Bretting, Peter

From:	E. Marden [redacted]
Sent:	Thursday, December 17, 2015 12:16 AM
To:	Ruaraidh Sackville Hamilton (IRRI)
Cc:	Susan McCouch; Andreas Graner (IPK); David Marshall (JHI); Elizabeth Arnaud (Bioversity); Bretting, Peter; Rajeev Varshney (ICRISAT & GCP); Sarah Ayling (TGAC); Daniele Manzella (ITPGRFA); Peter Wenzl (GCDT); Powell, Wayne (CGIAR Consortium); Ruth Bastow (GPC); Bhatti, Shakeel (AGDT); Marie Haga
Subject:	Re: Reorganization of JFU and Draft Interim Work Plan for 2016
Attachments:	JFU reorganization & Interim Work Plan_DivSeek_151215 NRSH em.docx

Hi Susan,

I think Ruaraidh raises some good points in this document. However, as I understood the Steering Committee discussion, the intent was to move to an interim Team Leader, as agreed upon by the JFU, in order to enable DivSeek to move forward as an organization, initiate a work plan, and secure funding for continued operation and a long term 'home.' I didn't read this MoU as disempowering the JFU members, but rather making one of them a 'focal point' so that decisions can be made and action taken. I took a stab at responding to some of the comments and revising text in the attached including defining 'focal point.' Of course, it remains for the JFU to agree on their own MoU; my comments are intended only to help facilitate a workable document.

It is possible that in this work plan, the JFU would choose to designate Leads on certain other tasks - perhaps workshops related to Annex 1 crops and Treaty signatories.

I think we must now realize that the Charter was a very limited document. Certainly, as Ruaraidh points out, there are no dispute resolution mechanisms. I think putting a limited dispute resolution mechanism in this MoU is fine - but anything beyond deciding which JFU members is a Leader on which task in the interim period needs to be put to the Assembly. I would be supportive of outlining roles more carefully when the Partners meet again. Of course, the hope is that at that time, we can move to a longer term operating plan which may require further revision of the Charter.

I hope this is helpful.

Emily

On Dec 15, 2015, at 9:52 PM, Ruaraidh Sackville Hamilton (IRRI) <r.hamilton@irri.org> wrote:

> Dear Susan,
>
> Many thanks for preparing and sharing this document quickly and helping to speed up the rate of progress. Indeed we need to take action quickly.
>
> I confess I stopped taking notes of the meeting after you organized for specific participants to be note takers; and I haven't seen their notes. Therefore I'm relying on memory which may well be at fault.
>
> I do recall that we agreed the JFU can re-organize itself, as an internal matter, into a team with a team leader and team members; also that the JFU agreed that they would do so and that the Trust would be the interim JFU team leader, pending a decision next year on which of the three options for DivSeek leadership would be adopted.

Did we agree that the SC would define how the JFU team would be organized after they had agreed the principle? I don't remember that. I was expecting a document like yours to come from the JFU itself based on their internal discussions.

And did we agree that the SC would create the interim work plan? I don't remember us deciding to change the process presented in the charter. I would have expected the interim / draft work plan to come be sent to the SC by the JFU.

On content, while I agree absolutely the need for strong leadership to speed up progress, the specific proposals seem to disempower the JFU team members somewhat excessively. I think they need to be toned down in line with the JFU being a team rather than a one-person operation. But really that's an internal decision for JFU, and if that's what they agree, fine.

With the above in mind, I attach some comments and revisions.

Ruaraidh

On 16 December 2015 at 07:18, Susan McCouch <srm4@cornell.edu> wrote:
Attachment!!!

From: <[redacted] on behalf of Susan McCouch <srm4@cornell.edu>
Date: Tuesday, December 15, 2015 at 6:15 PM
To: "Andreas Graner (IPK)" <graner@ipk-gatersleben.de>, "David Marshall (JHI)" <David.Marshall@hutton.ac.uk>, "Elizabeth Arnaud (Bioversity)" <e.arnaud@cgiar.org>, "Emily Marden (UBC)" [redacted] "Peter Bretting (USDA-ARS)" <Peter.Bretting@ars.usda.gov>, "Rajeev Varshney (ICRISAT & GCP)" <r.k.varshney@cgiar.org>, "Ruaraidh Sackville Hamilton (IRRI)" <r.hamilton@irri.org>, "Sarah Ayling (TGAC)" <sarah.ayling@tgac.ac.uk>, "Daniele Manzella (ITPGRFA)" <daniele.manzella@divseek.org>, "Peter Wenzl (GCDT)" <peter.wenzl@croptrust.org>, "Powell, Wayne (CGIAR Consortium)" <w.powell@cgiar.org>, "Ruth Bastow (GPC)" <ruth.bastow@divseek.org>
Cc: "Bhatti, Shakeel (AGDT)" <Shakeel.Bhatti@fao.org>, Marie Haga <marie.haga@croptrust.org>, Susan McCouch <srm4@cornell.edu>
Subject: Reorganization of JFU and Draft Interim Work Plan for 2016

Dear SC and JFU members,

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Please send me your edits and comments, preferably as tracked changes. I look forward to hearing from each of you. I would be very grateful if you could get back to me by Dec. 23 so I have time to integrate your comments before our round table discussion in January.

Many thanks for your continued support and contributions to DivSeek as we seek to evolve the initiative and allow it to become more effective as a multi-faceted operational unit.

I hope everyone had a safe journey home, and I look forward to hearing from you.
Best wishes for the holidays,
Susan

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Susan McCouch
Professor, Plant Breeding & Genetics

Cornell University
162 Emerson Hall
Ithaca, NY 14853-1901
Phone: +1 607-255-0420
Fax: +1 607-255-6683
Email: srm4@cornell.edu or mccouch@cornell.edu
Alternate Email: [redacted]

The International Rice Research Institute is a member of the CGIAR consortium<JFU reorganization & Interim Work Plan_DivSeek_151215 NRSH.docx>

DRAFT *December 15, 2015*

Memorandum of Understanding

DivSeek Joint Facilitation Unit

December 15, 2015

Pursuant to the principles of the Operation of the Joint Facilitation Unit, DS/SC---1/15/4, Section 2.2 ("Working Modalities"), "the allocation of work within the JFU is decided collectively, based on relevant expertise and availability of individual representatives."

On December 8, 2015, the four JFU members from the CGIAR Consortium Office (CGIAR CO), Global Crop Diversity Trust (Trust), the Global Plant Council (GPC), and the Secretariat of the International Treaty on Plant Genetic Resources for Food and Agriculture (Treaty Secretariat) collectively decided to identify a Team Leader located at the Trust to coordinate and lead DivSeek operational activities until such time as a long-term governance plan for DivSeek can be implemented. This decision was made in order to advance Interim Work Plans of DivSeek (see Annex 1 with the Work Plan for 2016). This Memorandum of Understanding identifies the allocation of responsibilities to the Team Leader at the Trust agreed to by the JFU members.

The JFU members explicitly recognize that each JFU member has committed to hosting and advancing DivSeek, and nothing in this Memorandum of Understanding is intended to limit the hosting or advancing of DivSeek by any JFU member. In addition, the JFU members acknowledge the simultaneous development of the Global Information System (GLIS) by the Treaty Secretariat and the synergies and complementarity of DivSeek and the GLIS.

For purposes only of the Team Leader's Responsibilities, a JFU member's obligations and responsibilities vis-à-vis DivSeek overlap or potentially conflict with the Team Leader's responsibilities, the JFU member undertaking such tasks will identify the overlap or conflict to the Team Leader. If either the Team Leader or other JFU member believes that their hosting or advancing of DivSeek is limited by the Team Leader responsibilities, they will identify the issue to the Steering Committee Chair. The Steering Committee Chair, in consultation with the Steering Committee (SC) as deemed necessary, will resolve the overlap or conflict in a reasonable manner.

Team Leader Responsibilities

Under the overall guidance of the SC, the Team Leader will undertake such actions as s/he deems necessary to advance Interim Work Plans. Such actions may include and are not limited to: Coordinating with other JFU members so that each takes on a Leader role relative to identified expertise; inviting SC members to undertake selected tasks; and requesting that tasks be undertaken by qualified outside experts including subcontracting to such experts. The Team Leader's role in the implementation of Interim Work Plans will be as follows:

1. **Reaching out to Stakeholders**

   The Team Leader will be the focal point for discussions with DivSeek Partners and external parties regarding informatics and research, and for discussions on any topic with funding bodies and the Private Sector. In this context "focal point" means that the Team Leader is made aware of any

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Commented [em1]: I think this comment raises is a very important point. However, I think that a conflict resolution process would need to go into the Charter and be approved by the Assembly. I definitely think it would be good to have one. At the same time, it does seem useful to have some interim measure for conflict resolution just for purposes of this Team Leader role consistent with our goal of having interim operating principles until we get DivSeek on longer term footing.

Commented [R2]: (1) Neither the Charter nor the principles of JFU operation provide for such a relationship between the JFU and the SC. No problem if the JFU decides as an internal matter that this is what it wants to do.
(2) Neither the Charter nor the principles of JFU operation contain any dispute resolution clause, for PA or SC or JFU. This seems to be a serious omission. Perhaps it would be better to have a general section dedicated to dispute resolution, rather than narrowly addressing the specific case of conflict of responsibilities.

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Commented [em3]: Perhaps it would be better to designate JFU members as having certain Team Leader responsibilities in this document, which I believe was the intent. More on this in the cover note.

Commented [R4]: ? This seems to disempower other JFU members. Yes, invite SC members or other experts as appropriate. But no, don't say other JFU members perform their tasks only at the invitation of the Team Leader.

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Commented [R5]: What does this mean? I presume it should *not* (a) prevent other JFU members from engaging in such discussions or (b) entitle the Team Leader to engage in such discussions to the exclusion of other JFU members

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discussions by JFU members external parties in advance to ensure that messaging regarding DivSeek is consistent. Communication amongst the JFU and with the focal point is particularly important with regard to the private sector.

2. **Drafting Grant Applications**

The Team Leader is the focal point for advancing all grant applications deemed necessary to advance the DivSeek initiative. Focal point has the same meaning in this context as above. For clarity, grant writing activities may be undertaken by other JFU members or DivSeek partners. For the interim period and until a permanent home for DivSeek is identified, the Team Leader will arrange that funds secured through these efforts reside within the Global Crop Diversity Trust in a segregated account.

3. **Organizing Meetings and Workshops**

The Team Leader is responsible for organizing meetings of DivSeek governance bodies and workshops consistent with the DivSeek initiative. With the Team Leader acting as the focal point, responsibility for individual meetings and workshops may be undertaken by other JFU members or external parties, as appropriate.

4. **Managing a Coherent Public Image for DivSeek**

The Team Leader is responsible for coordinating all communication efforts, which includes the development and maintenance of the DivSeek Website. References to DivSeek on websites of JFU organizations should be consistent with the content of the DivSeek Website.

5. **Communicating with the Steering Committee**

During the interim period, the Team Leader will schedule regular teleconferences no less frequently than bimonthly with the JFU and the Steering Committee to apprise them of the Team Leader's progress, for other JFU members to report activities, to seek the Steering Committee's guidance on matters s/he considers relevant, and to consult with the Steering Committee on responsibility for activities not previously considered.

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Commented [R6]: Again, this seems to disempower other JFU members

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Commented [R7]: ? This would seem to presuppose a decision in favour of option 1 as a permanent solution. In Bonn I think the consensus was for option 1 as a pragmatic interim solution, but option 2 as a permanent solution

Commented [em8]: I believe that this point is critical as funders will insist on a single point for monies contributed. I have attempted to clarify with language that makes clear that, consistent with the document as a whole, this is for the interim period.

Commented [em9]: Not sure I understand the comment

Commented [R10]: Contrary to Charter

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Commented [R11]: Disempowering again

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Commented [R12]: Disempowering again. It's not appropriate to expect the JFU Team Leader to interact with the SC to the same extent as with the JFU team.

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Annex 1: Interim Work Plan of DivSeek for 2016

1. **Reaching out to Stakeholders**
    a. Meet with diverse, private-sector representatives to discuss conditions under which different members of the private sector would engage with DivSeek:
        i. Summarize/categorize the responses and insights gained; crosscheck against relevant findings of the ASU study.
        ii. As needed, and funding permitting, convene a group of governance experts to develop a strategy for accepting private-sector stakeholders as DivSeek Partners.
    b. Promote coordination between DivSeek and other programs and initiatives of relevance to its mission, such as the CGIAR programs, multilateral initiatives promoting the use and transfer of relevant technologies and knowledge, and projects listed on the Landscape Study.
    c. Promote awareness about permanent unique identifiers for genebank accessions among editors of major scientific journals.

2. **Drafting Grant Applications**
    a. Prepare a major grant proposal to support the development of a biodiversity informatics platform, referred to as "GOBIIG" (*Genomics & Open-source Biodiversity Informatics Initiative for Genebanks*):
        i. Define goals, activities, expected outputs, impacts, and timelines.
        ii. Discuss with the team managing the ongoing *Genomics & Open-source Breeding Informatics Initiative* (GOBII) project to establish the feasibility and develop a strategy for coordination.
        iii. Identify partners such as the CGIAR Genebanks, Genetic Gains and Big-Data Platforms, key national genebanks and research initiatives and GLIS, and describe community interactions.
        iv. Develop a budget, and enumerate co-PI relationships.
    b. Discuss funding options with potential donors.

3. **Organizing Meetings and Workshops**
    a. Funding permitting, organize, co-organize, or contribute to workshops aimed at community-building, standard setting, and capacity-building:
        i. Contribute to community building and standard setting through meetings that bring together projects around species or technologies, to link groups with complementary expertise, identify best practices, and agree on common standards.
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        iii. Extend the Landscape Study to develop a database of workshop participants, organizations and projects.

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   ii. Solicit topic nominations and identify new opportunities for dialogue.

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   a. Make presentations at meetings, conferences, and workshops, using a set of slides shared among SC and JFU members.

   b. Prepare DivSeek-related white papers and/or scientific articles for submission to high-visibility journals.

   c. With input from JFU and SC members as well as DivSeek Partners, manage, update and (funding permitting) expand the DivSeek website:

      i. Host the results of the Landscaping Study with links to individual projects.
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      iii. Provide potential DivSeek Partners with membership information.

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   a. Establish a bi-monthly Skype meeting schedule for JFU and SC members to share updates about DivSeek-related activities, including interactions with Partners, the Private Sector, and potential donors.

   b. Subject to available funding, plan and organize two SC meetings per year and an annual Partners' Assembly.

   c. Present to the SC a draft budget that includes in-kind contributions from JFU organizations and details the costs of advancing the Interim Work Plan for 2016.

   d. Coordinate the election of new SC members.

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Sent: Tuesday, December 15, 2015 6:15 PM
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Cc: Bhatti, Shakeel (AGDT); Marie Haga; Susan McCouch
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DRAFT *December 15, 2015*

Memorandum of Understanding
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December 15, 2015

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Subject: Re: Reorganization of JFU and Draft Interim Work Plan for 2016

Emily,
Thanks very much for taking time to do this. I will pick it up in the am. I did send the JFU the note you drafted and it will be interesting to see if we get any feedback on that.
Goodnight for now,
Susan

Sent from my iPhone

On Dec 17, 2015, at 12:16 AM, E. Marden <[redacted] wrote:

> Hi Susan,
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> It is possible that in this work plan, the JFU would choose to designate Leads on certain other tasks - perhaps workshops related to Annex I crops and Treaty signatories.
>
> I think we must now realize that the Charter was a very limited document. Certainly, as Ruaraidh points out, there are no dispute resolution mechanisms. I think putting a limited dispute resolution mechanism in this MoU is fine - but anything beyond deciding which JFU members is a Leader on which task in the interim period needs to be put to the Assembly. I would be supportive of outlining roles more carefully when the Partners meet again. Of course, the hope is that at that time, we can move to a longer term operating plan which may require further revision of the Charter.
>
> I hope this is helpful.
>
> Emily
> <JFU reorganization & Interim Work Plan_DivSeek_151215 NRSH em.docx>

On Dec 15, 2015, at 9:52 PM, Ruaraidh Sackville Hamilton (IRRI) <r.hamilton@irri.org> wrote:

Dear Susan,

Many thanks for preparing and sharing this document quickly and helping to speed up the rate of progress. Indeed we need to take action quickly.

I confess I stopped taking notes of the meeting after you organized for specific participants to be note takers; and I haven't seen their notes. Therefore I'm relying on memory which may well be at fault.

I do recall that we agreed the JFU can re-organize itself, as an internal matter, into a team with a team leader and team members; also that the JFU agreed that they would do so and that the Trust would be the interim JFU team leader, pending a decision next year on which of the three options for DivSeek leadership would be adopted.

Did we agree that the SC would define how the JFU team would be organized after they had agreed the principle? I don't remember that. I was expecting a document like yours to come from the JFU itself based on their internal discussions.

And did we agree that the SC would create the interim work plan? I don't remember us deciding to change the process presented in the charter. I would have expected the interim / draft work plan to come be sent to the SC by the JFU.

On content, while I agree absolutely the need for strong leadership to speed up progress, the specific proposals seem to disempower the JFU team members somewhat excessively. I think they need to be toned down in line with the JFU being a team rather than a one-person operation. But really that's an internal decision for JFU, and if that's what they agree, fine.

With the above in mind, I attach some comments and revisions.

Ruaraidh

On 16 December 2015 at 07:18, Susan McCouch <srm4@cornell.edu> wrote:
Attachment!!!

From: <[redacted] on behalf of Susan McCouch <srm4@cornell.edu>
Date: Tuesday, December 15, 2015 at 6:15 PM
To: "Andreas Graner (IPK)" <graner@ipk-gatersleben.de>, "David Marshall (JHI)" <David.Marshall@hutton.ac.uk>, "Elizabeth Arnaud (Bioversity)" <e.arnaud@cgiar.org>, "Emily Marden (UBC)" <[redacted] "Peter Bretting (USDA-ARS)" <Peter.Bretting@ars.usda.gov>, "Rajeev Varshney (ICRISAT & GCP)" <r.k.varshney@cgiar.org>, "Ruaraidh Sackville Hamilton (IRRI)" <r.hamilton@irri.org>, "Sarah Ayling (TGAC)" <sarah.ayling@tgac.ac.uk>, "Daniele Manzella (ITPGRFA)" <daniele.manzella@divseek.org>, "Peter Wenzl (GCDT)" <peter.wenzl@croptrust.org>, "Powell, Wayne (CGIAR Consortium)" <w.powell@cgiar.org>, "Ruth Bastow (GPC)" <ruth.bastow@divseek.org>
Cc: "Bhatti, Shakeel (AGDT)" <Shakeel.Bhatti@fao.org>, Marie Haga <marie.haga@croptrust.org>, Susan McCouch <srm4@cornell.edu>
Subject: Reorganization of JFU and Draft Interim Work Plan for 2016

Dear SC and JFU members,

duplicate email trail removed

Bretting, Peter

From: [redacted] on behalf of Susan McCouch <srm4@cornell.edu>
Sent: Monday, May 25, 2015 9:15 AM
To: Andreas Graner (IPK); David Marshall; Elizabeth Arnaud (Bioversity); Emily Marden (UBC); Bretting, Peter; Rajeev Varshney (ICRISAT & GCP); Ruaraidh Sackville Hamilton (IRRI); Sarah Ayling (TGAC); Susan McCouch
Cc: Peter Wenzl; Ruth Bastow; Daniele Manzella; Wayne Powell (CGIAR CO)
Subject: Steering Committee- DivSeek documentation package for May 28 meeting in Rome
Attachments: List of documents.pdf; Agenda.pdf; Draft landscaping study.pdf; Draft landcsaping study (annex).xlsx; Potential elements for a DivSeek strategy.pdf; Operation of the Joint Facilitation Unit.pdf

Dear Steering Committee Members,

Our first in-person meeting is approaching. I would like to thank you in advance for the time and effort you will be dedicating to DivSeek, to make it a reality for our Partner organizations and the wider community of agricultural stakeholders.

In preparation for the meeting, the Joint Facilitation Unit has developed a documentation package, to facilitate our deliberations at the meeting.

Attached with this message, you can find the following four working documents:

1) T*he Draft Provisional Agenda and Indicative TImetable;*

2) *Potential elements for a DivSeek Strategy;*

3) *Initial Draft Landscaping Study of projects, tools and resources in the 'DivSeek Domain'* (with annex in xls format);

4) *Operation of the Joint Facilitation Unit (2015).*

In a separate email, I will send you some information documents.

The Secretariat of the International Treaty will shortly email you a note with all the necessary logistical information for the meeting, and an invitation for dinner on Wednesday, 27 May.

I look forward to seeing you in Rome and please do not hesitate to contact the representatives of the Joint Facilitation Unit, cc'd in this email, for any additional information you may need.

Kind regards,
Susan

--
Susan McCouch
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Cornell University
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Alternate Email: [redacted]

DS/SC-1/15/inf.1

First meeting of the Steering Committee

28 May 2015

FAO Headquarters, Canada Room (A-357)

Rome, Italy

List of documents

Working Documents

DS/SC-1/15/1	Draft Provisional Agenda and Indicative Timetable
DS/SC-1/15/2	Potential Elements for a DivSeek Strategy
DS/SC-1/15/3	Initial Draft Landscaping Study of Projects, Tools and Resources in the 'DivSeek Domain'
DS/SC-1/15/4	Operation of the Joint Facilitation Unit

Information Documents

DS/SC-1/15/inf.1	List of Documents
DS/SC-1/15/inf.2	DivSeek Charter
DS/SC-1/15/inf.3	Summary of DivSeek Technical Meeting
DS/SC-1/15/inf.4	DivSeek White Paper
DS/SC-1/15/inf.5	Note for Participants

DC/SC-1/15/2

Potential elements for a DivSeek strategy

A 'straw man' document to initiate discussions

Peter Wenzl and Ruth Bastow

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1. Summary

The following table lists the areas with elements for a DivSeek strategy discussed in this document, together with columns to (a) gauge their importance and urgency as well as funding required to support them, and (b) potential action points to address them. Empty rows are available to add areas not discussed in the document.

Component	Area	Importance	Urgency	Funding required	Action point
Community-building & networking	Landscape of ongoing projects				
	Engaging with blueprint/pilot projects in specific crops				
	Membership campaign				
Germplasm characterization platforms	Logistics and sample tracking				
	Accession-sampling strategies				
	Genotyping & sequencing				
	Phenotyping				
	Machine-searchable indexing to enable queries				
Software and data repositories	Data bases & analysis tools for managing primary data				
	Web-based data repositories & tools for sharing data				
Rights management	Broadly accepted data-sharing framework				
	Framework for engaging the private sector in DivSeek				
	Governance framework for crop communities				
Capacity strengthening					
Communication	DivSeek website				
Resource mobilization					

2. Scope and conceptual framework

For the sake of presenting a list of potential elements for a DivSeek strategy, we distinguish **three different domains of DivSeek-related activities** (Figure 1):

1. **Coordination of DivSeek** based on a community-driven governance framework,
2. Activities that are part of what could be called a crosscutting **'DivSeek knowledge-exchange platform'** that supports a community of practice of crop-specific projects (i.e., activities such as information-management tools & standards, genotyping platforms, capacity strengthening efforts, etc.), and
3. Individual **crop projects**, each of them dedicated to harnessing genebank accessions for a particular crop or groups of crops in one or several genebanks.

The first two activity domains are part of what has previously been referred to as the 'back of the DivSeek comb'. They are designed to build coherence among otherwise independent crop projects (domain No. 3), previously referred to as the 'teeth' of the 'DivSeek comb'.

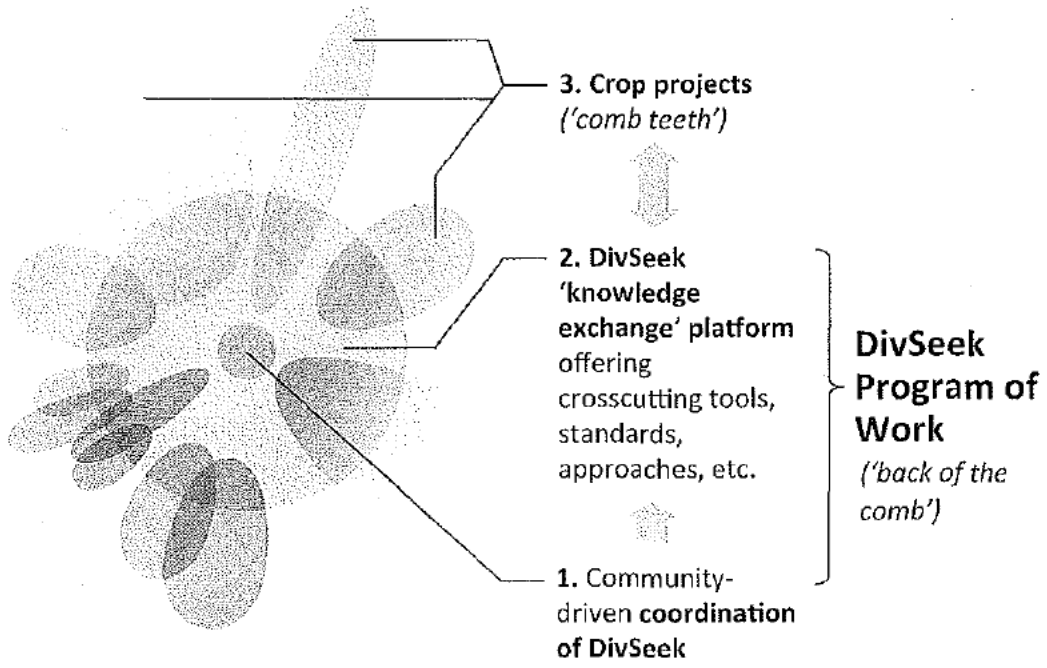

Figure 1: Three 'activity domains' of DivSeek activities.

As illustrated in figure 1 above, the value proposition that DivSeek could offer is a community-driven (domain 1) **'knowledge-exchange platform'** (domain 2) for otherwise unconnected crop projects (domain 3) to:

- **Promote synergies** among them, for example by rapidly spreading innovative tools or approaches, and
- **Add value** to individual crop projects by enabling data integration across projects, economies of scale, and joint advocacy efforts.

The DivSeek strategy, therefore, is assumed to primarily involve activities within domains 1 and 2 to support and add value to projects in domain 3 (Figure 1).

This document aims to provide a **'menu'** of potential strategy elements for the Steering Committee to consider. The list of elements is not intended to be comprehensive, but focuses on potentially strategic intervention points and 'low-hanging fruits'. Most of the presented elements are based on a survey conducted as part of the 2015 Partners' Assembly.[1] A few are based on more recent insights and discussions as well as first-hand experience of the authors in this domain.

In the following chapters we briefly discuss each of these potential elements or areas of work and their relationships with each other. Potentially **actionable opportunities** and already **ongoing activities** or projects are highlighted in **blue text boxes**.

3. DivSeek 'knowledge-exchange platform'

3.1 Community-building and networking

The formation of a **'DivSeek community of practice'** around the large-scale characterization of genetic resources has the potential to encourage a more regular exchange of ideas, lessons learned and best practices among community members with the aim of stimulating and propagating innovation in research approaches, information management and rights-management.

3.1.1 Landscape of ongoing efforts

DivSeek is an initiative that depends on organizations deciding to voluntarily cooperate and collaborate in areas where their interests and activities intersect. Efforts to network existing and emerging projects operating in the 'DivSeek space' to build a community of practice around the shared goal of harnessing genetic resources, are therefore central to DivSeek's mission.

Identifying and documenting the existing landscape of projects, initiatives and consortia already operating the 'DivSeek space', and feeding this information back to DivSeek partners, will support and reinforce a community-building process that has already begun to emerge in a spontaneous manner.

A comprehensive landscape of existing efforts will also guide efforts to identify and build linkages to strategically important projects, initiatives or consortia and help to identify gaps with regard to the crops covered and countries participating.

*The GPC's JFU representative has prepared an **initial landscape study** of projects already operating in DivSeek domains 2 and 3 (Figure 1). A considerable number of crop projects (domain 3; Figure 1) and projects developing crosscutting tools (domain 2; Figure 1) have been identified. The study, however, is preliminary and would require a second phase to identify publicly less visible and new efforts, particularly from developing countries and emerging economies.*

[1] Report on the technical session of the 2015 DivSeek Assembly

3.1.2 Engaging with 'blueprint' or 'pilot' projects in specific crops

The results from the project-landscape study should provide a framework for building partnerships with strategically important 'blueprint' or 'pilot' projects in the 'DivSeek space'. The value proposition for individual crop projects to link up with DivSeek may be manifold:

Already ongoing projects may:

- Wish to be seen as a 'blueprints' or leading examples for DivSeek,
- Wish to access a growing pool of common tools and resources, for example data repositories or high-performance computational platforms, to undertake additional and/or new analysis and to free up resources for other activities, or
- Wish to be seen as compliant with data and operational standards that may emerge from DivSeek facilitated activities. In the future, use of such community agreed standards could help to attract funding or assist with publication in journals that require adherence to 'DivSeek standards'.

New projects may:

- Wish to demonstrate that they build upon existing software tools and/or research approaches already validated by others, to increase their chances of getting funded,
- Wish to be seen to be associated with DivSeek for public-relation purposes,
- Wish to use DivSeek as a 'neutral broker' to assist in gathering crop-community members around the common goal of mining genetic resources for a particular crop, or
- Wish to use DivSeek as a platform to coordinate joint advocacy or fundraising efforts for selected groups of minor or underutilized crops.

A strategy for engaging with individual crop projects could build on some of these elements. Recent experience suggests that individual crop communities and projects are already looking at DivSeek as a platform to put their efforts into a broader context. In addition to the crop projects presented by IRRI, CIMMYT, ICRISAT, and IPK at the Assembly in January, and the Crop Wild Relatives Project at the Crop Trust, several new projects in other crops are gathering momentum and have voiced their interest in liaising with DivSeek (see box below). DivSeek may consider establishing a 'landing path' for such cases.

- *The **BEAN-ADAPT** project, recently funded under the joint NSF/ERA-CAPS scheme[2], includes collaborators from the USA, Colombia, Italy and Germany. The project is going to genotype approximately 10,000 common bean and 1,000 runner bean accessions. The resulting molecular data will be combined with data from multi-location, multi-year field evaluations in South America and Europe. The project has contacted the Crop Trust's JFU representative to declare their interest in associating BEAN-ADAPT with DivSeek and to organize an initial coordinating meeting in Bonn.*
- *The soon-to-be-submitted **G2P-SOL** proposal of a consortium of 17 organizations working on tomato, potato, pepper and eggplant sets out to characterize more than 50,000 accessions using genotyping-by-sequencing in combination with multi-location trials for agronomic traits and metabolic profiling for nutritional compounds and flavor components. DivSeek has submitted a letter of support, and the Crop Trust's JFU representative has been invited to joint the Advisory Committee of the project.*

- *Key representatives of the **global soybean community** recently met to start discussions about a global 'DivSeek project' for the crop. The Crop Trust's JFU representative was invited to participate in the discussions. An important take-away point from this event was that DivSeek is viewed as a neutral platform that could help to facilitate (a) data exchange among community members and (b) the assembly and genotyping of a global reference collection for the crop.*
- *Another soon-to-be-submitted EU proposal entitled **REMBRANDT** targets Brassicaceae genetic resources. The Crop Trust's JFU representative was recently contacted with a request to link REMBRANDT to the DivSeek initiative.*
- *The CGIAR has just decided to create a **Genebanks++ CRP** (CGIAR Research Program). This new CRP will address many of the elements described in Chapter 5 of the 'Genebanks Options Paper', which was jointly drafted by the CGIAR and the Crop Trust and describes research opportunities in the 'DivSeek space'.*[3]

*The Steering Committee may wish to provide **guidance** on how to deal with such projects and requests (e.g., list of criteria, letters of intent and support, etc.).*

Research in the 'DivSeek space' is continuing to increase and the number of new projects being initiated is accelerating. Efforts to keep track of, and invite new crop projects to connect with DivSeek will therefore increasingly require active management and communication efforts.

3.1.3 Membership campaign

The current composition of DivSeek partners is skewed towards organizations in developed countries. Participants at the first Partners Assembly expressed concerns about the lack of participation of developing-country organizations. This situation should be amended, not only because DivSeek was intended to be a global initiative, but also because many important germplasm collections are located in developing countries.

*A suggestion was made to initiate a **membership campaign** targeted at developing countries to achieve a better balance of DivSeek partner organizations.*

3.2 Germplasm characterization platforms

Summarizing and comparing the experiences of already ongoing 'DivSeek projects', for example through a couple of position papers, could be an initial step towards sharing and refining strategic approaches to large-scale germplasm characterization efforts.

[2] http://www.nsf.gov/awardsearch/showAward?AWD_ID=1539848
[3] CGIAR Genebanks Options Paper for FC13

- *Sarah Ayling, one of the DivSeek SC members, has elaborated a **technical appraisal of strategic approaches to large-scale germplasm evaluation**. Updating and expanding this study, written in 2012, and converting it into a position paper could be a good way to raise awareness about crosscutting technology platforms used for characterizing genetic resources.*
- *The International Treaty is at the final stages of elaborating a **paper on genomics and phenomics platforms** as part of work towards the Global Information System stipulated by Article 17 of the ITPGRFA.*

3.2.1 Logistics and sample tracking

A critical factor at the onset of a project that involves large-scale genotyping and phenotyping of genebank accessions is a 'high-throughput mindset' and the ability to consistently handle and track large numbers of samples in an error-free manner, be it seeds or DNA. Software tools to manage seed and DNA inventories, and equipment to automate handling of samples in batches are additional key resources for a well-managed project.

A key component for tracking and managing large numbers of samples is the use of a system of Permanent Unique Identifiers (PUID), and principles and guidelines for applying PUID to genetically clearly identifiable entities.

A task force established in the framework of the Global Information System under Article 17 of the ITPGRFA recently concluded that Digital Object Identifiers (DOI) where the preferable technical solution for defining PUID in this context.[4]

- *Sharing of experiences and **lessons learned** in this area across projects and organizations, for example as part of a couple of position papers, could have substantial impacts on the success of new projects.*
- *A new project, led by the Indonesian Agency for Agriculture Research and Development and funded under the Benefit-Sharing Fund of the ITPGRFA, will **test-drive the implementation of DOI-based PUID**. The principal objectives of this project are to: (a) implement PUID for rice accessions, and (b) to link PUID-identified rice accessions to the Multilateral System (MLS) of the ITPGRFA through the development of a dedicated application programming interface (API). This project also includes the development of guidelines for the adoption of DOI.*

3.2.2 Accession-sampling strategies

The sampling of genebank accessions for genotyping and phenotyping efforts is not a trivial matter, even for inbred species. Perhaps the most stringent approach is to 'purify' accessions, for example through single-seed descent (SSD) based generational advancement. Without SSD, genetic heterogeneity and residual heterozygosity may result in slightly different genetic profiles of individual plants sampled from a particular accession, even in inbred species. This creates challenges when associating genotypic with phenotypic data; the latter often derived from multiple individuals per accession.

[4] PUID Taskforce Recommendations

Genotyping pools of individuals, each pool representing one accession, is an alternative approach that has been used for maize (outcrossing species) in the Seeds of Discovery project at CIMMYT.

The issue of sampling strategies also has important implications for the way Permanent Unique Identifiers (PUID) are used to identify germplasm samples and the question of whether DivSeek might expand its original scope[5] to include genetic resources conserved in-situ.

*Encouraging the formation of a **discussion group** on this topic, which includes participants with first-hand experience in developing or testing different approaches, may be a way to sensitize community members to this important topic.*

3.2.3 Genotyping & sequencing

Given the widespread of genotyping-by-sequencing (GbS) in the 'DivSeek space', it would appear that agreement on common standards for reporting Single Nucleotide Polymorphism (SNP) and Presence Absence Variation (PAV) polymorphism data generated through this platform could have rapid and widespread impact across a number of projects.

An initial attempt in this direction was made several years back at the Plant and Animal Genome meeting in San Diego. Since then, the amount of data has grown exponentially, and with it, the need to find a solution for standardizing data formats. An important, unresolved question in this context is the degree of rawness at which 'primary data' should be stored in the long term (e.g., raw sequence reads, 'collapsed' or unique-sequence reads or allele calls).

- *GbS tag inventories representing the diversity of the crop gene pool are currently being assembled in the Seeds of Discovery project (maize, wheat) and it is envisioned that a similar approach will be used in the Canadian SoyaGen project (soybean), if funded. The same approach **could be applied across a range of crops** and rapidly add value to crop-wide genotyping efforts.*
- *The Genomic and Open-source Breeding Informatics Initiative (GOBII) is facilitating a process to create a cross-platform API for plant sciences. As part of this effort, a **'hackathon' event,** to be held at Cornell University between 15 and 19 June 2015, may discuss proposals for GbS data standards. DivSeek may wish to consider finding a way to **liaise with this effort**, for example by one of the DivSeek organizations participating in the event reporting back to the DivSeek community.*

3.2.4 Phenotyping

Phenotyping approaches are growing rapidly, both in the range of assays available and their use across the plant and crop-science communities. There are a number of national, regional and international efforts in this area, including the European Plant Phenotyping Network and International Plant Phenotyping Network, to name but a few.

As with any emerging field, data production and analysis is the initial focus; however as the amount, complexity and precision of phenotypic data grows, automated and computational methods will have to be developed to handle, analyze, integrate and compare datasets. Unlike genomic data where there are only four variables, the variation amongst phenotypic data is potentially infinite. In addition, phenotyping of interests to plant breeders, may require evaluation in native field

[5] DivSeek White Paper

environments, while phenotypes of interest to, say, a physiologist or a developmental biologist may required highly sophisticated, controlled environments. As a result standardization and data integration within this domain is not an easy task.

*Encouraging the formation of a **discussion group** to share knowledge, experiences and **lessons learned** in this area across a range of projects and organizations could highlight common and crosscutting challenges where a community-driven approach could have substantial impacts; e.g., a common language/ontology for describing environmental conditions across projects.*

3.2.5 Machine-searchable indexing to enable queries

Agreement upon, and use of common (meta)data standards for research in agriculture and plant biology has been a long-standing, yet difficult goal. Data standards are a critical tool for data integration and enabling queries across databases, organizations and crop species.

The generation of ever-increasing quantities of genomics data has driven a change in paradigm in the way data can be integrated, compared and leveraged across data domains and species. In addition, there is renewed impetus from a number of funding bodies and networks of researchers towards the development of common standards.

- *Global initiatives such as the Planteome project are beginning to investigate ways to build a **reference ontology for plants**. The DivSeek community of practice could link up with, and support these efforts.*
- *Use and uptake of standards requires both a 'carrot' and a 'stick' approach to encourage adoption of community-agreed standards. DivSeek could consider liaising with **scientific journals** and **funding agencies** to jointly advocate for common data standards and procedures. Both groups of stakeholders have a vested interest in the community agreeing upon and implementing common data standards.*

3.3 Software and data repositories

Data management-related items were, by far, the most frequently mentioned topics in the feedback to the survey distributed at the Partners' Assembly (50% of all answers had to do with information management-related topics)[1]. DivSeek aims to contribute to the assembly of a modular network of interoperable data repositories to add value to individual projects by facilitating data integration and re-use, and creating an environment for broad-based knowledge discovery.[6] Modularity enables the network to evolve and keep up with rapidly developing technologies and paradigms.

For the purpose of this chapter, we distinguish three 'data domains' associated with different areas of scientific inquiry (Figure 2), all of which contribute to the DivSeek community of practice:

- **Genebank-centric data**[7] generated when managing and making available genebank collections,
- **Breeding-centric data**[8] produced in the context of introgressing novel diversity into breeding

[6] Interoperability also is a guiding principle for the Global Information System envisioned under Article 17 of the ITPGRFA.

[7] We consider *genebank-centric data* to include seed-inventory, passport and basic characterization data.

[8] The distinction between breeding and research-centric data is somewhat arbitrary and may shift over time. Here we define *breeding-centric data* as data that is typically used or created when crossing plants and evaluating their progeny with

programs or developing new crop varieties, and

- **Research-centric data**[9] produced when practicing basic plant sciences in the areas of genomics, physiology, population genetics/genomics, etc.

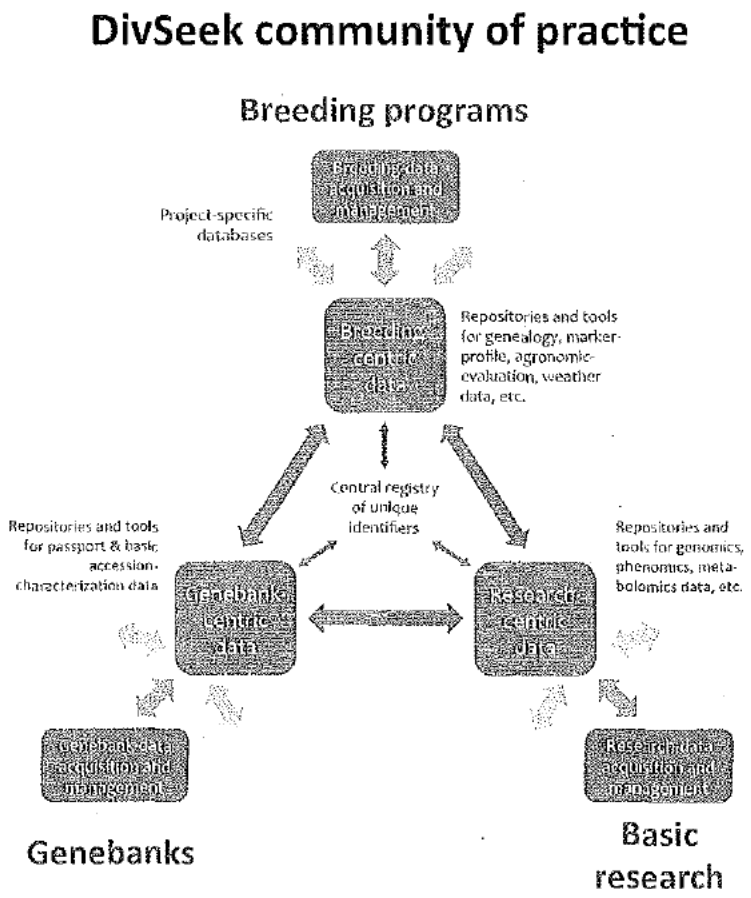

Figure 2. Three 'data domains' of relevance to DivSeek. Within each of the domains (genebanks, breeding programs, basic research), we distinguish between data bases & analysis tools used for managing primary data in individual projects (grey boxes) and web-based data repositories & tools for data sharing (blue boxes).

Scientists working in each of these domains view and deal with genetic resources from a somewhat different angle. Data generated within each of these domains doesn't readily flow across domain boundaries. This leads to information fragmentation and poses obstacles to knowledge discovery from multi-source data.[10]

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a view towards developing new varieties. The level of "coarseness" of this data matches the genetic/phenotypic resolution afforded by recombination events in breeding programs and field-based evaluations of traits typically targeted by breeders.

[9] We consider *research-centric data* as data that is primarily generated and used to advance scientific knowledge in more basic areas of research, such as molecular genetics, plant physiology, population genetics/genomics, evolutionary ecology, etc.

[10] As an example, it is often not possible to trace genomics data generated in costly studies back to the accession seeds from which the plants used for the studies have been derived. Also, genealogy relationships between genebank accessions and experimental or pre-breeding populations derived from them are only rarely available in public databases. Overall,

Where possible, data may best be stored in repositories that are close to the original data source, while simultaneously being exposed across domain boundaries through suitable API (application programming interfaces), the use of PUID, and an agreed-upon system for defining genealogy relationships between the germplasm from which characterization, breeding or basic biological data has been derived and genebank accessions available for distribution.[11]

The following subchapters describe possible elements for each of the 'data domains' of such an information network, elements that already exist or are under development.

*The **hackathon' event** in June 2015, organized by GOBII, will discuss steps towards creating a common API for plant sciences, with a view toward crop improvement. The meeting will involve the principal players in this area, such as Cornell University (GOBII, Cassavabase, T3 databases), the Integrated Breeding Platform (BMS database), Diversity Arrays Technology P/L (KDDart database), James Hutton Institute (Germinate data repository) and iPlant (high-end cyber-infrastructure). As mentioned, DivSeek could consider finding a way to **liaise with this effort**, for example by one of the DivSeek organizations participating in the event reporting back to the DivSeek community.*

3.3.1 Data bases & analysis tools for managing primary data

Project-specific platforms designed to store and analyze primary data (grey boxes in Figure 2), which may be of interest to DivSeek partners, include:

- *Genebanks domain:* The **Grin-Global** database developed/supported by USDA and the Crop Trust
- *Breeding domain:* The Breeding Management System (**BMS**) developed by the Integrated Breeding Platform (IBP), the **KDDart** database developed by Diversity Arrays Technology P/L (DArT P/L), and platforms to be developed by the recently launched Genomic and Open-source Breeding Informatics Initiative (**GOBII**) at Cornell University
- *Basic-research domain:* The **PRIDE** (PRoteomics IDEntifications) database, the **ENCODE** (Encyclopedia of DNA Elements) database, amongst others

The **iPlant** cyber-infrastructure offers opportunities for processing large datasets using a variety of tools and datasets hosted on their site.

We suggest that DivSeek does not get directly involved in ongoing efforts to develop databases for managing primary data, but instead "keeps watching this space" for ongoing developments and also considers collaborations with the private sector in this area.

3.3.2 Web-based data repositories & tools for sharing data

Examples of existing data repositories of relevance to DivSeek data domains as outlined (blue boxes in Figure 2) include:

- *Genebanks domain:* The **Genesys** data repository at the Crop Trust, whose development was jointly initiated by Bioversity, the Secretariat of the ITPGRFA and the Crop Trust, the Genebank Information System (**GBIS**) developed by IPK Gatersleben, amongst others

---

there seems to be a growing number of opportunities for information integration and value addition that could make genetic resources more immediately accessible and useable.

[11] IRRI's Genealogy Management System would be an example for a system for this purpose

- *Breeding domain:* The **Germinate** data repository at the James Hutton Institute, which has been implemented in the Seeds of Discovery project at CIMMYT, the **Triticeae Toolbox**, and the **Cassavabase**, amongst others
- *Basic-research domain:* The **EMBL-EBI portal** of the European Bioinformatics Institute, and the **GenBank sequence repository** at the National Center for Biotechnology Information, two widely used central archives for genomic data

➢ *As an initial, simple step to expose data across the different 'data domains' depicted in Figure 2, the German Federal Office for Agriculture and Food (BLE) has offered to fund a project to **link genebank-accession inventories in the Genesys repository to phenotypic datasets** available anywhere on the internet. The links will be established through the use of PUID, a minimum set of meta-data describing the phenotypic datasets, and the provision of URL links pointing to the data sets. Crop Trust staff are currently preparing a project proposal.*

➢ *The Crop Wild Relatives Project coordinated by the Crop Trust has **co-invested in the Germinate data repository** to upload rice and sunflower data. This will bring the number of crops for which Germinate has been implemented to six (barley, potato, maize, wheat, rice, sunflower).*

3.4 Rights management

3.4.1 Broadly accepted data-sharing framework

DivSeek recognizes the need for governance principles that encourage use and sharing of materials and data among a wide range of actors in all sectors: government, industry, university and other non-profit organizations. Through an enabling framework for sharing these resources, DivSeek has the potential to provide a valuable mechanism for increasing access to genetic information needed for the development of new knowledge and innovation.

The fundamental goals of DivSeek are not new. There have been numerous prior efforts to create organizations and develop institutions that encourage research collaboration, sharing of data, and innovation within various scientific communities and disciplines and across stakeholder groups. They have sought to develop mechanisms that both enable reputational and financial returns (to individuals, teams and organizations) and the production of public goods. Institutions have tried to both encourage open exchange of data, ideas, and resources necessary for the joint production of new knowledge and to support entrepreneurship and innovation.

*A recently initiated **study by Arizona State University** (ASU), to which the International Treaty's JFU member actively contributes and which is jointly funded by the International Treaty and the Crop Trust, will investigate how prior initiatives have addressed competing objectives of partners through institutional structures and organizational designs.*

3.4.2 Framework for engaging the private sector in DivSeek

Since the initial meeting in Asilomar[12], the interest of seed companies in what was going to become DivSeek has been steadily growing. There seems to be a widespread recognition that a broader use

[12] Feeding the future (2013) *Nature* 499: 23-24

of genetic resources for crop improvement is strategically desirable. Yet the domain in which research into genetic resources takes place is often considered too far removed from product-development pipelines to justify broad-based private-sector investment within individual companies.

Previous discussions during DivSeek-related meetings would suggest that a strategy, in which a group of seed companies co-invest in the characterization and utilization of genetic-resources in a precompetitive environment, seems attractive to many seed companies. As a signal of interest, Syngenta has submitted a white paper suggesting a global solution on user rules, including for sequence information.

Service providers in the genotyping and informatics field may be an additional area for public-private partnerships as part of DivSeek.

Requests from the private sector to participate in DivSeek have so far been answered by granting industry members an observer status in the Assembly and by stating that the development of a strategy for DivSeek to engage with the private sector would be part of an initial work program.

*It would thus appear that the development of a **framework for private-sector engagement** in DivSeek should be a topic to be addressed by the next Partners' Assembly. The ASU research project is likely to provide some criteria and ideas. In addition, DivSeek may consider initiating a dialogue with the industry during the second half of 2015, to better understand their motivations and ideas.*

3.4.3 Governance template for crop communities

Different crop communities are likely to face similar challenges when 'self organizing' around the common goal of systematically characterizing the genetic diversity of a particular crop. A 'governance template' that guides this process might be welcome by many.

*A group of governance experts could develop a **'governance template'** or 'roadmap' to help crop communities 'self-organize' around co-owned principles and goals, for example by offering guidance in areas such as the formulation of principles and rules of collaboration, the exchange of PGRFA subject to the different exchange regimes, the sharing of data among project participants and with external stakeholders, the engagement with private-sector players in the seed and technology-provision sector, etc.*

3.5 Capacity strengthening

DivSeek brings together germplasm providers with technology and knowledge providers to harness global genetic resources more effectively. Much of the germplasm to be characterized originates in countries of the developing world. This intersection of germplasm, technology and knowledge generation might provide a useful backdrop against which DivSeek capacity-strengthening efforts could be developed.

- ***Logistic challenges** related to consistently processing large numbers of genebank accessions in an error-free manner and **challenges in data management**, analysis and interpretation are perhaps the most significant obstacles to the initiation of new 'DivSeek domain' projects in some partner organizations. Capacity-strengthening efforts in these areas could generate significant payoffs with relatively little investment.*
- *Past interactions of the Crop Trust's JFU representative with seed industry representatives would suggest that there may be an opportunity to create a **'DivSeek' scholarship scheme** funded by a group of seed companies in the context of a broader framework to engage the private sector in DivSeek.*
- *Brazil, Norway and Indonesia are collaborating in a project to **co-develop and transfer PGRFA associated technologies**. This project provides for an online documentation platform that could be used to facilitate transfer of proven technologies to users.*

4 DivSeek coordination

This activity domain deals with 'housekeeping' activities required to coordinate and support DivSeek through a community-driven governance framework.

4.1 Operations of governance bodies

Topics in this area are covered elsewhere and thus not discussed here.

4.2 Communications

A properly elaborated communication strategy is an invaluable tool to communicate effectively, by providing a reference framework to guide and target communication efforts. Example could include coordinated advocacy efforts that could help DivSeek partners in mobilizing resources for their individual crop projects.

However, it is important to note that DivSeek is still a young initiative that is in the process of defining its own identity; as such it may be premature to develop a communication strategy before DivSeek partners have discussed and agreed upon a DivSeek strategy. In addition joint advocacy efforts should not raise unrealistic expectations that DivSeek is going to act as a fund-raising platform or a funding vehicle for individual crop projects.

Yet for DivSeek to gain and maintain public visibility, a continuing and more proactive management of the DivSeek website seems to be a prerequisite. The website has recently been updated, but more work needs to be done.

***Update and renew the DivSeek website** to better reflect the current state of the initiative. The website, which should also be translated into different languages, could include a global inventory of ongoing efforts in the 'DivSeek space', progress on selected 'blueprint' projects, ongoing discussions of concepts and lessons learned in a variety of areas, etc.*

4.3 Resource mobilization

Fundraising efforts will be required to support the operations of the governance framework itself (domain 1; Figure 1). In addition, it may be desirable to seek initial funding for selected 'catalytic' activities that contribute to the creation of a 'DivSeek knowledge-exchange platform' (domain 2; Figure 1). Activities for which to seek funding could, for example, include a more in-depth project-landscape analysis, the establishment of links to ongoing data-standardization efforts, and work toward enabling interoperability among multi-crop data repositories for different types of data.

To this date, support for the DivSeek Facilitation Unit has been provided by JFU member organizations, either in-cash or in-kind (or both). This situation is unlikely to be sustainable over the long term.

JFU member organization, have initiated ***conversations with potential funders*** *such as BBSRC, Genome Canada, USAID, USDA, BLE and the Syngenta Foundation (Crop Trust), and the Qatar Foundation, Syngenta Foundation and the Canadian and German ITPGRFA representatives (International Treaty). A more strategic, joint* ***fundraising approach*** *will need to be developed once an initial Program of Work has been elaborated.*

DS/SC-1/15/1

First meeting of the Steering Committee

28 May 2015

FAO Headquarters, Canada Room (A-357)

Rome, Italy

Draft Provisional Agenda

1. Welcome
2. Approval of the agenda
3. Potential elements for a DivSeek strategy
4. Draft landscaping study
5. DivSeek annual Program of Work
6. Operation of the Joint Facilitation Unit
7. Other business
8. Preparation of the report

Indicative Timetable

Time	Agenda item	Title	Working documents
09:00-09:30	1	Opening of the meeting	
09:30-9:45	2	Approval of the agenda	DS/SC-1/15/1
9:45-11:00	3	Potential elements for a DivSeek strategy	DS/SC-1/15/2
11:00-11:30	*Coffee break*		
11:30-12:00	3	Potential elements of a DivSeek strategy (*cont.*)	
12:00-12:30	4	Draft landscaping study	DS/SC-1/15/3
12:30-13:30	*Lunch*		
13:30-14:30	5	DivSeek annual Program of Work (*discussion*)	
14:30-15:30	6	Operation of the Joint Facilitation Unit	DS/SC-1/15/4
15:30-16:00	*Coffee break*		
16:00-16:30	7	Other business	
16:30-17:00	8	Preparation of the report	

DS/SC-1/15/4

Operation of the Joint Facilitation Unit (2015)

This document: i) presents the functions of the Joint Facilitation Unit; ii) clarifies the current modalities under which the Joint Facilitation Unit is working; iii) summarizes the activities that the Joint Facilitation Unit is carrying out in year 2015.[1]

1. THE MANDATE OF THE JOINT FACILITATION UNIT

The DivSeek Charter foresees the following responsibilities of the JFU:

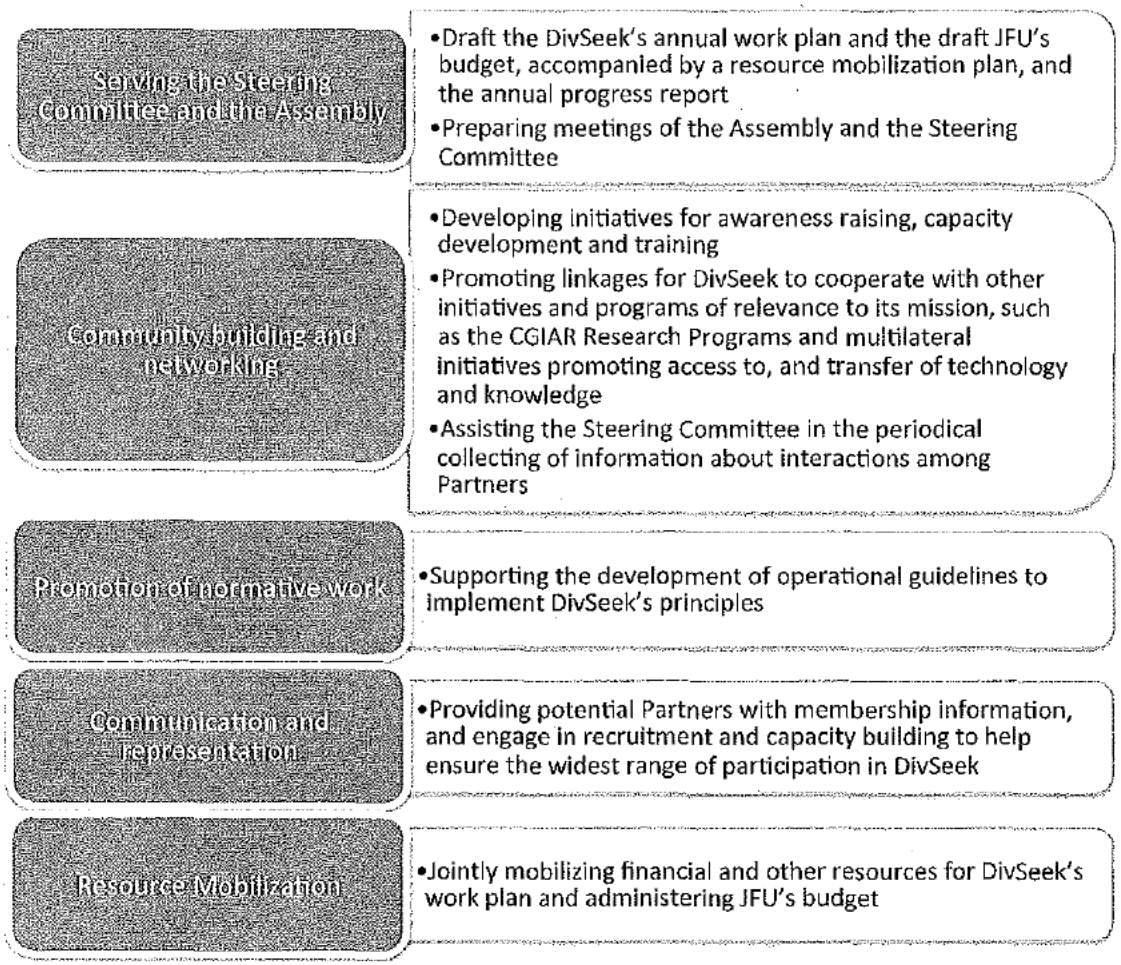
a) Developing the draft DivSeek's annual work plan and the draft JFU's budget, accompanied by a resource mobilization plan, and the annual progress report;
b) Developing initiatives for awareness raising, capacity development and training;
c) Supporting the development of operational guidelines to implement DivSeek's principles;
d) Providing potential Partners with membership information, and engage in recruitment and capacity building to help ensure the widest range of participation in DivSeek;
e) Promoting linkages for DivSeek to cooperate with other initiatives and programs of relevance to its mission, such as the CGIAR Research Programs and multilateral initiatives promoting access to, and transfer of technology and knowledge;
f) Assisting the Steering Committee in the periodical collecting of information about interactions among Partners;
g) Preparing meetings of the Assembly and the Steering Committee; and
h) Jointly mobilizing financial and other resources for DivSeek's work plan and administering JFU's budget.

JFU's responsibilities can be divided in the following five categories:

i) Serving the Steering Committee and the Assembly - paragraphs *a)*[2] *and g);*
ii) Community building and networking - paragraphs *b), e)* and *f);*
iii) Promotion of normative work - paragraph *c);*
iv) Communication and representation – paragraph *d);*
v) Resource mobilization - paragraph *h).*

[1] This document is not intended to establish any principle for the operation of the JFU.
[2] In response to a concern expressed at the first Partners' Assembly, it is important to highlight that the JFU does not approve DivSeek's annual programme of work. It prepares a first draft of the document that is reviewed by the Steering Committee and a second draft incorporating the feedback received. Once endorsed by the Steering Committee, the draft document is presented to the Assembly, which is DivSeek's decision-making body, for review and approval. Once approved by the Assembly, the JFU facilitates the implementation of the annual program of work.

The figure below illustrates the five categories.

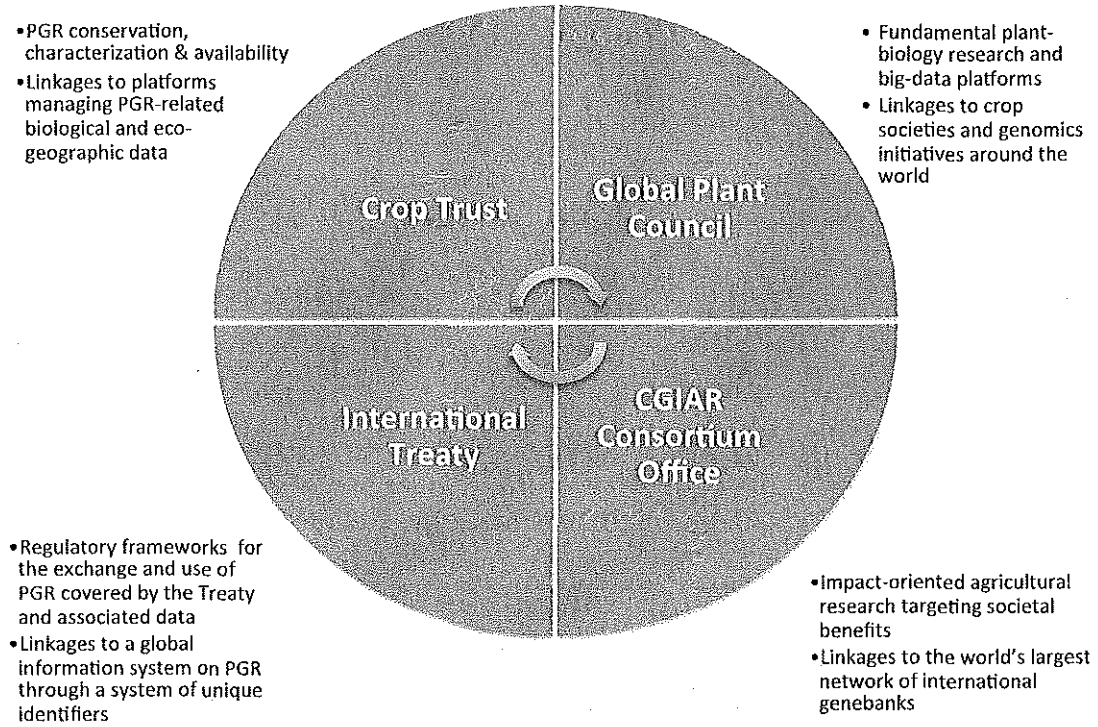


2. THE COMPOSITION AND WORKING MODALITIES OF THE JOINT FACILITATION UNIT

2.1 Composition of the Joint Facilitation Unit

As contained in the Charter, four organizations with global reach and complementary constituencies provide the JFU and contribute one representative each to the JFU. The four organizations are: the Global Crop Diversity Trust (Crop Trust), the Global Plant Council, the Secretariat of the International Treaty on Plant Genetic Resources for Food and Agriculture (International Treaty), and the CGIAR Consortium Office. The four representatives are, respectively: Peter Wenzl, Ruth Bastow, Daniele Manzella and Wayne Powell.

Each of these four organizations contributes a wide range of expertise and technical knowledge to the JFU; some examples are depicted in the diagram below.



The contribution to the JFU by the four organizations is not exhausted by the work of the four representatives. When and as needed and based on available resources, the four representatives mobilize other in-kind contributions by the respective organizations (e.g. on fund raising, communication, logistics of DivSeek's meetings).

2.2 Working modalities

In the implementation of its facilitating activities, the JFU is operating in accordance with the following criteria:

1) Structured cooperation with defined responsibilities for the deliverables;

2) Equality among JFU-participating institutions;

3) Timely alignment of JFU's facilitating activities with instructions received from the Chairperson and the Steering Committee.

The following practical internal arrangements have been made.

- The JFU operates through on-line and physical meetings that are scheduled on an as-needed basis.
- The allocation of work within the JFU is decided collectively, based on relevant expertise and availability of individual representatives.
- Regular reports on progress with individual activities are made at JFU meetings.
- Back-to-office reports on attendance to external meetings (see section 3.4 below) are shared within the JFU and with the Chairperson.
- The four representatives of JFU participating institutions have individual divseek.org email accounts that they use for internal and external communications.

3. THE CURRENT WORK

In the implementation of its functions and based on the working modalities above, the JFU is carrying out the following activities.

3.1 Meetings of Assembly and Steering Committee

The JFU is developing **documentation** for the meetings in consultation with the Chairperson. JFU's individual representatives take the lead on individual documents based on expertise.

The JFU is committed to circulating the meeting agenda and documents in advance of the meetings. It will circulate documentation for the 2016 Assembly thirty days in advance.

The JFU is responsible for the **logistics** of the meetings, with the Crop Trust and the International Treaty taking the lead on administrative tasks, such as travel and lodging, based on the location of the meeting and other practical aspects.

3.2 Community building and networking

Based on feedback received from the DivSeek Partner organizations, community building and networking are likely to be a component of DivSeek's program of work for 2016. To facilitate the development of this component, the JFU:

a) is developing a draft **landscaping study** of existing projects whose scope and objectives are relevant to DivSeek's mission;

b) will deliver a **study** by Arizona State University (ASU) **on institutional and organizational factors** for enabling data access, exchange and use aims for DivSeek, which the International Treaty and the Crop Trust are co-financing.

The studies are expected to generate useful information based on which the Steering Committee may review the draft DivSeek's program of work for 2016 that the JFU will prepare.

3.3 Promotion of normative work

The Charter foresees multiple normative documents for DivSeek, namely: a) representational guidelines for the Steering Committee; b) rules of procedures for meetings of the Assembly and the Steering Committee, c) operational guidelines that specify the principles of DivSeek, including for private sector engagement.

Representational guidelines for the Steering Committee were flagged as priority by experts who served in an advisory capacity before the first Assembly, and by the Chairperson. Based on **priorities** that the Steering Committee may set forth, the JFU will facilitate the development of normative documents, for the Steering Committee to review and the Assembly to approve.

3.4 Communication and representation

The JFU manages the content on DivSeek's **website** (www.divseek.org) and the Crop Trust administers it. The JFU will abide by any rule that the Assembly and the Steering Committee may establish regarding publication of documents for, and reports of the meetings.

The institutional websites of the JFU participating organizations (e.g. www.croptrust.org and www.planttreaty.org) also host information on DivSeek, derived from DivSeek's documents, to highlight programmatic and operational synergies with the mandates and activities of the organizations. This is without prejudice to the recognition of DivSeek as a community-driven initiative.

The JFU is responsible for **communications with Partner organizations.** The JFU maintains an updates list of Partner organizations, which is attached to the Charter.

The JFU handles requests for information through the website. The divseek.org email accounts of the JFU individual representatives are linked to the info@divseek.org address that is on-line.

The JFU is responsible for communicating with **new organizations** interested in joining the initiative. The Steering Committee has endorsed a procedure for interested organizations to become DivSeek Partners. The procedure consists of: a) an expression of interest in writing, based on a standard form available on-line; b) a review of the expression of interest by the Steering Committee, and; c) upon endorsement by the Steering Committee, acceptance of the Charter in writing.

DivSeek is an open and inclusive initiative and via its **membership** aims to reflect a wide range of relevant stakeholders. The JFU is raising awareness of the DivSeek initiative through the communication channels of the respective institutions of affiliation.

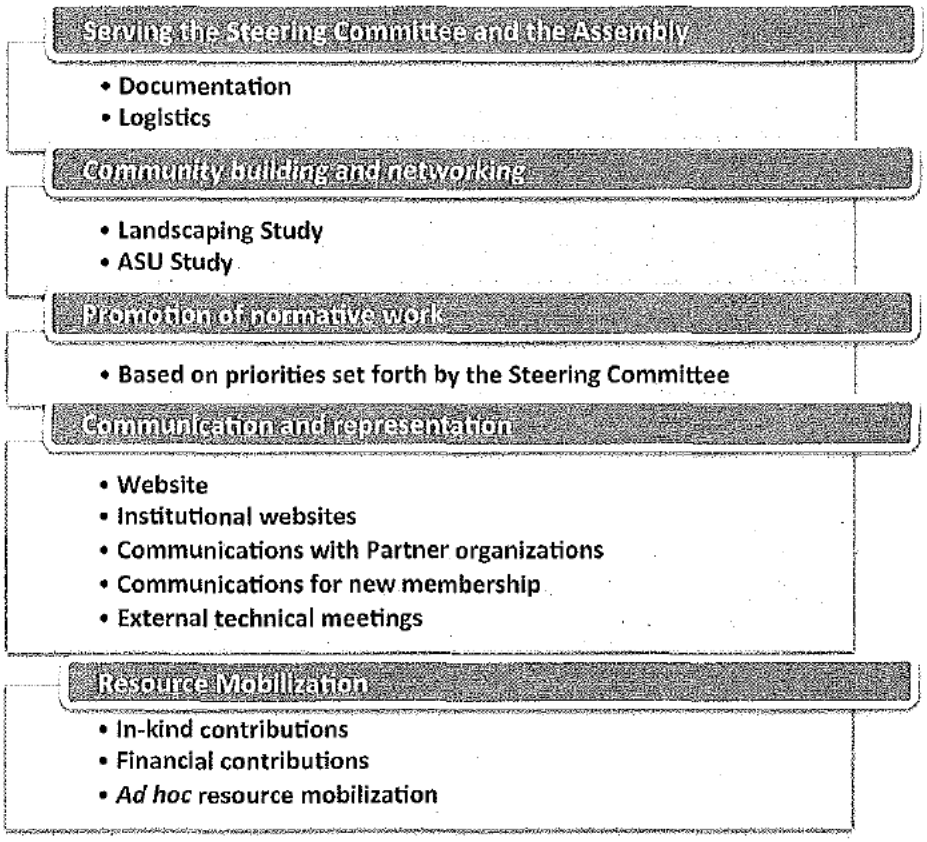
The individual representatives of JFU participating organizations coordinate with the Chairperson regarding attendance and representation at **external technical meetings** of relevance to DivSeek's activities.

3.5 Resource mobilization

At present, the JFU operates through **in-kind contributions** of the four participating organizations, including staff time of the four representatives, and **financial contributions** by the International Treaty and the Crop Trust, for meetings of the Assembly and the Steering Committee. JFU's budget depends on the allocations made from individual budgets of these organizations.

The International Treaty and the Crop Trust are undertaking ***ad hoc* resource mobilization** to sustain DivSeek. Once a resource mobilization plan is in place, as foreseen in the Charter, the JFU will jointly implement it.

The figure below illustrates the current facilitation work of the JFU.



DS/SC-1/15/3

Initial Draft Landscaping Study of projects, tools and resources in the 'DivSeek Domain

The draft landscaping study aims to identify and provide information on the existing landscape of projects, initiatives and consortia operating in the 'DivSeek space'.

The aim of this activity is to identify and build linkages to strategically important projects, initiatives or consortia, and help to identify gaps.

The initial landscaping exercise is based on the knowledge of the Steering Committee and the GPC representative in the Joint Facilitation Unit. It provides information on a number of crop projects and crosscutting tools and resources.

The resulting landscape, however, is preliminary and ideally would require a second phase to identify publicly less visible and new efforts, particularly from developing countries and emerging economies.

See the attached Excel file

Key	**Project Name**
G2P &IT	Seeds of Discovery (SeeD)
G	3,000 Rice Genome Project
IT	TransPlant
G	African Orpahn Crop Consortium
G	The 3000 Chickpea Genome Sequencing Initiative

IT	The Genomic and Open-source Breeding Informatics Initiative (GOBII)
G &IT	BRIDGE
IT &Standards	Crop Ontology

IT &Standards	Planteome
G2P	Crops for the Future - BamYIELD
IT	Germinate

G2P &IT	IRIC
G2P &IT	WHEALBI - Wheat and barley Legacy for Breeding Improvement
G	USDA Pisum Diversity collection
G2P	TGAC/JIC pea genotyping
G2P	Vietnamese rice
	Barley exomes
G	Cassava collection?
IT	Big Data Infrastructure for Crop Genomics

G2P &IT	WISP
G	CerealsDB
G	The CGIAR Research Program on Roots, Tubers and Bananas (RTB)

Seeds4needs

Geospatial database of collected crop samples and repository of expedition fieldbooks

IT	iPlant Collaborative

G2P &IT NEXTGEN Cassava

IT GRIN-Global

G & IT	Maize GDB
G & IT	SoyBase
G2P &IT	Legume Information System
G2P &IT	PeanutBase

G2P &IT	GrainGenes
G2P &IT	Gramene
G2P &IT	Cacao Genome Database
G2P &IT	CottonDB

G2P &IT	Genome Database for Rosaceae
IT	KBase

G2P &IT BreedWheat

Wheat Initiative

G2P &IT The European Plant Phenotyping Network (EPPN)

The Biology of Rare Alleles in Maize and Its Wild Relatives (Panzea)

IT &Standards

Phenomics Ontology Driven Data (PODD)

G 1000 Plant Genomes Project

Smart tools for Prediction (and) Improvement of Crop Yield (SPICY)

G	150 Tomato Genome ReSequencing project
G2P	The Rice Diversity Project
	The International Cocoa Germplasm Database (ICGD)

W3B-PR-29-Indonesia, "Multicountry construction of a test platform for the development and allocation of globally unique identifiers for rice germplasm, linking the MLS information infrastructure and the DivSeek repository

Key	
G	**Genomics**
G2P	**Genotype to Phenotype**
IT	**IT/Cyberinfrastcrture**
Standards	**Standards**

Project Mission/Aim/Goals

The *Seeds of Discovery* (SeeD) project strives to invigorating maize and wheat genebanks to make them more attractive to breeders. We want to "see into seeds" (hence the **See**D acronym) to unlock the dormant genetic potential of maize and wheat genetic resources by providing breeders with a toolkit that enables their more targeted use in the development of high-yielding, climate-ready and resource-efficient cultivars.

An international effort has resequencing a core collection of 3,000 rice accessions from 89 countries as a global public good. The 3,000 sequenced rice genomes had an average sequencing depth of 14X, average genome coverage and mapping rates of 94.0% and 92.5%, respectively.This data provides a foundation for large-scale discovery of novel alleles for important rice phenotypes using various bioinformatics and/or genetic approaches.

A European-Union funded e-infrstructure to support computational analysis of genomic data from crop and model plants. The project funds coordination and research activities; and provides free access to tools, training and data standards.

The consortium's goal is to sequence, assemble and annotate the genomes of 100 traditional African food crops, which will enable higher nutritional content for society over the decades to come. The resulting information will be put in the public domain with the endorsement of the African Union.

An initiative to sequence and phenotype the chickpea global composite collection comprising of XXX accessions from ICRISAT and XXX accessions from ICARDA. Comprehensive analysis of sequence data together with phenotyping data for breeding related traits is expected to provide superior alleles for using them in breeding program. In addition, genome architecture as well as millions of variations will be catalogued in the chickpea global composite collection.

The Genomic and Open-source Breeding Informatics Initiative (GOBII) takes aim at a hurdle created by the era of genomics: big data.

The overriding goal is to sequence (GBS) all barley accessions (>20.000) of the IPK Genebank and to establish a Bioinformatics platform that will connect sequence data to Passport data and allow for data analysis and visualization.

the Crop Ontology project (www.cropontology.org) has two primary objectives for the Integrated Breeding Platform: (1) Publish online fully documented lists of breeding traits used by the Breeding Management System (BMS) for producing standard fieldbooks and (2) Support data analysis and integration of genetic and phenotypic data through harmonized breeders' data annotation. The project also offers a forum for scientists to discuss their variables, methods and scales of measurement, and fieldbooks.

The goals of the Planteome Project are to provide researchers and agricultural breeding programs a common semantic framework and a focused set of comparative analysis tools to leverage the scientific value of the ever-expanding array of sequenced plant genomes and phenotype data.

A model international underutilised legume research and breeding programme using bambara groundnut (Vigna subterranea (L.) Verdc.) as an exemplar

Germinate is a generic plant genetic resources database and offers facilities to store both standard collection information and passport data along with more advanced data types such as phenotypic, genotypic and field trial data.

IRIC aims to provide access to well organized information about rice, and to facilitate communication and collaboration for rice community, having germplasm diversity as a focal entry point. Information about rice genotypic and phenotypic diversity is at the core of modern approaches for rice improvement. Accelerating genetic gains in rice breeding will require full exploitation of the genetic diversity of rice and utilizing it in efficient, product-oriented breeding pipelines that address future

WHEALBI will develop and implement tools, methods and procedures to facilitate the characterisation of wild relatives and local varieties of wheat and barley as sources of genes for use in crop improvement. Exome capture and phenotyping
USDA have used GbS to genotype 477 Pisum accessions

TGAC have a PhD project to sequence and phenotype 370 peas from the JIC GRU including landraces and wild peas

TGAC have a joint project with AGI to resequence and phenotype 600 Vietnamese rice accessions from AGI's collection
JHI will resequence a diversity panel of ~500 barley lines
CIAT have resequenced some of the cassava collection with JGI using a RAD-seq approach.
This project aims to develop infrastructure to accommodate data from the large-scale genomic resequencing projects that are already underway within the plant research community, for crop species such as rice (whole genome), brassica (transcriptome), wheat and barley (exomes and genotyping-by-sequencing). Also to develop infrastructure to enable the archival and querying of plant phenotypic data, using existing ontological terms and building on the software developed by the International Mouse Phenotyping Consortium.

This cross institutional programme will run from 2011 to 2017 and will produce new and novel wheat germplasm characterised for traits relevant to academics and breeders and will identify genetic markers for selecting these traits. The programme is structured around three complementary "pillars" (Landraces, Synthetics and Ancestral Gene Introgression) each of which will broaden the pool of genetic variation in wheat by a different route. Two cross-linking themes, Genotyping and Phenotyping, provide the "Entablature" connecting the Pillars. A fourth pillar, which will involve the production of elite wheat cultivars will be resourced independently by private breeding companies

Aimed at those who wish to obtain information about SNP markers; e.g., the sequence upon which they are based, obtain primers used for their identification, identify the haplotypes of common UK varieties.

Joint initiative of CGIAR and partners to address Global challenges roots, tubers, and bananas. Among many other activities, it promotes the re-sequencing and high-troughput genotyping at large scale of genetic resources held in genebanks and breeding materials as well as the development and interoperability of the underlying informatics infrastucture

Bioversity International's 'Seeds for Needs' initiative works with farmers to research how agricultural biodiversity can help minimize the risks associated with climate change.The concept is simple –. Seeds for Needs is trying to encourage this by:

- exposing farmer to more crop varieties and increase their first-hand knowledge about different traits and options available
- strengthening their seed systems and seed-saving capacity so that they always have access to planting material that fits their changing needs.

Seeds for Needs' conducts field trials with farmers to evaluate the performance of crop varieties that have been pre-selected through geospatial analysis (GIS). The favourites (usually around 20 varieties) are then blind-tested by farmers through a crowdsourcing approach, where each farmer evaluates 3 randomly-assigned varieties on their own farm.

The geospatial database compiles Passport data and observed traits of 200,000 landrace and crop wild relative samples collected all over the world for almost forty years, during 500 expeditions. 125,000 are georeferenced . When possible, samples passport contains the accession Identifier of the genebank accessions that were generated from the samples. 27, 000 PDF have been generatedduring the GLobal Piublic Good II programme from the reports or collecting forms produced by the collectors making the original hand written informaiton available.

The iPlant Collaborative is a virtual organization created by a cooperative agreement to create cyberinfrastructure for the plant sciences. Its goal is easier collaboration among researchers with improved data access and processing efficiency.

The Next Generation Cassava Breeding (NEXTGEN Cassava) project aims to significantly increase the rate of genetic improvement in cassava breeding and unlock the full potential of cassava, a staple crop central to food security and livelihoods across Africa.

Maintains and delivers information associated with plant genetic resources of the US National Plant Germplasm System. The GRIN-Global project's mission is to create a new scalable, version of the Germplasm Resource Information Network (GRIN), used by the USDA/ARS National Plant Germplasm System.

Maintains and delivers genome sequences, maps, genotypes, and other genomic information for maize.

Maintains and delivers genome sequences, maps, genotypes, and other genomic information for soybeans.

A collaborative, community resource to facilitate crop improvement by integrating genetic, genomic, and trait data across legume species.

A collaborative, community resource to facilitate crop improvement by integrating genetic, genomic, and trait data for peanuts to accelerate genetic improvement.

Maintains and delivers genome sequences, maps, genotypes, and other genomic information for wheat, barley, rye, and oats.
Gramene is a curated, open-source, integrated data resource for comparative functional genomics in crops and model plant species.

Maintains and delivers genome sequences, maps, genotypes, and other genomic information for cacao.

Maintains and delivers genome sequences, maps, genotypes, and other genomic information for cotton.

The Genome Database for Rosaceae is a curated and integrated web-based relational database providing data mining tools and publicly available genomics, genetics and breeding data for Rosaceae (almond, apple, blackberry, cherry, peach, pear, plum, raspberry, rose, and strawberry), to aid basic, translational and applied research in this economically important family. GDR contains whole genome sequences of apple, peach and strawberry available to browse or download with a range of annotations including gene model predictions, aligned transcripts, repetitive elements, polymorphisms, mapped genetic markers, mapped NCBI Rosaceae genes, gene homologs, and association of InterPro protein domains, GO terms, and KEGG pathway terms. Annotated sequences can be queried using search interfaces and visualized using GBrowse. EST unigene sets are available for major genera and Pathway data is available through FragariaCyc, AppleCyc, and PeachCyc databases. Synteny among the three sequenced genomes can be viewed using GBrowse_Syn. Markers, genetic maps, and extensively curated qualitative/Mendelian and quantitative trait loci are available as are phenotype and genotype data from breeding projects and genetic diversity projects. Search pages are available for genes, sequences, markers, trait loci, trait evaluation, genetic diversity, and publications. New search tools for breeders enable selection

KBase is an open platform for comparative functional genomics and systems biology for microbes, plants and their communities, and for sharing results and methods with other scientists.

BREEDWHEAT aims at strengthening the competitiveness of the French wheat breeding sector as well as to address the societal demand for sustainability, quality, and safety in agricultural production.

The Wheat Initiative aims to encourage and support the development of a vibrant global public-private research community sharing resources, capabilities, data and ideas to improve wheat productivity, quality and sustainable production around the world.

One of the core activities of EPPN, provideing access to plant phenotyping infrastructure, has given plant scientists across Europe the opportunity to address the relationship between the plant and the environment with leading plant phenotyping centres through a Transnational Access scheme.

This project will improve the understanding of the genetic architecture - the connection between phenotype (what we see) and genotype (the genes underlying the phenotype) - of complex traits in maize and its wild relative, teosinte. Understanding variation in genetic architecture is key to understanding evolution, manipulating species for a sustainable agriculture, and preserving variation as species adapt.

The PODD project will deliver a data management service that can handle multiple phenotyping platforms and data formats (text, image, video). The project will also provide the
ability to manage a repository of associated metadata based on standard ontologies. A range of tools and other features will be developed to provide Web-based discovery interfaces for users, external repositories, and services and support for the automatic capture and annotation of data and metadata from instrumentation, when
possible.

The project aims to obtain the transcriptome (expressed genes) of 1000 different plant species over the next few years.

The aim of the Smart tools for Prediction (and) Improvement of Crop Yield project is to develop a suite of tools based on molecular breeding to help breeders in predicting phenotypic response of genotypes for complex traits like yield under a range of environmental conditions.

The aim of the 150 Tomato Genome ReSequencing project is to reveal and explore the genetic variation available in tomato. Tomato has been selected as target crop because it is economically one of the most important crop species for the Dutch breeding industry, and is one the most important vegetables globally. However, since the tomato shows only limited genetic diversity in commercial breeding lines, valuable alleles will be available in wild tomato relatives. Since breeding and selection was targeted at only a narrow range of desirable agricultural traits, also old breeding material could be source of interesting alleles that have been lost during domestication.
The project evaluates genotypes and phenotypes in a diverse set of rice accessions and uses association mapping to link genotype and phenotype.

The project aims to collate information on the origins, characteristics and availability of cocoa germplasm and to make this available to researchers and breeders.

Importance for Agriculture

Wheat and Maize are amongst the Top 5 most highly prodcued crops worldwide according to FAO Stats

Amongst the Top 5 most highly prodcued crops worldwide according to FAO Stats

Underlying informatics infrastucture

Under-utilised crops often from developing countries

Second most widely grown legume crop after soybean

http://www.news.cornell.edu/stories/2015/04/185m-grant-aims-boost-staple-crop-breeding-worldwide

Barley is amongst the Top 5 most highly prodcued crops worldwide according to FAO Stats; Information on the genetic structure of a large barley collection.

Domain model, metadata and controlled vocabularies for economically important traits, compliant to semantic web formats and Open DAta

Domain model, reference ontologies, metadata and controlled vocabularies for Plant Biology

Bambara groundnut plus other example legumes

Provide information and tools to accelerate rice breeding by exploring & harnessing rice diversity. Organize genotypic, phenotypic, expression and other data into information system for global rice research community; Provide user-friendly access to data through a single portal 4,500 available lines available through genebank; whole-genome re-sequencing data for approx. 3,000 purified lines; characterization data from genebank;	
Wheat and barley	
Pea	
Pea	
Rice Barley	
Cassava	

Wheat

Wheat
About 200 million poor farmers in developing countries use roots, tubers, and bananas (RTB) for food security and income. (includes cassava, patato, sweet potato, banana, yam)

if farmers have better information and access to a wide range of varieties, they are more able to choose what best suits their conditions and cope with unpredictable weather. The initiative now involves around 25,000 farmers worldwide.

From 1974 onwards, Bioversity International* supported a series of expeditions worldwide. The objective was to systematically collect and conserve traditional varieties and landraces cultivated by farmers and their wild relatives which were being lost from fields and natural habitats. This collection is an invaluable Meticulous observations, personal remarks, photos and hand-drawn sketches combined with detailed maps, observations shared by farmers, and methods used for collecting samples can illuminate phenomena such as genetic erosion. The original information recorded by the collectors is a treasure trove of fascinating data. It also contains information that can help us understand better the consequences of climate change and people's changing agricultural practices.history of plants that may have been lost from their fields and natural habitats. Samples of approximately 4300 different species were collected.

The project will implement and empirically test a new breeding method known as Genomic Selection that relies on statistical modeling to predict cassava performance before field-testing, and dramatically accelerates the breeding cycle.

This project's goal is to provide the world's crop genebanks with a powerful, flexible, easy-to-use global plant genetic resource information management system that will constitute the keystone for an efficient and effective global network of genebanks to permanently safeguard plant genetic resources vital to global food security, and to encourage the use of these resources by researchers, breeders, and farmer-producers. By improving the capability of genebanks to provide data to a global accession-level information system under the leadership of Bioversity International, it will be possible to more accurately assess the "State of the World" for plant genetic resources, and to identify priority global needs for plant genetic resource conservation.

Maize is the most is the most widely grown crop in the world. This cereal, which originated in Mexico, is now grown in at least 164 countries around the world

Soybean [Glycine max (L.) Merr.] is a major food crop. The bean is a native of Asia and has been cultivated for centuries in China and Japan. Soyban is now grown across the globe

Cover a variety of species including Alfalfa, Chickpea, Common Bean, Cowpea, Faba Bean, Garden Pea, Lentil, Lotus, Medicago

Extensive research over the past two decades has shown there is a remarkably consistent conservation of gene order within large segments of linkage groups in agriculturally important grasses such as rice, maize, sorghum, barley, oats, wheat, and rye. Grass genomes are substantially colinear at both large and short scales with each other, opening the possibility of using syntenic relationships to rapidly isolate and characterize homologues in maize, wheat, barley and sorghum.

Cacao production is important! Not only is it the basic ingredient in the world's favorite confection, **chocolate**, but it provides a livelihood for over 6.5 million farmers in Africa, South America and Asia and ranks as one of the top ten agriculture commodities in the world.

Breedwheat will combine genetics, genomics, and ecophysiology analyses with high throughput phenotyping and genotyping to perform association studies and identify markers and candidate genes for yield and quality traits under abiotic and biotic stress. Moreover, the BREEDWHEAT project will characterize and tap unexploited genetic resources to expand the diversity of the elite germplasm. Finally, new breeding methods will be developed and evaluated for their socio-economic impact. A robust bioinformatics platform enabling efficient association analyses and breeder friendly access to the data will also be established.

The Wheat Initiative actions will lead to the creation of improved wheat varieties and to the dissemination of better agronomic practices worldwide. The combination of new varieties and agronomic practices will in turn allow farmers to improve and stabilise wheat yields in diverse production environments.

The project is an important nucleus for the development and integration of the pan-European community focused on plant phenotyping strongly demanded by plant scientists and plant breeding and production industry.

The understanding of the link between genotype and phenotype is currently hampered by insufficient capacity (both technical and conceptual) of the plant science community to analyze the existing genetic resources for their interaction with the environment. Advances in plant phenotyping are therefore a key factor for success in modern breeding and basic plant research.

Maize is the largest production crop in the world, and plays a central role in US agriculture and food production. Maize also has the greatest molecular and phenotypic diversity of any major crop species. This diversity enabled domestication and is key for future maize improvement. Understanding the role of rare alleles in maize genetic architecture will aid in the selection and development of future breeding lines, especially in predicting hybrid performance. In addition, this project will generate valuable germplasm and genomic annotation resources that will be used by many other groups to dissect numerous other traits and facilitate genomic breeding, allele mining, and genetic analysis.

The PODD system is a web based data repository developed to meet the data management requirements of the NCRIS 5.2 funded phenomics facilities: The Australian Plant Phenomics Facility (APPF); and the Australian Phenomics Network (APN). These requirements are to capture, manage, secure, distribute and publish raw and analysed data from the phenotyping platforms run by these facilities, as well as capture sufficient contextual information (metadata) to support data discovery and analysis services. In turn, PODD will provide metadata to the Atlas of Living Australia (ALA), so that the information generated by the APN and the APPF may be represented in the ALA as scientific reference collections.

The 1000 plants (oneKP or 1KP) initiative is an international multi-disciplinary consortium that has generated large-scale gene sequencing data for over 1000 species of plants.

The project particularly focuses on developing tools for predicting phenotypic performance (growth, yield) of a genotype by means of an integrated gene-to-phenotype model, thereby reducing the effort of phenotyping new genotypes. This will be achieved by extending a crop growth model with a separation between species specific and genotype (variety, line) specific parameters and the development of smart tools for integrating QTL analysis with crop growth models. In addition, gene expression studies will try to identify genes within the QTL while imaging and fluorescence tools will be developed for fast and automated large scale phenotyping.

The project will unlock important traits that are lost during domestication of the ancestors, for example resistance against pathogens, taste and health improving compounds. The project will thus help to make food production more sustainable. It will also help to reduce the time needed to develop new tomato lines.

Biological Factors

Wheat - Low cross pollination rate Polyploidy. Maize high cross pollination. Polyploidy

Self pollinating, Relatively simple genome. Major areas of production China, India, Indonesia, Vietnam, Thailand, Bangladesh

N/A

Various

Self Pollinating,Diploid, Top 5 Producers India, Australia, Pakistan, Turkey, Myanmar

self pollinating, large diploid genome; Genome evolution;
Identification of footprints of selection

Breeding traits

African drought tolerant, landrace-based, nitrogen fixing legume. Issues exist with cooking times, photoperiod sensitivity for pod-fill

Wheat - polyploid

Heterozygosity

Wheat - polyploid

Wheat - polyploid
Various

Adaptive trats to climate change; farmers' prefered traits

Crops and wild relatives samples

Supports a range of plants and crops

Maize high cross pollination. Polyploidy

Bretting, Peter

From: Daniele Manzella <daniele.manzella@divseek.org>
Sent: Thursday, May 28, 2015 9:02 AM
To: Susan McCouch; graner@ipk-gatersleben.de; Arnaud, Elizabeth (Bioversity-France); Ruaraidh Sackville Hamilton (IRRI); David Marshall; Bretting, Peter; Emily Marden; sarah.ayling@tgac.ac.uk; Varshney, Rajeev (ICRISAT-IN)
Cc: Peter Wenzl; Ruth Bastow; w.powell@cgiar.org
Subject: Re: Steering Committee meeting - Information Note for Participants - Rome, Italy, 28 May 2015 - #AGDT
Attachments: DivSeek Report 1_WelchLouafiManzellaFusi May 28 2015.docx

Dear Steering Committee members,

Attached to this message you can find an electronic copy of the initial progress report on the ASU project, which I have just distributed in hard copy at the meeting, under agenda item 4 of the revised agenda.

Thanks.
Daniele

On Mon, May 25, 2015 at 4:05 PM, PGRFA-Treaty <PGRFA-Treaty@fao.org> wrote:

> Dear participants in the DivSeek Steering Committee meeting,
>
> Please find attached a Note summarizing logistic information for your meeting, as well as an invitation to dinner on 27th May.
>
> We look forward to welcoming you in Rome.
>
> Best regards,
>
> Paola Franceschelli
>
> Office of the Secretariat of the International Treaty
>
> on Plant Genetic Resources for Food and Agriculture
>
> Tel.:+39 06570 53554
>
> Fax: +39 06570 53057
>
> www.planttreaty.org

DivSeek Governance Research Project
Progress Report
Eric Welch, Selim Louafi, Daniele Manzella and Federica Fusi
May, 28 2015

Overview

This report summarizes the main preliminary activities of the DivSeek governance research project that the Secretariat of the International Treaty and the Global Crop Diversity Trust are co-funding. Eric Welch, Director of the Center for Science, Technology and Environmental Policy Studies (C-STEPS) at Arizona State University (ASU), is leading a research team composed of: Selim Louafi, at CIRAD; Daniele Manzella, International Treaty representative in the DivSeek Joint Facilitation Unit; and Federica Fusi, PhD student at ASU. The aim of the research is to advise, in a scientifically sound manner, the DivSeek Steering Committee on governance structures that would support the achievement of DivSeek's goals, as expressed in the Charter and the White Paper.

The research focuses on the analysis of initiatives that are similar to DivSeek in terms of objectives, geographical scope, actors involved, and activities. Selected case studies will provide a more comprehensive basis for developing recommendations for governance structures.

In the current first stage of the project, the research team has reviewed relevant literature on selected issues and topics (see below) and is conducting a first round of exploratory interviews. The research team meets on a weekly basis to discuss relevant literature for the project. The list of all texts that have been analyzed, is in appendix 1. The interviews have been exploratory in nature, in order to collect baseline information prior to selecting the main case studies. The list of the interviewees is below and interview questions are listed in appendix 2. The interviews typically last one hour and are conducted by Skype.

The team has also been briefed on progress with DivSeek facilitation by the Global Crop Diversity Trust and by the Secretariat of the International Treaty, on two separate occasions.

Literatures Reviewed

Institutional Action Development Framework & Common Goods

The IAD framework (Ostrom 1999; Hess 2012) is relevant to DivSeek in that it addresses questions related to the design of institutions for the sharing of resources, such as data, information, and material, among a multitude of actors. The framework defines the boundaries of the common pool resources including the attribution of rights on the common resources (i.e. access, extraction, management and exclusion rights); the identification of actors involved and their role; the identification of the motivations for sharing resources across different actors; the background of participants and how sharing mechanisms are implemented.

Network Theory, Heterogeneity and Trust

This branch of literature addresses why and how actors within a network share. A network approach recognizes the importance of relationships and the role of social structure. Three key questions that have emerged from the review are: how relationships contribute to the development of social

capital; how the centralization or decentralization of network structure affect trust, responsibility and accountability across actors; how and why networks change over time. In addition, the literature examined shows that heterogeneity among actors, resources and uses of the resources affects relationships building, social capital formation, network structure and other outcomes such as access, participation, trust, sharing and reciprocity. The team also read and discussed a set of articles on trust, recognizing that it is a key mechanism to balance self-interest with the need for cooperation.

Case studies discussion

There are several case studies in grey literature and some in academic literature. We are also examining these documents to better understand, among other issues:

1) relationships among key stakeholders;
2) relevant codes of conducts or principles;
3) policies or legal mechanisms for the sharing of data and material; and
4) compliance mechanisms.

Interviews

The team has undertaken, or will be undertaking in the near future, the following exploratory interviews.

Initiative	Interviewee	Status
Seeds of discovery	Kevin Pixley, *Director, Genetic Resources Program*	Interviewed
Structural genomics consortium	Aled Edwards, PhD *Director*	Interviewed
Iplant	Eric Lyons *Senior Scientific Developer*	Interviewed
Cacao Genome Database	David Kuhn *USDA – ARS*	Interviewed
Cassavabase / Nextgen Cassava	Hale Ann Tufan *Project Manager*	Scheduled
Integrated Breeding Platform	Jean-Marcel Ribaut *Director*	Scheduled
International Rice Research Consortium	Ruaraidh Sackville Hamilton *Head of TT Chang Genetics Resources Center and International* Rice *Genebank*	Contacted, no response
Genome Canada	Cindy Bell, PhD *Vice-president*	Contacted, no response
Germinate	David Marshall *Information and Computational Sciences Group Leader*	Contacted, no response
Planteome	Elizabeth Arnaud *co-Principal Investigator*	Contacted, no response

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Appendix 2 – Interview Questions

Q0: Context and overview

a. What was the prevailing situation before the initiative? Which reasons have led to the establishment of the initiative?
b. How diverse are the partners involved in the initiative?
c. How have you identified the main common problems among actors?

Q1: Mechanisms to promote the exchange and use of data / material

a. How open the system is? Who has access to your data? What are access conditions?
b. Which community structures are in place? How are actors connected?
c. What incentives (data, information, knowledge, materials, and money) are in place to motivate actors to contribute to the system?
d. What is the organizational capacity to obtain alternative inputs in case of members' defection?

Q2: Governance

a. Who is in charge of the system?
b. Power structures and hierarchies (dominance of certain groups/interests; equity of power…)?
c. How is diversity reflected in the governance structure (in terms of status, disciplines, actors…)? What are the criteria for the exclusion/inclusion of members from decision-making processes?
d. What are the formal rules that lead the project? Are there norms that guide access, use, distribution, exchange, and contribution of data and material? If yes, can you briefly explain them?
e. How would you define the level of trust/social capital among the partners of your project?
f. How would you define the level of transparency and exchange of information among members? How are individual connected to each other?
g. What is the process of selection of newcomers? To what extent people can voluntarily enter or exit from the network?
h. What type of monitoring systems are in place? How decentralized or centralized are management processes in your organization?
i. Are there sanctions for individuals abusing the use of data and material? If so, how are sanctions imposed?
j. Are there differences in terms of sanctions and monitoring systems, by major sector – public, private, non-profit?

k. How do you manage to coordinate the key stakeholders?

Q3: Management

a. How is the program financially supported? Where is it located? How is it organized?
b. What resources – human, financial, institutional – are required to run it?
c. How do you manage
    1. Socialization processes?
    2. Recruitment activities?
    3. Communication activities?

Q4. Effectiveness

a. Exchange and use:
    1. How effective is the system in terms of frequency and quantity of exchange of data and material?
    2. To which extent do participation and collective actions advance or obstacle desirable outputs?
b. Returns:
    1. What return is provided from participating to the organization? Who are the main beneficiaries?
    2. How effective are those benefits in increasing the level of participation?
c. Sustainability
    1. Are the members of your program willing to financially support it in the long term?
d. Outputs
    1. What outputs are produced by the program? Such as: academic papers, new data, innovations, new products, applications to grants, exchange of information…

Q5: Constraints, gaps and challenges

a. What gaps would you identify in the structure, the processes or outcomes?
b. What are your main challenges for the future? What needs should be addressed in order to bring current activities and short-term outcomes more in line with long-term goals and aspirations?
c. What type of strategic planning or expert assistance would you seek? How would guidance by experts help you in this transition?

Bretting, Peter

From:	Bretting, Peter
Sent:	Tuesday, August 18, 2015 6:54 AM
To:	'Susan McCouch'; 'Susan McCouch'
Subject:	Outline for a DivSeek Knowledge Exchange and Capacity-Building Workshop
Attachments:	2015 Proposed DivSeek Workshop on Standards.docx

Hi Susan—paragraph 29 of the DivSeek Steering Committee meeting report states: "To further develop point d) above, the Chairperson requested that each Committee member draft a one-page outline for a DivSeek knowledge exchange and capacity building workshop."

Attached is my homework! It's the result of discussions with Carson Andorf (Maize GDB), Steven Cannon (Soybase and Legume Information System), and Chris Richards (NCGRP). They are responsible for any incisive thinking, whereas I'm responsible for any errors.

Thanks,

Peter

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DivSeek Knowledge Exchange and Capacity-Building Workshop

Standards for Managing and Integrating Crop Genetic Resource, Genomic, and Breeding Data Crucial for Global Food Security

Workshop Goals

Convene a diverse group of international experts in bioinformatics, genomics, information management, and plant genetic resource management to develop and adopt standards for data capture, exchange, formats, quality, and assessment needed for managing and integrating crop genetic resource, phenotypic, and genotypic information. Some specific topics are suggested below. Priorities and responsibilities for addressing the topics would be assigned.

- Properties for Standards:
  - Adaptability/flexibility: how can standards accommodate diverse, new, or emerging datasets?
  - Evaluation and assessments: how can the efficacy, strengths, and/or limitations of standards be evaluated and measured?
  - Encouragement and/or enforcement: how can researchers and institutions be encouraged to adhere to community standards, especially if multiple, competing standards exist?
- Types of Standards:
  - Data quality: how can evidence codes be devised to communicate the completeness of data sets and the data collection and analytical methods applied??
  - Data formats: diverse, heterogeneous data be represented effectively?
  - Data relationships: how can data relationships be managed and represented?
  - Data exchange: how can diverse and heterogeneous datasets be shared more efficiently and effectively?

Workshop Schedule

- Day 1: Plenary presentations in the AM, and break-out, small group discussions in the PM. Evening social event.
- Day 2: Review and refinement of Day 1 work in the AM, tour of local scientific facilities in the PM. Evening social event.
- Day 3: Small group discussions in the AM, Plenary discussions and conclusions in the PM. Adjourn.

Possible Workshop Venues (listed alphabetically)

- CIRAD/INRA (France); IPK (Germany); NIAS (Japan); NORDGEN (Norway); PAG (US)

Workshop Participants

- Technical staff from DivSeek partners and from key genebank systems, database/information resources, genomics projects, breeding programs, and genotyping/sequencing centers in developing and developed nations.

Bretting, Peter

From: Bretting, Peter
Sent: Tuesday, August 25, 2015 1:36 PM
To: Peter Wenzl; Daniele Manzella (ITPGRFA); Ruth Bastow (GPC)
Cc: Susan McCouch
Subject: FW: Outline for a DivSeek Knowledge Exchange and Capacity-Building Workshop
Attachments: 2015 Proposed DivSeek Workshop on Standards.docx

Hi Peter, Daniele, and Ruth—apologies, I forgot to address a copy to you when writing to Susan.

Thanks, hope that you have enjoyed a pleasant and productive summer!

Peter

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Web site: http://www.ars.usda.gov/research/programs/programs.htm?NP_CODE=301

DivSeek Knowledge Exchange and Capacity-Building Workshop

Standards for Managing and Integrating Crop Genetic Resource, Genomic, and Breeding Data Crucial for Global Food Security

Workshop Goals

Convene a diverse group of international experts in bioinformatics, genomics, information management, and plant genetic resource management to develop and adopt standards for data capture, exchange, formats, quality, and assessment needed for managing and integrating crop genetic resource, phenotypic, and genotypic information. Some specific topics are suggested below. Priorities and responsibilities for addressing the topics would be assigned.

- Properties for Standards:
  - Adaptability/flexibility: how can standards accommodate diverse, new, or emerging datasets?
  - Evaluation and assessments: how can the efficacy, strengths, and/or limitations of standards be evaluated and measured?
  - Encouragement and/or enforcement: how can researchers and institutions be encouraged to adhere to community standards, especially if multiple, competing standards exist?
- Types of Standards:
  - Data quality: how can evidence codes be devised to communicate the completeness of data sets and the data collection and analytical methods applied??
  - Data formats: diverse, heterogeneous data be represented effectively?
  - Data relationships: how can data relationships be managed and represented?
  - Data exchange: how can diverse and heterogeneous datasets be shared more efficiently and effectively?

Workshop Schedule

- Day 1: Plenary presentations in the AM, and break-out, small group discussions in the PM. Evening social event.
- Day 2: Review and refinement of Day 1 work in the AM, tour of local scientific facilities in the PM. Evening social event.
- Day 3: Small group discussions in the AM, Plenary discussions and conclusions in the PM. Adjourn.

Possible Workshop Venues (listed alphabetically)

- CIRAD/INRA (France); IPK (Germany); NIAS (Japan); NORDGEN (Norway); PAG (US)

Workshop Participants

- Technical staff from DivSeek partners and from key genebank systems, database/information resources, genomics projects, breeding programs, and genotyping/sequencing centers in developing and developed nations.