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An Evaluation of the ISPC Science Forum 2016

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Independent
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EXECUTIVE SUMMARY

The fourth Science Forum (SF 2016), organized by the Independent Science and Partnership Council (ISPC)¹, took place in Addis Ababa, Ethiopia, in April 2016, and was co-hosted by the United Nations Economic Commission for Africa (UNECA). The theme was: “*Agricultural Research for Rural Prosperity: Rethinking the Pathways*”. The objective of the Forum was to reassess the pathways for agricultural research to stimulate inclusive development of rural economies in an era of climate change. Nearly two hundred participants from around the globe, including 114 from Africa, attended SF 2016. Participants largely represented the CGIAR and research organizations. SF 2016 comprised of a series of plenary sessions on key issues pertaining to the major theme and breakout sessions for discussion. Insights from the Forum will be used to frame a comprehensive collection of research papers in a special issue of a peer-reviewed journal. The balance of participants in terms of geographic spread, gender and employment sector was sub-optimal,

and this will have to be addressed in the future. According to the results of a questionnaire, responded to by 59 participants, the SF was successful in promoting partnerships and in facilitating networking. A Knowledge Share Fair and a mentoring scheme for Early Career Scientists were also particularly appreciated. SF 2016, as for the previous three SFs, provided many lessons for future similar events. Although many of the strengths of previous SFs, in terms of promoting discussion and interaction among the participants, were evident in SF 2016, some weaknesses identified previously remained and will need to be taken into account in planning the next SF, which is scheduled for 2018. Shortcomings mainly revolved around time allocation and organizational issues rather than scientific content. Selection of future venues for SFs will need to be a major consideration, to ensure easy access for participants from a geographical spread of countries and optimal cooperation in terms of logistics.

¹ The first Science Forum in 2009 was organized by the Science Council, which then became the ISPC.

INTRODUCTION

One of the key roles of the Independent Science and Partnership Council (ISPC) is to convene and broker science discussions as well as strengthen partnerships within the CGIAR and between the CGIAR and its collaborators. In line with this role, the Science Fora (SFs), of which there have been four to date, provide a means to reach out to scientists and scientific communities largely external to the CGIAR, but who could make important contributions to the CGIAR research portfolio and its objectives of reducing poverty, improving food and nutrition security, and improving natural resources and ecosystem services. In addition to exploring recent scientific advances in research areas relevant to a particular theme, SFs aim to identify areas where there is real potential to deliver impacts on development goals through the application of science.

The SFs are designed to be interactive meetings and represent an opportunity for debate that is not provided by regular, specialist conferences. Attempts are made in the SFs to ensure that representation is broad and balanced in terms of geography, organizational affiliation and disciplinary background.

The first SF was held in 2009 in Wageningen, The Netherlands, on “*Science for Development: Mobilizing Global Linkages*” and covered six topics², exploring new areas of research and the most urgent research and partnership needs for making progress towards development goals. Key papers produced from SF 2009 were published in a special issue of *Crop Science*³ in March-April, 2010, Volume 50.

The second SF, on “*The Agriculture – Environment Nexus*”, was held in co-operation with the Chinese Academy of Agricultural Sciences in 2011 in Beijing, China. The plenary and breakout sessions addressed different aspects of the central theme, exploring six topics⁴ in detail. Selected papers from SF 2011 were published in the *Proceedings of the National Academy of Sciences USA* (PNAS, May 21st 2013)⁵.

The third SF was held in Bonn, Germany, in 2013 and focused on “*Nutrition and Health Outcomes: Targets for Agricultural Research*”. The Federal Ministry for Economic Cooperation and Development (BMZ) Germany cohosted the SF, which was structured as a mix of plenary and breakout ses-

2 Resilient natural resource systems; The future of food: developing more nutritious diets and safer food; ICTs transforming agricultural science, research and technology generation; Beyond the yield curve: exerting the power of genetics, genomics and synthetic biology; Eco-efficiencies in agro-ecosystems; Agriculture beyond food: science for a bio-based economy

3 https://www.crops.org/publications/cs/tocs/50/Supplement_1

4 Resource scarcity and the ecological intensification of agriculture; Sustainability science: are new arrangements for scientific partnerships needed to address the integrated natural resources management targets of the reformed CGIAR?; Metrics, monitoring and certification to support sustainable intensification of smallholder agriculture; Can intensifying agriculture save the forests?; Agrobiodiversity: an important contributor to productivity and the key to sustainability, nutrition and rural incomes; Animal protein: increased production and a healthy environment in conflict?

5 <http://www.pnas.org/content/110/21.toc#AgriculturalInnovationToProtectTheEnvironmentSpecialFeatureFreeOnline>

sions. Papers from the meeting were published in the journal *Food Security*⁶, Volume 7, Issue 3, June 2015.

The fourth SF took place in the UN Conference Centre, Addis Ababa, Ethiopia, in April 2016, and was co-hosted by the United Nations Economic Commission for Africa (UNECA). The theme was: *“Agricultural Research for Rural Prosperity: Rethinking the Pathways”*. The objective was to reassess the pathways for agricultural research to stimulate inclusive development of rural economies in an era of climate change. The SF aimed to marshal evidence and build on lessons learned to date, in order to suggest an updated list of priority research areas and approaches that involve more strategic and inclusive engagement with partners. The papers from SF 2016 are yet to be published.

In addition to serving to communicate important information and stimulate discussion, each SF has represented an opportunity for the ISPC to learn and adapt, and for this reason the format of each SF has differed according to past experience. SF 2016 was no exception in this regard, its struc-

ture attempting to take full account of the lessons learned from the three previous SFs, including picking a theme that unites disciplines, providing sufficient time for discussion, securing leaders in their fields as speakers and increasing CGIAR representation, not just in terms of numbers but also ensuring that all CGIAR Research Programs (CRPs) were represented. As for the previous SFs, SF 2016 provided opportunities for early career scientists (ECS) to participate in the discussion on innovative and forward-looking approaches.

Following SF 2016, the ISPC conducted an evaluation of the Forum to assist in planning and modeling future events more successfully. The ISPC managed the evaluation throughout the process, while an external consultant⁷ drafted the evaluation report based on the data collected. An online participant survey was carried out and all the SF 2016 participants were invited to answer a range of questions relating to the value of the Forum. Additionally, citation analyses were done for the papers published in the special issues after the previous three SFs.

6 <http://link.springer.com/journal/12571/7/3/page/1>

7 Jonathan Robinson, science editor and writer

CITATION INDICES FOR SCIENTIFIC PAPERS PUBLISHED FROM SF 2009, SF 2011 AND SF 2013

A comparison of citation indices for scientific papers published from SF 2009, SF 2011 and SF 2013 was done using Google Scholar. Citation data for SF 2009 and SF 2011 were previously reported in “An Evaluation of the ISPC Science Fora”⁸, and are reported again here with an assessment carried out a little more than a year after the previous one. The first citation record for the papers of SF 2013 was compiled in October 2016.

A comparison of the reach to the scientific community can be drawn from considering the citation indices of papers from each of the journal special issues. Citation analysis using Google Scholar has allowed the reach of the 15 articles published in *Crop Science*, a journal widely read by agriculturalists, from SF 2009 to be followed. The data are provided in Table 1, where it is apparent that those

articles that started with a high citation index continued over the course of more than three years to attract the greatest interest. The review article by Fischer *et al.* had the highest number of citations at sampling in January 2013 and maintained its position in August 2016. It was alone among the SF 2009 publications to be cited more than 300 times, while the paper on biofortification by Bouis and Welch exceeded 200 citations and that by Keating *et al.* (on eco-efficient agriculture) 100 citations. All other articles had indices below 100 by August 2016, some, such as that by Ballantyne *et al.*, being relatively rarely cited (17 citations). It is likely that the differences in citation indices reflect the breadth of appeal to readers - specialist papers being less likely to be read and cited than those with a wider focus, such as reviews.

8 <http://ispc.cgiar.org/publication/evaluation-ispc-science-fora>

Table 1. Citation analysis using Google Scholar for SF 2009 articles published in Crop Science, March-April, 2010, Volume 50, Issue Supplement 1 (journal impact factor 1.577).

PUBLICATION	10.01.13	07.04.14	30.08.16
Should enhanced resilience be an objective of natural resource management research for developing countries? Brian Walker <i>et al.</i>	15	25	40
Boundary work and the complexity of natural resources management, Peter P. Mollinga	21	37	84
The future of food: Scenarios for 2050, Bernard Hubert <i>et al.</i>	24	42	72
Biofortification- A sustainable agricultural strategy for reducing micronutrient malnutrition in the global south, Howarth E. Bouis and Ross M. Welch	58	110	254
Relearning old lessons for the future of food- by bread alone no longer: Diversifying diets with fruit and vegetables, John D. H. Keatinge <i>et al.</i>	13	24	43
Information and communication technologies- opportunities to mobilize agricultural science for development, Peter Ballantyne <i>et al.</i>	4	7	17
Mobilizing science to break yield barriers, Ronald L. Phillips	19	33	45
Climate risk management for adaptation to climate variability and change, Walter E. Baethgen	11	16	22
Rapid determination of gene function by virus-induced gene silencing in wheat and barley, Cahid Cakir <i>et al.</i>	7	15	29
Breeding and cereal yield progress, R. A. (Tony) Fischer and Gregory O. Edmeades	82	167	311
Eco-efficient agriculture: Concepts, challenges, and opportunities, Brian A. Keating <i>et al.</i>	45	82	148
Enhancing eco-efficiency in agro-ecosystems through soil carbon sequestration, R. Lal	31	51	97
More than eco-efficiency is required to improve food security, S. E. Park <i>et al.</i>	9	15	22
Development perspectives of the biobased economy: A review, J. W. A. Langeveld <i>et al.</i>	20	35	62
Biorefineries– A path to sustainability? Rajni Hatti-Kaul	10	16	21

Table 2 contains the citation data for the nine journal articles produced for SF 2011 and published in the high impact factor journal PNAS. One year after publication, indices were relatively similar to those for SF 2009. The data in Table 2 indicate that those papers that were cited most in the initial survey of 2014 maintained their lead over those cited to a

lesser extent, the paper by Sayer *et al.* being cited to twice the extent as papers by Zhang *et al.* and Jones *et al.*, in April 2014 and August 2016. As for the publications from SF 2009, the most cited papers addressed broad issues and proposed comprehensively applicable principles.

Table 2. Citation analysis using Google Scholar for SF 2011 articles published in PNAS May 21st 2013 (journal impact factor 9.423).

PUBLICATION	07.04.14	30.08.16
Ten principles for a landscape approach to reconciling agriculture, conservation, and other competing land uses, Jeffrey Sayer <i>et al.</i>	23	241
Addressing uncertainty in adaptation planning for agriculture, Sonja J. Vermeulen <i>et al.</i>	13	90
Green Revolution research saved an estimated 18 to 27 million hectares from being brought into agricultural production, James R. Stevenson <i>et al.</i>	9	56
Innovative grassland management systems for environmental and livelihood benefits, David R. Kemp <i>et al.</i>	4	31
New technologies reduce greenhouse gas emissions from nitrogenous fertilizer in China, Wei-feng Zhang <i>et al.</i>	13	106
Scope for improved eco-efficiency varies among diverse cropping systems, Peter S. Carberry <i>et al.</i>	8	46
Interactive effects among ecosystem services and management practices on crop production: Pollination in coffee agroforestry systems, Virginie Boreux <i>et al.</i>	6	38
Innovations in capture fisheries are an imperative for nutrition security in the developing world, Stephen J. Hall <i>et al.</i>	6	35
Zoonosis emergence linked to agricultural intensification and environmental change, Bryony A. Jones <i>et al.</i>	13	108

The eleven papers that resulted from SF 2013 were published in Food Security, its impact factor being similar to that of Crop Science, although below that of PNAS. After more than a year in print the citation indices were all low, none reaching ten and one having not been cited (Table 3). Time will tell whether these papers have an increasing impact in the field of agriculture and nutrition: past experience with the two previous SFs indicates that there is a possibility of reaching tens of citations after 2–3 years: the most cited paper of the first SF (2009) by Fischer *et al.* had an index of 82 after nearly three years in print. However, it should

be borne in mind that the GS citation indices are more a measure of popularity than an accurate gauge of science quality. Moreover, citations do not necessarily reflect readership, papers can be read with interest and not cited. It might also be the case that those papers that addressed broad issues and proposed principles are read by a larger audience than the citation indices indicate, that is to say that the citation indices actually underestimate the reach of the apparently most popular articles. Without more extensive data, however, this remains speculation.

Table 3. Citation analysis using Google Scholar for SF 2013 articles published in Food Security, Volume 7, Issue 3, June 2015 (journal impact factor 1.517)

PUBLICATION	30.08.16
Strengthening the links between nutrition and health outcomes and agricultural research, Anna Herforth <i>et al.</i>	3
Leveraging agriculture for nutrition in South Asia and East Africa: examining the enabling environment through stakeholder perceptions, Stuart Gillespie <i>et al.</i>	1
Measuring multiple facets of malnutrition simultaneously: the missing link in setting nutrition targets and policymaking, Patrick Webb <i>et al.</i>	6
The environmental impact of nutrition transition in three case study countries, Margaret Gill, <i>et al.</i>	5
The food environment, its effects on dietary consumption, and potential for measurement within agriculture-nutrition interventions, Anna Herforth <i>et al.</i>	7
Urbanization, market development and malnutrition in farm households: evidence from the Demographic and Health Surveys, 1986–2011, Amelia F. Darrouzet-Nardi <i>et al.</i>	0
Improving diets with wild and cultivated biodiversity from across the landscape, Bronwen Powell <i>et al.</i>	8
Developing country consumers' acceptance of biofortified foods: a synthesis, Ekin Birol <i>et al.</i>	7
International agricultural research to reduce food risks: case studies on aflatoxins, Delia Grace <i>et al.</i>	6
Agricultural policy and nutrition outcomes – getting beyond the preoccupation with staple grains, Prabhu Pingali <i>et al.</i>	7
Agricultural research for nutrition outcomes – rethinking the agenda, John McDermott <i>et al.</i>	3

EVALUATION OF SF 2016

A web-based questionnaire was sent to all participants to compile opinions about important aspects of the Forum. Several of the questions were the same as those asked of participants at the previous Forum in 2013, thereby allowing comparisons to be made among responses. The questionnaire is provided in the Annex. Most of the information reported here specifically for SF 2016 derived from responses to the questionnaire sent to the 190 participants attending the Forum.

Participant details were also requested from all participants prior to the Forum and used to determine the breakdown of the SF 2016 participants by region in which they were based (Figure 1), their work setting (Figure 2) as well as gender (Table 4). There were 190 registered participants at SF 2016 who provided details on their country base, gender, work setting, capacity and previous attendance. An additional three unregistered participants who attended the Forum provided only their names, which did not allow their personal data to be used in the analyses. The overall participant numbers were lower than for previous SFs (Table 4). One issue that militated against increased attendance at SF 2016 was the venue: it was more difficult to obtain visas for Ethiopia for many potential participants than it had been for some of the other countries where the SF has been held.

The regional base breakdown for the participants is given in Figure 1. For Europe, many Italy-based participants (17) were from the ISPC secretariat and the numbers of Ethiopia-based and Ken-

ya-based participants were relatively large (71 and 21 respectively), contributing substantially to the Africa figure. This was because the SF was held in Addis Ababa, and it has naturally been a feature of SFs that representatives of the country hosting the SF predominate. Outside of Africa and Europe other regions were relatively poorly represented, as has been the case for all previous SFs. Latin America was not well represented, with 4.2% of participants, possibly due to the language of the SF being English or that the CGIAR has relatively fewer activities in Latin America compared to other developing regions.

Determination of exact country representation is made difficult by CGIAR and ISPC representatives not being nationals of the countries in which they work. It was stated in the previous SF evaluation report that *'care will have to be exercised in the future to ensure that a representative balance is aimed for among participants in terms of gender, nationality and area of expertise.'* This is easier to say than to accomplish successfully. In the previous SF evaluation it was suggested that *'Venue is an important factor to the extent it helps achieve optimal diversity and the right mix of participants.'* Getting this right is not an easy matter, and consideration has to be given to venue in particular, in terms of accessibility, which in turn is determined by, *inter alia*, price of travel and visa requirements. Venue also plays a role in determining the level of assistance that can be provided to the Forum organizers: put simply, it is easier to get things done in some countries than in others.

Attempts were made to organize a specific regional breakout session on Latin America, but unfortunately it was not possible. It is apparent that there is a trade-off between organizing the SF in Europe, for example, and organizing it in a developing country. In terms of costs and benefit-cost considerations, in addition to ease of travel, it might be prudent to organize future SFs in a country where logistics and costs are most conducive to a positive outcome – SF 2013, held in Bonn, was considered by many to be particularly well-organized, well-attended and cost-effective.

According to the data in Figure 2, the CGIAR provided a large proportion of participants, with representatives from universities and research institutions making up a substantial fraction of those attending the SF. These figures are very similar to those reported for SF 2013, although more donors were present on that occasion. It is notable that a single participant represented the private sector (although it has always been difficult to engage the private sector at the SFs) and five individuals represented national governments. Of course the topic and venue have a significant effect on attracting a greater range of participants.

Figure 1. Regional base of the 190 SF 2016 participants

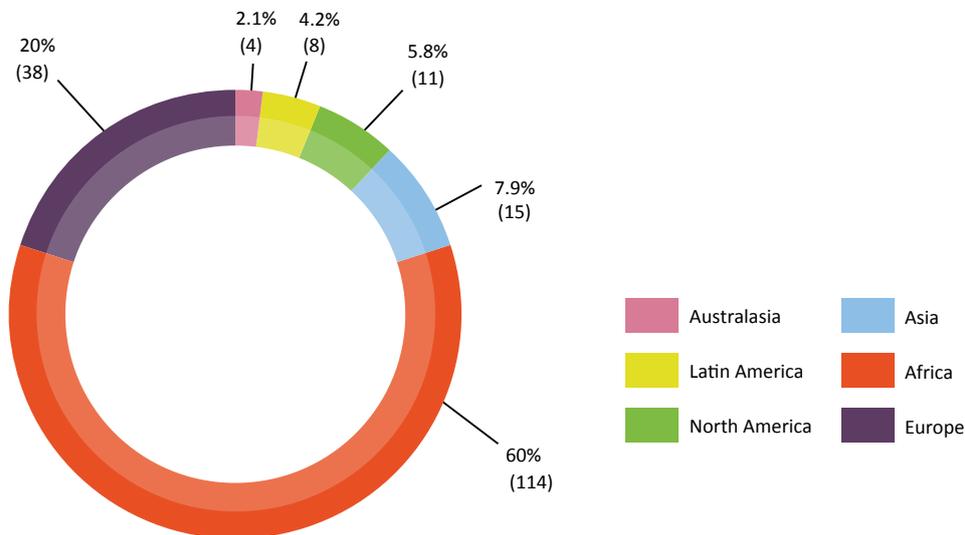
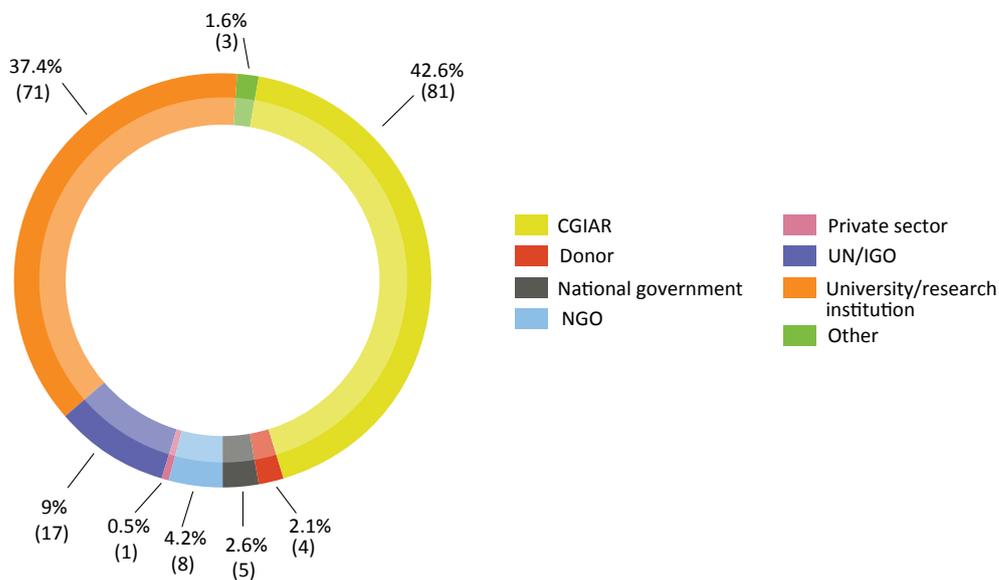


Figure 2. Work setting of the 190 SF 2016 participants



Steady progress was made between SF 2009 and SF 2013 regarding gender balance among SF participants, but according to the data provided in Table 4, the progress did not continue through SF 2016 –

female representation dropped to 30% (although it was still similar to that seen for SF 2011 and higher than that for SF 2009).

Table 4. Progress in ensuring gender balance at SFs

GENDER	2009 NO.	2009 %	2011 NO.	2011 %	2013 NO.	2013 %	2016 NO.	2016 %
Male	244	76	147	68	120	56	133	70
Female	78	24	70	32	96	44	57	30
Total	322		217		216		190	

The mentoring programme

Twenty-three ECS, representing 11 men and 12 women, were sponsored to attend SF 2016 (selected out of 74 expressions of interest that were received in response to a call for applications) and were allocated mentors to introduce them to some of the well-known senior scientists attending the SF and encourage them to participate in the discussions, particularly in the smaller breakout sessions where there were more opportunities for engagement. Most ECS also presented posters at the Knowledge Share Fair and all submitted a report to the ISPC describing their experiences and thoughts.

Following the Forum, there was an opportunity for the ECS to submit a research proposal to the ISPC, which for five resulted in an award to support exchange visits to visit a new partner, with the aim of either writing a paper or a proposal for a joint research project to be submitted to funding bodies. Previous recipients of the SF 2013 awards carried out research in universities and International Research Centres⁹, which subsequently led to publication of scientific papers, enrolment in doctoral programs and kick-starts to scientific careers (based on follow-up by the ISPC Secretariat in October 2016).

THE QUESTIONNAIRE

The questionnaire was made available to all 190 SF 2016 participants and a reminder was sent one week later to increase response rates. The response rate was 31%: 59 participants responded. This is half the number of respondents that responded to the questionnaire for SF 2013 (61.3%). A breakdown of the respondents indicated that 15 were early career scientists, 14 were invited speakers, 10 were breakout coordinators, 6 were connected with the administration of the SF, 12 were general participants and 2 provided no details on their roles. It would have been desirable to have stimulated a greater response to the questionnaire from the registered participants than actually occurred. Survey fatigue is prevalent and it is likely that some people do not have sufficient time or opportunity to complete a questionnaire, albeit a relatively brief one. No interviews were conducted at SF 2016, but perhaps a return to directed interviews (as was done for SF 2013) would be necessary to elicit the desired information from participants. Only through direct interviewing can the most relevant issues be pursued. Unfortunately, the completed questionnaires contained far too many single word responses to questions that sought greater detail: much of the desired information was not captured.

⁹ Helen Keller International and ICRAF (1), the World Vegetable Center (2), Tufts University (1), ILRI (1) and Bioversity International (2).

Figure 3. Reasons of the 59 respondents to the SF 2016 questionnaire for participating in the SF

What were your reasons for attending the Science Forum 2016? Please select all that apply.

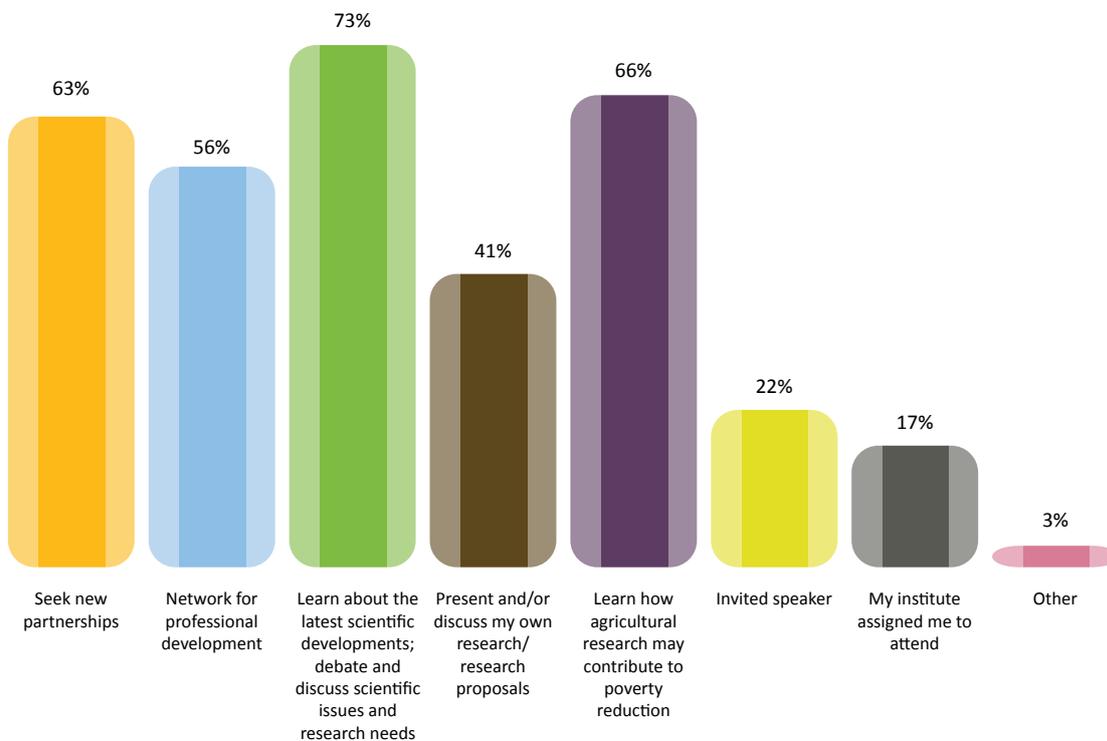
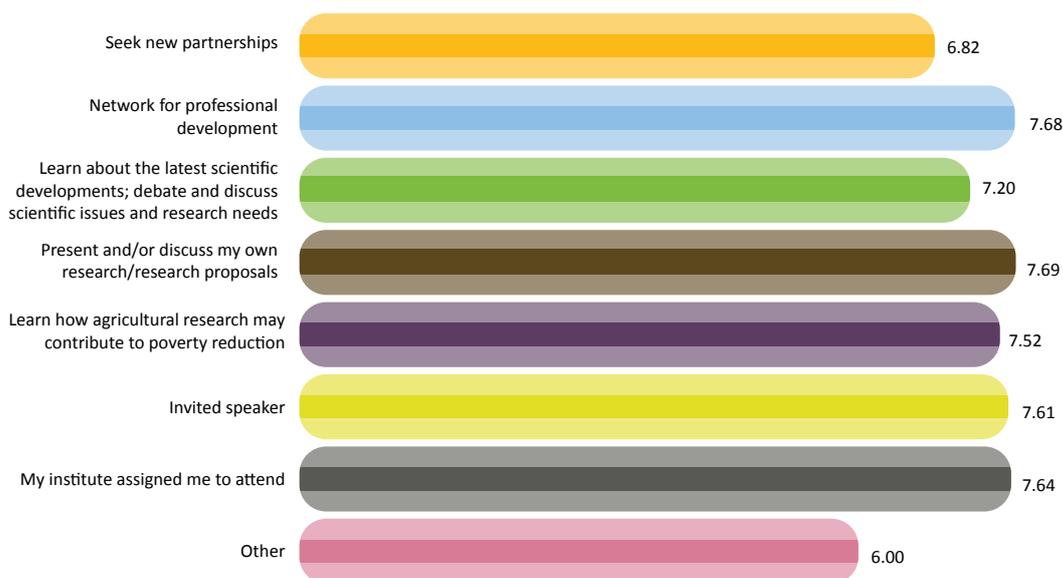


Figure 4. Expectations of the 59 respondents to the SF 2016 questionnaire rated on a ten-point scale

Please rate the extent to which your expectations were met by SF 2016. 1 = not at all and 10 = exceeded my expectations.



Reasons for attendance

The reasons for attendance at SF 2016 are detailed in Figure 3. Ranking the responses, it is evident that the most significant reason given was to *'Learn about the latest scientific developments; debate and discuss scientific issues and research needs'* (73%) and the least significant reasons were mere *'invitation'* and *'assignment'* (22% and 17%). The responses to the questionnaire for participants at SF 2013 were largely similar in terms of proportions, 75%, 30% and 11% respectively.

In terms of expectations, detailed in Figure 4, they were met over all categories similarly as for SF 2013, particularly regarding networking for professional development. It appears that an improvement over SF 2013 was registered because *'presentation and*

discussion of participants' own research' was rated 6.46 for SF 2013 and 7.69 for SF 2016. The only value that fell below seven for SF 2016 was that for seeking new partnerships (6.82), which was also relatively low for SF 2013 (6.64), indicating that more might have been achieved in promoting partnerships during the course of the SF.

The key benefits of participation in SF 2016 are outlined in Box 1, the majority of respondents being appreciative of the opportunities for networking and discussion afforded by attendance at the Forum. This benefit was made possible by allocating sufficient time for important activities: 76% of respondents indicated that there was sufficient time for networking, 20% indicated the contrary, and 4% made no comment.

BOX 1. KEY BENEFITS OF PARTICIPATING IN THE SF 2016 ACCORDING TO THE 59 RESPONDENTS TO THE 2016 SF QUESTIONNAIRE.

The benefits of participation mentioned by most respondents concerned the 'exceptional' opportunities to network, meet new scientists and establish, or at least discuss opportunities for, partnerships. The SF also represented an opportunity for learning about the linkages between agricultural research and poverty alleviation, particularly with respect to the difficulties associated with the complex pathways from research to impact. Some respondents considered that the SF

provided them with the opportunity to understand better the drivers of agricultural and economic growth, and this was largely attributable to being present at informative talks, given by world-class scientists, and being able to discuss issues with a broad cross-section of experts involved in agricultural research and poverty alleviation. These benefits are very similar to those identified for SF 2013.

Appropriateness and effectiveness

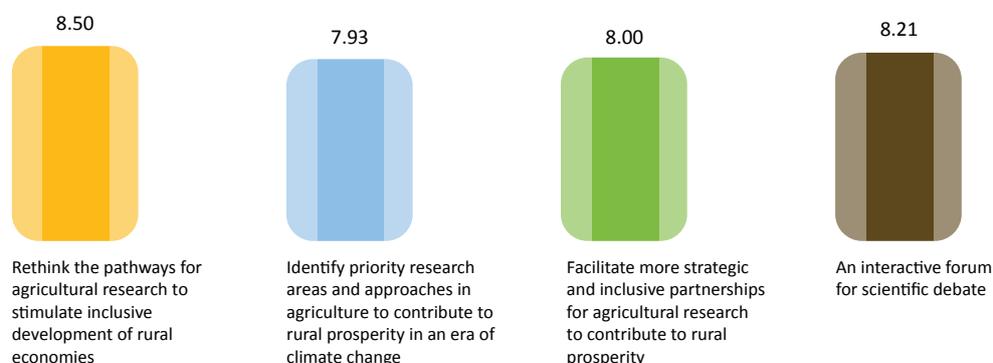
Rates of appropriateness of SF 2016 were very high, as they were for the previous SF. However, the question relating to climate change received the lowest appropriateness rating, while that concerning rethinking the pathways received the highest. Interestingly, the figures for effectiveness were consistently lower (Figure 6), as for SF 2013, indicating that there remains potential for improvement in tackling these important issues in the SF. There are prospects for improvement in forthcoming SFs. However, it would probably not be prudent to read

too much into differences among the figures for each individual question because the differences among the question classes themselves are quite subtle in many cases and responses might rely heavily on personal interpretations. What can be said, however, is that overall, according to responses to the questionnaire, SF 2016 was appropriately targeted and effective in its objectives.

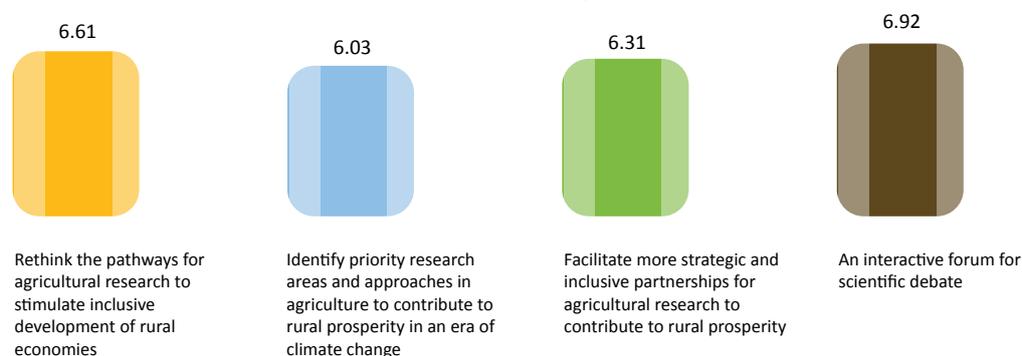
The key outcomes of SF 2016 are described in Box 2, where collaboration and partnerships, as similarly for the key benefits described in Box 1, were the issues most referred to.

Figure 5. Appropriateness on a ten-point scale for SF 2016 according to the 59 questionnaire respondents**How would you rate the appropriateness of each of these Science Forum objectives?**

1 = not appropriate at all and 10 = very appropriate

**Figure 6.** Effectiveness on a ten-point scale for the SF 2016 according to the 59 questionnaire respondents**How effective do you feel the Science Forum has been in meeting each of the following objectives?**

1 = not at all effective and 10 = more than met the objective

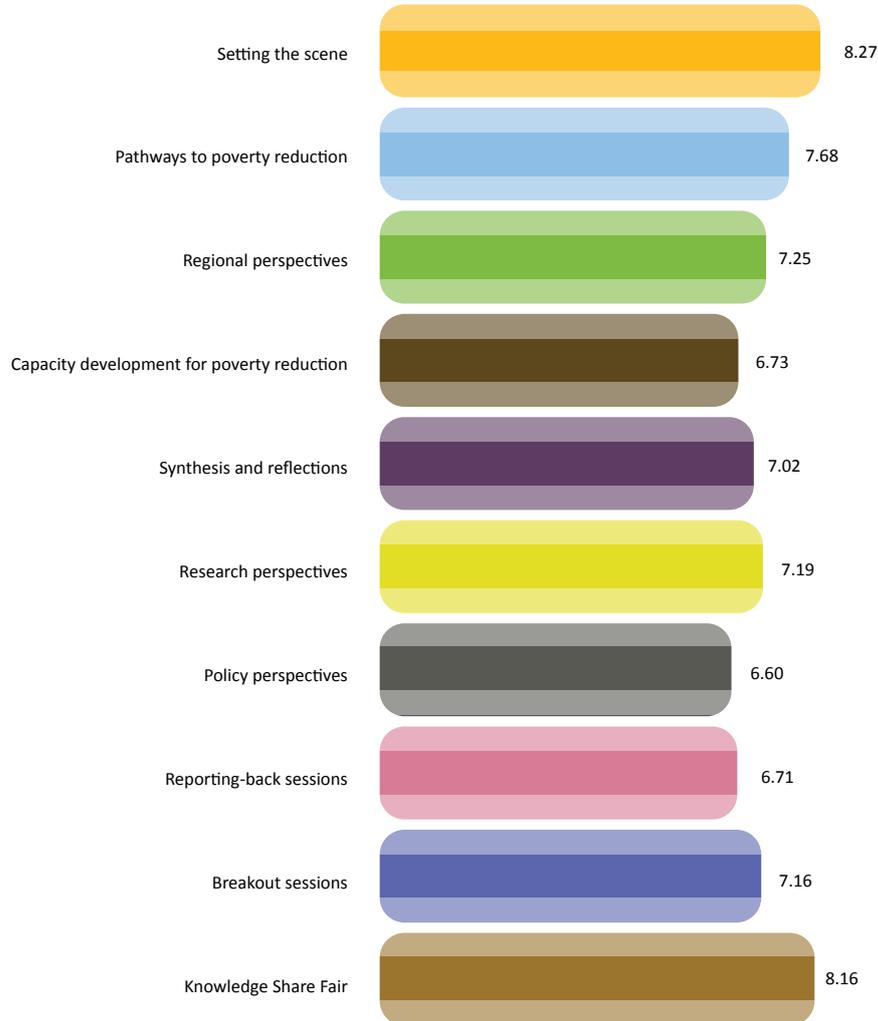
**BOX 2. SOME KEY OUTCOMES ACCORDING TO THE 59 RESPONDENTS TO THE QUESTIONNAIRE FOR SF 2016**

Many of the respondents raised the issue of better collaboration and strengthened partnerships being developed as a result of the SF. Improved awareness was a key outcome according to some, particularly regarding the problems inherent in improving rural prosperity and finding possible solutions to associated obstacles through application of the results forthcoming from agricultural research. It was suggested that the SF highlighted identification of contemporary research topics, including the importance of crops for the future, particularly in the face of impending climate change.

Several respondents suggested that as a result of the SF, there was better appreciation of the detailed nature of poverty reduction and improved rural prosperity. Participants appreciated being made more aware of the need for more transformative approaches to agricultural research that take account of the complex interdependencies that characterize the issue and which require more multidisciplinary than has been the case to date. The answers to this question indicate that the SF was highly informative for many respondents.

Figure 7. Relative value of SF 2016 session type according to the 59 questionnaire respondents

How valuable and informative did you find the Science Forum sessions? Please rate using a scale of 1 to 10, where 1 = not at all and 10 = exceptional



Value and informativeness of plenary sessions

The plenary sessions were highly valued by the respondents to the questionnaire according to the information contained in Figure 7, although there was a spread in the scores, ranging from an 8.27 high for *'setting the scene'* to a low of 6.60 for *'policy perspectives'*. The *'knowledge fair'* scored high also, at 8.16. From the associated comments on key values of the sessions suggested by the 59 respondents to the questionnaire for the SF 2016 (provided in Table 5) and comments on facilitation of the plenary and breakout sessions and suggestions for the future from the 59 respondents (Box

3), the difference in scores given in Figure 7 might, to some extent, be a result of differences in presentation and SF management rather than the subject. It is possible that the ratings reflect the quality of presentation and facilitation rather than the importance of the issue presented and discussed. With more flexible facilitation, it should be possible to address this issue in future SFs.

Some respondents commented on there having been too few high quality plenary sessions and the sessions having been too light on science. *'Setting the scene'*, *'pathways to poverty reduction'* and *'capacity development for poverty reduction'* were all rated most valuable (Table 5), but the remaining

sessions attracted little positive comment. This is a little worrying in that the issues of ‘*research perspectives*’ and ‘*policy perspectives*’ are very important, and the ‘*synthesis and reflections*’ should probably have represented an opportunity to summarize and identify gaps in current knowledge and approaches.

The Knowledge Share Fair, which was highly rated (Figure 7), was much appreciated by the respondents (Box 4).

Field trip

Most respondents made no comment on the value of the field trip, although some considered it to have been valuable. Information provided in advance would have added to its usefulness according to some, and it could have come before the meeting rather than after it. It was considered to be a good idea overall, but the field trip could have been better linked with the presentations according to respondents. Some of the comments appear to have been made without knowledge of the information provided on the SF 2016 website, which detailed the five options (given below) and provided the full schedule for the field trips.

1. East Shoa direction. Focus on livelihood opportunities with livestock, irrigation and trees.
2. Debre Berhan direction. Focus on sustainable intensification, fruit, livestock, small-scale irrigation, dry season animal feeding, integrated watershed management.
3. Holetta direction. Focus on root crops and potato value chains.
4. Debre Zeit direction. Focus on livelihood and field and staple crops – post-harvest, farmer group collective production/value addition and marketing, seed and input systems, and Debre Zeit research station.
5. Addis Ababa and region. Focus on public-private actors and partnerships, Ethiopia Biodiversity Institute, Menagesha Biotech Industry, AKF feed processing company.

Breakout sessions: strengths and weaknesses

Strengths and weaknesses of the breakout sessions are detailed in Table 6. The responses were generally not particularly detailed, but there was consistency in detailing the weaknesses. Time constraints were listed by many of the respondents, as previously described for the plenary sessions.

Table 5. Some key values of the plenary sessions suggested by the 59 respondents to the questionnaire for the SF 2016.

Plenary session	Rated most valuable, no.	Comments
Setting the scene	13	Science based, global approach, provocative. New insights provided and structured to stimulate debate and engagement.
Pathways to poverty reduction	13	Provided evidence and presented challenges.
Regional perspectives	7	Looked to the future.
Capacity development for poverty reduction	13	Explanation of important yet neglected topic. Impact perspective. Highlighted role of education.
Synthesis and reflections	1	
Research perspectives	4	Emphasized climate change effects and challenges.
Policy perspectives	1	

BOX 3. SOME COMMENTS ON FACILITATION OF THE PLENARY AND BREAKOUT SESSIONS AND SUGGESTIONS FOR THE FUTURE FROM THE 59 RESPONDENTS TO THE QUESTIONNAIRE FOR SF 2016

The respondents generally found little fault with the facilitation of the plenary and breakout sessions, describing it as *'excellent'*, *'effective'* and *'useful'*. A minority suggested that facilitation was *'too intrusive'* and *'overdone'*, one respondent saying that *'... became an objective rather than a tool'*. There were indications that the facilitators were not at all times objective and independent and that they occupied too much time, time that could otherwise have been spent in original thinking and enhanced participation. Time was an is-

sue; several respondents claiming that there was insufficient time to explore issues in depth, the timetable being *'too packed'*, although the aim was to attempt a 50:50 split between plenary and breakout sessions. Insufficient interdisciplinarity was an issue for some participants, although the Forum did aim at *'diversity in participation, including representatives from donor agencies, NGOs, and the private sector as well as researchers both from within and external to the CGIAR.'*

BOX 4. SOME COMMENTS ON THE KNOWLEDGE SHARE FAIR FROM THE 59 RESPONDENTS TO THE QUESTIONNAIRE FOR SF 2016.

The Knowledge Share Fair, according to the overwhelming majority of participants was *'great'*, *'valuable'*, *'excellent'*, *'wonderful'* and *'crucial'*. For some it was their favourite component of the SF and was described as being *'well-organized'*, *'informative'* and *'educational'*. There were very few dissenters: one suggesting that

the Fair indicated a lack of coherence in the CGIAR and another that it was *'too scientific'* for development practitioners. The results for SF 2016 differed from those for SF 2013, where the Knowledge Share Fair was generally rated as being of relatively low value.

There were also indications that the breakout sessions were not well planned in all instances and that there were too few participants. As the vast majority of participants were from Africa, principally Ethiopia and Kenya, it is not surprising that the session on Asia had too few attendees. The strengths of the breakout sessions were more session specific. Some were well organized, had good case studies and were visionary and managed successfully to get across key issues. Much of the success of the presentations and breakout sessions

depends on personalities and expertise: presenters and facilitators have to be of the highest calibre to challenge ideas and issues and engage the audience actively. This not only requires expertise but also enlightened management of the time and other resources available. There were suggestions that endorsement was sought for preconceived ideas and that there was domination, in some instances, by particular individuals. Optimal participation of all interested participants, is always desirable but not always achievable.

Table 6. Some key observations on the strengths and weaknesses of the breakout sessions according to the 59 respondents to the questionnaire for SF 2016.

BREAKOUT SESSION	STRENGTHS	WEAKNESSES
Linkages between staple crops research and poverty outcomes	Well organized, useful.	Time constraints, lack of focus, too much on production, insufficient socio-economics.
Nutrient-dense climate-resilient future crops	Importance of crops other than staples, examples of success.	Time constraints, lack of clarity, Africa focussed.
Animal agri-food systems research for poverty reduction	Good explanation of pathways and value chains.	Too few participants, poor time management, insufficient integration with crops.
Contribution of research on agricultural policies, institutions, and markets to poverty reduction	Good case studies, policy implications.	Time constraints, domination by CRP leader.
Africa	Importance of diversity, usefulness of partnerships.	Time constraints, too much theory, improvised rather than planned.
Asia	New visions.	Too few Asian participants, too much presentation, insufficient discussion.
Climate change	Links with poverty, research gaps.	Time constraints, too broad.
Understanding impact delivery from agricultural research	Importance of tracking research progress, need for structured methods to assess research impacts.	Lack of preparation, lack of clarity, endorsement sought for preconceived ideas.

Follow-up suggestions

Several follow-up suggestions were made by respondents to the questionnaire and are given below:

- Role model countries could present their experiences
- A synthesis report of the SF findings could be provided to participants
- Transfer all relevant information to the ISPC website for easy reference
- ISPC could establish a forum (online discussion/blog) to encourage partnerships
- There could be useful follow-up between early-career scientists and their mentors

Some of these suggestions have already been implemented, but not everyone was aware of them.

For instance, a summary of the plenaries and breakout sessions together with a brief distilling the key messages is published subsequent to every Forum. For SF 2016, much of the relevant information and findings were available from the website¹⁰, including abstracts and background papers from the plenary speakers and suggested background reading materials. The suggestion that there might be an online discussion forum or blog set up to encourage partnerships is interesting given that the dedicated website for SF 2016 includes a blog and 'Stay Current', a link that provided live updates on SF 2016 events. There were also background papers for most of the breakout sessions. Live streaming of the plenary sessions took place and Twitter updates were sent out regularly, as was information through e-mail to all the registered participants. All the SF 2016 presentations were made available on SlideShare and were viewed extensively: from

¹⁰ <http://www.scienceforum2016.org/>

102 to 2468 times, depending on the presentation. Only 25% of the presentations were viewed fewer than 149 times. The videos for the plenary sessions, and some discussions conducted during the forum, were uploaded to YouTube and viewed over a hundred times as of 11th October 2016. The ISPC Twitter account was used to disseminate information about SF 2016 and between March and May, the tweets earned 19.5K impressions, with 53 retweets during the period.

Despite so much information being available, and having been viewed by many, apparently some respondents to the questionnaire were unaware of it. It is difficult to see how this apparent obstacle can be overcome other than to outline the sources of information during the opening session and at opportune occasions during the course of events. It might also be useful in the future to include some questions in the questionnaire regarding the extent and usefulness of information supplied prior to and during the SF.

The suggestion that there might be useful follow-up of early career scientists and their mentors is valid, and this has proved practicable for the five individuals who received awards, allowing them to be placed in a research institute to pursue the project that secured them the award. For those who were not successful with their research proposal, through their mentors, they did meet numerous people at the Forum and were put in contact with other scientists. This should have allowed them to communicate with many people beyond the SF, although the extent to which this occurred has not been gauged.

Future SF topics

A vast range of subjects was mooted for future SFs ranging from the specific to the general, including current and future technologies; climate change; gender issues; big data; incentives for organizing agricultural research; urban agriculture; knowledge management; communication for impact; minor, under-utilized and future crops; science of delivery

and impact; resilience and vulnerability; genomics; governance and research; livestock development for nutrition and health; science for livelihoods; the African scientific brain drain; capacity building and education in Africa; pastoral systems; and land-use and ecosystem services.

While the reasoning behind many of these suggestions might be sound, some do not fall within the ambit of CGIAR research and others do not appear to be areas of scientific research at all. The ISPC seeks to identify SF topics that: i) cut across the interest of several of the CRPs/Centers and are related to the CGIAR Strategy and Results Framework; ii) have a strong potential for benefits across regions; iii) relate to fields with recent scientific developments that have a strong potential for development impact; and, iv) represent areas in which the CGIAR must build more effective partnership, to accelerate progress in achieving its goals. SFs are not intended to be typical scientific, specialist conferences; they represent a means to get diverse discourse on an important agricultural research theme.

General comments

The questionnaire respondents provided some general comments on SF 2016, many of which were mentioned in answer to previous questions posed in the questionnaire. Some respondents suggested that the SF was insufficiently scientific and aimed at too broad an audience to provide useful information. Consequently it was proposed that future SFs should aim at more scientific content, better focussed to the needs of the participants and the research agendas of the CGIAR centres. Because a principal aim of the Forum was to enhance partnerships and collaboration, it was felt that more could be done to encourage better representation at the Forum, in terms of geographical spread and work setting. One respondent mentioned establishing links with the education sector, which could usefully include representatives from centres of tertiary education. Better donor representation was mentioned specifically, along with farmer representa-

tion. However, the SF is a science forum and it has to be considered how advances in agricultural science might be promoted best. Encouraging greater participation from the donor and farming communities might not represent the best way forward in this respect, although the need for more non-CGIAR representation is apparent. One respondent did suggest that a decision be made on whether the SF is for enhancing partnerships or debating research and its impact, although these issues cannot be mutually exclusive.

Some of the respondents commented on the structure of the SF and two key issues came to the fore: there was insufficient debate and the calibre of the speakers and facilitators was not as high as some

would have liked to have seen. These issues are naturally relatively easy to identify with hindsight, but difficult to plan for. There is a limited amount of time available for debate and the purpose is not to have the SF represent a big brainstorming session. The best that could be hoped for is that the subjects debated are those that most merit debate and that the mediators do a good job in keeping the discussions focused and relevant. This requires careful selection of topics and people to lead the debates. The issue of striking balances between plenary and breakout sessions, and between presentation and discussion, has come up previously, but achieving a balance that suits all participants remains difficult.

CONCLUSIONS

SF 2016 was successful in meeting its main objectives of bringing people together to discuss an important agricultural theme, initiate partnerships and encourage collaboration, according to those that responded to the questionnaire. The theme, *“Agricultural Research for Rural Prosperity: Rethinking the Pathways”*, was appropriate and the Forum was largely managed effectively. SF 2013 was hailed as being the best SF to date and represented a solid base on which future SFs could build. However, SF 2016 fell short on a few issues, particularly regarding maximizing diversity and stakeholder representation. The improving gender balance over the course of the three previous SFs was not continued. Moreover, the number of participants overall was lower than for previous SFs and the response rate to the questionnaire was low relative to previous response rates. Many of the strengths of previous SFs were continued in SF 2016, and were similarly appreciated by participants, but many of the weaknesses identified previously remained and have yet to be successfully addressed.

These mainly revolved around time allocation and organizational issues and should be able to be addressed in time for the next SF in 2018. It appears from responses to the questionnaire that many participants were not aware of the large amount of information provided on the ISPC website prior to and during the SF. Perhaps the challenge is to get potential and actual participants to read the information provided.

Much of the success of an SF depends on venue, as well as on theme, and in this respect future efforts should be directed at holding SFs at venues that are easily, and relatively cheaply, reached by participants from a geographical spread of countries and where the hosting body is able to make a solid contribution to the logistics that underlie a successful SF. Taking account of such considerations will not only improve the effectiveness and efficiency of the event, but will also improve the benefit-cost aspects.

ANNEX

ISPC Science Forum 2016 participants' survey

YOUR VIEWS AND SUGGESTIONS ON THE ISPC SCIENCE FORUM

The Independent Science and Partnership Council (ISPC) of CGIAR would like to hear your views and suggestions with respect to the ISPC Science Forum: *"Agricultural research for rural prosperity: Rethinking the pathways"* that you attended 12-14 April, in Addis Ababa.

It is important that we hear YOUR views, so that they can be reflected in follow-up activities and planning of future Science Fora.

We estimate that it will take at most 10-15 minutes of your time to respond to the questions, which are categorized into six topics.

SECTION 1. REASON(S) FOR ATTENDING THE SCIENCE FORUM 2016

What were your reasons for attending the Science Forum 2016? Please tick all that apply.

Please also rate the extent to which these expectations were met by the Science Forum 2016. Use a scale of 1 to 10, where 1 = not at all and 10 = exceeded my expectations.

OBJECTIVE	AN OBJECTIVE OF MINE (SELECT ALL THAT APPLY BY MARKING AN X BELOW)	YOUR RATING (1–10) OR N/A IF NOT APPLICABLE (IF IT WAS NOT ONE OF YOUR OBJECTIVES)
Seek new partnerships		
Network for professional development		
Learn about the latest scientific developments; debate and discuss scientific issues and research needs		
Present and/or discuss my own research/ research proposals		
Learn how agricultural research may contribute to poverty reduction		

My institute assigned me to attend		
Invited speaker		
Other (please explain)		

Can you identify and describe one key benefit that you personally obtained from your participation in the Science Forum 2016?

In your opinion, was there enough time for networking? YES/NO

SECTION 2. EFFECTIVENESS OF THE SCIENCE FORUM 2016

How would you rate the **appropriateness** of each of these Science Forum objectives? Please rate using a scale of 1 to 10, where 1 = not appropriate at all and 10 = very appropriate.

OBJECTIVE	YOUR RATING (1–10) OR DK (DON'T KNOW)
Rethink the pathways for agricultural research to stimulate inclusive development of rural economies	
Identify priority research areas and approaches in agriculture to contribute to rural prosperity in an era of climate change	
Facilitate more strategic and inclusive partnerships for agricultural research to contribute to rural prosperity	
An interactive forum for scientific debate	

How **effective** do you feel the 2016 Science Forum has been in meeting each of the following objectives? Please rate using a scale of 1 to 10, where 1 = not at all effective and 10 = more than met the objective.

OBJECTIVE	YOUR RATING (1–10) OR DK (DON'T KNOW)
Rethink the pathways for agricultural research to stimulate inclusive development of rural economies	
Identify priority research areas and approaches in agriculture to contribute to rural prosperity in an era of climate change	
Facilitate more strategic and inclusive partnerships for agricultural research to contribute to rural prosperity	
An interactive forum for scientific debate	

Can you identify one key outcome that you think is most likely to arise from the Science Forum 2016?

SECTION 3: VALUE OF THE SCIENCE FORUM 2016 SESSIONS AND EVENTS

How valuable and informative did you find the Science Forum 2016 sessions? Please rate using a scale of 1 to 10, where 1 = not at all and 10 = exceptional

SESSION	PLEASE INDICATE YOUR RATING (1–10) OR N/A (NOT APPLICABLE, IF YOU DID NOT PARTICIPATE)
Plenary session - Setting the scene	
Plenary session - Pathways to poverty reduction	
Plenary session - Regional perspectives	
Plenary session - Capacity development for poverty reduction	
Plenary session - Synthesis and reflections	
Plenary session - Research perspectives	
Plenary session - Policy perspectives	
Reporting back sessions	
Breakout sessions	
Knowledge Share Fair	

Which **plenary session** did you find most valuable and why? (Please choose **one** of the following: (Setting the scene; Pathways to poverty reduction; Regional perspectives; Capacity development for poverty reduction; Synthesis and reflections; Research perspectives; Policy perspectives). Do you have any thoughts on the **length of plenary talks** – were they too short or too long?

How valuable did you find the facilitation format at the plenary and breakout sessions? What did you find useful? What were the weaknesses? Do you have any comments, observations, or suggestions for facilitation at future Fora?

How valuable did you find the Knowledge Share Fair? What did you find useful? What were the weaknesses?

SECTION 4: ASSESSMENT OF THE BREAKOUT SESSIONS

For the breakout sessions **you attended**, please give us your impressions on the usefulness of the sessions.

BREAKOUT SESSION 1 LINKAGES BETWEEN STAPLE CROPS RESEARCH AND POVERTY OUTCOMES - TUESDAY 12TH APRIL	
What did you find useful?	
What were the weaknesses of the session?	
Was the time for breakout group too short or too long?	

BREAKOUT SESSION 2 NUTRIENT-DENSE CLIMATE-RESILIENT FUTURE CROPS - TUESDAY 12TH APRIL	
What did you find useful?	
What were the weaknesses of the session?	
Was the time for breakout group too short or too long?	
BREAKOUT SESSION 3 ANIMAL AGRI-FOOD SYSTEMS RESEARCH FOR POVERTY REDUCTION - TUESDAY 12TH APRIL	
What did you find useful?	
What were the weaknesses of the session?	
Was the time for breakout group too short or too long?	
BREAKOUT SESSION 4 CONTRIBUTION OF RESEARCH ON AGRICULTURAL POLICIES, INSTITUTIONS, AND MARKETS TO POVERTY REDUCTION – TUESDAY 12TH APRIL	
What did you find useful?	
What were the weaknesses of the session?	
Was the time for breakout group too short or too long?	
BREAKOUT SESSION 5 AFRICA - WEDNESDAY 13TH APRIL	
What did you find useful?	
What were the weaknesses of the session?	
Was the time for breakout group too short or too long?	
BREAKOUT SESSION 6 ASIA - WEDNESDAY 13TH APRIL	
What did you find useful?	
What were the weaknesses of the session?	
Was the time for breakout group too short or too long?	
BREAKOUT SESSION 7 CLIMATE CHANGE - WEDNESDAY 13TH APRIL	
What did you find useful?	
What were the weaknesses of the session?	
Was the time for breakout group too short or too long?	

BREAKOUT SESSION 8 UNDERSTANDING IMPACT DELIVERY FROM AGRICULTURAL RESEARCH - WEDNESDAY 13TH APRIL	
What did you find useful?	
What were the weaknesses of the session?	
Was the time for breakout group too short or too long?	

SECTION 5: SUGGESTIONS FOR IMPROVING FUTURE SCIENCE FORA

What specific follow-up activities should take place in order to maximize the value and impact of Science Forum 2016, which you just attended? Who needs to do these?

Do you have any suggestions for **themes** of future Science Fora?

Do you have any other comments, observations, or suggestions, about the Science Forum 2016, or about future Science Fora?

Did you attend the field trip on Friday, April 15th? If yes, is this something you would like to see in future Science Fora? Do you have any specific feedback related to the organization and content of the field visits?

SECTION 6: BACKGROUND INFORMATION ABOUT YOURSELF

In which country are you based?

Are you:

- Female?
- Male?

What is your main work setting?

- CGIAR
- University/research institution
- National government
- IGO/NGO
- Private sector
- Donor
- Other (please specify)

In what capacity did you attend the Forum?

- Invited speaker/panellist
- Breakout session coordinator
- Early career scientist
- Registered participant
- Other (please explain)

Have you attended previous Science Fora?

- Yes
- No

Thank you very much for completing this survey



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