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WEED RESEARCH ORGANIZATION



TECHNICAL REPORT No. 24

THE CONDUCT OF FIELD EXPERIMENTS AT THE WEED RESEARCH ORGANIZATION

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NOTE

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# THE CONDUCT OF FIELD EXPERIMENTS AT THE WEED RESEARCH ORGANIZATION

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## INTRODUCTION

The main components of research on weed control are the study of weeds, the evaluation and development of herbicides and the appraisal of cultural practices associated with weed control. At the Weed Research Organization (WRO) as elsewhere the acquisition of this knowledge takes place in laboratories, in greenhouses, by means of field experiments and by the observation of the experience of farmers. The purpose of this report is to describe the way in which field experiments at WRO are organised.

The nature of the organisation has evolved over the years as experience of weeds and herbicides has grown. For example, many weeds which form the subject of field experiments are difficult to grow artificially. Annual species may be irregular in germination and perennials may take years to establish before they can be considered representative of a natural population. There is, moreover, a danger that weed populations established artificially on an experimental station are atypical and unrepresentative of the environment in which they occur naturally. For this reason, from the earliest days, it has been the practice for a proportion of the WRO field experiments to be carried out on ordinary farms where the particular weed is a problem. Therefore, WRO field teams have always been equipped so as to be mobile. The staff have been selected and trained to carry out most of the operations required for field experiments whether at Begbroke or outside.

On many research farms the competition for facilities between experimenters and farm staff is not satisfactorily resolved: it was accepted at the creation of WRO that, although field research must have priority on Begbroke Hill Farm, this priority should not operate to the detriment of the general farming on the Station. Such a policy would in the long term reduce the efficiency of the very facilities that the experimenters use. Land and other major facilities are not distributed on a sectional or departmental basis; they are held in a pool for general use according to a pre-arranged plan. In order to plan, co-ordinate and supervise the conduct of matters connected with field experiments the Director created the Field Experiments Committee (FEC). This body has developed over the years and now holds a key position in the affairs of the Organization.

### The Field Experiments Committee

The Field Experiments Committee is responsible for organising the general conduct of field experiments. Its main functions are as follows:

- 
- \* Head of Department of Weed Control
  - \*\* Joint Head, Evaluation Section, Department of Weed Science
  - \*\*\* Head, Aquatic Weed Section

1. It creates rules and codes of practice to guide field experimenters in the efficient conduct of their experiments.
2. It advises on and approves plans for field experiments.
3. It allocates land at Begbroke Hill ensuring that the necessary services are made available to experimenters and liaises with the Farm Manager to ensure the appropriate cross communication of information about experimenters' requirements.
4. It co-ordinates safety procedures wherever there are potential hazards in field experiments.
5. It observes the experiments in progress and comments on any deficiencies.
6. It receives back all relevant papers when the experiments are finished and indexes the results.
7. It advises the Director on matters to do with the land, buildings and field equipment.
8. It provides a range of ancillary services such as maps for field teams when they travel, advice on hotel accommodation, weather reporting etc.

At first sight FEC would appear to have somewhat overbearing powers and indeed its authority is considerable. However, its membership does much to temper its authority. The Committee consists of three senior members of WRO who are all very experienced in the planning and conduct of field experiments. Apart from their duties with the Committee, they are Section Heads and are responsible therefore for supervising the field teams who are the originators and conductors of the experiments. Not only are the members of the Committee in a good position to understand experimenters' problems but they themselves have research commitments and are not therefore given to extending the activities of FEC more than is absolutely necessary. The Committee is assisted by a Clerical Officer working three days a week who does all the detailed clerical work which is essential to the functioning of the system.

Meetings of the Committee are held as required and, on average, about once a month. In early February and late July it is necessary for the Committee to meet more frequently to approve the large number of field experiments that are submitted. Formal approval is required only for experiments at Begbroke Hill but the Committee finds increasingly that its advice is also sought in the planning of experiments to be placed on other farms. At the time of writing (1972) WRO has some 286 field experiments in being all of which have, to some extent, been examined by the Committee.

Since FEC is responsible to the Director, anyone dealing with the Committee may appeal to him if dissatisfied with the Committee's decisions. In reality the Committee finds that it obtains its requirements through persuasion and advice more effectively than through the use of authority. The Director rarely finds himself involved in arbitration.

It should be made clear that the Committee has no right to comment on the research subjects which form the basis of the experimental proposals that it receives; these are the prerogative of the Director and the departmental and section heads. FEC's concern is with efficient experimentation regardless of the subject.

Over the years the Committee has issued a number of instructions and items of information: these are made available to all team leaders in a booklet entitled "A Guide to the conduct of field experiments at Begbroke Hill". The guide is brought up to date each winter and is rewritten from time to time. A copy of the current issue may be found in the second part of this report.

### The planning of field experiments

Early experience showed that difficulties and failures may occur through the inadequate planning of a field experiment. It is accepted at WRO that all field experiments must be carefully planned in detail on paper before their start. The basic essentials for proper planning are that the experiment must have a clearly defined object; the treatments should be chosen to achieve this object; appropriate assessments should be carefully selected to reveal the consequences of the treatments; and the experiment should be designed according to sound statistical principles. Fulfilment of these four requirements is essential to any proposal submitted to FEC. Thereafter it is necessary to decide on the type of land and other services that may be required for the experiment. On a separate form is supplied information about the chemicals (if any) that are to be used in the experiment; advice on their toxicological hazards and therefore the safety precautions necessary is obtained from the Ministry of Agriculture personnel administering the Pesticide Safety Precaution Scheme.

The responsibility for planning the experiment, for presenting it to the Committee and for carrying it out rests with one individual known as "The officer in charge of the experiment". All matters relating to the experiments are referred to him, he is held responsible for the conduct of the experiment and the condition of the land upon which it takes place from the time that it is taken over from the Farm Manager until it is returned.

### A field team and its requirements

Field experiments are carried out by field teams; each field team consists of a leader and one or two assistants. The leader is usually a Scientific Officer or Higher Scientific Officer, who has been selected on the basis of past training or experience; his team is composed of Assistant Scientific Officers who are usually younger and less well qualified. In addition to its general training a team usually becomes specialised in a particular type of investigation, for example herbicide evaluation or grassland agronomy. A research section consists of a number of teams with skills appropriate to the role of the section.

The process by which a team develops its programme of work each year is as follows. Decisions on further progress in each project are reached at winter meetings between the Director and the departmental and section heads. In consultation with the section head the team leader decides upon the subjects that are to form the basis of his programme for the coming year. Once these are agreed, the team leader and his assistants plan the various details of the experiments. If the experiments are of a type necessitating placement at Begbroke Hill, a proposal is made to FEC. If a decision is taken to place the experiment on another farm, the team leader seeks a suitable site using his farmer contacts, assisted by the two liaison officers at Begbroke of the Agricultural Development and Advisory Service (ADAS). The decision to place the experiment at Begbroke Hill or elsewhere is governed by the circumstances of the experiment. There are certain activities that cannot be pursued on ordinary farms such as the deliberate planting of weeds or specific livestock control. On the other hand realism and wide variation in environmental circumstances are best achieved on ordinary farms. Once planning is complete and a site has been found the team's daily life is concerned with the execution of the planned programme through to the day when the experiment is concluded and there remains the summarising, interpretation and reporting of results. The activities of a team follow a seasonal pattern starting with planning during the winter, field activities during spring and summer, and writing up in autumn and early winter. The number of experiments undertaken in a year by a team varies considerably according to the complexity of the subject but averages between 15 and 25.

Once an experiment is launched, considerable responsibility rests with the team leader in the day-to-day decisions that he must make or remake according to the weather and the outcome of the treatments. To enable him to carry this responsibility

he has considerable freedom of action to do what is necessary to ensure the success of the experiment and he obtains the full backing of all the resources at WRO to this end. Because of Britain's changeable weather the teams live a day-to-day existence in summer, sometimes working irregular hours, in order to keep up to date with their programmes. Efficient weather forecasting is essential and the success of a team in summer largely hinges on its leader's ability to make correct predictions of the weather, perhaps at a distance from WRO. One of the services provided by FEC is that of weather forecasting obtained from the local Meteorological Station.

The team leader can refer difficult decisions about his experiments to his section head but the latter cannot always hope to be intimately conversant with the details of all his teams' experiments which may be spread out across the country: he is in any case unlikely to be on the spot at the time. The role of the section head is to make decisions at the planning stage: once the experiments are launched he is a troubleshooter who seeks to observe and assist at points of greatest complexity and difficulty. He comes into the picture again as the results start to come in when his experience is necessary for the interpretation of results.

To ensure the field teams' mobility they are individually equipped with Land Rovers, small equipment for marking out, spraying and assessing experiments. In addition the teams may draw on a pool of larger equipment, farm tractors and machinery, most of which can be transported to outside experiments on trailers towed by Land Rovers.

The question of the distance of an experiment from base is often a difficult one to decide. It may be desirable to place an experiment in a particular area where the weed is a problem or where there is a particular farming system or contrasting climate but every extra mile from base involves valuable staff sitting in a vehicle when they might be working, and multiplies the complexities of servicing the experiment. It is a general rule that no experiment should be further away from WRO than is necessary. When away from Begbroke Hill the team leader is responsible for his team's work and good behaviour. If need be the team may stay away overnight in a hotel and a subsistence allowance is paid. Inevitably, experiments at distance involve extra hours of work and this also is paid as appropriate.

With a pre-planned programme to fulfil, committed to travel and at the mercy of the weather, the teams are heavily dependent on the services provided at their base at Begbroke Hill. Delay in carrying out the repair of a Land Rover or the lack of an experimental chemical on the day when it is required could reduce the team to inactivity. The efficiency of the supporting services is an essential complement to the efficiency of the field teams.

#### The organisation of supporting services

The services upon which field experimenters rely may be divided between those which are general to WRO (mostly controlled by WRO Secretary) and those which are specific to field experiments (mostly controlled by FEC). The general services consist of personnel administration, stores, engineering, carpentry and electrical workshops, vehicle maintenance and repair workshop, library and information section, canteen and social accommodation. The more specific services are: those already listed as provided by FEC, field chemical laboratory, farm services by the manager of Begbroke Hill Farm and clerical services. There are two additional services which do not fall into the categories described. WRO shares a statistical section with another ARC Institute (the Letcombe Laboratory): the section assists in the processing of experimental data using the computer at Rothamsted Experimental Station. Weather records are maintained by the Evaluation Section as a Station service. A special building provides offices, clean work rooms, general and soil processing rooms, ovens, low temperature storage, individual team stores, facilities for sprayer calibration etc. There is also a large barn in which is housed a variety of equipment designed for field experiments but too large for the team stores; in this barn are also the large experimental sprayers.

### Maintenance of experimental equipment

The field experimenters themselves are responsible for the maintenance of experimental equipment. To obtain some cohesion in this task, one week in January is set aside each year. During this week (known as Maintenance Week) the checking, maintenance and repair of equipment associated with field experiments takes priority over other activities for staff of the rank of Higher Scientific Officer or below. An Equipment and Buildings Sub-Committee of FEC arranges for the examination of equipment in the autumn so that spare parts may be ordered and prepares a programme for Maintenance Week. When the week arrives the programme is put into effect using the 40 or so staff involved in field experiments. The work is communal and staff are sometimes put to work on unfamiliar equipment to widen their experience. In addition during this week, team stores are cleaned, protective clothing is examined, jets and sprayers are re-calibrated, vehicles are inspected and inventories are checked. Altogether Maintenance Week provides an opportunity for re-organisation in preparation for the coming season.

### Begbroke Hill Farm

The specification for a suitable farm upon which WRO might be placed was drawn up in 1956. It required that the land should be free draining with a light textured top soil. An even topography should contain large and rectangular fields. An over-all size of 150 - 200 acres was required. The arable farm which forms the Western half of Begbroke Hill meets all these requirements admirably. The wet and low lying Eastern half is a valuable contrast and is maintained as grassland.

Since research takes priority over commercial activities on the farm the form of land use is designed to cope with this requirement. Field experiments can usually be divided into two categories: the majority last for one season only and with them the need is for a regular supply of ground each year which is relatively uniform in fertility and weed seed content and is free of herbicide residues; a lesser number of experiments are long term, lasting for four years or longer; the main requirement for these is lack of disturbance. The form of land use is described in the second part of this report.

It was foreseen from the start that the provision of land for experiments in a high state of fertility and of efficient farm services could only be assured by a high standard of farming. It was also anticipated that there would be a desire to use the commercial farm as a working test-bed for new techniques developed in research. For these reasons it was considered important that efficient commercial farming should be run in balance with efficient field experimentation at Begbroke Hill and to meet this requirement a system of land use was devised that ensured a balance. The system allows the two requirements to balance; it has worked effectively and with very little friction for some 10 years.

Because the field teams do so much of the work on their own experiments, the farm staff's responsibility is limited to handing over land in a rough seedbed condition, to supplying seeds, fertilizers and machinery on demand and, in the case of certain complex machinery, to supplying an operator. To meet its commercial and experimental commitments the farm is provided with a manager, three men and one boy. Tasks requiring additional labour such as potato harvesting are assisted by casual workers. The farm manager is a key figure who spends a great deal of time assisting and advising field teams: he more than anyone else must ensure the day-to-day balance between research and farming. To do this he has to be a man of great experience and equable temperament.

Records both factual and financial are kept of all farm activities. For this purpose an accounting system was introduced within which the farm manager is regarded theoretically as a tenant of the Agricultural Research Council and pays rent for all

the land at WRO. He is expected to give first priority to a contract service for experiments in which land and supplies are charged for. Tractors and other machinery are made available on demand and a charge is made according to a fixed scale: if a man is supplied with machinery an additional charge is made. The farm manager is expected to buy back any usable produce from the experiments. He does his own valuations and, assisted by WRO Secretary, produces a trading account each year. In a profitable year the farm is able substantially to meet the cost of services to experiments. As WRO is a state-financed organization no money changes hands in these accounting transactions but they have the important function of indicating the cost of experiments and measuring farm efficiency in relation to other commercial farms.

#### Experimental records

The basis of the experimental record system is that as long as an experiment is in being ("live"), its records are held by the officer in charge. Once summarized and written up, the experiment is considered "dead" and the records are handed to the Field Experiments Committee for indexing and storage. At the time of handing over, relevant information obtained from the experiment is entered on a special form and this is transferred to cards in an index so that the information may be retrieved later if required. The index is a Carter Parratt and is similar to that used by WRO Information Section, in their production of Weed Abstracts. Thus an experimenter may concentrate his attention on his "live" experiments and his files are not encumbered with the results of past work.

During the life of an experiment the officer in charge is required to provide the Field Experiments Committee with a number of papers as follows:

1. A proposal form and, following this, a continuation proposal if the experiment lasts for more than one year.
2. An application for toxicological ('safety') clearance.
3. Details of treatments and layout when the experiment gets under way.
4. A summary of results.
5. The relevant forms for indexing.
6. All papers of the experiment when it is "dead".

Although this list may appear formidable it is the minimum necessary to ensure that sufficient information about the experiment is available to others. In practice the return of these papers may occur over a year or longer and it does not constitute a burden.

Such are the circumstances of field research at WRO that have led to the system which is now in use and which is further described in the second part of this report. The pages contain in full the actual guide which is issued by the Field Experiments Committee to all leaders of field teams. Readers should appreciate that the instructions and information were originally written for internal WRO use: it has been considered preferable to make no alterations.



AGRICULTURAL RESEARCH COUNCILWEED RESEARCH ORGANIZATIONA GUIDE TO THE CONDUCT OF FIELD EXPERIMENTS \*Produced by the Field Experiments Committee

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Mrs N Dover (Experiments Clerk) acts as  
secretary to the Committee.

\* Author's Note The contents of this Guide are revised regularly in order to keep them up-to-date. Readers of Technical Report No. 24 must understand that the instructions and information contained on the pages that follow represent the guidance given to field experimenters at WRO at the time of publication of the report. They should understand therefore that some of the information will become dated.

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## PART ONE - INSTRUCTIONS AND ADVICE

### I - INTRODUCTION

#### 1. This Booklet

This booklet brings together the instructions governing the conduct of all field experiments carried out by W.R.O. staff at Begbroke Hill and elsewhere.

It also contains information and advice that may be useful to field experimenters in their daily activities.

The booklet is revised from time to time to keep it up to date.

#### 2. The Field Experiments Committee

The constitution and the terms of reference of the W.R.O. Field Experiments Committee can be seen in full in Admin. and Tech. Instruction No. 67. The overall responsibility of the Committee is to ensure the smooth and efficient running of all field experiments carried out by the Organization. Meetings are held regularly so that a continuing responsibility can be exercised.

The Committee has two Sub-committees that exercise detailed supervision of two aspects of the Committee's responsibilities. They are:-

1. The Sub-committee on Accommodation and Equipment.
2. The Irrigation Sub-committee.

The successful conduct of field experiments depends largely on the individual experimenter but it is hoped that by its services of co-ordination, advice and information, the committee helps to make his work easier and more fruitful.

The general co-ordination and supervision of some 300 field experiments each year is a complex undertaking that necessitates a certain number of rules and procedures. The Committee is empowered by the Director to issue and enforce instructions necessary for the conduct of field experiments.

#### 3. The extent of the Committee's responsibility

The sequence of events in field experimentation is usually as follows:-

1. The Director agrees the project with the Departmental and Section Heads.
2. The Section Head in consultation with the Team Leader splits the project up into various aspects and decides the work to be done during the season that is approaching.
3. The Team Leader, in close collaboration with the Section Head plans the necessary experiments.
4. The experiments are carried out (with the prior approval of the Field Experiments Committee).

5. After completion of assessments, the experiments are summarised and reported to the Director with recommendations as to
  - (a) follow-up work required.
  - (b) publication of results.
6. Such details as are required for future reference are recorded and filed by the Experiments Clerk.

In this sequence of events the Field Experiments Committee is concerned with the period during which the experiment is under way and for ensuring that the relevant information is properly recorded in the files (i.e. 3, 4 and 6 above).

Records and a great deal of other information relevant to field experiments have been collected over the years by the Experiments Clerk. All this information is available to members of the Organization on demand. In addition the Experiments Clerk gives a great deal of assistance to experimenters in matters relating to the day to day conduct of their experiments: She also liaises with the Farm Manager on matters to do with the land. This service is provided by the Field Experiments Office.

## II - THE START OF THE EXPERIMENT

There are certain considerations about the conduct of all field experiments that have to be taken into account at the planning stage. These are considerations of clearance of the treatments under the Pesticide Safety Precautions Scheme, the disposal of produce from the experiment and possible compensation to the farmer or grower. These subjects are dealt with later in this guide.

### 1. The Initiation of Experiments

#### At Begbroke Hill

When planning an experiment the officer in charge must acquaint himself of the clearance status of the treatments that he intends to apply. All treatments for which there is not a firm clearance must be notified to P.S.P.S. through the M.A.F.F. Approvals Officer at Begbroke Hill. The notification takes the form of an application for clearance to carry out the treatment. A suitable form is provided for this purpose. Before an experiment starts the Field Experiments Committee will need to be informed of the clearance status of the treatments.

Officers or others wishing to carry out a field experiment at Begbroke Hill should, after taking statistical advice, draw up a proposal sheet in duplicate for each experiment. These should, if possible, be submitted to the Field Experiments Committee by the 31st January each year in respect of experiments to be started between 1st February and 31st August and by the 31st July in respect of experiments to be started between 1st September and 31st January. (Exceptionally, however, experiments can be accepted outside these dates). When an experiment lasts for more than one year, a continuation proposal should be submitted on 31st January each year.

The Committee examines the proposal, usually in the presence of the originator to establish its value as an experiment. In doing this the Committee is not concerned with the subject of the experiment, which is a matter for the Section Head. Guidance on details is frequently given at this stage. In the rare event of the Committee rejecting an experiment, the originator may appeal to the Director. After a proposal has been accepted, the Committee will suggest a site for the experiment. When agreed, an outline of the experimental area will be recorded on the field plan kept by Field Experiments Office. As soon as the site has been allocated the originator assumes responsibility for it and for the uncropped area around its perimeter. This responsibility will continue until the Farm Manager is notified that the site is no longer required.

All requests or proposals for experiments in the field at Begbroke Hill by or in collaboration with organizations other than W.R.O. must be referred to the Director prior to any decision being made. A similar notification through the WRO Radiation Safety Officer is necessary for all field experiments using radioactive materials. Experiments involving uncleared treatments, if approved, will also be referred to the Director.

### Outside Begbroke Hill

Experiments away from Begbroke Hill may be initiated without prior reference to the Field Experiments Committee except on matters to do with clearance and compensation. It is important that the clearance status of all treatments is established and communicated to the Committee before the start of the experiments because instructions from P.S.P.S. or W.R.O. on the disposal of produce and/or subsequent management of the experimental area may influence decisions about the conduct of the experiment. Proposal sheets for off-station experiments are not required. The Committee is, however, always prepared to give advice on any experiment. Experiments in co-operation with other research organizations require the prior approval of the Director.

### Guidance on liaison with local ADAS officers

When a site for a field experiment is obtained with the assistance of a regional or local ADAS officer, there is some obligation on the officer in charge of the experiment to reciprocate by keeping the ADAS officer informed (where it is appropriate to do so). There are two guiding principles:

1. The ADAS officer should be informed as much as he wishes, within reason.
2. The officer in charge of the experiment should be prepared to volunteer information unless there is a positive reason to withhold it.

Where a number of possible sites are suggested by an ADAS officer, he should be informed quickly when one is taken up. If the ADAS officer shows no further interest in the experiment then he need be informed only when the experiment finishes. If he expresses a desire to know the details and learn of the results then he should be given this information, if appropriate to do so. It may on occasions be necessary to request that the information be treated as "in confidence" or to stress that the results should not be taken to apply outside the conditions of an experiment. Judgement on such matters must be the responsibility of the officer-in-charge. Where the ADAS officer has a special interest in the subject then a special effort should be made to keep him informed of the progress of the experiment. The fact that the ADAS officer is being kept informed should not excuse the officer in charge of the experiment from keeping the farmer informed so that he too can know what is happening on his own farm; this should be standard practice.

### 2. Notification of the start of all field experiments

As soon as an experiment has been laid down at Begbroke Hill or elsewhere a statement (1 copy) giving details should be sent to the Field Experiment Office for central filing.

This statement should include brief information under the headings listed. It should be accompanied by a plan of the experiment showing plot numbers and orientation.

#### Information required:-

Section	Weeds
Experiment No.	Treatments
Location	Experimental design
Origin	Date of starting
Object	Co-operator (if any)
Crops (variety)	

If more convenient, the relevant headings on a standard proposal sheet may be filled in and used as a statement to accompany the plan.

### III - THE EXPERIMENT IN PROGRESS

#### 1. The Handling of Chemicals

The chemicals for field use are stored in the Field Chemical Laboratory where there are facilities for making up required solutions etc. and cleaning containers. When using the laboratory, experimenters are expected to comply with the instructions drawn up for users of the building.

It is all too easy to become casual when using chemicals regularly. Do not allow this to happen. Develop the habit of careful handling. We advise you to read the Safety Manual and comply with the instructions in the memorandum on the handling of chemicals issued by the Director.

Chemical washings should not be dumped on the land but should be brought back to the laboratory for disposal. When spraying, bear in mind the effect that drift may have on neighbouring crops and experiments.

The increased use of soil acting chemicals has brought attendant dangers of persistent locally high concentrations in the soil caused by spraying when stationary. If possible this should not be allowed to happen and in the case of an accident with a persistent chemical advice should be obtained as to the most effective means of disposal of the contaminated soil. This may entail removal or the mixing in of activated carbon.

Excess spray solution should be brought back to the laboratory for disposal or when there is no hazard sprayed in the fence line. Troughs are provided as receptacles for use with manual sprayers.

#### 2. Use of Uncleared Treatments

Experimenters are strongly advised to establish the clearance status of all treatments before the commencement of the experiment. It is the responsibility of the officer in charge to ensure that any instructions by P.S.P.S., the Director or the Field Experiments Committee are carried out. When an experiment contains treatments about which the clearance status is unknown or which are not cleared the following procedure will be carried out:-

- i) The experiment will be sited as far as possible from public access.
- ii) Warning notices containing the words "Keep out" must be attached to each corner post and on additional posts if the experiment is large or not rectangular.
- iii) The officer in charge must take particular care to ensure the safe disposal of the produce (see paragraphs 10 & 12) and in following instructions regarding site clearance.

### 3. Use of Radioactive Materials

The intention to use radioactive materials in experiments at Begbroke Hill must be stated on the proposal sheet; and if to be used in an outside experiment, prior approval by the Director and the Radiation Safety Officer must be obtained. The principles and instructions set out in W.R.O. Safety Manual should be read and the relevant Director's memorandum observed.

The experimental site should be chosen so as to avoid possible risk to the public or public water supplies. The area of the experiment should be fenced. If there is a risk of stock or children obtaining entry, four strands of barbed wire should be used, otherwise a single plain wire will suffice.

Notices indicating that the public may not enter should be affixed on all four sides of the area; the wording of the notice should be decided in consultation with the Radiation Safety Officer (R.S.O.).

### 4. Farm Services on Experiments

The major purpose of the farm is to provide land and facilities for experiments, but the staffing of the farm has been worked out on the assumption that much of the straightforward work on experiments is carried out by the experimental teams. The extent of farm work on experiments is, therefore, limited to:-

- a) carrying out basic cultivations prior to an experiment being started, and
- b) operating complicated farm machinery.

The machines to be operated by the farm staff are: the MF 165 tractor, combine harvester, potato planter and harvester, and fore-loader. Other farm machinery may be used by the experimental staff by prior agreement with the Farm Manager.

Requests for services by the farm staff will have been put on the proposal sheet. When the time comes for the service to be provided, the officer in charge of the experiment should contact the Farm Manager not less than 24 hours in advance to make an appointment subject to weather conditions. The Farm Manager will be in his office between 9 a.m. and 9.30 a.m. daily during the main experimental season.

### 5. Vehicle Tracks

Field teams and others are asked to be particularly careful to keep to the tracks or field boundaries until the point nearest their destination has been reached. The tracks to be followed are shown on maps in the Field Experiments Office.

### 6. Maintenance of the Experimental Area

It is a common failing among experimenters that they do not keep the areas around their experiments tidy. Nothing detracts more from the appearance of the station than weeds in pathways, unsightly heaps of vegetation and corner posts leaning over or broken. We have to bear in mind that many visitors to Begbroke Hill come with a preconceived idea of what a research station should look like, and they judge on that basis.



Pathways within an experiment are the sole responsibility of the officer in charge. Those surrounding an experiment are the joint responsibility of the officers in charge of adjoining experiments, or of the Farm Manager and the officer in charge, where the experiment joins a farm crop. Herbicides to be used for controlling vegetation on pathways may be obtained from the Farm Manager and not from the Field Chemical Laboratory.

As soon as the position of the experiment is known accurately the corners should be marked with 6 ft. white topped posts. On one of the posts a board should be mounted showing the number of the experiment.

The treatments in one replicate should be labelled with white painted slats on which are painted letters or numbers appropriate to the plan held by the Field Experiments Office. The slats should be put in position as soon as possible after the treatments have been applied. More flexibility is allowed on grassland experiments, due to the difficulty of stock knocking over posts; but whenever possible experiments on the grassland should be marked in similar manner to those on the arable land.

#### 7. Visitors to Field Experiments at Begbroke Hill

The Field Experiments Office keeps two sets of plans for all field experiments in progress at Begbroke Hill; these are available to senior members of staff (scientific and experimental officers).

Providing it is understood that all information gained from the plots and plans is strictly confidential and not to be disclosed outside the Weed Research Organization without permission from the officer responsible for the experiment, then there is no restriction concerning the use of these records by senior staff for their own information. If, however, it is proposed to demonstrate the experiment to a visitor, the prior approval of the officer in charge of the experiment must be obtained, together with instructions as to the confidential nature of any of the treatments or results.

The Experiments Clerk has been instructed to keep these records under her personal supervision and to remind members of staff who wish to use them of the need for caution in disclosing information about the field experiments to visitors, and the importance of close liaison with section heads.

#### 8. Recording the Location of Field Experiments at Begbroke Hill

It is very important that the location of each experiment on the station is recorded accurately so that a check may be kept of any long term effects. For this reason the entire farm is covered by a system of reference points from which the corners of experiments may be located by using the engineer's level available. This must be done as soon as possible after the experiment has been started and well before it is terminated. It is the responsibility of the officer in charge to ensure that the experiment is located before the pegs are removed.

The Field Experiments Office keeps a special map of the farm showing the exact location of triangulation reference points. The individual outlines of all experiments are also recorded annually on map tracings of each field.

## 9. Field Factors relevant to Experiments

The Farm Office keeps records of the position of all soil samples taken on the farm together with references as to where information concerning the analysis of the samples can be found. Field teams and others who carry out soil sampling for the determination of soil properties or herbicide residues are asked to give the Field Experiments Office the details as soon as the results are known, and they will be passed on to the Farm Manager.

It is intended that we should build up a record of features that may affect experimental work in the field, e.g. patches liable to drought or flooding, patches of variable fertility or soil structure, main areas affected by moles and other pests or diseases, weed infestations, areas affected by herbicide residues etc. Field experimenters are, therefore, asked to co-operate by drawing the attention of the Field Experiments Office to any such features which they consider worth recording, preferably at the time of the year when the feature is most evident. Their location can then be conveniently recorded on the large field maps.

## 10. The Labelling and Disposal of Produce from Experimental Plots

The Pesticide Safety Precautions Scheme should already have given directions as to the disposal of produce from treated plots when the proposed treatments were notified (See Part II 'The Start of the Experiment').

Produce from plots to which uncleared treatments or treatments whose status is unknown, have been applied, may not be used for human or animal consumption.

### Experiments at Begbroke Hill

Once harvested any produce from treatments which have not been fully cleared should bear a label marked 'Warning - this produce may be contaminated'. Labels should be attached to the containers into which produce is directly harvested. As an additional precaution, fruit from uncleared plots should be harvested into containers of a distinctive colour.

To avoid any risk of confusion arising between produce from cleared and uncleared treatments warning labels should be attached to all the containers, and cleared produce subsequently over stamped 'Cleared for human consumption' or 'Stock only' as appropriate. Supplies of warning labels are available in the main stores and suitable rubber stamps can be obtained from the Experiments Clerk.

It is the responsibility of the originator of the experiment to ensure that all staff or casual labour engaged in harvesting are aware of which plots have received uncleared treatments. Where there is any likelihood of confusion, red topped canes should be used to delimit such plots.

Produce cleared for human consumption should be disposed of by arrangement with the Secretary. That for animals, by arrangement with the Farm Manager. Uncleared produce should be placed on the compost heap.

### Experiments away from Begbroke Hill

Where experiments are conducted away from Begbroke Hill, particular care will be necessary to ensure that produce from plots treated with uncleared chemicals is kept separate from cleared produce. Uncleared produce should be adequately marked, and the originator of the experiment should ensure that the co-operator and any of his workers likely to assist with the harvesting are aware of the significance of the markers used.

Edible produce which has only been cleared for animal consumption should either be brought back to Begbroke Hill or left, clearly labelled at the site of the experiment by arrangement with the co-operator. Uncleared produce should also be returned to Begbroke Hill for disposal whenever possible. If left behind it should be disposed of in such a manner that it cannot be consumed. Refer to paragraph 12 with regard to compensation.

#### 11. Clearing of Land

Experimenters are responsible for removing string, pegs, and gross quantities of vegetation from the land before handing it back to the Farm Manager. Any materials which can be used again should be returned to the field stores. Agreement should be obtained with the Farm Manager as to the disposal of standing crops. He should also be informed of any limitations on the subsequent use of the land imposed by the Pesticide Safety Precautions Scheme when clearance was given for the various treatments used in the experiment. The land is the responsibility of the officer in charge of the experiment until accepted by the Farm Manager.

#### 12. Compensation to Farmers

For many years we have had no facilities for paying compensation but it is now possible to do so. The guiding principles are as follows:-

1. At the initial discussion with the farmer, the experimenter should be prepared to inform him that compensation is payable for loss of crop. This information should be conveyed only if it seems necessary in the light of circumstances. The experimenter should not seek to encourage the farmer to claim it.
2. We do not compensate for disturbance, but only for loss of crop.
3. Compensation should be the exception rather than the rule and only where the head of section considers that the experiment has been economically damaging to the farmer. Team leaders should limit any discussion of the subject with the farmer to the bare intimation that facilities for compensation exist. Further discussion and the settling of details are the responsibility of section heads.
4. Compensation is normally paid by cheque, but on rare occasions it is possible to compensate in kind if this is more convenient and is agreeable to the farmer.

5. We wish to avoid the present informal 'gentleman's agreement' becoming a business deal, or worse still a drawing up of a contract. The continued successful operation of the present system depends largely on the good sense of team leaders and section heads, and a spirit of voluntary collaboration on the part of the farmer.

The Field Experiments Committee does not wish to introduce a system for the formal notification of the likelihood of claims, but would rather rely on team leaders keeping the Field Experiments Committee informed of events that may lead to a claim. Section heads should bear in mind the possibility of a claim when planning their experiments and must notify the Field Experiments Committee at the planning stage if the anticipated value at harvest of the farmer's produce involved in the experiment exceeds £50, or in the case of uncropped land, if the value of the produce that the farmer would have obtained would exceed £30. Where there is a risk that a claim of £50 or more may arise the Field Experiments Committee will notify the Director who will decide whether or not the experiment shall proceed.

IV - REPORTING AND INDEXING EXPERIMENTS

The purpose of top sheets and index sheets is to summarise all the useful information gained in an experiment. Minor effects noticed whilst carrying out the main object of the experiment should be included in the top sheet and the index sheet. Should an experiment have to be abandoned all useful data should be written up and indexed. It is important to remember that negative results are just as valuable as positive ones. Often the main theme of an experiment or group of experiments is written up for publication, but the only means of recording many of the minor effects and additional data is through the system of top sheets and indexing.

1. Reporting

- (i) When an experiment is completed it should be written up as a 'top sheet' or final summary by the officer responsible as soon as possible. If a number of identical experiments have been conducted they may be written up as a single report. All useful information should be incorporated in the report in summary form with statistical data where appropriate. A brief discussion of the results should also be included. Where the experiment has been published it may be appropriate to attach all or part of a reprint of the paper to the top sheet.

- (ii) Information should be given under the following headings:-

CROP ..... LOCATION ..... EXPT. NO.....

BRIEF TITLE .....

OBJECT:

RELEVANT DATES (Spraying, assessments, harvest etc.)

EXPERIMENTAL CONDITIONS (Stage of growth of crop & weeds,  
weather conditions, soil conditions etc.)

EXPERIMENTAL DESIGN (Layout, plot size, replication)

TREATMENTS (Chemicals, formulations, doses, volume etc.)

RESULTS (Effects on crops and weeds expressed as concisely  
as possible and making maximum use of tables)

CONCLUSIONS AND DISCUSSION (Including recommendations  
for further work)

REFERENCES TO OTHER EXPERIMENTS

AUTHOR

DATE

- (iii) Top sheets should be prepared in duplicate, the top copy being handed to the Field Experiments Office, with the best copy of all relevant papers. The second copy is retained by the section concerned.
- (iv) Top sheets should be written with a ball-point on A4 paper, or typed, leaving a one inch margin for binding. Graphs and other illustrations can be photocopied if necessary.

## 2. Indexing

- (i) The experiment index is housed in the Field Experiments Office. It is based on a modification of the species and chemical index already in use by the Information Section for Weed Abstracts.
- (ii) After a top sheet has been prepared, information required for the index should be entered on special forms obtainable from the Experiments Clerk who will be responsible for transferring information from the forms to index cards.
- (iii) The experiment index is confidential. If information from it is required for transmission outside W.R.O. permission should be obtained from the section head responsible for the experiment.

V - FILLING IN PROPOSAL AND INDEX SHEETS1. Experiment Proposal Sheet

The main objects of the Experiment Proposal Sheet are to give the Field Experiments Committee sufficient information on which to judge the proposed experiment and to enable land to be allocated. Most of the information asked for on the form is self-explanatory, but the items 'Origin' and 'Object' are not always clearly understood.

Under 'Origin' a brief explanation should be given of the situation that has led up to the trial being proposed. Why, for example, new herbicides are needed in a particular crop, what benefits may be expected from any new management system being tested, what problems the proposed trial is expected to elucidate, etc. It should also provide sufficient background information to explain to members of the Committee not closely associated with the project why the experiment is necessary.

Under the 'Object' heading the aim of the proposed trial should be stated briefly (in a single sentence when possible) and should indicate what information the experiment is expected to provide. The Object is the heart of the experiment, and it is important that the originator should think out clearly and simply just what it is hoped to achieve by carrying out the experiment.

In addition to the information given on the Proposal Sheet itself as much information as possible should be given on the layout of the trial and on the programme of work envisaged, including assessments to be made, and attached on separate sheets of paper.

Each Proposal Sheet submitted to the Field Experiments Committee should be accompanied by a Treatments Clearance Form unless all the treatments involved are known to have been cleared under the Pesticides Safety Precautions Scheme. A Treatments Clearance Sheet should also be submitted to the Field Experiments Committee for any experiments off Begbroke Hill farm which contain treatments not known to be cleared under the Pesticides Safety Precautions Scheme. Copies of the standard Proposal Sheet and Treatments Clearance Sheet are shown overleaf. Further copies may be obtained from the Field Experiments Office.

2. Index sheets

These sheets should be completed and returned with the final top sheet for each experiment. Where experiments last for several years and a top sheet is written for each year the index sheet is not required until the final year of the experiment. Where a group of experiments are written up as one top sheet, one index sheet for the group is sufficient.

It is a common failing that experiments are not top-sheeted or indexed until a long time after the completion of the field work. It is in the experimenter's own interest to carry out these tasks quickly to prevent the accumulation of incomplete experiments.

W.R.O. EXPERIMENT PROPOSAL SHEET

<u>W.R.O. Number</u>	<u>Section</u>	<u>Collaborator's</u>
<u>Officer responsible</u>	<u>Project No.</u>	Number
Dates of :-	Location :-	Name
Start.	Suggested	Address
Finish.	Final	

OriginObjectCrop(s)Weed(s)

<u>Design</u>	<u>Replication</u> X	<u>Number of Treatments</u>
<u>Main plots</u> : X	<u>Dimensions</u> :-	One replicate X
<u>Sub-plots</u> : X		Total area X

RemarksArrangements for Site Clearance

Apart from normal rough seedbed is assistance required from farm staff?  
(Answer 'Yes' or 'No'. If the answer is 'Yes' attach details on separate sheet).

Details of treatments, sketch of layout (including amount of discard required around experimental area) and programme of work should be attached