

## **The Generation Challenge Program: Year 1 Progress and Planning for the Future**

### **Introduction**

The inception year of the Generation Challenge Programme (GCP) was one of scientific productivity, institutional growth, expansion of scientific and institutional partnerships, and increasing international recognition beyond the CGIAR. The arrival of this productive and promising model for the application of cutting-edge science to problems of the world's poorest people is proving to be attractive to leading scientists from around the world. This appeal extends to traditional donors to the CGIAR and offers an attractive portal for non-traditional donors and the private sector to participate in the CGIAR. The success in translating the vision of the GCP into operational research and capacity building activities was recognised by the CGIAR as it approved the GCP for full implementation at the 2004 AGM in Mexico.

### **Management and Administration**

The establishment of an appropriate management and governance system proved essential to assure that the GCP funds are managed efficiently, that they are allocated in a transparent and orderly fashion, and that the research and capacity building agendas are executed effectively. This is particularly important since the GCP does not have legal status, nor a physical infrastructure in which to execute its research agenda. In Year 1, the GCP developed competitive and commissioned research schemes to structure and guide the research program.

#### *Governance*

- Established a Programme Steering Committee; process developed for the orderly change in Chairman (Serageldin to Terry). Programme Advisory Committee recruited following consultation with Programme Steering Committee; Terms of Reference developed. Selected a Stakeholders' Committee led by GFAR; Terms of Reference developed.
- First year work plan agreements formulated, including reporting requirements.
- Developed Consortium Agreement in consultation with Consortium members and inputs from the private sector to reconcile needs and requirements of CGIAR and non-CGIAR members.
- Welcomed two new members to the consortium: the African Centre for Gene Technologies (South Africa) and the Indian Council for Agricultural Research (India).

#### *Research Management*

- A Director was internationally recruited and appointed, followed by appointment of a communications coordinator, and 50% time secretary; an intern assistant was added in August.
- The Director's office oversaw execution of first year work plan. Funds for first year were disbursed following the development of terms and letters of agreement between GCP institutions and CIMMYT/GCP Director's office.
- Recruited and appointed research management team following a competitive, transparent search from within GCP consortium members (3 Subprogramme Leaders from CGIAR centres and 2 from non-CGIAR GCP members).
- Designed and conducted a transparent competitive grants programme.
- Developed capacity building strategy based on a needs assessment consultation with NARS.
- Established strategic linkages with other CPs and NEPAD Biosciences (BECA, Nairobi).

- Undertook a wide range of intensive consultations with GCP participating scientists to establish norms and standards for research approaches and protocols and data management.

#### *Development of Year 2 Research Portfolio – Competitive and Commissioned Grant Schemes*

- Competitive grants scheme established: 17 successful proposals (out of 78 submitted)
- Commissioned research scheme put in place: To fill in the gaps of the competitive proposals and continue the platform-building activities that are integral to the GCP research goals, the GCP commissioned a set of projects in each subprogramme that encourage innovative partnerships across and outside the GCP consortium.

#### *Resource Mobilisation and Utilisation*

- Expanded funding base from two founding donors (World Bank and the European Commission) to include: Department for International Development – UK (~\$4.25 million – funds allocated to support research), Swedish International Development Agency (~\$100K – funds used to support mainly diversity analysis activities in SP1), Austria (~\$50K – funds used to support start-up of GCP research program), Rockefeller Foundation (~\$900K – funds used to support several research projects in East Africa and India and MAS training courses at BECA), Pioneer (\$75K – funds to support MAS training course at BECA and a graduate fellowship program in the GCP), Syngenta Foundation (\$50K – funds to support BECA MAS course and GCP participation in genomics initiative for African crops), and the Kirkhouse Trust (\$15K - support for BECA MAS course to which BECA also contributed ~\$50K).

#### *Private Sector and Other Partnerships*

- The GCP is pursuing discussions with the private sector to leverage their expertise, particularly in drought, for the benefit of the resource poor. Contacts were made with Syngenta, Pioneer – DuPont, and Monsanto
- HarvestPlus Challenge Program has an aggressive programme to reach end-users that the GCP can benefit from, and the GCP's network of breeders and research focus on drought will also be integral to the development and delivery of H+'s products.
- Biosciences East and Central Africa (BECA): Programmatically the GCP is an excellent complement to the priorities and strategies outlined by the BECA Steering Committee. The GCP and BECA have agreed to jointly seek support for programmes of common interest.

#### *Communications*

- Developed title and logo for the programme, and produced suite of public awareness materials. Built informative and attractive website; set up e-newsletter, now distributed to over 1,000 people per month. Garnered publicity for the GCP in national and international media.
- Presented the GCP at several international scientific meetings such as the Plant and Animal Genome Conference (San Diego).

## **Subprogramme Updates**

The GCP activities for 2005 – 2007 are organised within five subprogrammes that fall into two broad objectives: (1) to develop a platform for, and conduct, analysis of genetic diversity in international crop genetic resources and apply this to improve major crops for drought tolerance and other related traits of importance to resource-poor farmers (subprogrammes 1-4) and (2) to strengthen the capacity of NARS and Generation CP scientists to apply the tools of genomics, molecular biology, and bioinformatics to the analysis of genetic diversity held in germplasm collections, and to use this knowledge to improve crop breeding programmes and to develop new stress-tolerant varieties (subprogramme 5).

### *Subprogramme 1: Genetic diversity of global genetic resources*

This Subprogramme aims to characterise the diversity of the crop germplasm collections held by the CGIAR and its partners. This characterisation includes an assessment of the genetic structure of the collections as well as the phenotypic variation associated with that structure.

The first year (2004) of the GCP in SP1 focused on starting molecular analysis of genetic diversity (or “genotyping”) of composite sets representing the global genetic resources for a first tier of eleven crops. From there, reference samples are to be extracted, that will serve as the base of many GCP activities. This work was designed and monitored in two research workshops in January and June. The “phenotyping” part was discussed at a workshop in July, which led to methodological recommendations for the evaluation of drought tolerance in field experiments involving large numbers of accessions. A rationale for promoting sound and efficient association studies was elaborated, showing the importance of targeted assessments of the extent of linkage disequilibrium.

### *Subprogramme 2: Comparative genomics for gene discovery*

This Subprogramme focuses on genomic tools, technologies, and approaches to achieve an understanding of gene systems across many species of importance to developing country agriculture. Comparative biology and genomics are used to discover and validate the function of key genes central to the practical objectives of the Generation CP. The Year 1 Work Plan of Subprogramme 2 was organised in four work clusters designed to gather germplasm and genomic resources for identifying and validating stress tolerance genes with an emphasis on drought. SP2 developed a coordinated strategy among researchers in using diverse genetic materials that exhibit certain attributes of drought tolerance. In coordination with SP1, a common phenotyping framework of techniques, plant developmental stages, and parameters was developed to enable cross-species comparison. Each participating team planted selected stocks for detailed drought phenotyping in the field studies. Each research team on drought has also expanded characterisation of QTL in selected species. For consensus markers across species, marker design using orthologous sequences across species was initiated. Genetic materials (RNA) from different genotypes and species were prepared and shared among laboratories for testing with different gene arrays. SP2 also expanded and improved the characterisation of EST libraries of *Musa* and cassava.

### *Subprogramme 3: Trait capture for crop improvement*

This Subprogramme focuses on the validation and refinement of molecular breeding systems and the resultant enhanced germplasm with the primary purpose of increasing the efficiency, speed, and scope of plant breeding gains. This includes a commitment to create technologies for the application of marker-assisted selection in national breeding programmes, to provide technical assistance for the uptake of molecular breeding in tropical staple crops, and to foster the development of communities of practice supported by regional centres of excellence and state of the art technologies and approaches. The primary focus of SP3 lies in the application of genomics tools and the development of products based on outputs from the other subprogrammes. For this reason, first year activities in SP3 were largely limited to the validation of pre-existing linked markers for drought tolerance as a means of establishing an effective operational framework in molecular breeding across each crop group. Additional Year 1 activities in SP3 were the development/identification of molecular markers for drought tolerance; a workshop on gene

isolation and transgenic products; the development of a database of background genotypes; and the establishment of molecular breeding communities of practice.

#### *Subprogramme 4: Genetic resource, genomic and crop information systems*

The value of the data generated in the first three Subprogrammes largely depends on the way they are stored, managed, analysed, and made accessible. The way they can be analysed is, in turn, dependent on the way analysis tools and other information sources are made available. This Subprogramme addresses the challenge of linking and integrating these information components and analysis tools into a coherent information gateway. A bioinformatics, biometric, and advanced data management system is under construction to support an integrated genetic resources, genomics, and crop improvement information network. In Year 1, projects in Subprogramme 4 designed the Generation CP information exchange platform and delivered proof-of-concept; developed plans for interoperability, infrastructure, and a central registry; reviewed integrated germplasm and crop information systems and LIMS; and created tools and databases to support Subprogrammes 1, 2, and 3.

#### *Subprogramme 5: Capacity-building and enabling delivery*

Like Subprogramme 4, this Subprogramme addresses a major cross-sectional theme of the GCP. It has two dimensions: one is to better enable GCP members to carry out this cutting edge research agenda. The second is to empower national programme scientists to participate in GCP activities. In combination, these two activities create mechanisms by which GCP products can reach crop improvement programmes and farmers. The strategy for Subprogramme 5 was not elaborated until much later than the other subprogrammes, so Year 1 activities were mostly limited to internal project workshops with CG, ARI, and NARS participants, in addition to a Needs Assessment Workshop convened in August 2004 to augment the SP5 strategy and solicit the input of NARS on how the GCP can and should help their programs and the resource poor in their regions. A fellowship scheme and travel grants program for NARS were developed. Many hands-on training activities were undertaken in the 2004 commissioned research projects, and capacity building was a required component of the projects submitted for consideration in the competitive grants scheme. The intellectual property and policy research component of the GCP was also added to SP5's mandate late in the year in response to wide-ranging requests for assistance in this arena from GCP members and others.

## **Financial Status**

The GCP started 2004 with a carryover of \$2.6 M from 2003. In 2004, the EC provided approximately \$5.2 M, the WB provided \$1 M, and DFID provided approximately \$4.7 M; along with smaller contributions from additional donors, the GCP's total budget for 2004 was approximately \$13.6 M. A reserve of \$500K was built up during 2004, which we expect to increase to \$1 M by the end of 2005. The 2005 budget is estimated at \$20.1 M, of which \$15 M is committed to research. The competitive grants program accounts for roughly \$7 M of that, and commissioned research accounts for about \$7.3 M. Capacity building accounts for another \$2.6 M.