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# Waste & Resources Action Programme

## Compost Use in Agriculture: Training for Crop-Consultants II

**OAV020**

**September 2007**

Tender Invitation Document

## **Executive summary**

This document sets out the scope of work that the Waste and Resources Action Programme ("WRAP") wishes to commission. WRAP selects its tenderers through a competitive process and this document describes that process and explains how tenderers may tender for the work described.

## **Purpose of the work**

The purpose of the work is to deliver training to crop consultants to increase technical knowledge and practical use of green compost in agriculture, to promote the value and benefits of compost, and address some of the barriers to its use. The training package should be delivered through a series of events, preferably utilising existing knowledge transfer networks.

## **Scope of work**

To deliver a series of training events/presentations specifically for crop consultants. These can be linked to demonstrations or site visits if appropriate. It will be preferable to promote and deliver the training package in partnership with existing networks, organisations, trade associations.

The training has been split into two Lots and tenderers are invited to submit a proposal for either, or both, Lots:

**Lot 1** – Training for Crop Consultants related to Quality Compost Use in Agriculture as a Soil Conditioner

**Lot 2** – Training for Crop Consultants related to Quality Compost Use in Agriculture as a Surface Mulch

## **Timings**

The deadline for the work programme and tender submissions is detailed below:

## **Work Programme**

Work to commence by: 8<sup>th</sup> October 2007\*  
Work to be completed by: 31<sup>st</sup> March 2008\*

## **Tender Timetable**

Deadline for receipt of tender submissions	12:30 pm 26 <sup>th</sup> September 2007*
Shortlisted tenderers notified	1 <sup>st</sup> October 2007*
Presentations to tender assessment panel	4 <sup>th</sup> October 2007*
(Successful tenderers will be informed if a presentation is necessary)	
Tenderers receive written notification of WRAP's decision	5 <sup>th</sup> October 2007*

\* WRAP reserves the right to change the timetable.

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## Section 1: Background

- 1.1 WRAP (The Waste & Resources Action Programme) is a not-for-profit private company backed by funding from the Department for Environment, Food and Rural Affairs, the Scottish Executive, the Welsh Assembly Government and Northern Ireland Executive.

WRAP works in partnership to encourage and enable businesses and consumers to be more efficient in their use of materials and recycle more things more often. This helps to minimise landfill, reduce carbon emissions and improve our environment.

## Section 2: Scope of work

- 2.1 The aim of this work is to deliver a training package for crop-consultants to increase technical knowledge and practical use of quality green compost in agriculture, to promote the value and benefits of compost, and address some of the barriers to its use. The training package should be delivered through a series of training events, preferably utilising existing knowledge transfer networks.
- 2.2 This work falls under WRAP's Organics Programme strategy, developing markets for quality assured PAS100 compost in added value markets. Agriculture is a key added value market for compost, where quality composted products can be used either as a soil conditioner or as a mulch. The benefits of using compost in these applications include:
- Helping to maintain and enhance soil organic matter levels
  - Improving soil quality through increased drought resistance and workability
  - Supply major crop-available nutrients and trace elements
  - Improving crop establishment and yield
- 2.3 At present, the use of compost in agriculture is limited; recent survey work has shown that the estimated theoretical potential market for compost in agriculture is in excess of 6 million tonnes per annum (ORG041 2005/06 Agricultural Market Assessment). The Composting Association Survey (2005/06) estimated that around 1 million tonnes of compost was used in agriculture, a 6th of the potential available market. WRAP is continuing to develop the market further and build confidence in use of recycled green compost as a soil improver and mulch. In particular, market assessment work has identified that root crops offer a significant market for compost as a soil conditioner.
- 2.4 Increasing the use of compost in agriculture is a key objective of the added value organics programme. WRAP provided training to crop consultants to promote quality compost in agriculture during 2006/07 under project OAV013. OAV013 was in the form of half day training courses delivered by ADAS that included interactive exercises and PowerPoint presentations (a copy of the presentations can be found in Appendix II). A total of 218 people attended the 10 workshops between November 2006 and January 2007. Demand for places at the workshops was high; when the events were first advertised in October 2006, extra dates had to be added to the timetable. The need for a second series of training course has been identified as there is a potential audience of over 1,000 qualified farmers and farm advisors. The training proved an effective method of encouraging the use of compost in agriculture, with 95% of crop consultants attending the training stating that they intend to use, or recommend the use of quality compost following the workshop.
- 2.5 Further workshops for crop consultants are now needed to continue to build confidence in the use of quality green compost in agriculture and to take account of new developments such as the recently established Quality Protocol for compost. This new project seeks to establish a second round of training to crop consultants, building upon the training provided under OAV013, and complementing other WRAP Organics projects (OAV017 Support to Farmers for Compost Use, and a series of product trials for compost use in agriculture OAV011). It will also draw from WRAP's recently completed guidance document for the use of compost in agriculture (ORG0036). WRAP have also been running workshops on the Quality Protocol for compost producers and land managers. These have focussed on the requirements of the Protocol and in particular the use of the web based reporting tool for the application of compost to land. These workshops are likely to be complete by the end of September.
- 2.6 The use of crop consultants as specialist advisers to farmers and agri-business is a well established practice. Crop-consultants offer a wide range of services, skills and experience to

farmers. In this advisory role, they have a strong influence over any soil management decisions a farmer makes. Working with a wide range of farmers means they have a direct influence over the management of a large land-bank, which presents a significant opportunity for compost use. By providing further training to crop consultants on the use of compost in agriculture, WRAP will increase the incidence of compost being recommended as a soil conditioner.

### **Requirements or services**

- 2.7 To deliver a series of training events aimed specifically at crop-consultants, regionally based to enable easy access. To provide guidance at these training events for crop-consultants - providing information on the use of compost in agriculture. The training should include information on the benefits of compost use, particularly those characteristics valued most by growers including increased water and nutrient retention in soils and general improvements to soil structure. Wherever possible, the benefits of compost should be substantiated, for example by presenting trials evidence or providing economic data to demonstrate the NPK value of compost, and the training should take account of the wide variation in experience of compost use and knowledge of potential benefits.
- 2.8 It is anticipated that materials developed for a previous WRAP project - OAV013 Training for Crop Consultants, together with the WRAP Guidance Document for Use of Compost in Agriculture, will provide the basis of information to be communicated to crop-consultants. The presentation and workshop format developed for OAV013 will need to be revised in light of previous feedback and recent changes to regulatory controls such as the Quality Protocol, however, it is not anticipated that entirely new materials will need to be developed. The training needs to include the Quality Protocol web reporting tool requirements.
- 2.9 The training should focus on the use of compost in market sectors which maximise potential for swift and significant uptake of green compost. Recent market assessment work (ADAS, 2006) has identified two key uses for compost in agriculture: the use of compost for its soil conditional properties; and the use of compost as a surface mulch, for example in fruit growing. The training has therefore been split into two Lots and tenderers are invited submit a proposal for either, or both, Lots:
- 2.9.1 Lot 1 – Training for Crop Consultants relating to Compost Use in Agriculture as a Soil Conditioner**
- The survey highlighted the following crops as key priority areas for compost use as a soil conditioner: potatoes, carrots and parsnips; brassicas; onions; leeks; and asparagus. It is anticipated that the training will focus on some of these key crops.
- 2.9.2 Lot 2 – Training for Crop Consultants relating to Compost Use in Agriculture as a Mulch**
- The survey identified the following top and soft fruits as priority areas for the use of compost as a surface mulch: apples and pears; strawberries; blackcurrants; and raspberries. It is anticipated that the training will focus on some of these key crops.
- 2.10 It will be preferable to promote and deliver the training package in partnership with existing structures, organisations or trade associations, for example by working with AICC, FACTS courses, or local farmers groups. Tenderers should make recommendations for co-branding the training course materials to identify where partnership organisations are interested.

- 2.11 Design and production of invitations for workshops. Send invitations to target audience (crop consultants and farm managers) and to key stakeholders, as appropriate, these may include: the Association of Independent Crop Consultants (AICC); the British Institute of Agricultural Consultants (BIAC); the Fertiliser Advisers Certification and Training Scheme (FACTS); VGA (Vegetable Growers Association); FAST (Farm Advisory Services Team); the NFU; technical managers of large horticultural businesses and producer organisations; and other relevant trade bodies and organisations.
- 2.12 Design and production of publicity for workshops to be disseminated via appropriate trade bodies, websites and associations.
- 2.13 Where appropriate training events can include site visits to compost producers and/or farmers using compost and should involve practical activities/exercises to reinforce learning.
- 2.14 The training should offer BASIS points to stimulate greater interest and should include an 'after the event' questionnaire to assess feedback from delegates, with a view to continuous improvement of the training format and content.
- 2.15 Tenderers should make recommendations for tutors and event locations where appropriate. Costs associated with providing trainers should be clearly identified as part of the bid.
- 2.16 The training should promote the use of quality assured composted products, compost from businesses that have either achieved full certification to BSI PAS 100 or are currently working towards certification. '**BSI PAS 100**': The BSI Publicly Available Specification 100 (PAS 100) for composted materials specifies the minimum requirements for the selection of input materials, process of composting and the quality of composted materials, as well as for the marking and information labelling of the product.
- 2.17 Training should include as a minimum; guidance on nutrient planning, compliance with NVZ regulations and the Quality Protocol, benefits and issues of compost use.

### **Deliverables**

- 2.18 Revision and updating of existing training materials (e.g. PowerPoint presentation) in light of previous feedback, new data and recent developments such as the Quality Protocol.
- 2.19 To deliver a series of training events specifically for crop-consultants to increase technical knowledge and practical use of quality compost in agriculture, to promote the value and benefits of compost, and address some of the barriers to its use. It is preferable that the training events are delivered through existing knowledge transfer networks and are practical and interactive.
- 2.20 Provide to WRAP a Feedback Report following completion of each training event. Including summaries of delegate feedback. This feedback should include the likelihood of an increase in compost as a result of the training.
- 2.21 Provide to WRAP a summary of recommendations for future training courses.

### **Terms and Conditions**

- 2.22 A sample copy of WRAP's terms and conditions is included at appendix 1 to this document. As part of your tender submission you are required (as described within Section 3 of this document) to comment on the acceptability (or otherwise) of the terms and conditions. Objections noted are not guaranteed to be accepted.

## **Programme**

2.23 The target deadline for the work programme is detailed below:

### **Work Programme**

Work to commence by: 8<sup>th</sup> October 2007

Work to be completed by: 31<sup>st</sup> March 2008

\* WRAP reserves the right to change the timetable



## Section 3: The tender submission - Information required

3.1 Your tender submission should be provided electronically, either by email, or sent on a cd. It should be limited to no more than 20 pages (excluding appendices). Only the information included in your tender will be assessed and negotiation will not be entered into during the assessment period.

3.2 Your tender submission must include the following information (preferably in order):

(1) **An executive summary** of no more than one side of A4 in length, outlining the proposed work and including the total cost of the proposed work, inclusive of Value Added Tax ("VAT") and anticipated expenses. **State which Lots you are tendering for.**

(2) **Company/ Organisation details**

WRAP will need the following information:

- The name of the Company submitting the tender;
- The registered office name, address, VAT number (if applicable) and company or charity registration number;
- The name of the nominated contact person within the tenderer's organisation;
- Contact details including: address (if different to the above), telephone number, fax number and e-mail address.

WRAP accepts tenders both from individual companies and from consortiums. Should you decide to tender as part of a consortium you will need to identify one member of the consortium (the "Lead Contractor") to act as the contracting party. All other consortium members will be sub-contractors to the Lead Contractor.

(3) **A description of your working methods**

You will need to make clear how you intend to deliver the work and provide estimated timescales for delivery. You will need to state which Lots you are tendering for.

(4) **A description of the project team who will manage and deliver the work**

This should include a list of individuals, their respective roles within the organisation and, for the purposes of this work their relevant skills and experience including any relevant professional qualifications.

(5) **An identification of any sub-contractors to be used**

You should include a list of any sub-contractors you intend to use to fulfil the requirements of the work.

(6) **The total cost of the work** (inclusive of VAT) together with a full breakdown of costs. Expenses should be identified separately but must be included as part of the total cost of the work. You will also need to identify:

- Any lease or hire costs associated with the delivery of the work to be clearly identified and costed and justification provided to demonstrate the necessity of each item;
- Any capital expenditure associated with the delivery of the work to be clearly identified and costed and justification provided to demonstrate the necessity of each item.

Please note that capital expenditure can only be supported in exceptional circumstances. WRAP's preference is to support projects through revenue

expenditure. In cases where additional equipment is required, these should be leased, where possible. In the exceptional event that purchase of capital equipment is necessary, suitable terms and conditions will be negotiated. The contract will include details of equipment ownership/leasing, maintenance, insurance and disposal.

- (7) **Evidence of a track record** in undertaking work similar to that described in this document.
- (8) **Identification of any conflicts of interest** which might arise if you were selected to undertake the work and if such a conflict were to arise, an indication of how this conflict would be addressed. Where you tender as part of a consortium, all members of the consortium should be considered.
- (9) **A copy of your Environmental Policy** and evidence of any accredited Environmental Management System.
- (10) **As appendices**, tender submissions should include:
  - **Audited or management accounts** for the last financial year;
  - **A statement of any material litigation**, pending or threatened, or other legal proceedings;
  - **Evidence of the level of professional indemnity, public liability and property damage insurance cover held**
  - **Comments on WRAP's Terms and Conditions**  
Ideally WRAP would prefer a statement confirming that you are happy to comply with WRAP's terms and conditions should your tender be successful. However, if there are certain terms that you feel you will be unable to comply with you are asked to make any objections clear within your tenderer submission. Objections noted are not guaranteed to be accepted.

A sample copy of WRAP's form of contract is included at appendix 1 to this document.

- 3.3 Should you have any questions in relation to the type of information required by WRAP please contact the person identified in Section 5.2 of this Tender Invitation Document to discuss.
- 3.4 All tender submissions will be treated on a confidential basis by WRAP and its advisers, subject to the provisions of the Freedom of Information Act 2000.

## Section 4: Evaluation criteria

- 4.1 The process WRAP uses to select its tenderers is a competitive one. Your tender submission should be written to address the key requirements and scope of the work and demonstrate how it meets the evaluation criteria below.
- 4.2 Your tender submission will be evaluated against the following criteria, with overall value for money being the most important:
- The overall value for money offered;
  - Consistency of proposal with services or requirements and deliverables;
  - Strength of interpretation of brief and ability to add value;
  - Technical and operational track record in projects of a similar nature;
  - Authority of allocated personnel, their skills and technical capability;
  - Corporate environmental commitment – submission of credible environmental policy and/or environmental management system details.
- 4.3 Your attention is drawn to the fact that WRAP reserves the right to exclude from the tender process any tenderer who:
- fails to meet minimum requirements relating to financial standing; and/or
  - fails to meet the required standard of technical competence; and/or
  - is reasonably thought by WRAP to have misrepresented information within the tender submission.

## Section 5: Application procedure / tender process

- 5.1 The deadline for tender submissions is 12:30pm on 26<sup>th</sup> September 2007.
- 5.2 You should send an electronic copy of your tender (either Word or PDF format) by email to the following contact:

OAV020 Training for Crop Consultants II

Kate Heath – Interim Project Manager

Kate.Heath@wrap.org.uk

Telephone: 01295 819900

Facsimile: 01295 819911

- 5.3 Emails containing tender submissions should clearly state the following reference number: OAV020 Training for Crop Consultants II together with the words “Confidential Tender”.
- 5.4 If you have an enquiry about the work being commissioned or the processes WRAP uses to select its tenderers please contact **in writing only** (by e-mail, fax or post) to Kate Heath quoting OAV020.

### Tender process & timetable

- 5.5 All tender submissions must remain valid for a minimum period of 90 days following the deadline for receipt of tender submissions.
- 5.6 All tender submissions will be competitively assessed against the evaluation criteria, (stated in Section 4 of this document). A preferred tenderer may be selected at this stage or suitable tender submissions short listed. WRAP may invite short listed tenderers to present their tender submissions to a Tender Assessment Panel, before selecting a preferred tenderer. The Tender Assessment Panel will include representatives of WRAP and external organisations as appropriate.
- 5.7 The target timetable for this process is as follows:

#### Tender Timetable

Deadline for receipt of tender submissions	12:30 pm 26 <sup>th</sup> September 2007*
Shortlisted tenderers notified	1 <sup>st</sup> October 2007*
Presentations to tender assessment panel	4 <sup>th</sup> October 2007*
(Successful tenderers will be informed if a presentation is necessary)	
Tenderers receive written notification of WRAP's decision	5 <sup>th</sup> October 2007*

\* WRAP reserves the right to change the timetable.

- 5.8 All tenderers will receive written notification of WRAP's decision and tenderers will be given the opportunity to obtain feedback on their tender submission.
- 5.9 This information is offered in good faith for the guidance of interested parties, but no warranty or representation is given as to the accuracy or completeness of any of it. WRAP and its advisers shall not be under any liability for any error, misstatement or omission. No aspect of this procedure shall constitute a contract or part of a contract. Tenderers participate

in the process on the strict understanding that the procedure may be altered or that WRAP may not proceed for any reason. WRAP reserves the right not to follow up this Tender Invitation Document in any way and in particular not to enter into any contractual arrangement with any of the tenderers. WRAP does not bind itself to enter into negotiations or proceed with or accept any tender. Any decision to tender is at the sole discretion of the tenderer and WRAP excludes all liability in respect of any tendering costs incurred.

## **Appendix I – Sample Form of Contract**

# **SERVICES AGREEMENT**

**Between**

**The Waste and Resources Action Programme**

**And**

**Name of Contractor**

**WRAP Contract Reference No. xxxx**

**Add**

**THIS AGREEMENT** is made on this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_\_

**Between:** **The Waste and Resources Action Programme** (Company No. 4125764) whose registered office is at The Old Academy, 21 Horse Fair, Banbury, Oxfordshire, OX16 0AH (“**WRAP**”)

**And:** **Name of Contractor** (Company No. xxxx) whose registered office is at address not PO Box (the “**Contractor**”)

**NOW IT IS HEREBY AGREED** as follows:

## **1. KEY OBLIGATIONS**

1.1 The Contractor undertakes:

- 1.1.1 to carry out, or procure the carrying out of, the Services;
- 1.1.2 that the Services shall be carried out with the competence, skill, care and due diligence that might reasonably be expected of a contractor that has held itself out to be an expert in every aspect of the performance of the Services;
- 1.1.3 to commence, or procure the commencement of, the Services on or before the Services Commencement Date;
- 1.1.4 to complete, or procure the completion of, the Services on or before the Services Completion Date.

1.2 WRAP will pay the Contractor:

- 1.2.1 Milestone Payments, in aggregate up to the Services Payment Total, following receipt of relevant invoices raised upon performance in full of each Milestone, and which quote WRAP's project code; and
- 1.2.2 Expenses, in aggregate up to the Contract Expenses Total, which have been agreed in advance by WRAP and (where applicable) are in accordance with the rates for expenses set out in Schedule 2 (Milestones and Expenses), following receipt of such receipts as WRAP may require;

in each case within 30 days of WRAP being satisfied that payment is due.

## **2. CONTRACTOR'S REPRESENTATIONS**

2.1 The Contractor represents to WRAP at all times that the following representations are true and accurate in all material respects, and are not misleading, and will notify WRAP of any breach of any of such representations at the earliest opportunity:

- 2.1.1 the Contractor is duly incorporated and validly existing and the Contractor has the power to enter into and perform, and has taken all necessary corporate action to authorise its entry into and performance of, this agreement;
- 2.1.2 no breach of this agreement is continuing; and
- 2.1.3 all information provided to WRAP for the purposes of this agreement is true and accurate as at the date it was provided and as at the date of this agreement.

## **3. INDEMNITY AND INSURANCE**

3.1 The Contractor will, on demand, indemnify and agrees to keep indemnified WRAP against all costs, expenses, actions, charges, claims, damages, proceedings and other liabilities sustained or incurred by WRAP as a result of any breach of this agreement by the Contractor.



- 3.2 The Contractor will maintain public liability insurance cover for at least £1,000,000 and professional indemnity insurance cover for at least £1,000,000 in connection with the Services with reputable insurers (and provide evidence of such insurance to WRAP on request).

#### **4. PUBLICATION, CONFIDENTIALITY, INTELLECTUAL PROPERTY**

- 4.1 The Contractor will not publish any information supplied by WRAP or any of the results arising from the Services without the prior written consent of WRAP and will acknowledge WRAP in any publicity material in respect of the Services.
- 4.2 The Contractor undertakes to maintain in confidence and not use for any purpose other than the performance of this agreement all information acquired or generated in consequence of this agreement or otherwise relating to WRAP which comes into its possession save where such information:
- 4.2.1 is in the public domain;
  - 4.2.2 enters the public domain lawfully and through no breach of any obligation of confidentiality;
  - 4.2.3 is disclosed to the Contractor by a third party acting lawfully;
  - 4.2.4 is the subject of the express consent of WRAP for publication or disclosure; or
  - 4.2.5 is obliged to be disclosed by law.
- 4.3 All intellectual property including, without limitation, all data, databases, reports, records, drawings, photographs, specifications, plans, software, designs, inventions and/or other material created by the Contractor (or any employee or person engaged by the Contractor) in the course of the performance of the Services under this agreement shall vest in and be the property of WRAP.
- 4.4 The Contractor hereby grants to WRAP a non-exclusive, irrevocable, royalty free, perpetual licence (but with the right to grant sub-licences and transferable only for the purposes of publishing and disclosure) in respect of all the intellectual property rights of the Contractor in existence at the date of this agreement which in the opinion of WRAP is necessary or useful in order for WRAP to publish and disclose details of the Services and all or any of the other data, information or knowledge relating to the Services.

#### **5. TERMINATION**

- 5.1 WRAP may terminate this agreement immediately by written notice if:
- 5.1.1 any Insolvency Event occurs;
  - 5.1.2 the Contractor fails to comply with the terms of this agreement in any material respect (unless such non-compliance is remediable in the opinion of WRAP); or
  - 5.1.3 any representation made by the Contractor is or proves to have been incorrect or misleading in any material respect (unless such representation is remediable in the opinion of WRAP),
- and in such circumstances WRAP may, at its discretion, pay the Contractor a fair and reasonable amount for the Services completed before the date of termination to the satisfaction of WRAP or cancel payment under this agreement.
- 5.2 WRAP will also have the right to terminate this agreement at any time by notice to the Contractor and in such circumstances WRAP will pay the Contractor a fair and reasonable amount for the Services completed to the satisfaction of WRAP before the date of termination but the Contractor will not be entitled to any other payment or recourse from WRAP.
- 5.3 In the event of termination, the Contractor will promptly provide WRAP with a full report on the status of the Services together with all information, documentation, property and materials relating to the Services as soon as reasonably practicable and in any event within 14 days.

**6. MISCELLANEOUS**

- 6.1 Terms will have the meaning given to them in Schedule 1 (Definitions).
- 6.2 Any notice under this agreement will be in writing and served by sending the same to the other party at its address set forth above marked for the attention of the company secretary or such other address from time to time notified by that party for the purpose of notices under this agreement.
- 6.3 The Contractor shall not assign or transfer any of its rights and/or obligations under this agreement.
- 6.4 The Contractor shall not enter into any subcontract for the performance of its obligations under this agreement except with the prior written consent of WRAP. Where a subcontract has been consented to by WRAP this shall not relieve the Contractor of any of its obligations under this agreement.
- 6.5 This agreement comprises the entire understanding of the parties in relation to the matters referred to in this agreement.
- 6.6 The authorised officer for the receipt of all day to day communications relating to this agreement shall be:
  - 6.6.1 **Name and title** for WRAP
  - 6.6.2 **Name and title** for the Contractor
- 6.7 This agreement is governed by English law and the parties hereby submit to the non-exclusive jurisdiction of the English courts.
- 6.8 Nothing in this agreement is intended to confer on any person any right to enforce any provision of this agreement which that person would not have had but for the Contracts (Rights of Third Parties) Act 1999.
- 6.9 The provisions of Clauses 4 (Publication, Confidentiality, Intellectual Property), 5 (Termination) and 6 (Miscellaneous) will survive the termination of this agreement irrespective of the reason for termination for a period of 6 years.

IN WITNESS WHEREOF, the parties have executed this agreement.

For and on behalf of: **The Waste and Resources Action Programme**

Signature: .....

Print name: **name**

Title: **title**

For and on behalf of: **Name of Contractor**

Signature: .....

Print name: .....

Title: .....

## Schedule 1

### Definitions

In this agreement the following terms will have the following meanings:

1. **“Insolvency Event”** means any of the following:
  - (a) a receiver, trustee or similar officer is appointed in respect of the whole or any part of the undertaking or assets of the Contractor or its assets;
  - (b) any action is taken for or with a view to the winding up (which includes, where such person is or has legal status other than as a company (as defined in the Companies Act 1985) any corresponding process applicable to that person) or administration of the Contractor (or the bankruptcy of the Contractor where applicable);
  - (c) the Contractor becomes, or is deemed to be insolvent (or, where applicable, bankrupt), unable to pay its debts as they fall due, or is deemed under applicable law to be so, or has an excess of liabilities over assets (taking into account contingent and prospective liabilities); and
  - (d) the Contractor ceases to operate (or, where applicable, dies or ceases to have legal capacity).
2. **“Services Commencement Date”** means [date].
3. **“Services Completion Date”** means [date].
4. **“Contract Sum”** means £xxxx including VAT. This is the sum of the Services Payment Total added to Contract Expenses Total.
5. **“Services Payment Total”** means £xxxx including VAT. This is the maximum sum of Lump Sum Fees added to Time Charge Fees added to Item Charge Fees. The Services Payment Total shall comprise the following:
  - 5.1 Lump Sum Fees: £ xxxxx exclusive of VAT;
  - 5.2 Time Charge Fees: Up to £ xxxxx exclusive of VAT; calculated on a time charge basis in accordance with the following rates:
    - 5.1.1 £ xxxxx exclusive of VAT per day for NAME.
  - 5.3 Unit Item Fees: up to £ xxxxx exclusive of VAT; calculated on a unit time charge basis in accordance with the following rates:
    - 5.3.1 £ sum exclusive of VAT per unit item.
  - 5.4 VAT: at a rate of 17.5%.
6. **“Expenses”** means out-of-pocket expenses reasonably incurred by Contractor staff in the proper performance of the Services.
7. **“Contract Expenses Total”** means a maximum sum of £xxxx including VAT.
8. **“Milestone Payment”** means the relevant amount of the milestone payments referred to in Schedule 2 (Milestones and Expenses) in respect of the Milestone services that have been delivered to date.
9. **“Milestones”** means the milestone services specified in Schedule 2 (Milestones and Expenses).
10. **“Services”** means:
  - 10.1 Insert services
  - 10.2 Insert services

## Schedule 2

### Milestones and Expenses

#### 1. Milestone Payments

Milestone	Milestone services	Target milestone date	Maximum Milestone Payment to be invoiced (including VAT)
1	<i>Details of Services required by the milestone completion date</i> and delivery of satisfactory Progress Report and occurrence of satisfactory progress meeting.	<i>date</i>	<i>£amount</i>
2	<i>Details of Services required by the milestone completion date</i> and delivery of satisfactory Progress Report and occurrence of satisfactory progress meeting.	<i>date</i>	<i>£amount</i>
3	<i>Details of Services required by the milestone completion date</i> and delivery of satisfactory Progress Report and occurrence of satisfactory progress meeting.	<i>date</i>	<i>£amount</i>

#### 2. Schedule of rates for Expenses

Expense	Rate
Motor vehicle mileage	at 40 pence per mile (including VAT)
Hotel and breakfast in London	at actual cost up to a maximum of £90.00 night (including VAT)
Hotel and breakfast other than London	at actual cost up to a maximum of £75.00 night (including VAT)
Other	at the rate agreed with WRAP prior to the expense being incurred

## **Appendix II – OAV13 Training For Crop Consultants I PowerPoint Presentation**



**COMPOST USE IN AGRICULTURE AND FIELD HORTICULTURE**

Selwyn Richardson  
Susie Holmes

WRAP  
Material change for a better environment

ADAS

www.adas.co.uk

## Programme

- Introduction to compost use
- Benefits from organic matter supply
- Crop nutrient supply
- Break for coffee**
- Desk exercise on nutrient planning
- Putting it into practice/case studies
- Feedback questionnaire
- Lunch**

## Why compost?

- 30m tonnes of household waste are landfilled each year
- European Landfill Directive says: by 2010 only **75% of 1995** amount of putrescible waste must be landfilled and by 2015 **50% of 1995** amount
- Local authorities will be fined £150 for each tonne over these amounts

**WRAP aims to promote sustainable markets for recycled materials, eg compost**

## Compost - what's in it?

- Made from biodegradable materials separated by type before composting, usually in windrows.
- Mostly green waste from gardens, landscaping, chipped wood, straw, paper/card, waste fruit/veg.
- Food waste which may contain meat can be included but extra regulations on processing (ABP regs.)

## Windrow composting

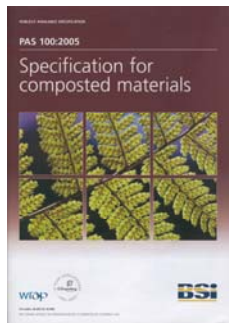


## Selection of compost

- Acceptable input materials e.g. green waste from kerbside collection, local authority green waste, catering waste, livestock manures, sewage sludge
- Particle size range
- Nutrient content
- Sharps content
- Metal/glass/plastic content

## BSI PAS 100 (2005)

- Baseline specification for general purpose products
- Compliance with PAS 100 provides assurance that the compost is consistent, reliable and safe
- Provides traceability
- Additional specifications may be needed by some end users of compost



## PAS 100 Requirements

Parameter	Upper Limit
Pathogens	
Salmonella spp	Absent
Pathogens - Escherichia coli	1 000 CFU g <sup>-1</sup> fresh mass
Weed Seeds & Propagules	
Weed Seeds & Propagules	0 (mean no. per 1t compost)
Plant Response	
Reduction in germination of plants in amended compost as % of germinated plants in peat control	20%
Reduction in plant mass as % of plant mass in peat control	20%
Description of any visible abnormalities	None

### PAS 100 Requirements

Parameter	Upper Limit
Potentially Toxic Elements	
Cadmium (Cd)	1.5 mg kg <sup>-1</sup> dry matter
Chromium (Cr)	100 mg kg <sup>-1</sup> dry matter
Copper (Cu)	200 mg kg <sup>-1</sup> dry matter
Lead (Pb)	200 mg kg <sup>-1</sup> dry matter
Mercury (Hg)	1.0 mg kg <sup>-1</sup> dry matter
Nickel (Ni)	50 mg kg <sup>-1</sup> dry matter
Zinc (Zn)	400 mg kg <sup>-1</sup> dry matter
Stones	
Stones > 4mm in grades other than mulch	8% mass/mass of 'air-dry' sample
Stones > 4mm in mulch	16% mass/mass of 'air-dry' sample

### PAS 100 Regime for eradication of pathogens

Temperature	Time	Moisture	Mixing/turning
>65°C	7 days	>50% mass/mass	>2 times

### Main uses of compost

- As a **soil improver** (0-20/40mm) - increases organic matter levels and provides slow release nutrients
- As a **surface mulch** (10-40mm) - conserves soil moisture, suppresses weeds and protects soil surface from erosion and run-off

### The key benefits of using compost

- **Improving soil organic matter**  
30t/ha compost provides approx. 6 t/ha of organic matter = long-term benefits for soil structure, fertility and water holding
- **Slow release nutrients**  
30 t/ha compost is worth approx. £90/ha
- **Increasing soil microbial population**
- **Stabilising soil pH (fertilisers acidify soil)**
- > **Better crop establishment & yields**



### Regulatory & Industry Issues

- **Compliance with regulations** Nitrate Vulnerable Zones rules, Water Code, P loading
- **Exemption from Waste Management Licensing Regulations** needed from the EA (cost £546 for up to 50 ha )  
Quality compost protocol may change this
- **Customer requirements**  
Assured Produce, retailer requirements (WRAP in dialogue with retail sector)

### Assured Produce - 1 Jan 2007 revisions

- **Generic Protocol 6.7.1b Documented risk assessment for green compost (as organic manure)**
- **Include in farm HACCP for chemical, biological and physical hazards and assess risk (PAS100)**

### Specific requirements

- **Sharps must be absent in compost used on land for crops eaten raw and for root crops for human consumption (e.g. potatoes)**
- **Metal/glass/plastic >2mm must be <0.25% (of which <0.1% plastic) % w/w air dry sample**
- **Moisture content should be 30-55% (w/w) to avoid dust problems**
- **pH should be 7.0-9.0**

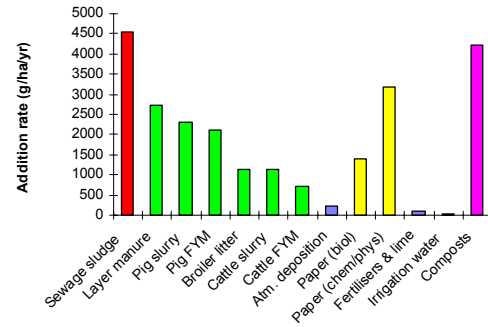
### Other issues

- **Stability of compost (PAS 100 definition)**
- **Plant pathogens (PAS 100 recommendation will eradicate most plant pathogens of concern but specific tests can be carried out e.g. bioassay for Club Root)**
- **Microbial risk to humans and animals**
- **GMO risk from catering wastes**
- **Potentially Toxic Elements**

## Food Industry issues

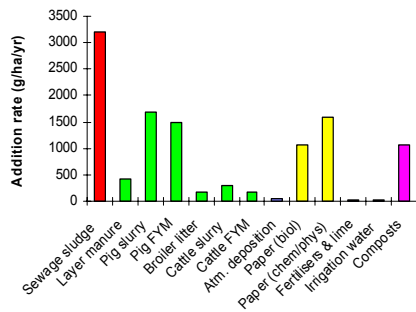
- Physical contaminants
- Contamination of green waste/catering waste feedstocks with meat waste
- Pesticide contamination of green waste, e.g. grass trimmings
- Public perception extremely important
- Genetically Modified Organisms (GMOs)

## Zinc addition when OM's are spread (g/ha/yr)



Materials spread at rate equivalent to 250 kg N/ha

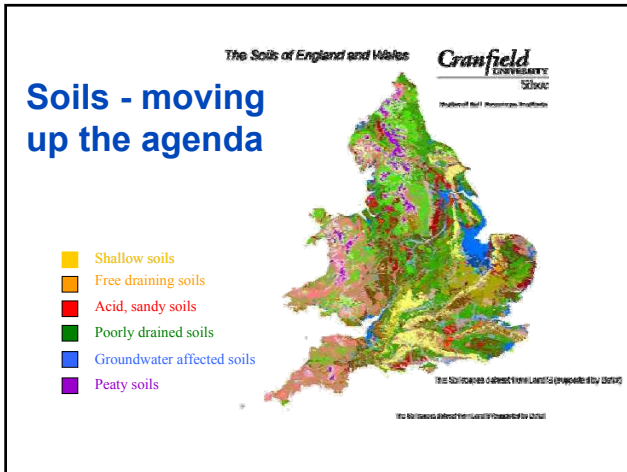
## Copper addition when OM's are spread (g/ha/yr)



Materials spread at rate equivalent to 250 kg N/ha

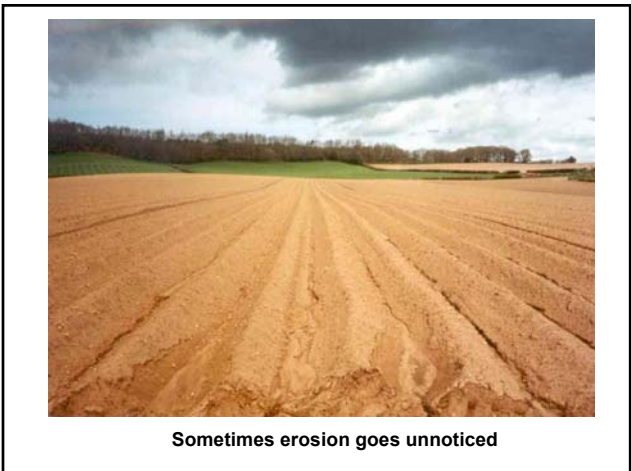
## Good soil management





- ### Soils - policy drivers
- **EU Soil Thematic Strategy**
  - **Defra - First Soil Action Plan for England**
  - **EA - State of Soils**
  - **Entry Level Stewardship - 3 points/hectare for producing a Soil Management Plan**
  - **Cross Compliance - Single Payment Scheme:**
    - soils must be maintained in Good Agricultural and Environmental Condition

- ### Good Agricultural and Environmental Condition (GAEC)
- **GAEC for Soils** involves taking action to:
    - maintain soil organic matter levels
    - reduce the chances of soil erosion
    - reduce damage to soil structure
  - **Producing and implementing a Soil Protection Review**





At other times ...

## Impacts of soil erosion- on farm

- **SHORT TERM:** crop losses and harvesting problems (estimated at £8 million/year)
- **LONG TERM:** depletion of soil resources (shallow soils)
- 44% of arable land assessed to be at risk of soil erosion
- 2.2 million tonnes of arable topsoil moved annually



Environment Agency

## Impacts of soil erosion - off farm

- In-filling and nutrient (N and P) enrichment of surface water
- 43% of freshwater wetland SSSIs in England are in unfavourable condition
- Soil deposition on roads and damage to property



## Increasing Organic Matter Levels



## Organic matter - arable soils

- Soil organic matter reserves are reaching 'critically' low levels
  - by annual cultivation
  - crop production may not be sustainable in the long term on some soils
- Soil organic matter is Defra's headline soil quality indicator and maintenance/enhancement is a cross compliance requirement
- Organic manure (e.g. compost) and crop residue returns provide a valuable means of replenishing soil organic matter

Cross Compliance Soil Protection Review (continued)

Positive actions to maintain soil organic matter

Positive actions	Do you do this now?		Enter any comments you wish to make, or extra actions you may take in the future (optional)
	Yes	No	
Return straw and/or other crop residues after harvest			
Include grass leys and/or short-term cover crops in the rotation			
Apply farmyard manure or other bulky organic manures such as green waste compost or sewage sludge cake			
Use herbicides or other soil treatments that can maintain or increase organic matter near the surface			
Please add here any other actions you take			

Apply farmyard manure or other bulky organic manures such as green waste compost or sewage sludge cake

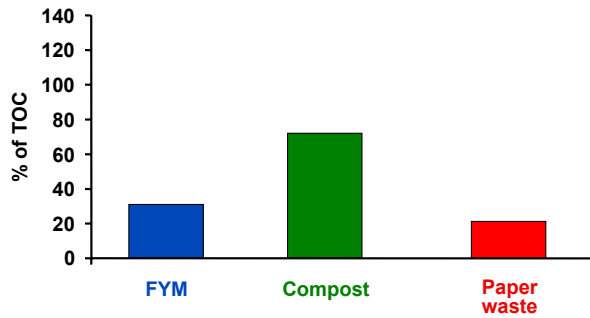
Section 3 Managing soil problems on a crop-by-crop or livestock basis

## Organic matter additions (250 kg/ha N)

Material type (dry matter)	Application rate (t/ha)	Organic matter applied (t/ha)
Cattle-FYM (25%)	42	5.5
Paper waste-biological (27%)	33	5.4
Green waste compost (60%)	31	5.8



### Organic manure characterisation: Lignin composition

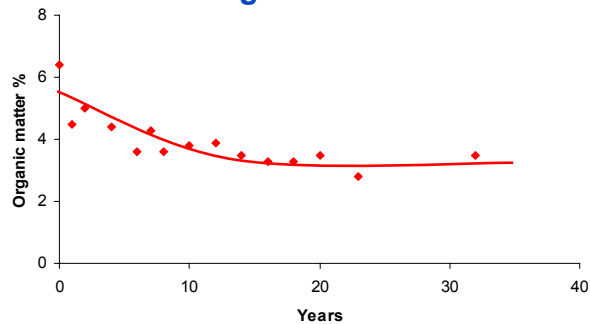


Defra-funded Soil-QC project

### Improved organic matter from compost addition:



### Decline in soil organic matter following the ploughing out of grassland



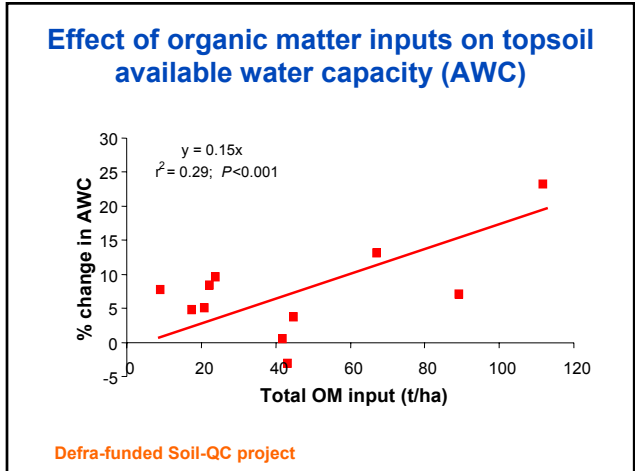
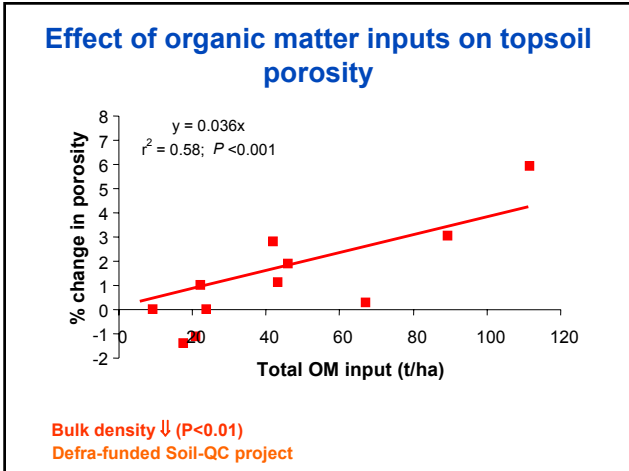
### Soil Structure

- **Good soil structure is essential for sustainable farming**

- **Poor soil structure:**

- reduced yield and quality
- bad drainage, runoff and soil erosion
- restricted land access (vehicles and livestock)





OSR plots Rosemaund - September



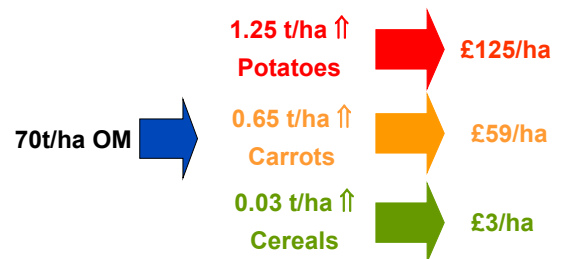
OSR plots Rosemaund - October



OSR plots Rosemaund - November



**Plant available water capacity  
- benefit to crop yields**



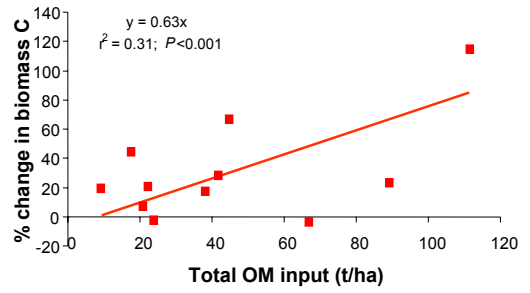
Crop value from Farmers Weekly 6th Oct 2006



## Increased soil microbial activity

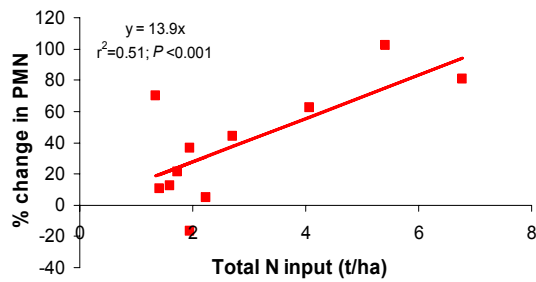


## Effect of organic matter inputs on topsoil microbial biomass



Defra-funded Soil-QC project

## Effect of total nitrogen inputs on topsoil potentially mineralisable N (PMN)



Defra-funded Soil-QC project

## Nutrients supplied by compost



### Total nutrient content (kg/t, fresh wt)

	Nitrogen N	Phosphate P <sub>2</sub> O <sub>5</sub>	Potash K <sub>2</sub> O	Sulphur SO <sub>3</sub>	Magnesium MgO
Cattle - FYM	6.0	3.5	8.0	1.8	0.7
Biosolid - cake	7.5	9.0	Trace	6.0	1.3
GWC	8.0	3.0	6.0	3.0	3.0

### ADAS/CRL 3-year agricultural trials

1. N supply - first crop grown
2. Residual **and cumulative** N supply
3. Soil quality and fertility

Trials run by Composting Research project, funded by Landfill Tax Credit money, administered by Waste Recycling Environmental Fund (WREN)

### CRL trials (LTCS/WREN funding)



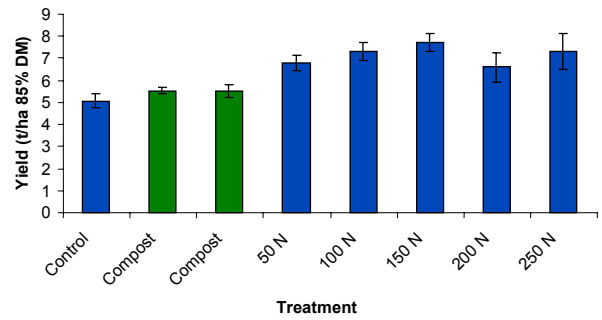
### CRL W.Wheat plots - Rosemaund



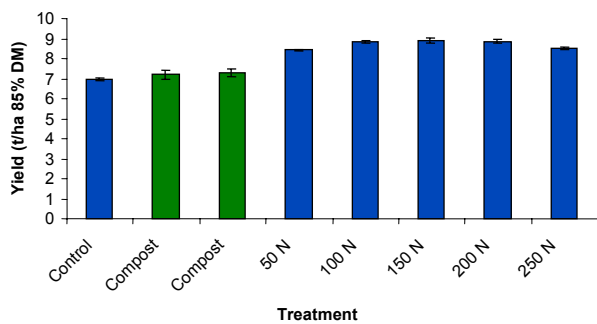
### CRL W. Wheat plots - Boxworth



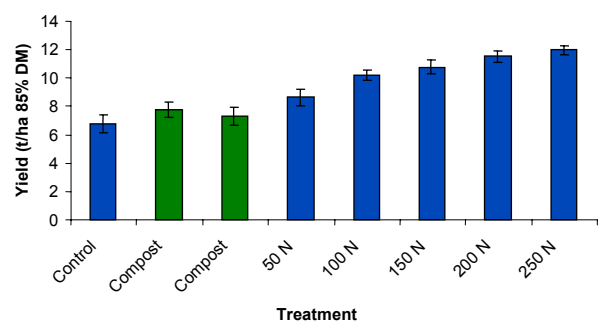
### Gleadthorpe winter wheat yield - 2006



### Boxworth winter wheat yield - 2006



### Rosemaund winter wheat yield - 2006



### Compost N efficiency

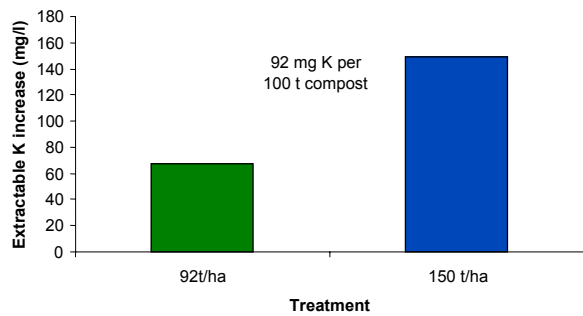
	N replacement (kg/ha)	N efficiency (%)
Gleadthorpe	13.3	5.3
Boxworth	15.6	6.2
Rosemaund	16.8	6.7

### CRL trial results

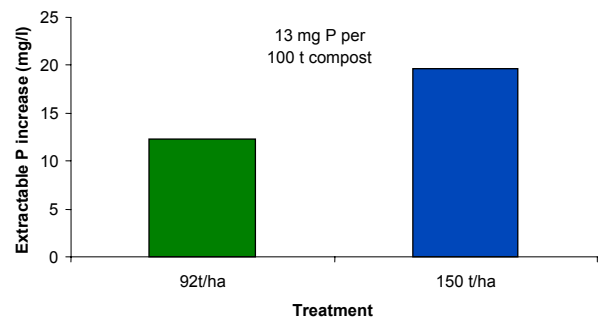
Results will be available from spring 2007

[www.compostresearch.com](http://www.compostresearch.com)

### Effect of compost addition on soil extractable K, compared with untreated control



### Effect of compost addition on soil extractable P, compared with untreated control



## Phosphate and potash availability

Especially important -

- at Index 0 and 1
- for P-responsive crops (potatoes, lettuce)

Availability of P & K from compost

- 50% of P released in first year
- 90% of K released in first year

Allow for total P & K over the crop rotation when nutrient planning

## Nitrogen availability

- Nitrogen availability from compost in first year after application is around 5-10%
- Cumulative effect of repeated applications of compost on N availability uncertain (CRL trials will give useful data)

Desk exercise - assume N availability 6%

## Typical ££ value from organic manure applications (250 kg/ha total N)

Manure type (% dry matter)	Crop available N	Total phosphate	Total potash	Fertiliser Value (£/ha)
		(kg/ha)		
Cattle – FYM (25%)	50	147	336	157
Biosolid - cake (25%)	38	297	-	121
GWC (65%)	15	93	186	87

Assuming N = 45 p/kg, P<sub>2</sub>O<sub>5</sub> = 35 p/kg and K<sub>2</sub>O = 25 p/kg

## Disease suppression



### Disease suppression associated with compost use:

- Much work has been carried out in Europe and N America to determine the effects of composts on plant diseases
- Data on the effects of compost on over 40 soil-borne pathogens has recently been reviewed in a project funded by WRAP

### Examples of disease suppression

- Turf top-dressed with compost has been found to have consistently lower levels of diseases
- Most work which has shown suppression of disease has involved glasshouse pot experiments, these have shown that compost can suppress diseases such as those caused by:

*Phytophthora spp.*, *Rhizoctonia solani*,  
*Fusarium oxysporum*, *Pythium spp.*



30 tonnes/ha

### Disease suppression in field crops

- There have been few instances where the disease suppressive properties of composts have been demonstrated under **field conditions**. Further work needed.
- However, recent work has shown that Allium white rot has been successfully controlled under UK field conditions through application of composted onion waste

## Desk exercise



## Desk exercise - the answers



### Combining Compost and Inorganic Fertiliser for Arable Crops

Assume indicative nutrient costs of N = 45 p/kg, P<sub>2</sub>O<sub>5</sub> = 35 p/kg and K<sub>2</sub>O = 25 p/kg

25 t/ha (10 tons/acre) of compost applied in September. Growing feed winter wheat on heavy silt. Soil P Index 2 and K Index 2+. Straw incorporated. Expected yield 8 t/ha. Previous crop cereal in a 675 mm rainfall area (= SNS Index 1).

Stage and calculation procedure	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Value £/ha
<b>1. Nutrient requirement for winter wheat (kg/ha)</b> • Pages 78 and 86 of RB209	180	60	20	<b>£107</b>
<b>2. Enter total nutrients in compost (kg/t)</b> • Refer to standard values in handout	8	3	6	
<b>3. Estimate available nutrients in compost (kg/t)</b> • Refer to % availability values in handout	0.48	1.5	5.4	



### Combining Compost and Inorganic Fertiliser for Arable Crops

Stage and calculation procedure	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Value £/ha
<b>4. Calculate compost supply of nutrients (kg/ha)</b> • Use only <i>available</i> N. • Use <i>available</i> P and K supply at low soil P or K value (Index 0/1) and for P to potatoes at all soil P Indices. • Use <i>total</i> P and K supply where there is only need for maintenance of soil nutrient status.	12	-	-	
<b>5. Calculate inorganic fertiliser need (kg/ha)</b> • Stage 1 minus stage 4 amounts	170	75	150	<b>£76.50</b>
<b>6. Cost saving in NPK fertiliser inputs, for this first crop</b> • Stage 1 minus stage 5 costs/value				<b>£30.50</b>
<b>7. Surplus phosphate and potash for subsequent crops</b> • Stage 4 minus stage 1 (based on total P & K supplied)		15	130	



### Combining Compost and Inorganic Fertiliser for Vegetable Crops

Assume indicative nutrient costs of N = 45 p/kg, P<sub>2</sub>O<sub>5</sub> = 35 p/kg and K<sub>2</sub>O = 25 p/kg

30 t/ha (12 tons/acre) of compost applied in December. Growing Brussels sprouts on a light silt soil. Soil P Index 3 and K Index 2. Previous crop sugar beet in a 570 mm rainfall area (= SNS Index 2).

Stage and calculation procedure	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Value £/ha
1. Nutrient requirement for Brussels sprouts (kg/ha) • Pages 108 of RB209	270	50	200	£189
2. Enter total nutrients in compost (kg/t) • Refer to standard values in handout	8	3	6	
3. Estimate available nutrients in compost (kg/t) • Refer to % availability values in handout	0.48	1.5	5.4	



### Combining Compost and Inorganic Fertiliser for Vegetable Crops

Stage and calculation procedure	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Value £/ha
4. Calculate compost supply of nutrients (kg/ha) • Use only available N. • Use available P and K supply at low soil P or K value (Index 0/1) and for P to potatoes at all soil P Indices. • Use total P and K supply where there is only need for maintenance of soil nutrient status.	18	-	-	
5. Calculate inorganic fertiliser need (kg/ha) • Stage 1 minus stage 4 amounts	250	90	180	£117.50
6. Cost saving in NPK fertiliser inputs, for this first crop • Stage 1 minus stage 5 costs/value				£71.50
7. Surplus phosphate and potash for subsequent crops • Stage 4 minus stage 1 (based on total P & K supplied)		40	0	



### Combining Compost and Inorganic Fertiliser for Arable Crops

Assume indicative nutrient costs of N = 45 p/kg, P<sub>2</sub>O<sub>5</sub> = 35 p/kg and K<sub>2</sub>O = 25 p/kg

30 t/ha (12 tons/acre) of compost applied in February. Growing Maris Piper potatoes on a Medium textured soil. Soil P Index 3 and K Index 3. Previous crop peas in a 550 mm rainfall area (= SNS Index 2).

Stage and calculation procedure	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Value £/ha
1. Nutrient requirement for maincrop potatoes (kg/ha) • Pages 92 and 94 of RB209	140	130	150	£146
2. Enter total nutrients in compost (kg/t) • Refer to standard values in handout	8	3	6	
3. Estimate available nutrients in compost (kg/t) • Refer to % availability values in handout	0.48	1.5	5.4	



### Combining Compost and Inorganic Fertiliser for Arable Crops

Stage and calculation procedure	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Value £/ha
4. Calculate compost supply of nutrients (kg/ha) • Use only available N. • Use available P and K supply at low soil P or K value (Index 0/1) and for P to potatoes at all soil P Indices. • Use total P and K supply where there is only need for maintenance of soil nutrient status.	14.4	45	-	
5. Calculate inorganic fertiliser need (kg/ha) • Stage 1 minus stage 4 amounts	125.6	85	180	£86.27
6. Cost saving in NPK fertiliser inputs, for this first crop • Stage 1 minus stage 5 costs/value				£59.73
7. Surplus phosphate and potash for subsequent crops • Stage 4 minus stage 1 (based on total P & K supplied)		45	30	





### Putting it into practice



### Rates of application of compost

- NVZs - typical compost N content means around 30 t/ha is maximum application rate (250 kg/ha total N/yr)
- Outside NVZs higher rates can be used but ideally not more than once every 2 years

### Timing of application of compost

- Can be applied at any time of year
- Some markets will want pre-harvest interval as for other organic manures
- On land receiving composts containing ABPs land must not be grazed, cropped or used as feed within 2 months (pigs) or 3 weeks (other livestock)
- Compost should not be applied to soil that is waterlogged, flooded, frozen hard or snow covered (Water Code)

### Arable crops

- Cereals, OSR & linseed respond to **N, P, K** and **S** in compost, the latter becoming particularly important
- Malting barley - **N** from compost may affect grain N so be careful
- Fodder crops have high **K** requirement but if grazed in situ ABP regulations relevant for some types of compost

### Case studies - arable crops

- **Remade Essex trials 2003/4**

Compost improved establishment of OSR and seed yield by 0.7 t/ha, >100t/ha compost increased WW plant nos.

- **GROWS trials 2003**

Compost significantly increased grain yield

- **Warwick HRI 2005**

3 out of 4 source segregated composts increased yield of spring barley

### Case studies - arable crops (cont.)

- **ReMade Essex trials 2005**

**Heavy land** - compost significantly improved hemp establishment, 20 t/ha yield increase compared to control

**Light land** - Av. inc.yield of sugar beet of 5 t/h compared to fert. only plots = £150/ha

- **Velcourt farm demo. sites**

Have also shown increase in OM, WHC, easier cultivation of heavy land and less inorganic fertiliser needed

### Case studies - arable/potatoes

- **EB Nationwide/BPC 2005**

7 sites in E England, 3 years:

Compost increased soil organic matter and available nutrients.

Yields with compost average of 5% higher compared with farm standard

Net value of compost, taking into account N availability, liming value, irrigation savings & cost of transport/spreading = **£2.55/tonne**

### Compost use on intensive crops



### Case studies - vegetable crops

Fewer trials to date

- **ReMade Kent & Medway 2002:**

Trial with salad onions

Plant numbers increased with compost rate because of improved plant establishment

Yield response to compost: untreated 5.4 t/ha, compost @ 66t/ha 10.0 t/ha

Compost improves WHC of light sandy soils commonly used for vegetable crops

### Current use of compost on intensive crops (WRAP study ORG0041)

- 128 growers surveyed in 2006, 28 of these were already using compost. Of those not using 28% due to lack of availability
- Intensive crops most commonly receiving compost were top fruit, carrots, soft fruit, potatoes and onions
- Growers were more interested in the soil improving value of compost rather than its fertiliser value
- Most compost use on light/medium soils

### Compost use on vegetable crops

- Club root and White Rot are issues
- Brassica crops often grown on soils with high organic matter anyway so less need for compost but for other crops on light land > water holding capacity beneficial
- Root crop growers worried about sharps
- Less incentive to use compost for long-term benefit on rented land
- 'Safe Compost Matrix' needed to distinguish between risk categories for different crops (eg eaten raw/cooked)

### Green compost in vegetable propagation

- Research into increasing the use of recycled materials in production of growing media: propagation of vegetables. Peatering Out Ltd at STC April 2005. WRAP funded.
- Evaluation of green compost for module brassica production. ADAS/WHRI Kirton Sept 2006- Sept 2007. HDC funded.



- Coarse grade compost as a mulch**
- Conserves soil moisture, better than straw
  - Fruit trees **less prone to water stress**, particularly relevant in drier areas/years
  - Extension growth improved
  - Annual weeds suppressed
  - Nutrients slowly released into soil
  - **Yield and fruit size can be increased**
  - Mulch compost should have low fines content (<10 mm particles)

**Compost used as a mulch**

Compost rate t/ha	35	50	100
Depth cm	3.4	5.1	10.1
Total N kg/ha	170	250	500
Organic matter t/ha	20.4	30.1	60.1

### Compost as a mulch in Germany



### Case studies - top fruit

- **ReMade Kent & Medway trials 2004->**
- 4 t mulch per 100 m row used for young trees (Braeburn and Cox)
- Moisture levels monitored for 18 months
- Protected trees from moisture stress
- Compost same price as straw but lasts 2 years instead of 1, not blown by wind and less fire hazard than straw
- 36% increase in shoot no., total shoot length doubled

### Case studies - top fruit (cont.)

- **ReMade trials in Kent 2005**
- Yield of Victoria plums 13% higher per tree with compost mulch compared to straw mulch (46% inc. compared to unmulched trees)
- May and June rainfall well below 30 year average
- Annual weeds suppressed but neither mulch controlled perennial weeds

### Summary: Benefits from using compost

- Increases soil organic matter (high lignin)
  - Increases water holding capacity
  - Improves workability of heavy soils
  - Supplies slow release nutrient
  - Increases microbial activity in soil
  - Stabilises soil pH
- = HEALTHIER SOIL AND BETTER YIELDS**



**Supplier list of accredited compost  
producers**

**[www.wrap.org.uk](http://www.wrap.org.uk)**



**FACTS CPD points**

**PN/066/067/a**

**5 points**

**1PD 3PN 1E**

