, and almost never above MRLs. Residues of growth regulators have only been looked for recently.
- Major food companies can work together to promote sustainable agriculture practices.
- The UK approach to chilled food is believed to be the most highly developed in the world. Certain major multiples actively promote the PDD guidance to their supply bases.

(iii) Drivers for change

- Due diligence to meet food safety regulations, and to gather evidence that the treatment and processed product are safe, transparent supply chains.
- To ensure that any problems are foreseen.
- Demands by consumers will lead to commercial pressures on millers to select product with lower or nil residues.
- CFA's general aim is to minimise/eliminate (where practically achievable) residues in final product for commercial reasons, and to facilitate compliance with planned active ingredient legislation.
- Challenge and drive improvement in the area of crop protection.
- High quality products produced based on high quality brand values.

(iv) Barriers to adoption

- Lack of support for SMEs to develop alternative crop protection products and methodologies.
- Lack of government support to encourage best practice e.g. knowledge of use of biological control.
- No simplified fast track process for all crop protection products.
- Current lack of awareness of the impending legislation changes on active ingredients.

(v) Concerns and views

- Millers do not blend wheats in order to manage residues, only to produce the right grist.
- The continued development of crop assurance schemes is most likely to lead to improvements.
- A sustainable approach, focussed on continuous improvement of upstream activities will reduce the levels of pesticide residues in foods with the long-term aim of residue elimination.
- Focus research on problem areas e.g. post-harvest pesticides in crops such as potatoes, onions and fruit.
- Government assistance is needed to raise awareness of pesticide legislation changes.
- The focus of residue testing should be on primary products for processing.
- Consumer education is required to explain the need for pesticides on some foods and the low risk that this use entails.
- Detection of pesticide residues in food is a moving target.
- Progress in reduction can only be gradual.
- Measures must be global or will lead to movement of purchasing abroad.

H: Retailers and related organisations

Those consulted (* responses received or returned as not applicable):

British Retail Consortium
Tesco Stores Ltd *
Sainsbury's (* response not published as requested by stakeholder)
Asda Stores Ltd *
Safeway Stores plc
Marks & Spencer plc *
Waitrose Supermarkets *
Wm Morrison Supermarkets plc
Co-operative Retail *
Iceland Foods plc
Somerfield Stores Ltd
Association of Convenience Stores (na)

(i) Current and planned initiatives

Tesco

- Rational view of reduction in pesticides and likely residues, and have targeted all of UK sourced product to date. Priorities high in produce, medium in processing, low in canned and dried food.
- Nature's Choice is the sole initiative, incorporating ICM with new technology and products as they emerge.
- Profiled product groups by risk e.g. citrus – high risk.
- Residue testing – incorporating supplier data with Tesco's own, to help identify risk, drive up best practice and save cost. Data are fed back to growers e.g. round lettuce and potatoes.
- Tesco Organic Centre at Newcastle University, aiming to identify best organic practice, which may also help conventional production.

Asda

- High priority, with several work schemes underway to help reduce pesticides.
- Developing strategies with suppliers.
- Initiatives assessing applications on sensitive chemicals.
- Supporting LEAF and similar ICM initiatives.

Marks & Spencer

- Clear corporate objective – M&S trade on principle of highest quality product.
- Specifically the Corporate Social Responsibility objectives, there are 60 banned substances on the red list, an amber list is being prepared with 19 pesticides being phased out.
- Biological control and alternative techniques are encouraged, with the objective that use of pesticides is the last resort.
- Sourcing from locations, growers and suppliers where pesticide inputs can be lower and where potential residue burden will be less.
- Engagement with a wide range of stakeholders, suppliers and NGOs in particular.

Waitrose

- High priority as wish to sell residue free, better quality food.
- Stronger emphasis on justification and risk assessment, especially for post-harvest chemicals.
- High sales of organic produce.
- Temperature control of sprouting for potatoes.
- Purchasing from less intensive areas of production.

Co-operative Retail

- Pesticide residues are high on their agenda. They have focussed on sustainability and reduced reliance on pesticides for the past 10 years. It is also high priority for their customers and the wider Co-op group, and is embedded within their Responsible Retailing Policy.

- Strategy is evaluation of risk with justification of use: with reduction and removal of reliance on chemical intervention through mechanical and agronomic inputs, with use of pesticides being seen as the last resort tool.
- In the 1990s, Farmcare, the Co-operative Group's farming division, began to use ICM for peas leading to farm trials work, research and independent advice, now at the point where ICM is the standard approach amongst Co-op farms and the supplier base.
- Code of practice developed and introduced three years ago, specifies restrictions and promotes best practice. Work with growers to aim to reduce residues to zero over set periods of time for specific products.
- Advisory sheets created for a range of crops, preventative measures first, biocontrols, mechanical measures, finally pesticides backed up with environmental, pollution, safety and efficacy information. Information supplied allows growers/agronomists to make an informed decision on the control methods that can be used and allows a comparative risk assessment of the available pesticides to be carried out.
- Involved with the Assured Produce Scheme on the technical committee, with the aim to push and increase rate of uptake of new and safer products, and promote the approach taken by Co-operative Retail to a wider audience, with the aim of provision of improved information for growers.
- Always trying to promote both the Precautionary Principle and Comparative Risk Assessment for new and existing products.
- Broad corporate approach to provide support and not just making prescriptive demands.
- Willingness to lead, support and push to reduce inputs and residues, with an open policy and results published on its website.

(ii) Success in changing practice

- No targets have been set, but wish to see progressive quality improvements, cost savings, reduction of chemical inputs and lowering of residues (Tesco).
- Success is monitored by ensuring close relationship with suppliers who are subscribing to the constraints of the prohibited list. Some quick wins e.g. reduced insecticides in UK field vegetables by the use of fleece on carrots (M&S).
- Targets are moving and continuous, 3 years with codes of practice, 2 years with advisory sheets, keeping pace with all new activity, taking up specific initiatives as required for pesticides and crops, ongoing and long-term timescale.

(iii) Drivers for change

- To deliver best practice for quality and choice was the driver for Nature's Choice. Reduction of pesticides and residues was subsidiary.
- Brand integrity and customer concern.
- Customers are the main driver, and their view is widely formed. All M&S food shoppers identified the brand with quality and safety, so when PRC results identified problems with M&S products, they decided to drive the issue internally, rather than wait for a coherent government strategy.
- Waitrose wish to sell residue-free, better quality food, and also have concern for brand impact.
- Three key reasons for the Co-op: to address consumer concerns and raise awareness; to adopt and promote the Precautionary Principle and Comparative Risk Assessment to secure safer options in pesticide use; and to identify and develop opportunities for reducing risk from pesticide use through alternative methods.

(iv) Barriers to adoption

- Debate and definitions around MRL/LOD/ADI and approvals are seen as real blocks to progress.
- Naming and shaming league tables are preventing transparency and co-operation as they are being used to obtain and maintain market position.
- Approvals process too slow, restricting, costly and tailored to the larger market. Pheromone controls look to be a good way forward but not available in the UK at the moment.
- Problem area is Spain – all other parts of the supply chain are broadly meeting targets.
- Need to have a good relationship down the supply chain, based on understanding and trust.

- Assurance standards are weak and slow e.g. EUREPGAP not being driven in the right direction, problem with southern Europe.
- The unknown cocktails effect – urgent attention needed to the testing and regulatory process.
- Lack of pace across Standards and Regulatory bodies.
- Comparative risk assessment should be promoted more widely.
- Lowering of limits of detection is unhelpful. Residue testing is expensive, vested interest of labs.
- Alternative products/strategies – government support and direction has been less than constructive, not responding to customers.

(v) Concerns and views

- If the regulatory procedure is seen to be working, why are residues, which are within permitted limits, an issue? Not food safety, but public perception. Food with pesticide residues is not desirable, no matter how safe it is claimed to be, from a customer's point of view.
- Crop management specifications – work to improve these in conjunction with other stakeholders, may remove the selective and competitive nature of them. All retailers acknowledge that cross industry action is required, but no one is prepared to lead, so FSA is the most likely force of change to increase momentum, if that is the agenda.
- All stakeholders have an interest, each with specific market drivers or agendas, but should seek to end competitive advantage on the pesticide residue front, communicate, share information, pool resource and engage with consumers.
- Needs independent central body to draw together – could be third party – with specific aim of reducing residues – hit top 10 products, top 10 crops, top 10 countries.
- The UK agrochemical industry has been proactive in promoting ways to reduce pesticide residues.
- Networks of best practice would help progress.
- More robust sampling and analytical procedures are needed, with set detectable residue levels.
- Pooling of residue data should be encouraged.
- PSD sampling seen as inadequate and statistically poor.
- Biological and physical control should be the first line of attack, with new technology having an impact over time, prioritising problem areas and crops.
- Adoption of the precautionary principle across regulation and use of pesticides needs a champion.
- Would be interested to know what the methodology was for the FSA consumer research re attitudes to pesticide residues.
- Encourage debate on the 5 a day campaign, which should be seen as a driver for zero residues.
- UK food v imported food v food miles.
- Collaboration with NGOs has been useful, and is essential to move progress forward.
- This initiative from the FSA is needed, and lessons are to be learnt from stakeholders.
- At some point, reduction in residues, reaches a level so small, that the validity of chasing application against natural background contamination has to be questioned.
- Balance between availability, quality and the use of pesticides.

(vi) Other

- FSA to be main driver and to have a plan for clear fast action. The Co-op would be interested in driving this agenda with the FSA

I: Assurance Schemes

Those consulted (* responses received or returned as not applicable):

Assured Food Standards (email received referring to individual schemes)
Farm Assured British Beef & Lamb (FABBL)
Farm Assured Welsh Livestock (FAWL)
Assured Combinable Crops Scheme (ACCS) *
Assured Produce Scheme (APS) *
National Dairy Farm Assured Scheme (NDFAS)
Assured Chicken Production (ACP)
Farm Assured British Pigs Scheme (FABPS) (na)
Scottish Quality Cereals
Guild of Conservation Grade Producers

(i) Current and planned initiatives

ACCS

- Pesticide residues are a high priority for ACCS, as part of due diligence for the Food Safety Act.
- Application of best practice for the use of pesticides, with due regard to residue levels, label recommendations, maximum permitted dose rates, restrictions on repeated applications to a single crop, harvest interval and latest application stage.
- Application of best practice to the handling and storage of food crops.
- Adoption of ICM techniques. Members are asked to consider alternative methods of control where possible to avoid unnecessary applications, but there are no specific protocols.
- All members are inspected annually by independent, accredited inspectors.

APS

- APS policy is that scheme member growers aim for no residues to exceed MRLs in fresh produce. APS members farm around 77 % of area growing fresh produce and potato crops in the UK.
- The importance of good agricultural practice leading to residue reduction is constantly reviewed in the APS and its crop protocols, with continual improvement in ICM practice.
- Generic and crop specific protocols are produced and updated annually, which promote ICM methods and alternative strategies for controlling pests, weeds and diseases, especially pest and disease monitoring and forecasting, resistant varieties and biological control.
- Technical solutions to residue problems are introduced in the annual updates.
- Glasshouse growers first choice for control of pests should be biological control methods. The Tomato Growers Association has an aim of zero pesticide use on the crop within 10 years.
- APS is advised by expert crop protocol authors on current best practice. Growers are encouraged to use pesticides that may leave the lowest residues and have the least environmental impact.
- The requirement for residue testing is written into the APS. Members have to be able to demonstrate that they are part of a residue-testing scheme.
- In the potato protocol, new information has been provided for the 2004 season on the use of CIPC.
- APS is also in active dialogue with lettuce growers regarding pesticide residue problems.
- Discussions are being held with Defra to possibly include technical updates from relevant research projects in the annually updated crop protocols.
- The development of a residue database project will potentially give access to international residue analysis data, much of which is currently confidential.

(ii) Success in changing practice

- 85 % of traded grain is within ACCS. This is still rising and new members are still being recruited.
- NABIM have driven many of the standards including reducing MRL exceedances. Feedback from
- NABIM has been that incidences of pesticide residues and other quality issues, such as non-food objects, rodent and pest problems have reduced since the scheme was introduced, but no figures were available and no targets had been set.

- Currently, APS has no quantitative targets set within its protocols, but does monitor non-compliances.
- APS would be interested in setting up an indicator project to determine whether improvements are being achieved by growers, if funding was forthcoming.

(iii) Drivers for change

- Food Safety Act and food scares gave the incentive to set up the standards, part of due diligence and traceability.
- Interest in reduction in residues from a HACCP approach.
- The retailer and producer members of APS feel the need to respond to consumer pressure on minimising pesticide residues in food, and the scheme tries to meet this requirement.

(iv) Barriers to adoption

- Pesticides are being used to produce high quality grain. Strobilurin fungicides produce bright bold grains and enhance yield, even in the absence of disease, and glyphosate is used to aid ripening and reduce green grains. Farmers will be reluctant to change these practices.
- Availability of new products could be a problem.
- Grain price is an issue – farmers will be less receptive to another control on their practices at low grain prices, and could switch to animal feed crops with less controls, which would result in more imports of milling wheats.
- If standards become too stringent, farmers may leave the scheme so advantages won so far would be lost.
- Communication is a barrier to pesticide residue minimisation. Loss of ADAS as an extension service has led to a fragmentation of the UK consultancy base and problems with the flow of information up and down the food chain.
- There is also a major need for more joined-up thinking in government about the more selective biological and non-chemical products for pest and disease control, e.g. use of pheromones, which is allowed on mainland Europe but not in the UK. Companies face difficulties in financing the regulation of these products.
- There is still a significant area of land producing fresh produce crops (23 %) which is farmed by non-members who may not follow ICM and GAP principles.
- Use of pest and disease resistant varieties may be desirable but the produce may not be wanted by the retailer or market e.g. because of poor flavour.

(v) Concerns and views

- More restrictive use of pesticides could be seen to be anti-competitive by the Office of Fair Trading.
- Assurance schemes could have a potential role in minimising pesticide residues in arable crops if it was market led.
- The APS is keen to work with the FSA in commenting on any draft policy re pesticide residues, and in working towards sensible implementation, provided the survival of APS member businesses is not compromised.
- APS needs to be in a position to be able to meet the needs of all retailers, and not just those who want to reduce residues at a faster pace.
- Need to raise awareness with arable producers that residues are an issue and provide the means by which they can take action e.g. research and training.
- Also need to raise awareness that arable crops should be grown for a market and customer needs addressed – not just a bulk commodity crop.
- Producers need to give consumers confidence in British produce.
- The FSA has a good a chance as any organisation of making this work, as they have no commercial axe to grind.
- Short-term targets are unrealistic. It could take up to 25 years for some difficult technical problems to be solved in horticultural crops, to substantially reduce residues.

J: Consumer organisations and NGOs

Those consulted (* responses received):

National Consumer Council
Consumers Association (letter and campaign details only)
Friends of the Earth (FoE) *
Pesticides Action Network UK (PAN) *

(i) Current and planned initiatives

FoE

- Very high priority for the FoE within the Food and Farming team, key part of a campaign which has been going on for about five years.
- Campaign to reduce pesticide residues in food, including raising consumer awareness about residues, meeting with retailers to engage positively and apply pressure for change, providing information for consumers, media work and direct contact with FoE supporter base plus actions to reach the wider public.
- Desk-based research on the effects of different pesticides and impacts on human health.
- Involved in government consultation, stakeholder events and currently on the steering group of the Voluntary Initiative

PAN

- High priority for PAN, an important area - residue reduction is part of a whole policy on pesticide minimisation in its broadest sense.
- Pesticide use reduction, developing a policy framework, following the EU thematic strategy for the 6th European Action Plan (EAP). Developed draft text for a directive on Pesticides Use Reduction in Europe (PURE) at European level.
- Involvement through the Pesticides Forum.
- Organised the 'Pesticides Challenge' conference on 26 November 2002 to debate the importance of strategies to achieve a reduction in use and risk (Ref. Pesticide News no. 58). Considering comparative risk assessments between pesticides, and substitution of the most hazardous by less hazardous alternatives. Would need to look at residues in food and consider removal of the more risky chemicals and proactively seek alternatives. Would also need to consider whether actions were mandatory, voluntary or policy driven.
- Have actively engaged with the retailers, and have assisted the Co-op and M&S in their strategies to reduce residues. No positive indication from the other retailers yet but it is a PAN objective to encourage them to adopt similar strategies.
- Call for changes to the regulatory processes (via PURE) with a pest management focus to PSD and ACP. Current process looks at individual chemicals only, should look at the task rather than the input, so that alternative methods of control can also be considered. ACP has a sub-group which is looking at alternative methods and policy measures, and should report back in October 2003.
- Promotion of other systems in PURE – very supportive of organic farming.

(ii) Success in changing practice

- No specific targets have been set, FoE's policy is to minimise use of pesticides and minimise residues.
- Potential targets set out in PURE: 25%, 50% reductions in frequency of applications, and increased land in organic production. PAN UK recommends that government adopts a policy that minimises pesticide residues with the ultimate aim of zero residues.

(iii) Drivers for change

- Past drivers were the effects of pesticides in the environment, but now also concerned about the impact of low levels of hormone-disrupting pesticides and the cocktail effect of multiple residues on human health, especially young children (FoE).
- Removal of unsafe pesticides.
- Concerns over impacts of pesticides on human health and the environment – precautionary principle.
- Development of safer pest management techniques that have public support.
- Comparative risk assessment
- Reduction in the use of pesticides, especially for unnecessary cosmetic applications.
- Sustainable food supply chain.
- Need for changes to the UK regulatory processes.
- Lack of state-funded agricultural extension service, and costs of supporting pesticide research and registration compared with lower resources available for investment in less hazardous strategies.

(iv) Barriers to adoption

- Farmers encouraged to produce intensively, they are dependent on inputs. Huge task to take farmers in another direction, as they are wary of going down a different path.
- FSA and retailers cannot just demand change, they need to provide help to develop alternative strategies.
- Issues of cosmetic appearance of food driving pesticide use. Retailers are tied into this and need to think about ways forward, but no easy solutions
- Need serious resources into R&D for alternative methods. Farmers feel that there are no viable alternatives, the research is going on but is not reaching the development phase, and Defra have reduced funding for near-market research.
- Need a new independent extension service to get new advice to farmers. Farmers are being advised by pesticide companies rather than by independent agronomists, as they are less inclined to pay for independent advice when margins are so tight.
- NFU does not help – sceptical about the Voluntary Initiative and how it is going to work. NFU do not support a pesticides tax but some of the measures of the VI could work well with a tax, and money could be recycled back into research. A lot of the measures will cost money anyway.
- Assurance protocols – misleading to consumers by suggesting that the produce is a higher standard – really just legal practice. Assurance should be to a very high standard – not there at the moment.
- Commercial barrier, FoE welcome the actions of some leading retailers but they will still not shift on cosmetic standards – growers still having to use pesticides to meet quality standards. Not necessarily consumer response but now consumer expectation.
- Some consumers would pay more for lower residue food but low income groups concerned about cost still share the same concerns over safety.

(v) Concerns and views

- Real concern about consumer awareness – need more information.
- Development work government funded, joined up funding with Defra and FSA.
- Role and responsibility lies with retailers.
- Should put money into helping farmers, and also into farmers in other countries supplying the UK market, to meet our standards.
- Should not just concentrate on residues in food, need to consider whole systems of production.
- Link government policy to innovation – new alternative strategies and production methods.
- Pesticides tax to fund research, natural chemicals, surveillance, pollution reduction and training.
- Need a stakeholder forum to look at some of the practical implications. Pesticides Forum to be more practical than political.
- Key role for the FSA – honesty with consumers and information for consumers, but the FSA rarely publishes anything about pesticides in food, although they publish information on other contaminants. Silent about pesticides in food, even when safety levels are exceeded – why not send the information out to consumers? Peeling advice relevant to pesticide residues but was withdrawn although problems are still there e.g. on apples and carrots.

- Alternative pesticides – problems with getting more benign pesticides on the market, FoE not in favour of 'fast-tracking' for bio-pesticides as they can still have an impact. But smaller companies should be helped to put innovative products on the market. Data from products approved in other countries should be shared.
- Do not want to encourage use of pesticides with acute hazard ratings but with low crop residues. Important to look at the whole system, not just pre and post-harvest.
- GM crops not a solution – no strong evidence that they reduce pesticide use over time. Money should go into other ways of reducing pesticide use – technological innovations and organic production (not going backwards). PAN has signed a five year freeze on GM crops.
- FoE priorities for action – residues on produce eaten most regularly by infants, toddlers, children e.g. bananas, apples, pears. Look at what children are eating and tackle these foods. Should also look at lettuce – do something about it and make a difference.
- Food should be labelled in store, not necessarily with a list of pesticides, but consumers should be told that pesticides have been used – on shelf labelling, not on product, and should be told about residues that come up – leaflet in store.
- No evidence that consumers are eating less fruit and vegetables because of concerns about pesticide residues.
- Retailers, consumer groups, environmental NGOs and organic organisations are best placed to take forward approaches to reduce pesticide residues in food.

K: Organic farming organisations

Those consulted (* responses received or returned as not applicable):

Soil Association *
Organic Farmers and Growers (na)
UKROFS
Scottish Organic Producers Association Ltd
CMi Certification

(i) Current and planned initiatives

Soil Association

- Minimisation of the use of any 'outside' inputs, including pesticide inputs, on organic farms is a high priority.
- Pesticide residues are a 'standards' issue. Organic certifiers and farmers will test for residues if there is a suspicion of a problem e.g. from illegal use or previous land use.
- The Horticultural Standards Committee of the Soil Association (SA) is seeking to reduce the number of pesticides allowed over the next seven years or so.
- Storage pesticides are not allowed, and high standards of store cleanliness are promoted.
- Alternative techniques for weed, pest and disease control are fundamental in organic farming.
- SA Producer Services Section works on the development of technical solutions, and is charged with transmitting to organic producers information on relevant research issues.

(ii) Success in changing practice

- Very little pesticide is used on organic arable crops, and discussions are taking place on withdrawing use from horticultural crops.

(iii) Drivers for change

- Minimal use of outside inputs on all organic crops is the ultimate aim.

(iv) Barriers to adoption

- New producers tend to resort to pesticides more often before their systems 'bed down'. More work is needed to educate them on the alternatives.
- Need more biologically-based products for use in farming systems – cost of development is a barrier.
- Alternatives to the use of copper as a fungicide in potatoes for blight control and permitted materials for top fruit are major technical issues to address.

(v) Concerns and views

- Adoption of GM technology has led to very little if any reduction in pesticide use in those countries where it is used. GM is not a long-term solution, yet alone a short term one.
- The other UK assurance schemes are doing little more than noting down best practice. Their standards are just a baseline.
- The multiple retailers are potential drivers for the reduction of pesticide residues in food.
- A more active programme of residue testing and quicker turn around of results would be a key promoter of change, leading to the reduction of pesticide residues in food.
- A pesticides tax would have the most impact. It has worked very well in Sweden.

APPENDIX I – List of Stakeholders consulted

SH No.	Organisation	Main stakeholder contact	Interview/ personal contact	Proforma	Report or proforma completed
Government Departments, Agencies, NDPBs					
1	DEFRA Arable Crops Division	Andrew Kuyk Robin Manning	Yes		Yes
2	DEFRA Horticulture Division	David Jones	Yes		Yes
3	Pesticide Safety Directorate	Matthew Wells Tim Davies David Williams David Richardson Steve Baulk Sue Rambridge	Yes		Yes
86	Cabinet Office	David Pendlington		Yes	Part only
4	Welsh Assembly	Hugh Jones	Yes		Yes
5	Scottish Executive		SAC		-
6	Dept of Agriculture, N Ireland	Ian McKee Fiona Garrett	Yes		Yes
7	Advisory Committee on Pesticides	Jayne Wilder Secretariat		Yes	Comments
8	Pesticides Forum	Secretariat		Yes	No
9	Pesticides Residues Committee	Secretariat		Yes	No
10	Environment Agency	Derek Tinsley Andy Croxford	Yes		Yes
11	English Nature	Alistair Burn		Yes	Yes
12	Countryside Agency	Sue Cornwell		Yes	Yes
13	Advisory Committee on Consumer Products and the Environment	Lindsay Coombs		Yes	Letter
14	Sustainable Devt Commission	Victoria Read		Yes	Comments
15	British Potato Council	Dr Mike Storey	Yes		Yes
16	Home-Grown Cereals Authority	Prof. Graham Jellis Rebecca Geraghty	Yes		Yes
17	Horticultural Development Council	Dr Annette Carey	Yes		Yes
18	British Beet Research Organisation	John MacLeod		Yes	No
19	Meat and Livestock Commission	Dr Duncan Pullar		Yes	No
20	Milk Development Council	Brian Lindsay		Yes	Nil return
Pesticide companies/bodies					
21	BASF plc	Rob Gladwin		Yes	Yes
22	Bayer CropScience Ltd	Patrick Mitton	Yes		Yes
23	Dow AgroSciences	John Sellars		Yes	Yes
24	Du Pont (UK) Ltd	Tudor Dawkins		Yes	No
25	Makhteshim	Adrian Sisson		Yes	No
26	Monsanto (UK) Ltd	Neil Adams		Yes	Yes
27	Syngenta	Helen Steggles		Yes	Yes
28	Crop Protection Assoc.	Dr Anne Buckenham		Yes	Comments
29	British Crop Protection Council	Dr John Fisher		Yes	Yes
30	UKASTA	Paul Rooke.		Yes	Yes
31	BASIS	Robert Simpson Paul Singleton		Yes	Yes

Agronomists/research/breeders

32	AICC	Allen Scobie	Yes		Yes
33	SAC	Dr Gemmell		Yes	No
34	ADAS	David Parish ADAS Arable David Lancaster ADAS Horticulture		Yes Yes	Yes No
35	Morley	Jim Orson		Yes	Yes
36	Stockbridge	Dr Martin Macpherson		Yes	No
37	Silsoe	Prof.Paul Miller		Yes	Yes
38	British Society of Plant Breeders	Dr Penny Maplestone		Yes	Nil return
87	Agricultural Engineers Association	Jake Vowles		Yes	Yes

Farmer/Producer Organisations

39	National Farmers Union	Chris Wise Sarah Pettitt (Salveson)	Yes		Yes
40	LEAF	Caroline Drummond	Yes		Yes
41	Produce Category Managers (a) (b) and (c)	Nathan Dellicott Farms Director Barfoots of Botley Ltd Paul Challinor General Manager Humber VHB Richard Harnden KG Fruits Ltd	Yes Yes Yes		Yes Yes Yes
42	Fresh Produce Consortium	Doug Henderson	Yes		Yes
43	FarmCare (Co-op)	David Gardiner		Yes	No
44	National Trust	Rob Macklin		Yes	No
89	MBM Produce Ltd	Chris Marshall Richard Barnes	Yes		Yes
90	Worldwide Fruit Limited	Dr Drew Reynolds	Yes		Yes
91	FUW	Arwyn Owen		Yes	No
92	NFU Wales	Malcolm Thomas		Yes	No

Processors

45	NABIM	Damien Testa	Yes		Yes
46	Seed Crushers & Oil Processors Assoc.	Lynda Simmons		Yes	No
47	The Maltsters Assoc of Great Britain	Ivor Murell		Yes	No
48	Association of Cereal Food Manufacturers	Joanne Moore		Yes	No
49	Food and Drink Federation	David Bellamy		Yes	Yes
50	Chilled Food Association	Kaarin Goodburn		Yes	Yes
51	British Sugar	Nick Carter		Yes	No
88.	Birds-Eye Walls Unilever	Colin Wright Andrew Crimes Jos van Oostrum		Yes	Yes

Retailers

52	British Retail Consortium	Kevin Swoffer		Yes	No
53	Institute of Grocery Distribution		FSA		-
54	Tesco	Tony Palmer	Yes		Yes
55	Sainsburys	Simon Thirkell	Yes		Yes
56	ASDA	Dr Chris Brown		Yes	Yes

57	Safeway	Gavin Bailey		Yes	No
58	Marks & Spencer	Mike Barry	Yes		Yes
59	Waitrose	Alan Wilson		Yes	Yes
60	Morrisons	Chris Blundell		Yes	No
61	Co-op	Kevin Barker	Yes		Yes
62	Iceland	Suzanne Ravenscroft		Yes	Comments
63	Somerfield	Stephen Ridge		Yes	No
64	Association of Convenience Stores	James Lowman		Yes	Nil return

Consumer organisations & NGOs

65	National Consumer Council		FSA		Comments
66	Consumers Association	Sue Davies	Yes		Comments
67	Friends of the Earth	Sandra Bell	Yes		Yes
68	Pesticides Action Network	David Buffin	Yes		Yes
69	SUSTAIN		FSA		No
70	Food Aware		FSA		No

Assurance Schemes

71	Assured Food Standards	Jonathan Tipples	Yes		Nil return
72	Farm Assured British Beef & Lamb	FABBL		Yes	No
73	Farm Assured Welsh Livestock	Moss Jones		Yes	No
74	Assured Combinable Crops Scheme	Tony Pexton	Yes		Yes
75	Assured Produce	Professor Chris Payne Chair of Board	Yes		Yes
76	National Dairy Farm Assured Scheme	Alistair Beattie		Yes	No
77	Assured Chicken Production	Tim Green (same as 85)		Yes	No
78	Farm Assured British Pigs Scheme	Marcus Wood		Yes	Nil Return
79	Scottish Quality Cereals	John O'Rorke		Yes	No
80	Conservation Grade	Guild of Conservation Grade Producers		Yes	No

Organic Bodies

81	Soil Association	Francis Blake	Yes		Yes
82	Organic Farmers & Growers	Richard Jacobs		Yes	Nil return
83	UKROFS	Andrew Jedwell Christopher Stopes	Yes		No
84	Scottish Organic Producers Assoc Ltd	Chris Atkinson		Yes	No
85	CMi Certification	Tim Green		Yes	No

APPENDIX II – Consultation Proforma

Pesticide Residues in Food

Please feel free to append documents with any detailed information on initiatives mentioned in Q2.

Q1	**Where does the objective of reduction of pesticide residues fit into the priorities of your own organisation?** (e.g. High/medium/low, share of resources allocated)
Q2	**What initiatives/activities is your organisation involved with which – directly or indirectly – are likely to result in a reduction in pesticide residues in food?** (e.g. technological solutions (new varieties, new products, new processes); application of best practice to the use of pesticides; application of best practice to the handling, storage and processing of foods; adoption of organic and ICM production methods; alternative strategies for the control of pests, diseases and weeds; retailer production requirements and assurance schemes; the pesticide approval process)
Q3	**What was your organisation's reason for engaging in these initiatives/activities?** (e.g. What are the drivers for change?)
Q4	**What progress is being made with this/these initiative(s)?** (e.g.What targets have been set? How is progress being monitored? What is the timetable/schedule for achieving the targets?) **What barriers, if any, are there to progress?**
Q5	**What other ways are there in which pesticide residues in food could be reduced?** Are you aware of any organisation taking this approach? **If yes, *Who? Are they in a position to make a difference to the levels of pesticide in food?*** Who is in the best position to make this approach effective? Could your organisation have a role?
Q6	**Are there any aspects of pesticide residues in food that you think are not reducible?**
Q7	**Which initiatives/activities do you think will have the greatest impact on the levels of pesticide residues in food?**
Q8	**In the long term, how realistic an objective do you think it is to seek to have no pesticide residues in food?** How long term must the objective be? How long will it take to achieve?

Appendix III – FSA background document for Stakeholders

Background

The Food Standards Agency accepts the use of pesticides in food production so long as any residues which occur in food:

- do not result in consumers exceeding safety standards; and,
- are the minimum that is appropriate for effective use, even if higher levels would not be harmful.

The FSA recognises that consumers prefer not to have pesticide residues in their food and is working with producers, importers and retailers to develop an appropriate action plan that will guide the Agency and its stakeholders towards minimisation of pesticide residues.

The FSA held a Stakeholders' meeting on 30 April 2002, to discuss the feasibility of minimising pesticide residues in food. At the Open Board Meeting on 13 June 2002, the Board was strongly of the view that the Agency should adopt a pesticides minimisation policy with the aspiration of eventually achieving residue free food.

A report was therefore commissioned to critically review the scientific literature to inform policy development in this area. The academic consultants preparing that report have highlighted a number of key areas where further work with stakeholders is necessary so that the final targets set in the strategy are achievable and practical. These include areas such as:

- post-harvest storage of fruit and potatoes,
- fungicide and growth regulator use in agriculture and horticulture,
- the role of assurance schemes and other approaches in supporting best practice and uptake of Integrated Crop Management approaches
- impacts of reduced pesticide use on food quality and appearance
- potential for development of new chemistry more focused on residue reduction.

We are now working with consultants to enable us to hold a range of meetings to take forward discussions with stakeholders in these and other areas. These will be reported to the project group within the Agency and guide the development of the strategy. We currently envisage that the strategy will focus initially on finding ways of getting producers whose products consistently contain significant residues up to the standard of those whose products contain no detectable residues.

Wide engagement with stakeholders will, of course, also be important in the implementation of the action plan (if approved) and the Agency looks forward to continuing to work with its stakeholders in this area.

Appendix IV – Summary of scientific literature review on minimising pesticide residues in food

THE MINIMISATION OF PESTICIDE RESIDUES IN FOOD: A REVIEW OF THE PUBLISHED SCIENTIFIC LITERATURE

D Atkinson, F Burnett, G N Foster, A Litterick, M Mullay, C A Watson, SAC

Summary

Current crop protection, against pests, weeds and diseases over much of world agriculture, is based on the use of pesticides. The scale of pesticide use inevitably results in the occurrence of residues in food products.

We have studied the publicly available scientific literature to identify the current scale of the problem and to identify a range of approaches to minimising both residues in individual foods and total exposure.

Our review of published information on pesticide residues indicates that a significant proportion of most major vegetable crops and all major fruit products consumed in the UK contain residues of pesticides. Similar situations exist in EU and USA. Residues are found both in produce which originates in UK and in that which is imported.

Fungicide and growth regulators are most commonly found as residues. Post-harvest applications more commonly give rise to residues than do applications in the field. In current systems of production, losses of food production would be large without the use of crop protection chemicals. Alternatives to chemical crop protection would need a substantial reconsideration of systems of crop production. Most current systems of production have come about because chemical crop protection has been available and so has facilitated the use of pesticides. The concentration of research on systems designed to function with chemicals has meant that alternative options have not recently been explored. The pesticidal materials most commonly found in food products and the crops and foods in which residues are found most commonly are identified in the report.

Although residues are commonly found in most major food crops only a very small proportion of residues detected exceed maximum residue levels (MRL), there is no substantive evidence that current residues represent a health issue. Although this was not an issue we were commissioned to examine. At the present time, in both EU and UK, the application of pesticides in agriculture is decreasing. A number of options which should further accelerate this decrease, and as a result reduce residues in food, are detailed here. These options are identified on the basis of our review of the publicly available literature.

There are also a number of options not related to current pesticide application practices and technologies, which could influence the quantity of residues or the frequency with which such residues are found. We have commented on these options.

Both biotechnology enhanced production systems and organic farming have as part of their basic rationale the reduction of pesticide use to low or no levels. Both approaches individually and as part of a whole UK strategy have a potential role to play in reducing residues in food.

Organic farming has been successful in reducing the frequency and levels of pesticide residues in produce from this sector. In many cases this means production of results in a yield penalty. The yield penalty seems more often to be related to the availability of soil nutrients that to the ineffectiveness of crop protection. Consequently, many of the crop protection practices developed for organic farming seem likely to have value to conventional agriculture, especially Integrated Crop Management (ICM) systems. Introducing appropriate methods from this sector may therefore reduce both pesticide use and recovery as residues. Many of the options available to conventional producers e.g. selection of varieties, timing of operations are also available to organic producers. They may result in improvements to total productivity, so making organic production a more viable option for the production of some commodities. Pesticide residues currently detected in organic foods include a number e.g. dichloro-diphenyl trichloro-ethane (DDT) derived from historic uses in more conventional agriculture.

The use of genetically modified (GM) crops in crop production in USA has resulted in some reductions in pesticide use. Total reductions seem less than had been anticipated. For herbicide tolerant crops, the ability of GM crops to reduce use depends on whether the broad spectrum herbicides, to which the crops are now resistant, can deliver a high enough standard of weed control to obviate the need for repeat applications or the continued use of residual materials. Varieties engineered to be resistant to insect pests, *Bacillus thuringiensis* (Bt) varieties, have reduced the use of insecticides. Currently, no commercial GM varieties seem to have been rendered resistant to fungal infection.

Pesticide use in conventional systems can be reduced by both advances in crop breeding and through modified agricultural practice. Plant breeding can reduce the need for fungicides and insecticides but is likely to have little impact on herbicide use other than through any impact of herbicide tolerant (Ht) crops. Breeding for insect and disease resistance which has been successful in the past will continue to help reduce the need for fungicides and insecticides.

Our review of the literature indicates that modification to crop husbandry presents a wide range of means of reducing both pesticide use and residues. A large number of major system experiments, e.g. the Boxworth Project, have identified a range of techniques which have been effective in reducing chemical use. These system experiments have informed the production of decision support systems (DSS) to provide a basis for rationalising pesticide use. Case studies detailing work on glasshouse salad crops, the Danish system, glyphosate, strobilurin fungicides and cereals are used in the report to illustrate some available options for reducing chemical use. Many of the suggestions made are of a type which, would be applicable to both UK systems and countries outwith UK from where we currently receive imports. Options to reduce pesticide use include the possibilities of replacing chemical use with physical protectants such as mulches. Pesticide residues cannot be seen in isolation within the debate about food quality. Minimising pesticide residues through reduced use or alternative practices must be seen in the context of consumer demands for products with high visual impact.

A high proportion of the residues found in UK foods derive from post-harvest chemical use. A range of options, related to both the use of crop protection chemicals and the management of the storage environment, could reduce chemical use and the presence of residues. Options for fruit, grain and potatoes are detailed in the report.

Current levels of pesticide use and residues in foods are a function of the post-war development of farming systems based around pesticide use for crop protection. Moving away from current methods and levels of pesticide use will require some rethinking of the design of the current systems. A wider range of options for crop protection are needed. Such systems need to be financially and environmentally viable and deliver high quality food. The need to minimise pesticide residues should be seen in the context of the current environmental, agricultural and health debates.

PAU154 - LIST OF ACRONYMS

ACCPE	Advisory Committee on Consumer Products and the Environment
ACCS	Assured Combinable Crops Scheme
ACD	Arable Crops Division
ACE	Arable Cropping and Environment
ACP[1]	Advisory Committee on Pesticides
ACP[2]	Assured Chicken Production
ADI	Acceptable Daily Intake
AFS	Assured Food Standards
AICC	Association of Independent Crop Consultants
AP	Assured Produce
APS	Assured Produce Scheme
BCPC	British Crop Protection Council
BPC	British Potato Council
BSPB	British Society of Plant Breeders
CA	Countryside Agency
CFA	Chilled Food Association
CIPC	Chlorpropham
CMi	Checkmate International
COLEACP	Europe-Africa-Caribbean-Pacific Liaison Committee
CPD	Continual Professional Development
CSF	Chemical Stakeholders' Forum
CSL	Central Science Laboratory
DARD	Department of Agricultural and Rural Development, Northern Ireland
Defra	Department for Environment, Food and Rural Affairs
DESSAC	Decision Support Systems for Arable Crops
EA	Environment Agency
EAP	Environmental Action Plan
EIS	Environmental Information Sheets
EN	English Nature
EU	European Union
EUREPGAP	European Promotion of Good Agricultural Practice
FABBL	Farm Assured British Beef and Lamb
FABPS	Farm Assured British Pigs Scheme
FACTS	Fertiliser Advisers' Certification and Training Scheme
FAWL	Farm Assured Welsh Livestock
FDF	Food and Drink Federation
FoE	Friends of the Earth
FPC	Fresh Produce Consortium
FSA	Food Standards Agency

GAP	Good Agricultural Practice
GMO	Genetically Modified Organism
HACCP	Hazard Analysis and Critical Control Point
HDC	Horticultural Development Council
HGCA	Home-Grown Cereals Authority
HPD	Horticulture and Potatoes Division
ICM	Integrated Crop Management
LEAF	Linking Environment and Farming
LOD	Limit of Detection
M&S	Marks and Spencer plc
MRL	Maximum Residue Level
NABIM	National Association of British and Irish Millers
NDFAS	National Dairy Farm Assured Scheme
NFU	National Farmers Union
NGO	Non-Government Organisation
NPTC	National Proficiency Testing Council
NSTS	National Sprayer Testing Scheme
PAN UK.	Pesticides Action Network (UK)
PCN	Potato Cyst Nematode
PDD	Due Diligence Guidance on Agricultural Use of Pesticides for Suppliers of Chilled Food Manufacturers
PRC	Pesticide Residues Committee
PSD	Pesticides Safety Directorate
PURE	Pesticide Use Reduction in Europe
QA	Quality Assurance
R&D	Research and Development
SA	Soil Association
SAC	Scottish Agricultural College
SAPPIO	Sustainable Arable Production Based on Precision and Input Optimisation
SCOPA	Seed Crushers and Oil Processors Association
SME	Small Medium Enterprise
SOLA	Specific Off-Label Approval
TASCC	Trade Assurance Scheme for Combinable Crops
TGA	Tomato Growers Association
UK	United Kingdom
UKASTA	UK Agricultural Supply Trade Association
UKROFS	UK Register of Organic Food Standards
USA	United States of America
VI	Voluntary Initiative
WWF	WorldWide Fruit