

Procedures for Scientific Utilisation of the Horsham and Walpeup FACE Experiments

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Introduction

The Department of Primary Industries (DPI) Victoria and The University of Melbourne established an Australian Grains Free Air Carbon Dioxide Enrichment (AGFACE) Experiment at the Plant Breeding Centre, Horsham in 2007 (Horsham AGFACE). The FACE infrastructure and research were funded to produce specific outputs (“Core experimentation”) and experimental procedures are being implemented to produce these outputs (see Horsham FACE Experimental Protocols, May 2007). A second FACE experimental site has been established at Walpeup in 2008 as part of the “Core Experimentation” (Walpeup AGFACE). In addition, planning is being undertaken to establish a second FACE experiment at Horsham to allow research on soil and plant biosecurity issues within a cropping rotation (Horsham rotation FACE). This document outlines procedures for collaborators to become involved in FACE experimentation at Horsham or Walpeup.

Table 1. FACE facilities covered by this Procedure

Experimental site	Project leaders
Horsham AGFACE experiment	Dr Rob Norton, Dr Glenn Fitzgerald
Walpeup AGFACE experiment	Dr Rob Norton, Dr Glenn Fitzgerald
Horsham rotation FACE research	Dr Roger Armstrong
Biosecurity research	Dr Joanne Luck
Physiology Research	Dr Saman Seneweera
Crop Systems Modelling	Dr Garry O’Leary

The project leader for the AGFACE is Dr Rob Norton, University of Melbourne, who is based in Horsham. Overall DPI leadership is provided by Dr Glenn Fitzgerald who is also located at Horsham. Specific projects with the AGFACE facility include the Horsham rotation FACE experiment led by Dr Roger Armstrong, based in Horsham and biosecurity research, led by Dr Joanne Luck who is based at DPI Knoxfield in Melbourne. Dr Seneweera (University of Melbourne) and Dr O’Leary are both based at Horsham.

Even though the experimental areas within FACE systems are small and highly structured, FACE experiments internationally have attracted researchers to utilise the infrastructure and experiments for additional studies beyond the Core experimentation. The additional research has involved non-destructive measurements and/or plant/soil material not required for the Core experimentation. Usually data from the Core experimentation supplements data collected in add-on research. Add-on research often contributes to the interpretation of Core experimentation or permits investigation of carbon dioxide impacts on factors outside the Core experimentation. For example, add-on research at Horsham in 2007 investigated aspects of cereal disease not included in the Core experimentation.

The intent is to encourage add-on research at Horsham and Walpeup to maximise returns on the high cost of establishing and running a FACE experiment. This document outlines the principles that researchers need to consider when planning research, the procedure to follow to obtain access to the site for experimentation, and the dispute resolution procedure while undertaking research at the facility.

This protocol also covers those wishing to access and use particular data sets from the Core experiment, such as for modelling, either for validation or assessment of impacts.

The Australian Greenhouse Office has established a national committee to advise on priorities for research relating to the impact of elevated carbon dioxide on Australian plant production. Add-on research will be submitted to this committee for approval before access to the Horsham and Walpeup FACE can be granted.

Principles for research approval

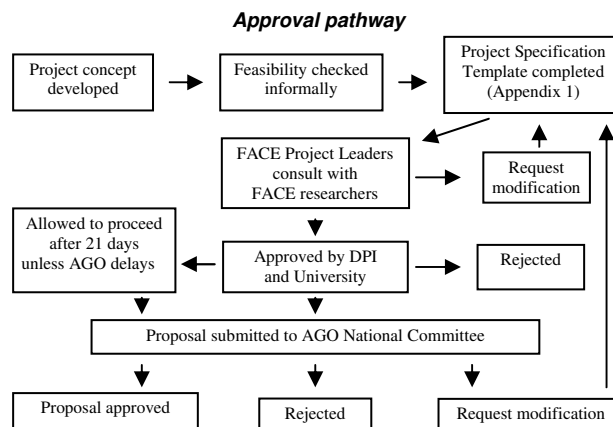
The following principles will be used to guide decisions on approval of proposed additional (non-core) FACE research:

1. That the proposed research does not affect or threaten the Core experimentation as outlined in FACE Experimental Protocols (eg May 2007 Horsham FACE Experimental Protocol). Treatments will not be modified for add-on research and add-on research cannot impact on measurements defined in the Core experimentation.
2. That the proposed research does not affect or threaten any other add-on research that has been approved for the FACE site.
3. That the proponent prepares a protocol for the proposed experimentation using the headings indicated below. Completion of the attached template (Appendix 1) will be required for collaborative projects. A Microsoft Word version of the template is available from Dr Mahabubur Mollah (see end of document for Contacts list). The request must include:
 - project title;
 - name of principal investigator (name, position, organisation);
 - which FACE experiment is proposed to be used;
 - names of people who will require access to the FACE experiment and their role;
 - the proposed duration of the investigation;
 - a brief project summary (one paragraph);
 - background and justification for the research;
 - an experimental hypothesis;
 - a detailed research methodology including details of where/when the measurements will be taken and any destructive measurements;
 - a list of equipment from DPI or The University of Melbourne that will be required by the researchers;
 - a list of measurement and site management requirements requiring staff input from DPI and the University of Melbourne.
 - requirement for data from the Core experimentation;

- a list research team members (names, position, organisation, FTE)
 - a list of expected/proposed scientific publications that could result from the research and agreement to acknowledge researchers involved in Core experimentation in any publication of research;
 - risk management – identification of risks to core research from proposed research (eg additional disease risk) and how this risk will be managed and eliminated.
 - a route to market plan
 - funding for research;
 - an agreement to acknowledge those funding the Core experimentation in any promotion, reporting or publication of research;
 - an agreement to provide copies of all data and publications to leader of FACE experiment (Dr Rob Norton and Dr Glenn Fitzgerald) within a reasonable time;
 - an agreement to abide by the dispute resolution procedure outlined in this document;
4. That funding for the proposed research will be arranged by the proponent of the proposed research. Provided the proposed research can be accommodated and the proposal obtains approval, no charge will be made by DPI or The University of Melbourne for using the Horsham/Walpeup FACE experiments by add-on researchers. In the event that add-on research requires those involved in the Core experimentation to collect extra data or undertake additional field operations, these additional activities will need to be funded by the add-on project.
 5. That the proposed research is approved by both the University of Melbourne and the Department of Primary Industries.
 6. That the proposed research is approved by the Australian Greenhouse Office National Committee on Elevated CO₂ Research.

Procedure for obtaining access

A two stage process for obtaining permission to undertake research will be used. The first stage is to investigate feasibility to undertake the research and the second stage is to obtain formal approval.



- **Feasibility**

Researchers should consult written FACE Experimental Protocols to see how they might incorporate their research into an existing or planned FACE experiment. In addition, researchers should consult any additional add-on experimental protocols that have been approved and will potentially impact on their planned research. Copies of written protocols are available from the site engineer (Dr Mahabubur Mollah).

Having considered what is already being done and developed a plan of how their proposed research could be incorporated into the AGFACE, researchers should enter into discussion with the project leaders for the Core experimentation (Table 1). When agreement has been reached that collaboration is possible the proponent should prepare a written submission for approval and submit to the relevant project leader.

- **Approval**

1. Receipt of a completed application (Appendix 1) by the project leader (Table 1) addressing the issues identified in this protocol will be taken as a formal request to undertake additional (non-core) research.
2. The project leader will provide copies of written requests for add-on research to those involved in the Core experimentation and any approved add-on research. Written comments on the proposal and proposed amendments should be provided to the project leader within 30 days. Following consultation, the project leader will do one of the following:
 - a. Advise the applicant that the proposal has been rejected because of objections from DPI or the University of Melbourne who are investors in the Core Research.
 - b. Request that the proponent modify the request and resubmit after modification
 - c. Advise the applicant that the proposal has been approved by DPI and the University of Melbourne and submit the request to the Australian Greenhouse Office National Committee on Elevated CO₂ Research for consideration.
3. Australian Greenhouse Office will provide both the proponent and the relevant project leader (Dr Rob Norton or Dr Glenn Fitzgerald) with its decision on the proposed work and any amendments required. The project leader will provide a copy to Dr Mahabubur Mollah who will have responsibility for providing approved proposals to collaborators and potential collaborators.
4. Proposals for the following cropping season (May sowing) should be submitted **at the latest** by July-August in the previous year to the FACE project leader so they can receive feedback and modify before submission to the Australian Greenhouse Office National Committee on Elevated CO₂ Research in late September. The Committee meets in October and requires proposals be circulated before their meeting, and sometimes they seek independent scientific review. They meet again in February which is the final date for consideration of modified submissions.
5. It is recognized that some projects may require short time frames for approval. Projects which meet all of the following criteria will be permitted to proceed after 21 days following approval by both DPI and the University of Melbourne. Documentation for these projects will be submitted to the Australian Greenhouse Office National Committee on Elevated CO₂ Research, who could request that the research is delayed until the full committee meets and considers the proposal. The criteria for a project proceeding are that the project is short term (up to one season), requires

no modification of existing treatments, is initiated by either DPI or the University of Melbourne, and is considered “low risk” to existing research by researchers involved in FACE existing research, and has full funding to proceed. It is expected that research arranged at short notice, such as student Honours research projects and measurements by visiting scientists, can occur without delays in approval using this mechanism.

- **Modifications**

It is expected that experimental protocols could require modification after approval. It is important that protocol changes that might impact on other research are discussed and any issues resolved. When protocol changes are required they need to be documented (draft form initially) for discussion with the project leaders (Dr Norton and Dr Fitzgerald) and other FACE researchers to determine if there are any potential concerns. Discussion should occur at regular project meetings and with individual researchers.

Once proposed changes have been finalised and documented, a copy is to be submitted to the relevant FACE project leader for approval. The project leader will then either:

1. Approve – where the change is considered to have no major impact relative to what has already been approved.
2. Follow the approval process for obtaining permission to undertake research at the FACE site (points 2-3 above).

Publications and data

Collaborators are expected to publish data within a reasonable time. The expectation is that collaborators analyse data and get a first draft of a manuscript written within 12-18 months of completing field work. Otherwise, if another researcher requires the data and is prepared to take the lead on publication, the original researcher is expected to turn over the data, assist in the analysis, and be second rather than first author. All Core Experimentation data are captured in project databases maintained by Dr Mahabubur Mollah. All add-on projects are allowed access to these data, which can be requested from Dr. Mollah.

Primary data collected from these add-on experiments must be provided either electronically or on-paper to the project leaders. This can be in the form of a short report on the results for our records. Researchers may care to archive these data in the database developed for the project.

The expectation is that data will be shared with modellers, so that they can proceed with validating their models. However, the actual validation manuscripts should not be submitted until the researchers have had ample time to write their manuscripts.

Data sharing is expected, and it is expected that those individuals contributing data and expertise to any publication are recognized through authorship. At other FACE sites there has been a range of opinion as to how much involvement is required to deserve co-authorship or at least an acknowledgement. Proposed publications, expected draft submission date and authorships need to be indicated on collaborator project proposals.

It is proposed that the “Vancouver Protocol” endorsed by the Australian Vice Chancellors Commission, be considered as the basis of recognizing appropriate authorship guidelines for scientific publications. This protocol considers what constitutes a substantial contribution sufficient to warrant recognition as an author/co-author and proposed that the minimum requirement for authorship is substantial participation in the research, where the following conditions are met:

- a) Conception and design, or analysis and interpretation of data; and
- b) Drafting the article or revising it critically for important intellectual content; and
- c) Final approval of the version to be published.

Participation solely in the acquisition of funding or the collection of data does not justify authorship.

Dispute resolution

It is possible that disputes will arise and rapid resolution will be required by all parties. A key aspect of dispute avoidance is good communication between all participants in the FACE experiment. The approval process for add-on experimentation is designed to resolve potential issues before research starts. Regular project meetings will be held at DPI Horsham to ensure that there is awareness of the planned work schedule in the short term. Dr Rob Norton or Dr Glenn Fitzgerald will chair these meetings. Dr Mahabubur Mollah can be contacted for distribution of meeting minutes. Collaborators are encouraged to send a representative to meetings.

The Horsham and Walpeup FACE experiments are on the premises of the Department of Primary Industries (DPI) Victoria and entry to the sites is at the discretion of DPI. DPI reserves the right to deny access to its premises and the FACE experiments to protect the Core experimentation and to meet any legal obligations (e.g. OH&S). This dispute resolution procedure is designed to allow resolution of issues where a researcher is denied access to the Horsham FACE experiment site.

DPI has empowered the following departmental officers to request any person to leave the Plant Breeding Centre at Horsham or the Mallee Research Station at Walpeup to protect FACE experimentation and/or to meet DPI legal obligations:

1. Dr Mahabubur Mollah, DPI FACE Engineer
2. Russel Argall, FACE operations manager, Horsham
3. Dr Glenn Fitzgerald, DPI Leader for AGFACE project
4. Dr Roger Armstrong, DPI Leader for Horsham rotation FACE experiment
5. Ivan Mock, Walpeup AGFACE senior officer
6. Departmental officers managed by those listed above

Where a departmental officer is concerned or collaborator is concerned, they can request initiation of the disputes process. Following a request, a nominated departmental officer (above) will verbally request the person (a) threatening the Core experimentation or (b) threatening any approved add-on research or (c) not meeting DPI legal obligations to leave DPI premises until further notice.

In the event of a person being requested to leave DPI premises verbally, the departmental officer will immediately inform the project leader (Dr Rob Norton or Dr Glenn Fitzgerald) and Dr Chris Korte so dispute resolution can be initiated.

If informal discussion can resolve the issue, the DPI officer who advised the person to leave DPI premises will inform the person in writing that they have permission to re-enter the premises and resume their research in the FACE experiment, and any conditions attached to this permission. Collaborators are encouraged to use informal discussion to resolve disputes quickly. A copy of the written permission/conditions is to be provided to the relevant FACE project leader and Dr Korte.

If informal discussion cannot resolve the issue within 24 hours, Dr Chris Korte (or his nominee) will convene a meeting to consider the matter and reach a decision. Note, a meeting may not be able to be held for several days because of pre-existing commitments. After the meeting he will inform the person in writing if they have been granted permission to resume research on DPI premises and any conditions associated with this permission.

If a collaborator is unhappy with the decision of Dr Chris Korte, the issue can be taken to the Australian Greenhouse Office National Committee on Elevated CO₂ Research. It should be noted that this committee meets every few months and may be unable to adjudicate on all issues in dispute (e.g. application of local OH&S regulations).

Documentation

Dr Mahabubur Mollah, FACE Engineer, is responsible for maintaining documentation for FACE projects in this protocol, and current copies of project documentation. Collaborators should contact Dr Mollah for copies of documentation they require.

Acknowledgement

We thank Dr Bruce A. Kimball, USDA, for providing suggestions on data sharing and publications based on experience with the FACE project at Phoenix, Arizona.

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Appendix 1 Project specification for collaborative research using DPI-University of Melbourne FACE facilities

This form is designed to allow documentation of proposed research so it can be assessed by different parties with stakes in existing FACE research. A detailed methodology should be attached to this form so researchers can ensure that potential areas of conflict are resolved before research starts and risk management involves all parties.

Project Title

Principal Investigator (name, position, organisation):

FACE experiment (Indicate FACE experiments that will be used for this project specification)

- Horsham AGFACE (project leaders Rob Norton and Glenn Fitzgerald)
- Walpeup AGFACE (project leaders Rob Norton and Glenn Fitzgerald)
- Horsham rotation FACE (project leader Roger Armstrong)

Names of people requiring access to FACE and roles:

Brief summary of proposed research (one paragraph):

Background and justification (Outline why research considered necessary from an industry or science perspective; scientific novelty, benefits of undertaking research, potential impact of results in assisting industry adapt to climate change, potential to add value to existing FACE research. A summary can be used on this form, with more detail in an attachment).

Experimental hypothesis (Provide a clear statement of the research hypothesis that will be addressed by the project).

<p>Research Methodology (As an attachment, provide a detailed research methodology including diagrams of plot/measurement location, detailed description of where/when measurements will be taken, risk analysis, etc. This must be of sufficient detail so that other experimenters at the site can assess the potential impact of proposed research on their work. In the space below, please provide a summary of the main features of the methodology):</p>
<p>Equipment. The following sections are designed to show what equipment is required and will be contributed to the project.</p>
<p>Equipment from DPI (List equipment that DPI will need to provide for the collaborative research. This is equipment that would not be used at the site as part of existing approved research. Indicate usage and terms of use – eg Leaf Area Meter (20 hrs per year with own operator, no charge from DPI).</p>
<p>Equipment from University of Melbourne (List equipment that University of Melbourne will need to provide for the collaborative research. This is equipment that would not be used at the site as part of existing approved research. Indicate usage and terms of use – eg Leaf Area Meter (20 hrs per year with own operator, no charge from University).</p>
<p>Equipment provided by researchers (List equipment that will be required for the project and will be provided by the researchers. Please indicate for each item if it is an existing item, or new equipment that has yet to be purchased or will require grants to fund purchase)</p>
<p>Staff support. (List any measurement or site management requirements requiring staff input from the University of Melbourne or DPI. These are additional inputs not required for existing approved research).</p>
<p>Data requirement (List data that is being collected from existing experiments that will be required for completion of this research).</p>

Research Team (List researchers who will undertake the research, their position, organisation and time input into the research as a full time equivalent. The research methodology can indicate in more detail the expected contribution of individual team members.)		
Name, Position, Organisation	Role in research	FTE
Proposed Publications (List the potential titles of proposed scientific journal publications that will result from this research and author list for each publication. It is recognised that titles could change and additional publications could result from the research once field work is completed).		
Risk analysis (List risks that have been identified by the researchers in discussion with researchers already using the site. Risks that threaten existing research are of particular concern. For each risk identified, a brief statement of proposed management should be provided. A more detailed description can be included in the attached detailed methodology).		
Route to market (Explain how research will be used to support industry adaptation to climate change and what linkages the team has with next users of knowledge. Make reference to specific models where knowledge is to be used to develop or verify simulation models).		
Funding (The total cost of the research should be shown below and proposed investment by different funding bodies. The status of investment should be indicated as secured, application submitted, etc in the comments column. Do not include investment in research already approved, only the new additional research).		
Fund Source	Amount	Comments
DPI Vic		
University of Melbourne		
Total		

Agreement to conditions of collaboration - The Principal Investigator agrees that the research team will adhere to the following conditions of collaboration as detailed in “Procedures for Scientific Utilisation of the Horsham and Walpeup FACE Experiments”:

1. Acknowledge researchers involved in the “Core experimentation” in any research publication.
2. Acknowledge those funding the Core experimentation in any promotion, reporting or publication of research.
3. Use and abide by the dispute resolution procedure.
4. Advise the leader of the FACE experimentation (Rob Norton, Glenn Fitzgerald) of any proposed changes to research methodology and obtain approval of changes before implementation.
5. Provide copies of all data and publications to the leader of the FACE experimentation (Rob Norton, Glenn Fitzgerald) within a reasonable time.
6. Publish data within a reasonable time and if unable to meet expectations in the procedure, assist others in publication.

Signature

Signed by Principal Investigator (name):

Date signed:

FACE Team Approval – The Leaders for the FACE facility that will be used for the research certify that this proposal has been evaluated by researchers already using the facility and meets the following criteria:

1. As described, the research can be undertaken without affecting or threatening existing research at the facility.
2. Risks have been evaluated and fully discussed to reach agreement on management.
3. Equipment and data sharing has been discussed and agreement reached as described in this document.
4. Authorship on proposed science publications has been discussed and shared understandings developed.
5. Protocols for communication of timing and details of field operations and co-ordination of operations have been agreed.

Signature

Signed by DPI FACE site leader: Glenn Fitzgerald

Date signed:

Signature

Signed by University of Melbourne FACE site leader: Rob Norton

Date signed:

Australian Greenhouse Office National Committee on Elevated CO₂ Research Approval. The FACE site leader will submit this specification to the Australian Greenhouse Office National Committee on Elevated CO₂ Research. The Committee will communicate its decisions by letter and/or email.

Submitted to Committee by FACE:

Signature of site leader (Rob Norton/Glenn Fitzgerald): _____

Date submitted:

The Committee will access specifications for scientific novelty, soundness of scientific method, potential benefits of research, uncertainty of existing knowledge, route to market, research team capability/reputation, risk to existing research, value adding, adequacy of resources, duplication.