



A CGIAR Challenge Programme

**3<sup>rd</sup> call for Proposals**

13 May 2008

## The CGIAR Generation Challenge Programme

### Cultivating plant diversity for the resource-poor

#### Competitive Grants Programme: Call for Full Proposals

**Submission deadline:** Proposals must be submitted electronically no later than  
**20 June 2008** at <http://www.ohmedia.ca/clients/gcp-full-proposals/>

#### I. OVERVIEW

##### GCP's mission and purpose

The Generation Challenge Programme (GCP) is at the heart of a research and capacity-building network that uses plant genetic diversity, advanced genomic science and comparative biology to develop tools and technologies that help plant breeders in the developing world produce better crop varieties for resource-poor farmers living in drought-prone environments.

Modern plant breeding programmes need novel genetic variation and effective breeding tools and strategies to meet growing global demand for food. GCP addresses these needs by linking molecular characterisation studies on crop genetic diversity to gene discovery and allele mining strategies—with drought tolerance as our trait of focus—to develop more efficient breeding tools and approaches for [CGIAR mandate crops](#).

In 2006, the GCP Management Team refined GCP's objectives and operational framework. The result was a Strategic Framework available at: <http://www.generationcp.org/brochure.php#strategy>. This process involved the compilation of 'reference studies' to identify the impact targets—farming systems, crops, and traits—of the Programme. One such study identified GCP target farming systems based on the highest incidence of poverty and highest probability of crop failure due to water-stressed conditions. The study also identified the crops associated with those systems. To ensure envisioned project outputs will have positive impacts on breeding in GCP target environments, we strongly encourage applicants to refer to the GCP Strategic Framework.

All of GCP's outputs are for the public domain, ensuring fair access for researchers and benefit-sharing for resource-poor farmers. More information on GCP can be found on [our website](#), where you will also find the [Project Development Guide \(PDG\)](#), a tool primarily for researchers as an aid in project design, management and monitoring. The PDG is highly recommended by GCP management. By using the PDG and its checklists in developing your proposal, you ensure that it fully complies with GCP requirements.

GCP activities are organised around five Subprogrammes:

Subprogramme 1 – Genetic diversity of global genetic resources (leader: J C Glaszmann)  
Subprogramme 2 – Genomics towards gene discovery (leader: R K Varshney)

Subprogramme 3 – Trait capture for crop improvement (leader: P Monneveux)

Subprogramme 4 – Bioinformatics and crop information systems (leader: T van Hintum)

Subprogramme 5 – Capacity-building and enabling delivery (leader: C de Vicente)

### **Scope and purpose of this call for competitive grants**

Continuing with the tried and tested rationale of our 2<sup>nd</sup> ‘oriented’ call opened in early 2006, this 3<sup>rd</sup> call encompasses four thematic research areas. Drought tolerance is the common target trait to be considered in the proposals across all the research themes.

As in previous years, the grant programme seeks to attract the world’s best scientific teams and strives to broaden partnerships to efficiently and effectively utilise genetic resources and modern technologies to improve staple crops in the developing world. As you will see from the themes below, some areas open the door for strong comparative genomics, while others lean towards deeper genetic research for a specific crop.

### **Call for proposals**

Four thematic areas are proposed in this third call:

#### **Theme 1: Tapping crop diversity to identify genetic factors for drought tolerance**

Exploring germplasm diversity is a major basis for improving crops by identifying traits contributing to plant performance and incorporating them into breeding. Molecular investigations have proven efficient for describing germplasm structure. The present challenge is ensuring such exploration also enables high-resolution genetic analysis to isolate genome regions and genes influencing plant adaptation and performance.

Various population genetics approaches have recently been developed in order to exploit the new massive characterisation power applied to monitoring diversity along the genome. This is being successfully applied on natural populations in order to detect traces of natural selection. In comparison, crop germplasm has largely been shaped by domestication, cultivation and breeding, rather than by evolutionary processes under natural selection. Methodological refinements are needed to apply genome analysis to crop germplasm in order to highlight factors for adaptation and agronomic performance.

We invite proposals with theoretical and practical components built on case studies exploring diverse crop species. Approaches such as LD mapping based on whole-genome profiling, association analysis based on candidate gene re-sequencing and detection of selection patterns will be considered. Case studies should be oriented to drought tolerance.

#### **Theme 2: Comparative genome analyses and new approaches to QTL and/or gene/allele discovery for drought tolerance**

Ability to define the narrow genetic regions (QTLs) and genes with significant effects on drought tolerance has multiple benefits for breeding programmes. It enables precise transfer of genomic regions, genes or gene complexes into multiple

genetic backgrounds. It also leads to a deeper understanding of the complex GxE interactions that have thus far rendered drought tolerance a difficult trait to work with.

Despite the inherent complexity, there is evidence that genes and QTLs with sufficiently large effects can be detected under agronomically relevant environments. This presents an exciting opportunity to use genomics approaches for genetic dissection and molecular cloning of genes or gene clusters conferring tolerance to water stress.

We invite proposals that will use appropriate segregating genetic materials for tolerance to water stress to identify QTLs or specific genes—or gene combinations—responsible for the tolerance phenotypes. The multigenic nature of the trait may call for appropriate use of available ‘omics’ together with high-resolution genome mapping technologies to gather converging evidence. Use of field-proven genetic materials in gene expression studies would be a plus, as it would ensure agronomic relevance of the genes identified.

### **Theme 3: Traits to improve drought tolerance**

In order to identify drought-tolerant genotypes in segregating populations and large germplasm collections, it is necessary to have innovative and efficient screening tools (for field and/or controlled environments) and the associated protocols.

GCP is interested in evaluating the accuracy of new traits, or refining the use of existing traits associated with yield, under different drought scenarios or crop mega-environments. Particular attention should be paid to: i) the expected impact of the target trait[s] on plant performance under water-limiting and non-limiting conditions; ii) the throughput of screening protocols and cost per sample; and, iii) the contribution of the proposed research to improve the understanding of the metabolic and genetic bases of target trait(s).

Possible traits to be targeted in the proposals encompass plant morphology and/or the differential regulation of physiological and metabolic pathways, including resource partitioning. Priority will be given, however, to traits that have hitherto received relatively less attention (eg, root morphology), and that now take advantage of new technologies. An accurate characterisation of the drought stress (intensity, timing, etc) faced by—or imposed on—the crop will be required. Relevant molecular marker work and/or comparative genomic components are also desirable, but not essential, for the proposals of this particular research theme.

### **Theme 4: Innovative breeding strategies for drought tolerance improvement**

The landscape for plant breeders has changed considerably over the last decade. Genomic resources—including molecular maps, markers and candidate genes—have become increasingly available; the knowledge about plant and crop physiology has increased; the structure of gene pools has largely been resolved;

and finally, the availability of computing capacity has increased exponentially. As a result, breeding strategies can be revised and new methods can be developed and implemented.

Current molecular breeding practices generally only make use of a limited part of the available information and resources. Potential improvements reside in particular in the integration of crop physiology models, the development of multi-parental populations, the optimisation of QTL validation and manipulation, and further development of molecular breeding strategies. Methods have to be developed that integrate the increased resources and new knowledge into optimised breeding strategies that will allow the plant breeder to breed varieties in a shorter time and/or at lower costs.

Proposals should aim at developing new approaches for breeding GCP crops under drought-prone environments using new methods and technologies developed by GCP and other organisations. They can include theory development, studies comparing alternative strategies and tool (software) development, and should demonstrate— using case studies—that those approaches result in breeding methods that increase the speed and/or decrease the costs compared to existing molecular breeding schemes.

### **Eligibility**

Same as for the Concept Note call

### **Selection Criteria for the Full Proposals *(Different from the Concept Notes!)***

- |   |     |
|---|-----|
| • Scientific excellence and originality                             | 20% |
| • Feasibility (potential to achieve objectives and deliver outputs) | 30% |
| • Expertise in the field <sup>1)</sup>                              | 15% |
| • Strength and composition of partnerships <sup>2)</sup>            | 15% |
| • Potential impact on plant breeding in GCP target environments     | 20% |

### **Notes:**

- <sup>1)</sup> Expertise in the field will be evaluated mainly based on CVs and list of publications submitted with the Concept Note.
- <sup>2)</sup> For all research themes, but in particular for themes 1–3, active participation of national programme scientists will be a major plus, especially national scientists working in GCP target environments.

### **Scientific oversight of proposals and next steps**

The 24 Full Proposals will be first ranked within thematic areas. The top-ranked proposals for each thematic area will then be considered together by the review panel during a face-to-face meeting, to do a final ranking, taking into account the balance between thematic areas and proposal quality. The Management Team (GCP Subprogramme Leaders and the Director) will

then review the recommendations of the Panel, and, if necessary, revise budget allocations and request adjustments. The GCP Director will then submit the final list of proposals<sup>1</sup> recommended for funding to the GCP Executive Board for approval.

Note:

- <sup>1</sup>) Between 30 and 50 percent of the Full Proposals will be selected based on the quality of the proposals and degree of compliance with eligibility criteria.

**Intellectual property**

Competitive grants will only be awarded to scientific teams in institutes which explicitly accept and comply with GCP's IP policy. The policy is articulated in the Generation Challenge Programme Consortium Agreement (available online at: [http://www.generationcp.org/sccv10/sccv10\\_upload/Consortium\\_agreement\\_signed.pdf](http://www.generationcp.org/sccv10/sccv10_upload/Consortium_agreement_signed.pdf)).

**Capacity-building and the GCP Delivery Strategy**

GCP defines capacity building at two levels: for research and for delivery. Where relevant and appropriate, capacity-building activities for research should be included in the proposals.

Capacity building for delivery is vital for ensuring the delivery of GCP research products. The GCP [Delivery Strategy](#) elaborates the philosophy that to ensure impact, it is essential to conduct targeted training and capacity-building for project partners and intended users on how to access, use and apply GCP research products (markers, methodologies, tools, techniques, etc). This delivery-oriented capacity building will make up the core of the project [Delivery Plan](#), which will be required from all successful applicants for competitive grants. Before the projects begin, each project team must jointly develop a Delivery Plan with the project partners and other relevant users of the research products.

GCP will provide expert guidance to support the development of the Delivery Plan. The Delivery Plan will define in detail the research products, the users of those products, the training needs of the users to enable them use the products, and the timeline for these training activities.

Please note that all proposals must submit preliminary information on products and users in preparation for the Delivery Plan.

**Grant amount**

In total, approximately USD \$3 million will be disbursed annually for this 3<sup>rd</sup> round of competitive grants:

- Indicative budget per project and per year: USD \$300,000
- Maximum budget that may be requested per project and per year: USD \$400,000 (with strong justification).

**Continuity of funding**

Projects may be funded for up to three years, but funding for the second and third year will be contingent on satisfactory progress and continued GCP funding. Therefore, although grants

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may be awarded for multiple years, **funding can only be assured on an annual fiscal-year basis.**

**Timeframe**

- Full Proposals must be submitted by 20 June 2008
- Awards will be announced by latest 31 July 2008
- Starting date for projects: 1 October 2008

**NOTE: Full Proposals received after the deadline will not be considered.**

**Acknowledgment**

**We acknowledge receipt of the submission only to the PI and we will not open any proposals, or attachments thereto, before the deadline for submission.**

**NOTE: If you do not receive an acknowledgment of your online submission within 3 (three) working days, please contact Griselda Marquez urgently. We do not assume responsibility for submissions not received due to technical problems with transmission.**

## II. PREPARATION AND SUBMISSION OF FULL PROPOSALS:

### Project Development Guide

GCP's [Project Development Guide](#) (PDG) is a brand-new web-based tool designed primarily for project PIs as an interactive aid for both designing and implementing GCP projects. The PDG is highly recommended by GCP Management, and enhances the chances of your proposal getting funded. Using the PDG ensures your proposal has all the necessary components required by GCP, and, with its prompts and checklists, maximises attaining project goals on time and within budget. We realise that not all researchers have the necessary support for good proposal writing. In this regard, by providing support in developing concepts and/or proposals, the PDG is one means of ensuring *every* researcher has an equal chance to qualify for GCP project funding.

### Format:

Paper size: 8.5 x 11 inches or A4; 12 pt font size; 1 inch (2.54 cm) margins.

### Cover Page:

- Title
- Main targeted thematic area (select only one)
- Lead PI, Partners (co-PIs) and corresponding institutions
- Full contact details for the PI (email, address, telephone and fax)
- Submission Date

### Content:

- Table of Contents
- Summaries (two):
  - i. Executive Summary (300 word maximum) suitable for a non-scientific audience
  - ii. Scientific Summary (300 word maximum)
- Project Description (12 pages maximum)
  - Objectives and Intended Specific Outcomes
  - Introduction and Rationale
  - Approach and Methods
  - Critical Assumptions and Contingency Plans
  - Timeline and Milestones
- Products and potential users (see annex A below)
- Data production and availability (see annex B below)

### Budget (see template below)

Indicative Budget (broken down by Institution and Year)

- Salaries (show appropriate benefits as a separate line)
- Supplies and Services
- Travel
- Training (tuition, living expenses, etc)
- Equipment (strong justification in the budget notes)

- Indirect Costs (the audited indirect cost rate for each Institution, up to a maximum of 20%)
- Budget Notes and Justification

**Budget template**

<b>LEAD INSTITUTION</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Total</b>
Personnel costs				
Supplies and services				
Field				
Lab				
Travel				
Training, meeting, and workshop				
<b>Subtotal</b>				
Indirect costs (up to 20%)				
<b>Lead Institution Total</b>				
<b>COLLABORATING INSTITUTION 1</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Total</b>
Personnel costs				
Supplies and services				
Field				
Lab				
Travel				
Training, meeting, and workshop				
<b>Subtotal</b>				
Indirect costs (up to 20%)				
<b>Partner 1 Total</b>				
<b>COLLABORATING INSTITUTION 2</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Total</b>
Personnel costs				
Supplies and services				
Field				
Lab				
Travel				
Training, meeting, and workshop				
<b>Subtotal</b>				
Indirect costs (up to 20%)				
<b>Partner 2 Total</b>				
<b>GRAND TOTAL</b>				

### Appendices:

- Appendix A: Activities, Quantifiable Outputs, and Key Products (template provided)
- Appendix B: Timeline (template provided)
- Appendix C: Partners
- Appendix D: Data production and availability

Appendix A, Appendix B and Appendix D are requested for each project proposal, to identify the outputs of each project. These appendices help the GCP Management Team in monitoring and evaluation of GCP projects. All projects are requested to fill these forms. By using this standard language of Objectives, Activities, Quantifiable Outputs and Key Products, GCP is able to track project progress efficiently, and to standardise the inventory of GCP products.

The table in Appendix A requires you to identify the Outputs that correspond to each Activity under the different Objectives, and we ask that you quantify the Outputs. You may have more than one output per Activity. At the bottom of this table, we also ask you to identify the Key Products (identified below) from your project.

Finally, we ask you to map the Outputs onto the Timeline in Appendix B. Definitions for all of these terms can also be found below.

Appendix D requires you to describe the data to be produced and where they will be posted by the end of the project.

It is critically important for you to be as realistic as possible about what your project will deliver and when. Project reviews will use these tables as the baseline, so it is to your advantage to be realistic about when you will produce outputs. GCP is reviewed as a programme based on this information (in our Medium-Term Plan, available at: <http://www.generationcp.org/brochure.php#MTPs>).

**NOTE: Full Proposal without Appendices A and B properly filled will not be considered.**

### Definitions:

- **Objective:** The conceptual aim of the project; the condition that will exist when the project has been successfully completed.

*An example of an objective is: Marker-assisted selection for Striga resistance in cowpea*

- **Activity:** A task or process that uses inputs to produce a project's output(s).

*Examples of activities are:*

- 1) *Develop molecular markers linked to race-specific Striga resistance genes*
- 2) *Screening cowpea genotypes in Striga 'hotspots' in West Africa*
- 3) *Test markers and develop MAS protocols*

- Quantifiable Output: The work product or deliverable that results directly from a project activity. It must be quantified.

*Examples of Quantifiable Outputs are:*

- 1) *One SCAR marker for resistance to Striga races SG1 and SG developed*
  - 2) *One marker linked to SG5 resistance*
  - 3) *At least 5 populations for Striga resistance studies developed*
- Key products: Every project will have a number of quantifiable outputs, but not all outputs are products. Products in the GCP are defined as: complete or almost complete project components that can be passed on to another researcher or plant breeder outside the project and outside the GCP, who can immediately use it in their research or programme. Products must therefore be validated, of high quality, and useful for other people. Products may include: validated molecular marker, new screening protocol, EST/BAC library, etc. We recognise that different kinds of projects produce different kinds of products, so you have freedom to define what you see as a product of your project. Please identify no more than 5 key products, focusing on those that have the largest potential impact.

**Appendix A. Activities, Quantifiable Outputs and Key Products**

**EXAMPLE**

**Please use the example below as a guide to fill in this table.**

<b>Project Title: Marker Development and Marker Assisted Selection for Drought Tolerance and Striga Resistance in Cowpea</b>	
<b>Principal Investigator/Institute:</b>	
<b>Objective 1: Marker assisted selection for Striga resistance in cowpea</b>	
<b>Activities</b>	<b>Quantifiable Outputs</b>
1. Develop molecular markers linked to race specific Striga resistance genes	1. One SCAR marker developed for resistance to Striga races SG1 and SG3 2. One marker mapped for Striga race SG5
2. Screen cowpea genotypes in Striga “hotspots” in West Africa	3. 47 cowpea cultivars evaluated
3. Test markers and develop of MAS protocols	4. One Striga resistance marker validated for resistance to Striga races SG1 and SG3 5. Five populations developed and evaluated for races SG1, SG2 & SG4z
<b>Objective 2:</b>	
<b>Activities</b>	<b>Quantifiable Outputs</b>
1.	8. 9.
2.	10. 11. 12.
3.	13. 14.
<b>Objective 3:</b>	
<b>Activities</b>	<b>Quantifiable Outputs</b>
1.	15. 16.
2.	17. 18. 19.
3.	20. 21.

**Key Products Developed by the Project (those that you consider as having the largest potential impact—please limit to 5):**

1. SCAR markers for Striga resistance races SG1 and SG3
- 2.
- 3.
- 4.
- 5.

## Appendix B. Timeline

### EXAMPLE

Please place your Quantifiable Outputs along this timeline. Every Output should appear on the Timeline.

		Year 1												Year 2												Year 3													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36		
Objective 1	Activity 1											1										2																	
	Activity 2								3																														
	Activity 3																					4															5		
Objective 2	Activity 1																																						
	Activity 2																																						
	Activity 3																																						
Objective 3	Activity 1																																						
	Activity 2																																						
	Activity 3																																						

### Quantifiable Outputs (cut and paste from Appendix A):

1. One SCAR marker developed for resistance to Striga races SG1 and SG3
2. One marker mapped for Striga race SG5
3. 47 cowpea cultivars evaluated
4. One Striga resistance marker validated for resistance to Striga races SG1 and SG3
5. Five populations developed and evaluated for races SG1, SG2 & SG4z

## **Appendix C. Partners**

**For each proposed project, please provide the information below:**

1. Description of Partners (demonstrating their capacity to undertake to the project and a rationale for the proposed partnership)
2. CV for each PI and co-PIs (maximum two pages each including references for five most recent relevant publications)
3. Letters of Intent from Partner Institutions specifying resource, in-kind etc. commitments, if appropriate
4. Intellectual Property Statements from each partner

## **Appendix D. Data Production and Availability Section Format**

**For each proposed project, please provide the information below:**

*1. The nature of the data to be produced*

Describe briefly the data sets that will be produced during the life of the project (phenotypic data, genetic map, QTL characterisation, gene expression, etc).

*2. Data format*

Indicate briefly in the proposal the format in which the data will be presented (Excel file, Word table, MapMaker output file, etc). Data sets should be presented in a form that allows an outsider to interpret the data. To assure interpretability and allow easy processing of the data, GCP is developing data templates for the storage of off-line data sets. Templates for SSR fingerprint data and for passport data are now available. Where available, the GCP template should be used to present the data. Templates currently available can be accessed at:

<http://www.generationcp.org/bioinformatics.php?da=0650728>, and background information on data templates at:

<http://www.generationcp.org/bioinformatics.php?da=0526023>

*3. Where and when the data will be posted*

Indicate where and when you anticipate making your data available (in a publicly accessible database or the [GCP Central Registry](#)). In all cases, data must be posted to a publicly accessible database or the GCP Central Registry at the end of the project. A six-month embargo period can be considered in exceptional cases such as data cleaning or preparation of publication. In these cases, data must be available upon the request of the Subprogramme Leader at the end of the project. If the data are posted to a public database, the link to that data must be provided to the curator of the GCP Central Registry.