

NATIONAL PROGRAM FOR RESEARCH CENTERS OF EXCELLENCE
(FONDAP)

FIRST PERIOD EVALUATION REPORT

This form is intended to facilitate your work as a referee and standardize the evaluation reports. Each topic should be evaluated with concepts ranging from “Excellent” to “Does Not Qualify”. Please indicate your qualification for each criterion in a scale between 0 to 5 points (half points are also allowed). Each qualification must be properly supported with relevant comments.

Grading scale:

0 = Does Not Qualify	The proposal fails to meet/address the criterion under analysis or cannot be evaluated due to missing or incomplete information.
1 = Poor	The proposal does not properly meet/address the aspects of the criterion or there are serious inherent deficiencies.
2 = Fair	The proposal broadly meets/addresses the aspects of the criterion, but there are important deficiencies.
3 = Good	The proposal properly meets/addresses the aspects of the criterion, although some improvements are required.
4 = Very Good	The proposal meets/addresses the aspects of the criterion very well, although some improvements are still possible.
5 = Outstanding	The proposal successfully meets/addresses all the aspects of the criterion. Any shortcomings are minor.

If the Center report does not contain information on the given topic, please indicate so in your evaluation.

Your final overall comments and recommendations are an important part of the review process.



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Científica y Tecnológica – CONICYT

I. PROJECT INFORMATION

CENTER'S NAME:

Center for Climate and Resilience Research (CR)2

DIRECTOR:

Dr Laura Gallardo Klenner

II. EVALUATION PANEL

REFEREE NAME	ORGANIZATION/ INSTITUTION	E - MAIL	SIGNATURE
REVIEWER 1			

III. CENTER ACHIEVEMENTS

1. Scientific achievements and their impacts to local, national and international community.

i. Comments

CR2 set itself up to be not just a centre of excellence in climate system science, but to invest in and nurture disciplinary, multidisciplinary and transdisciplinary research capability and to deliver research that would support outcomes in terms of better knowledge, improved management and resilience. And it also sought to build a capability and community of researchers.

Scientific achievements go to the Centre's first goal of building a center of excellent research and advancing knowledge and understanding of the climate system. Evidence of these achievements depends on the number and quality of its peer reviewed publications. The centre's researchers are to be congratulated on this aspect, with 178 ISI publications listed in their report; and a growing annual rate of publication as well. Most of these publications are in high quality journals, with a reasonable citation rate (1438 citations since its establishment).

I also note that the centre has achieved, or exceeded, its indicators of success in:

- Number of publications
- Number of ISI publications in the top 10% of impact

I also note a CR2 researcher (M. Rojas) as an author on the IPCC Fifth Assessment; and very strong attendances (400 in 5 years) at Symposia within and outside of Chile.

Within the research lines, there have clearly been important publications detailing key research results and scientific achievements, in particular:

- BGC Line: quantifying the biogeochemical pathways of GHGs between the ocean and atmosphere – especially regional differences in net exchange of greenhouse gases in the waters around Chile The tightened focus of the BGC line on research of relevance to the CR2 goals is also a noteworthy achievement.
- CD Line: analyses showing a multi-decadal drying trend in the region (since the 10970s) and the relative contributions of natural (PDO) and anthropogenic (GHG) forcing and the implications for future rainfall trends; reconstruction of millennial scale climate variability from the paleo record; development of the CR2 climate explorer; advancing the understanding of the dynamics of hydrometeorological extremes.
- Ecosystem Services Line: Nationally consistent methods for LULC change mapping; and designing landscapes to optimize timber production and runoff; the vulnerability of different ecosystems to, and the meteorological factors causing, forest fires; and quantifying the impact of the megadrought on forest fire frequency and burnt area; reconstruction of streamflow at centennial timescales.

- Human Dimensions Line: better defining what resilience is and how it is being used; conceptual models for informing adaptation strategies and pathways and disaster risk reduction; a legal/institutional framework to address climate change and the need for a climate change law.
- MOS Line: Contributions to the megadrought analysis including tracking long-term trends in atmospheric composition; quantifying air pollution episodes in urban Santiago; and contributing to a national emissions inventory of black carbon (and to nationally consistent emissions inventories in general); development and evaluation of an operational air quality forecasting system. These achievements are noteworthy, given that this line was somewhat slower to establish its core scientific direction.

Perhaps more important, given the goals of the center are the publications that address the multidisciplinary and transdisciplinary “resilience” goals – these have been posed as integrative questions. So I would include under “achievements” the fact that the centre has been able to produce quality, peer-reviewed publications that take this integrative approach. Highlights include:

- Defining both the nature and consequences of the megadrought, and attributing the role of climate change in this and the projections for future droughts.
- A set of papers in preparation for submission to a special issue that addresses how humans are influencing the Earth system, and what this means for adaptation, mitigation and resilience – including the role of governance and the implications for policy.

ii. Evaluation

	√				
Outstanding	Very Good	Good	Regular	Poor	Not Qualify

Actually – somewhere between very good and outstanding.

2. Educational achievements and impact. Pay attention to integration of research and educational activities, and also in training advanced human resources, participation in PhD Programs.

i. Comments

A strong community of researchers, Postdocs, Postgraduate students and research assistants has been created through the formation of CR2; a significant achievement in itself (there are 149 undergraduate, Masters and PhDs listed – which seems quite impressive). The centre is to be commended for exposing students and postdoctoral fellows to interdisciplinary research and integrating them into decisions about research directions and priorities (as explained on p.24).

It also seems that the student cohort has helped the center to foster integration across the research lines, and driven a trans-disciplinary approach.

The centre has contributed significantly to developing a multidisciplinary capability that has the potential to grow into a true transdisciplinary research effort over its lifetime. The clear enthusiasm for the interdisciplinary approach that the Center practices is a strength upon which it can build. We commend the Center's leadership for providing the research environment that is enabling this to develop.

The relatively modest number of PhD theses completed is noted; as is the intention to address this in the centre's second phase. This is something that would be worth exploring through focused discussion. The centre does seem to be exporting well-trained students to do their PhD's abroad!

The centre attracts quality Postdoc fellows (25 to date) – including those bringing their own funding - this must be a measure of the success of the centre.

Graduate students and postdocs are also contributing to the centre's publications (about 20% and 10% of the ISI publications are authored by postdocs and graduate students, respectively). Postdocs are also active participants in congresses.

In terms of metrics, the centre has equalled or surpassed its indicators in:

- Number of Postdoc Fellows (2-3 times the expected number)
- Number of finished Masters theses
- Number of finished undergraduate theses

In terms of coursework, there don't yet seem to be any summer schools in operation.

ii. Evaluation

	√				
Outstanding	Very Good	Good	Regular	Poor	Not Qualify

3. National and international collaboration achievements. Pay attention to activities that contributed to national and international networking

i. Comments

The significant number of national and international connections are noted. I do wonder if more connections could be made to other Southern Hemisphere nations – i.e. researchers and/or agencies in NZ, Australia and South Africa.

Activities that have contributed to collaboration include:

- Shared positions and staff, with universities and research centres within Chile
- Collaborative support and use of research infrastructure (NLHPC, laboratories, marine research platforms, expedition logistics)
- Joint projects – nationally and internationally (e.g. emissions inventories across Sth America; and projects from the CD line)
- International consortia (e.g. INCETT)

The benefits and/or outcomes of the collaboration and networking include:

- Critical mass capability in key areas (e.g. energy and mitigation)
- Improved research infrastructure (access to HPC and laboratories)
- Greater impact (e.g. Chilean Strategy for Energy)
- Courses
- Masters theses and publications
- Nationally consistent information – led by CR2

In terms of metrics, the centre has equaled or surpassed its indicators in:

- Joint publications (exceeded by more than a factor of 3 in some years) – national and international
- Joint projects (although lower than baseline)
- Visiting researchers (exceeded by more than a factor of 3 in some years)
- International workshops

ii. Evaluation

☐

Outstanding

☒

Very Good

☐

Good

☐

Regular

☐

Poor

☐

Not Qualify

4. Outreach Achievements. Pay special attention to those activities that tied the Center with the external community such as elementary or high schools, institutions, companies, among others.

i. Comments

As their final report states, outreach is a key aspect of the centre. Over its five years, the centre’s communication strategy has sought to: i) position its brand; ii) present its researchers as credible providers of information to the public, via the media; iii) focus on the impacts of its research to the public, via the media and through the integrative research themes.

In terms of achieving these aims; it is noteworthy that mentions of CR2 in the media have increased (from 12 in Year 1 to > 200 in Years 3 and 4), and significant cross-cutting areas of climate change, extreme events (hydromet. and fires) and global climate assessments (IPCC) and policies (COP20, 21) dominated the media coverage.

And in terms of focusing on the specific integrative themes (MD, Julieta, the buoy etc); I think the “campaign” style approach is wise (e.g. combining a launch, video, artwork, presentations to the government etc for the MD campaign).

Other communication products are noted: the investment in science communication and engagement with/outreach to the community is impressive and the involvement in the Diploma programme will deliver great benefit.

I would have liked to be able to read the strategy to understand what the final outcomes were being sought by the investment in communications. Nonetheless, the metrics support the assessment of “very good”, indeed I think the achievements are close to outstanding given the resources the centre has available to support the range of activities described in the report.

ii. Evaluation

<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Outstanding	Very Good	Good	Regular	Poor	Not Qualify

5. Contribution to public policies. Pay special attention to the impact of the FONDAP Center in terms of contribution to public policies and to the development of other targeted groups.

i. Comments

The final report is refreshingly honest and frank about their contribution to public policy. As a senior leader in a climate research centre, I know that it can be hard to demonstrate and quantify these links. Clearly, the centre has been engaging deeply with stakeholders in the public policy domain. Turning this into demonstrable contributions and impact is quite hard and therefore I don't think it appropriate to criticize and lower the score for the centre.

That they are considering taking on knowledge brokers demonstrates that they understand what is needed, and are committed to achieving this in the second phase of the program. There are ways this can be done: this would be a useful discussion to follow-up on in the development of the second phase.

The list of engagements/collaborations/contracts is impressive and demonstrates that the centre is regarded as a "trusted advisor" by the public policy sector, which demonstrates their credibility and brand. This is an achievement in itself. It would be good to know what outcome resulted from these activities.

ii. Evaluation

☐

Outstanding

☐

Very Good

☒

Good

☐

Regular

☐

Poor

☐

Not Qualify

IV. RESPONSE TO SUGGESTIONS FROM PREVIOUS EVALUATIONS

Please comment and evaluate the response to the suggestions and observations provided by the panel of experts in previous evaluation reports.

i. Comments

I am impressed by the spirit in which the centre's leadership have embraced the comments and suggestions from past reviews; they seem very open to taking on board feedback.

That said, some recommendations made in earlier reviews do not appear to have been addressed, especially:

- collaborations with other centres/research agencies that could deepen the international engagement
- establishment of a summer school
- strengthening co-supervision across lines (not clear if this is happening or not)
- the communications response does not mention whether there are now more internal newsletters etc to improve internal communications.

I appreciate that there are likely to be very good reasons for this – including resource constraints (time, funds, people). I only mention them again as ideas for the centre's leadership to take on board for the second phase.

ii. Evaluation

☐

Outstanding

☒

Very Good

☐

Good

☐

Regular

☐

Poor

☐

Not Qualify

V. OTHER RELEVANT ASPECTS

If the Center report does not contain information on other relevant aspects, please indicate so in your evaluation.

i. Comments

No additional comments, but I thought the centre's commentary on Sections 6 – 9 were insightful and demonstrated the clear strategic thinking, and honest self-reflection, by the centre's leadership. This bodes well for a successful future. The points made in Sections 8 and 9 are valid as well.

And I commend Laura and her colleagues for taking on the task described in Section 7 – I think the result of this project could be another centre publication.

VI. CENTER PROJECTIONS

Please comment about the center projections after the 5 - year FONDAP grant. If the Center report does not contain information on the Center projections, please indicate so in your evaluation.

i. Comments

I am not sure if this is what FONDAP were looking for; but can I very strongly endorse both the approach being taken, and the resulting 5research areas/foci and cross-cutting "issues (fires, air pollution, hydro-met extremes and their impacts). I also strongly support the idea that such a centre needs to address both "strategic" science (or curiosity or discovery) as well as problem-oriented research that demonstrates and realizes the value of the research capability.

VII. INSTITUTIONAL COMMITMENTS

Please comment about the facilities available to the Center, the commitment of the administration of the leading and partner institutions to the Center, and the commitment of the partner institutions to achieve the Center goals.

i. Comments

I can only repeat what is stated in the Final Report – it seems that institutions have met their obligations but there are areas where efficiencies could be improved, especially by the Host University.

ii. Evaluation

☐

Outstanding

☐

Very Good

☒

Good

☐

Regular

☐

Poor

☐

Not Qualify

VII. ADVISORY COMMITTEE

Please comment about the commitment of the advisory committee, and its contribution to the Center development.

i. Comments

The International Advisory Panel are an outstanding group of scientists and must be a great advantage to the Centre. The Final Report does not explain how they engage with this Panel, or how frequently; but it seems clear that the centre has benefitted from the wisdom and advice of this panel.

ii. Evaluation

☐

Outstanding

☒

Very Good

☐

Good

☐

Regular

☐

Poor

☐

Not Qualify

IX. FINAL OVERALL COMMENTS AND RECOMMENDATIONS

Please provide a final overall and recommendations for the Center. Include here aspects that were not covered in the previous sections, which you consider significant for the Center.

i. Comments

The Centre has performed very well, and has delivered on its own goals and objectives; and those of FONDAP. Indeed, in many aspects they have exceeded expectations. They have also shown themselves to be adaptable; changing structure and focus as needed to ensure that the centre was achieving its aims.

The reasons for this assessment are contained in the separate elements of this assessment, and also my earlier reviews. Don't think it is necessary to repeat these comments here except to say that my assessment of the Centre's performance is "very good", based on the material I have reviewed. Importantly, this assessment is not just based on the science excellence, and the quality and quantity of the research outputs (although this is very good); it also reflects the centre's commitment to doing multi- and trans- disciplinary research; doing science that has impact and makes a difference to the wellbeing and productivity of Chile – as well as advancing knowledge.

The centre has created a strong cohort of researchers and students who I think have been part of something quite special: they have been taught and supervised by high quality researchers, and they have helped create not just a centre of research excellence, but also relevance – as evidence by the collaborations and outreach.

My assessment of "very good" means that I strongly recommend the centre's funding be continued. The strength of leadership, and their demonstrated commitment to adapting and changing in response to guidance and feedback means that I am confident that any areas of improvement will be addressed in the second phase.

ii. Evaluation

☐

Outstanding

☒

Very Good

☐

Good

☐

Regular

☐

Poor

☐

Not Qualify



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Científica y Tecnológica – CONICYT

I. PROJECT INFORMATION

CENTER'S NAME:

CR2: Centro de ciencia del Clima y la Resiliencia
(Center for Climate and Resilience Research)

DIRECTOR:

Laura Gallardo Klenner

II. EVALUATION PANEL

REFeree NAME	ORGANIZATION/ INSTITUTION	E - MAIL	SIGNATURE
REVIEWER 2			

III. CENTER ACHIEVEMENTS

1. Scientific achievements and their impacts to local, national and international community.

2.

i. Comments

After four and one-half years of operation, the CR2 has compiled an impressive list of achievements. What is particularly striking is not just the significant scientific and social scientific output of the Center but its influence on both the national political and public realms in Chile. I provide details on these aspects in the sections that follow.

As a summary statement, it is clear that the CR2 has lived up to or exceeded the expectations anticipated when the Center was initially funded. In the original proposal--submitted by a small but well-organized and integrated interdisciplinary team of scholars from multiple institutions--the mission of the Center was described on page 11 as follows:

"... to develop Earth System Science in Chile to increase our understanding of the functioning of the climate system and look into new approaches to create resilience to climate change."

Later on the same page, the proponents wrote:

"In order to address the diversity of challenges that climate change poses for Chile and the world at large, CR2 proposes...to promote dialogues with the relevant public and private sectors stakeholders at national level."

These are appropriately ambitious, achievable, and important goals for Chile. Did the CR2 do them justice? In my view, the answer is an unqualified yes. The Centre has contributed significant new scientific and social-scientific knowledge at both the basic research and applied research levels; it has vigorously and successfully reached out to the Chilean public, offering insights and products in accessible form that are increasingly being used by society; and importantly, it has contributed to development of Chilean climate-action policy, albeit perhaps more indirectly than directly.

Moreover, the CR2 has managed to do something truly difficult and rather rare: it has built a community of scholars who actually practice interdisciplinarity.

Finally, while the CR2 has clearly been highly successful to this point, there are areas where it can continue to improve. In that context, it was refreshing to read the strikingly honest self-assessment documentation provided by the Center's leadership that describes progress to date and foci for improvement, including organizational restructuring to strengthen its operations. This reviewer salutes that honesty.

Overall, an "outstanding" grade is warranted in the achievements and impacts areas.

ii. Evaluation

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Outstanding Very Good Good Regular Poor Not Qualify

2. Educational achievements and impact. Pay attention to integration of research and educational activities, and also in training advanced human resources, participation in PhD Programs.

i. Comments

The First Period Report (FPR) offers this (p. 24):

“In total, there are 37 under graduate exams, 47 masters and 7 doctoral theses completed at the moment of writing this report.”

I am not sure what a ‘graduate exam’ is, but the number of Master’s students who have benefitted from CR2 pedagogy and research is impressive. In contrast, the number of PhD theses completed to date is modest. The FPR is appropriately cognizant of this limited level of training, and proposes as solution, noting (p. 24):

“This may reflect...the lack of an aggressive enough search for doctoral students. In the second phase we intend to attempt the creation of an inter-institutional program in climate and resilience research, and to better focus our search for doctoral fellows.”

and later:

“We have provided opportunities for their training in the international arena, and promoted their participation in symposia and conferences. However, these efforts have generally responded to occasional opportunities, and not to a systematic planning in support of their formal training. This should receive more attention in the form of a person in charge in a second phase, permitting a more focused budgetary and management effort.”

The awareness demonstrated here by the CR2 leadership that PhD education and formal logistical support needs to be strengthened is positive, as is the intent to create an inter-institution program. But intent is one thing; doing it another. I hope that such inter-institutional arrangements can indeed be established for they should induce more meritorious students to apply. It is worth noting as well that the apparent dearth of PhD candidates is an international issue. All universities (at least in the west) have the same complaint, so the CR2 is not alone. What the issue does demonstrate however is the need for aggressive recruiting coupled with an attractive product. The inter-institution opportunity might well prove to be an attractive option, and putting “a person in charge” is a good idea.

Overall, I would judge the education achievements/impact to be very good. But getting to ‘outstanding’ will require increased output of highly engaged and broadly educated PhD recipients.

Finally, an observation about integration: This is difficult to assess with the information at hand, and without the benefit of face-to-face interviews with Masters and PhD graduates. However, the available documentation does imply that students in the CR2 programs gain broad interdisciplinary exposure while participating in significant intellectual cross-fertilization through joint program meetings that apparently are scheduled twice per year. Within that context, there is a very good sign in the FPR (p. 24) that alludes to flexibility within the CR2 leadership (a good thing):

“Our students and younger colleagues have acted as Guinea pigs venturing across the tenuous footbridges that link different fields of knowledge, and they have... forced us to change our paradigms...”

The heading comments in this section do not request consideration of the role of post-doctoral fellows, but I shall nevertheless offer some observations. Table 1 in the FPR (p. 26 ff) lists 11 active PDFs and 13 who have moved on. Having 24 post-doctoral fellows participating in the research program of the CR2 in just four and one-half years is impressive. Moreover, I note that the topics studies are very well aligned with CR2 objectives. This is all very healthy. But, the CR2 leadership notes that there remains scope for improvement, pointing out that provision of traditional short-term (one, two or three-year) positions does constrain the recruitment pool. In view of that, it suggests a novel approach that might well reinforce the PDF complement within the CR2 (p. 24) while appealing to candidates from abroad:

“...we are considering the opening of a few 5 year research positions for younger promising researchers that may be more appealing for coming to Chile both for foreigners and the Chilean diaspora (This would be done sacrificing short-term research assistants, who can be paid with other funds).”

This strikes me as creative and progressive, but at a cost – losing some short-term research support. But *if* that support can indeed be covered by ‘other funds’, establishing a five-year appointment program for highly meritorious young scientists should prove an attractive option for scholars internationally.

ii. Evaluation

☐

Outstanding

☐

Very Good

☐

Good

☐

Regular

☐

Poor

☐

Not Qualify



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3. National and international collaboration achievements. Pay attention to activities that contributed to national and international networking

i. Comments

There has been considerable progress made in building national and international networks and collaborative activities. However, I would not describe these as 'vast' as the First Period Report does in line 1 on page 29; that strikes me as an overstatement. Rather, I would suggest that national collaborations are now very strong --multiple examples are offered-- but international collaborative and networking activities are more modest but look to be growing.

I make three points here:

1. It is promising that the CR2 joined the International Network of Climate Change Centers Of Excellence and Think Tanks for Capacity Building (INCCETT) at COP 22 in Marrakech in late 2016 (p. 30, FPR). The Memoria document describes the new network (p. 40) as comprising "11 other research centers around the world" and is designed to promote "greater international collaboration" with a focus on "...defining aspects of financing and implementation of joint work" that will support the development of nationally determined emissions-reductions contributions for countries signatory to the Paris Accord. The 'other centers' include some that are very well known, including the Inter American Institute for Global Change Research and the International Research Institute for Climate and Society of Columbia University. I note that this network is still being developed formally and is to be defined at COP 23 later this year, when a full proposal and work plan will be presented. That work plan promises to: include attention to science-policy interfaces, including productive actions illustrated by successful experiences; address urgent needs of vulnerable developing countries (mitigation, adaptation, risk management); draw from the experiences of interdisciplinary climate change science centers; and strengthen scientific diasporas via, for example, postgraduate student, PhD and scientist exchange programs. Based on its experiences to date, the CR2 is very well placed to contribute to all of these objectives. Thus INCCETT has the potential to strengthen the international visibility and contributions of the CR2 (but is not there yet).
2. CR2 researchers contributed to the fifth evaluation report of the IPCC as well as to special reports of the IPCC including risk management for extreme events. They are also participating in preparatory meetings for the sixth evaluation report, to be published in 2022. The inclusion of CR2 scholars in such international activities validates the scientific excellence of the group.
3. National networking activities truly are very strong and span a very broad spectrum, described in both the "Memoria" (pp. 37-40) and in the FPR (pp. 29-30). I needn't recite the activities here, but I will highlight the particular importance of direct involvement of the CR2 with governmental organizations listed in Table 2 of the FPR (pp. 37-38). These



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interactions are notable because they illustrate how the CR2 is bringing science into the policy realm reasonably directly, often at the request of the government bodies. The importance of that aspect of the CR2 operations is not to be underestimated.

ii. Evaluation

☐

Outstanding

☐

Very Good

☐

Good

☐

Regular

☐

Poor

☐

Not Qualify

4. Outreach Achievements. Pay special attention to those activities that tied the Center with the external community such as elementary or high schools, institutions, companies, among others.

i. Comments

This statement appears on page 7 of the FPR:

“Along with scientific research, outreach to the non-expert public is a fundamental part of CR2’s mission and activities.”

It is clear that the outreach activities undertaken by the CR2 since its inception are outstanding. The Center maintains an exceptional website, is highly active in social media channels (Twitter and Facebook, which the CR2 notes are slowly supplanting the website as primary points of contact), and has enjoyed vigorous interaction with Chilean (and occasionally international) media. Moreover, through such products as the easy-to-use “Climate Explorer”, the prize-winning “Julieta in the Land of Girls” project, and its “Reports to the Nation” series (the Megadrought report of 2015 being the first, but not the last), the CR2 has distinguished itself as the creator and distributor of first-rate, highly accessible, germane and influential products. The Center has also been contributing to teaching within the nationally-unique “Diploma in Science Communication” offered by the University of Chile.

What I find especially laudatory is that the Center manages to do all of this with a very small communications team, comprising just 1.5 journalist positions and one part time designer. That team and the Center as a whole are to be commended.

As pointed out on page 7 of the FPR, resources for such critically-important outreach work are limited, and the Center plans to augment them should a Phase 2 be funded. Thus, it is worth emphasizing that given the critical importance to Chile of addressing the climate-change challenge on all fronts – mitigation, adaptation, and reinforcing resilience—communicating with both policymakers and the public are paramount needs that fully warrant an appropriate level of support. This is well recognized by the CR2 leadership and that speaks well for the future.



ii. Evaluation

☐

Outstanding

☐

Very Good

☐

Good

☐

Regular

☐

Poor

☐

Not Qualify

5. Contribution to public policies. Pay special attention to the impact of the FONDAP Center in terms of contribution to public policies and to the development of other targeted groups.

i. Comments

As noted in Section 3, the CR2 has increasingly been contributing directly to at least the thinking of government via interactions across a significant number of ministries and other governmental bodies.

But has it contributed to specific policy development? That question is difficult to answer without interviewing government officials. Despite the absence of such interviews, the answer appears to be yes. The evidence in support of this inference is offered in various documents. Table 2 in the FPR, for example, notes that CR2 researchers contributed to the National Action Plan for Climate Change as well as to adaptation planning in the report, “Chile’s Vulnerability and Adaptation to Climate Change”, both conducted under the auspices of the Ministry of Environment. Center researchers have also contributed to risk-management and disaster-risk assessments under the umbrella of the Ministry of Public Works and the National Emergency Office. And in what might be a particularly important initiative (I cannot assess its impact at this point), legal scholars affiliated with the CR2 worked to analyze the need for a legal and institutional framework for the creation of a law on climate change for Chile. Three reports were prepared: “Climate Change Governance in Chile”; “Analysis of Comparative Climate Change and Content Legislation for a Climate Change Law for Chile”; and “Guidelines for Economic and Social Evaluation”. The latter work proposed two institutional models for the governance response in Chile to the climate change challenge. Whether or not either model will be adopted remains an open question.

Related to the governance issue is another: climate justice. This is noted on p. 20 of the FPR and strikes me as a highly appropriate integrating issue for the CR2 to study in a Phase 2, for it firmly straddles the public policy-human dimensions-economics-science interface.

Finally, the exceptionally well-produced, content-and-graphics-rich “Report to the Nation” on the 2010-2015 Megadrought (now available in both Spanish and English) was a particularly important document that was hand-delivered to President Michelle Bachelet. The report recommends that Chile “...create an administrative entity charged with coordinating the work of the different institutions having jurisdiction over our water resources both at the national scale and at the scale of each watershed”. It noted that the proposed entity must work to improve adaptive capacity, increase awareness of the limited nature of water resources in the country, put in place “the basic human right to access and consume water”, and ensure “adequate

preservation of the environment”. I cannot assess the impact of the report, but given its very high production quality, clearly summarized scientific and social scientific findings and appropriate recommendations, it should not fail to generate an appropriate policy response from the Government of Chile. The CR2 is to be commended for producing such an outstanding report.

But that does not mean that ‘water’ can be checked off by the CR2 as a keyword. I say this because a troubling section appears at the bottom of p. 8 in the FPR:

“...the existence of a multiplicity of authorities (>40) that respond to droughts, typically via economical subsidies, building dams, deepening wells, and providing water trucks in a rather discoordinated manner result in suboptimal economic and social responses, which are no longer appropriate to address the recurrent water shortage Chile will be facing over the next decades.”

That comment by the authors suggests that the CR2 must stay active at the science-policy interface whenever the word ‘water’ appears in legislative initiatives. I presume the Center has every intention of doing so.

As to my evaluation score, I will check both the “Outstanding” box, because the *contributions* have earned that designation, and I’ll check the “Very Good” box because I have no evidence at this time of a direct policy response to the work of the CR2 in terms of *impact*. In a sense therefore, I am commenting on two related but somewhat independent assessment variables.

ii. Evaluation

☐

Outstanding

☐

Very Good

☐

Good

☐

Regular

☐

Poor

☐

Not Qualify

IV. RESPONSE TO SUGGESTIONS FROM PREVIOUS EVALUATIONS

Please comment and evaluate the response to the suggestions and observations provided by the panel of experts in previous evaluation reports.

i. Comments

The CR2 leadership has done a very good job of responding to suggestions offered by expert panels. In saying that, I note that expert panels (especially when international) do not always appreciate national contexts and difficulties in making changes that embrace cultural

influences, bureaucratic practices and the like. But that aside, the CR2 team has paid heed to suggestions from outside and its self-appraisal on page 39 of the FPR is very honest.

The team is clearly right to note that expertise in economics has been slow in being added to the intellectual pool of the CR2 and that “concrete outputs” in this area “must be speeded up.” The addition of Dr. O’Ryan to the team should help to address this, but the need to incorporate additional economic analysis and research remains a priority.

The same is true regarding both human dimensions and international collaboration. One example of the importance of the former was very nicely captured in the sections entitled “People’s perception of the mega-drought” and “Response of civil society” in the Report to the Nation on the Megadrought. Both sections illustrate the inherent value of coupling the human dimension to scientific analysis of an issue, in this case, water, or the lack thereof. The inclusion of both sections markedly strengthens the impact of the megadrought report and serves as an exemplar for reports that might be issued in the future.

Previous evaluation ✓ have pointed toward integrative questions or themes as providing an appropriate framework for ongoing CR2 research. While the five original streams proposed in the 2011 original proposal remain valid on their own, the need to promote integration at every opportunity remains a high priority and it is good to see the Center adopting this as its primary way to proceed, noting (p. 39):

“We think that our new structure will be better suited for the development of mega drought like integrative questions, with concrete mid-term outputs, in addition to disciplinary and long-term quests addressing key issues such as the governance and policy-science interface.”

From my perch, this is a very wise roadmap for the future.

ii. Evaluation

☐

Outstanding

☐

Very Good

☐

Good

☐

Regular

☐

Poor

☐

Not Qualify

V. OTHER RELEVANT ASPECTS

If the Center report does not contain information on other relevant aspects, please indicate so in your evaluation.

i. Comments

I shall offer several observations that do not fit well in other evaluation sections:

1. A particularly relevant strength of the CR2 is its willingness to examine and critique its operations, thereby following a path of continuous improvement. One example lies in its recent efforts to document what might be called “soft achievements”, ie, those that don’t fit traditional academic models of evaluation (publications history and journal impact factors, for example). Recognizing that “what is not monitored is not seen”, in July 2016 the Centre “started a pilot project to generate metrics for formative assessment” [Anexo X, page 1]. This was not to be just a number-collecting exercise but rather an effort to “support strategic management and organizational learning.” According to the description in Anexo X (page 1), the Center leadership “wanted to learn about how we are accumulating different types of capital for doing research and how it is being shared with others.” The results of the pilot project stimulated reflection on the value of various activities carried out by the Center, including “where the activity is needed at all.” [Anexo X, page 8]. Such self-appraisal is healthy and a sign of very good management practices.

2. The data compiled in Anexo X show that among the various economic, social and professional sectors in Chile, there is a growing demand for the climatic information that the CR2 now provides via its website. I note that use of CR2 climate data by teachers more than doubled from 2015 to 2016, while the demand by other sectors (agro, forestry, engineering, fishing, mining, construction, retail, others; Anexo X, page 4) rose dramatically between 2014 and 2016. In addition, the “Climate Explorer” product provides high-quality graphical interpretations of Chilean climatic variables and now attracts some 1000 site visits per month. While such usage by the broader community may be considered ‘soft’ in some academic circles, taking that perspective would be parochial and a mistake. It would seriously undervalue the importance that data access of the type the CR2 now provides offers to broader society as a whole.

I believe that this aspect of the CR2 operations is highly relevant and warrants strong support from CONICYT.

3. The Center has managed to institute gender balance to a remarkable degree, as noted on page 5 of the “Final Report”: *“An important and distinctive feature of CR2 is gender equality; women make up 46% of all researchers and hold prominent leadership roles, and are authors of 41% of peer-reviewed articles.”* These are impressive achievements, and all are to be saluted. CONICYT would do well to publicize them internationally should opportunities arise.

4. A special issue of Elementa, focusing on the Anthropocene in Chile, is ‘in preparation’ (p. 9, FRP). I can’t help but wonder: Could it provide the basis for the next “Report to the Nation”?

5. I suggest that the CR2 is being very well led. One sign of that is the honesty on display in the documentation. On p. 40 of the FPR, for example, the following statements appear:

“...the center’s director played a dual role as head of CR2 –during the installation process—and as leader for Modeling and Observing System. In addition to the issue addressed earlier, her dual role resulted in a slower settlement of research foci for that team. In general, people in that line continued with their individual or associative projects but a bit discoordinated from one another. This situation improved greatly when Dr. Huneus took over the leadership of the team. This impinged a direction to the research, and a substantial development took place.”

What is important here is that the Center identified an issue and corrected it.

VI. CENTER PROJECTIONS

Please comment about the center projections after the 5 - year FONDAP grant. If the Center report does not contain information on the Center projections, please indicate so in your evaluation.

i. Comments

Section VI on p. 42 of the FPR describes the process used to winnow myriad suggestions for next steps for the CR2 down to five broad themes, all of which sit well with what could well be an overarching consideration, “Chile under 1.5° by 2030”:

- Water availability and (weather/climate) extremes
- Cities under climate variability and change;
- Coastal processes and impacts
- Land use change
- Governance and policy-science interface

Each of these is highly relevant to the needs of the country in the coming decades in terms of both knowledge and governance. Moreover, the CR2 leadership rightly recognizes that enquiries that fall under these interdisciplinary or integrative themes do not exclude disciplinary curiosity-driven research – there is a case to be made for both.

Given the exemplary academic track record of the CR2 to date, its first-rate leadership, outstanding outreach and public educational capacity, as well as its growing and influential interactions with federal policy makers, I have every confidence that the Center will deliver well on the topics listed above should Phase 2 funding be provided.

VII. INSTITUTIONAL COMMITMENTS

Please comment about the facilities available to the Center, the commitment of the administration of the leading and partner institutions to the Center, and the commitment of the partner institutions to achieve the Center goals.

i. Comments

There is no indication in the documentation provided that there is a lack of commitment from any partners or that the facilities available to the Center are inadequate.

However, I don't feel able to offer an appropriate assessment regarding ongoing commitment from the partner institutions. Rather than make an assumption that the necessary commitment will continue, I've checked the "Not Qualify" box below.



ii. Evaluation

☐

Outstanding

☐

Very Good

☐

Good

☐

Regular

☐

Poor

☒

Not Qualify

VII. ADVISORY COMMITTEE

Please comment about the commitment of the advisory committee, and its contribution to the Center development.

i. Comments

I have no independent way to assess the contribution(s) of the Advisory Committees and so must defer to Center's own appraisal, which states that both "national and international committees have been immensely helpful and supportive."

If I accept that at face value I would check the "Very Good" box, but in the absence of independent insight, I'll instead check the "Not Qualify" category.

But I wish to be very clear: I have no reason whatsoever to doubt the Center's own views on the value of its advisory boards.



ii. Evaluation

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Comisión Nacional de Investigación
Científica y Tecnológica - CONICYT

Outstanding

Very Good

Good

Regular

Poor

Not Qualify

IX. FINAL OVERALL COMMENTS AND RECOMMENDATIONS

Please provide a final overall and recommendations for the Center. Include here aspects that were not covered in the previous sections, which you consider significant for the Center.

i. Comments

I will largely reiterate what I stated in Section I: the CR2 is an impressive operation that can be very proud of what it has accomplished in less than half a decade. It has met or exceeded all expectations at hand when the initial funding decision was made.

The practice of interdisciplinarity is hard and to its credit, the CR2 is doing it well. Based on the information provided by CONICYT, including an array of documents prepared by the Center, I draw the following conclusions:

- a) the Center is wisely and very well led. Leadership is responsive, flexible, honest, transparent and willing to make difficult decisions;
- b) the CR2 has brought together a vibrant collection of blue-ribbon faculty members, post-doctoral fellows and graduate students who appear to work well collectively and are contributing significant new knowledge at both the basic and applied research levels;
- c) the productivity of the Centre is very high, with high quality publications being delivered in high-impact journals on a timely basis;
- d) the Center's outreach products and public education efforts are exemplary and provide a blueprint for other institutions internationally;
- e) the Center has established strong relationships with Chilean government ministries and has the potential to help shape public policy on an ongoing basis.

However, there is one area that continues to need attention. This has been raised in the past: bureaucratic requirements imposed primarily by the university sector (particularly the University of Chile) are turgid and onerous. Hiring procedures for personnel appear to be lengthy and constrained by requirements that contracts be for short terms. Social security benefits packages are not typically included for contract employees, and immigration paperwork can be cumbersome. On balance, such issues limit the capacity of the CR2 to attract the world's best talent.

But putting institutional and bureaucratic limitations aside, I judge the overall performance of the Center as "Outstanding". It has thoroughly earned that evaluation.

ii. Evaluation

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Comisión Nacional de Investigación
Científica y Tecnológica - CONICYT

Outstanding

Very Good

Good

Regular

Poor

Not Qualify



Comisión Nacional de Investigación
Científica y Tecnológica – CONICYT

I. PROJECT INFORMATION
CENTER'S NAME: Center for Climate and Resilience Research
DIRECTOR: Laura Gallardo Klenner

II. EVALUATION PANEL			
REFEREE NAME	ORGANIZATION/ INSTITUTION	E - MAIL	SIGNATURE
REVIEWER 3			

III. CENTER ACHIEVEMENTS

1. Scientific achievements and their impacts to local, national and international community.

i. Comments

The center has made outstanding contributions to the development of scientific knowledge for a broad range of areas that highlight the centers strengths in biogeochemistry, climate dynamics, ecosystems, societal impacts and modeling. In addition to scientific advances in along each of these research areas, the center has been successful in fostering interdisciplinary research that addresses key issues of regional importance. There is insufficient room to note all of the Center’s achievements here, however there are a few accomplishments that require further recognition.

The Mega Drought study of Central Chile is a particularly exceptional example of practical, societally driven research that leverages expertise across multiple disciplines to yield fundamental advances in the understanding of the causes and future implications of drought in this region. Through a series of modeling, diagnostic and paleo-climatic analyses, the Center’s scientists place recent drought conditions in the context of historical norms and are able to attribute anthropogenic activities as a contribution factor. In looking towards the future, these studies provide quantitative predictions of future drying and outline how current governmental policies are insufficient to adapt to the recurrent water shortages that central Chile will experience in the coming decades.

In addition to the significant contributions made towards understanding and predicting regional climate changes in Chile, the Center has also made significant advances in understanding processes of relevance to global-scale climate change. The role of oceanic processes in regulating the emission and sequestration of greenhouse gases is a key area of research in climate science. Researchers at the center have made significant advances in documenting and quantifying the biogeochemical pathways of greenhouse gases between the atmosphere and regions of coastal oceanic upwelling. The biogeochemical research team has also advanced the understanding of subsurface ocean waters in facilitating the accumulation and recycling of key greenhouse gases, nitrous oxide and methane.

These are just two examples of internationally recognized work that have advanced both the knowledge and application of research to address critical climate questions. Through a combination of disciplinary, interdisciplinary, and transdisciplinary research, the Center has transcended the traditional boundaries of science and guided both public discussion and policy on issues of direct relevance to both Chilean society and the international scientific community.

ii. Evaluation

☐☒☐☐☐☐

Outstanding Very Good Good Regular Poor Not Qualify

2. Educational achievements and impact. Pay attention to integration of research and educational activities, and also in training advanced human resources, participation in PhD Programs.

i. Comments

The Center has been a tremendous success in the training and development of post-doctoral research scholars – both in terms of the quantity and quality of scientists. There is clearly a wealth of young, talented researchers in Chile that the center has tapped into. The number of publications and key scientific accomplishments that were made by postdoctoral scientists is clear evidence of the success of CR2 in integrating of young scientists into the overall goals of the center. The development of a 5-year research positions will provide an excellent platform for attracting and retaining some of this young talent.

As the Final Report notes, the number of PhD students is small relative to the number of postdoctoral fellows, reflecting the limited number of options for doctoral studies in climate in Chile. The Center is well situated to take advantage of this and the development of an interdisciplinary and inter-institutional doctoral program in climate research would not only be a valuable contribution to the center, but to the nation as a whole as it develops a new generation of scientists to tackle the challenges of climate change.

One aspect of the CR2's training program that truly stands out among its peers is its commitment to scientific communication. This critical skill has long been overlooked in academia, and I can speak from personal experience that filling this void is not an easy task. The recently launched *Diploma in Science Communication* at Universidad de Chile places CR2 among a very select group of institutions world wide that have managed to develop a program to train future scientists with this important skill.

ii. Evaluation

☐

Outstanding

☒

Very Good

☐

Good

☐

Regular

☐

Poor

☐

Not Qualify

3. National and international collaboration achievements. Pay attention to activities that contributed to national and international networking

i. Comments

The CR2 has been successful in establishing and maintaining a substantial national and international network of collaborators. Although a portion of this network reflects partnerships between individual researchers and previously established colleagues, the growth of the center has led to the initiation of a number of new and growing research ties to individuals, groups and centers both nationally and internationally. This is critical as it provides a broader avenue for the exchange of knowledge and creativity, as well as the leveraging of talent and resources to address the broad range of interdisciplinary science questions the center is confronting in a cost-effective and efficient manner. This growing national and international network of collaborations have produced papers and on-going research projects covering a broad range of climate and resiliency issues. The breadth of the collaborations is large and diverse, spanning the majority of subject areas addressed by the center.

ii. Evaluation

☐

Outstanding

☒

Very Good

☐

Good

☐

Regular

☐

Poor

☐

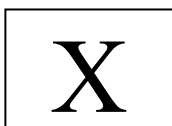
Not Qualify

4. Outreach Achievements. Pay special attention to those activities that tied the Center with the external community such as elementary or high schools, institutions, companies, among others.

i. Comments

The outreach activities of the center have grown steadily since its inception and now represent one of the center's strengths. The outreach program has clearly been effective in raising awareness, not just of CR2 and its research activities, but also in fostering an awareness and understanding of the climate change and implications for the environment, ecology and society of Chile. This is accomplished using a diverse set of educational and outreach tools to promote CR2's activities through the conventional media, social networking, and student-oriented communication programs. The strategy of using tangible climate topics such as the mega-drought in Chile and the local impacts of air pollution and climate change that are experience in Chile provide effective tools for educating the general public on the challenges that current and future generations will face in confronting climate change. Novel activities such as RedLama and Explorers helped to bring the subject of climate change to local communities and school children. One of the more innovative aspects of CR2's outreach effort is "*Julieta in the Land of Girls*" – an awarding winning outreach program that introduces science to girls at an early age, helping to narrow the gender gap in science. Lastly, the *Diploma in Science Communication* from the Universidad de Chile is a cutting edge academic program that provides specialized training to undergraduate and graduate students in the professional communication and dissemination of science research. Such a diverse and efficient outreach program would be the envy of any research center, and serves as a model for other programs in Chile and abroad.

ii. Evaluation



Outstanding



Very Good



Good



Regular



Poor



Not Qualify

5. Contribution to public policies. Pay special attention to the impact of the FONDAP Center in terms of contribution to public policies and to the development of other targeted groups.

i. Comments

It's clear that the RC2 has been extremely active and involved in a variety of public policy initiatives in Chile, reflecting the high demand for their thought leadership and relevancy of the center's research activities to the socioeconomic development of the country. However, as noted in the report, it is difficult to quantify "the success or impact of these many interactions". I have therefore selected "not qualify" for this portion of the review.

ii. Evaluation

☐

Outstanding

☐

Very Good

☐

Good

☐

Regular

☐

Poor

☒

Not Qualify

IV. RESPONSE TO SUGGESTIONS FROM PREVIOUS EVALUATIONS

Please comment and evaluate the response to the suggestions and observations provided by the panel of experts in previous evaluation reports.

i. Comments

The center has successfully responded to, or is in progress of adopting, most of the suggestions from previous evaluation reports. In reviewing these, I noted that one of the reviewers questioned the necessity of having the center reviewed annually. I echo that concern here, since preparing for such evaluations can be a substantial time sink for the senior administration and it can be difficult to achieve substantial new results in only 12 months.

ii. Evaluation

☐

Outstanding

☒

Very Good

☐

Good

☐

Regular

☐

Poor

☐

Not Qualify

[Close](#)

V. OTHER RELEVANT ASPECTS

If the Center report does not contain information on other relevant aspects, please indicate so in your evaluation.

i. Comments

The Center has undertaken efforts to better allocate resources according to the objectives of the Center, and to restructure some aspects of the program by combining the original research lines under integrating complex issues, to better leverage the cross-disciplinary goals of the center. These dynamic qualities of the center are a compliment to the leadership, reflecting both their commitment to the Center's objectives and a willingness to respond and improve upon the original plans.

The report also noted the challenge of dealing with its initial success. As the demand for its knowledge and research has grown under fixed resources, its ability to meet those demands while still investing and developing new research activities becomes limited. One option to help ameliorate these challenges could be to leverage the early success of the center and further expand their network of national and international collaborations.

VI. CENTER PROJECTIONS

Please comment about the center projections after the 5 - year FONDAP grant. If the Center report does not contain information on the Center projections, please indicate so in your evaluation.

i. Comments

The Center seeks to strive a balance between disciplinary research and fulfilling its mandate of serving as a integrative, interdisciplinary center of excellence for Chile. In doing so it must be careful to allocate resources according to their contribution to the Center's goals, which can be challenging when the emphasis is on the nexus of multiple disciplines. The five proposed areas of research seem to be only slight modifications to their original research lines, which is to be expected given their institutional expertise and the early success of the center. However the openness of the Center's leadership to embrace comments and feedback from all members of the staff should be lauded, as well as the willingness and flexibility of the researchers to embrace the potential for change.

VII. INSTITUTIONAL COMMITMENTS

Please comment about the facilities available to the Center, the commitment of the administration of the leading and partner institutions to the Center, and the commitment of the partner institutions to achieve the Center goals.

i. Comments

The report notes that relevant institutions “have fulfilled their commitments regarding funds, facilities, personnel”. However there appears to be a number of bureaucratic issues related to the hiring, immigration processing, and other HR issues that are typical in setting up research centers within academic institutions. It sounds like the senior staff has made some progress in addressing these issues (or learning how to cope with them).

ii. Evaluation

☐

Outstanding

☒

Very Good

☐

Good

☐

Regular

☐

Poor

☐

Not Qualify

VII. ADVISORY COMMITTEE

Please comment about the commitment of the advisory committee, and its contribution to the Center development.

i. Comments

The center's advisory committee is composed of national and internationally recognized scholars whose expertise spans the breadth of the research activities at RC2. However it is not possible to evaluate their contributions to the Center development, so I have selected "not qualify" for this rating.

ii. Evaluation

☐

Outstanding

☐

Very Good

☐

Good

☐

Regular

☐

Poor

☒

Not Qualify

IX. FINAL OVERALL COMMENTS AND RECOMMENDATIONS

Please provide a final overall and recommendations for the Center. Include here aspects that were not covered in the previous sections, which you consider significant for the Center.

i. Comments

Overall the Center is an undisputable success in its first 4.5 years. It has experienced rapid growth both in terms of its scientific productivity and its impact on the education, policy, and society of Chile. The accomplishments of the Center are impressive in all aspects, but most notably in its ability to integrate and apply expertise across multiple disciplines to yield tangible scientific advances that have a direct and immediate impact on Chilean society. Institutions in the U.S. generally share the same objectives as RC2, but are much less efficient in reaching those goals, both in terms of the resources required and the time to delivery. Many aspects of the Center, such as the development of robust scientific communication and cross-disciplinary activities, are at the forefront of similar efforts in the U.S. Even under the current resource limitations, the early success of the Center should guarantee continued acceleration of its productivity and impact. Continued expansion of its national and international network of collaborations would help to meet the growing demands for its knowledge development and application, while also expanding the breadth of its expertise and research activities. Such expansion should be encouraged, both with complimentary interdisciplinary research centers and between peers at the disciplinary level.

ii. Evaluation

☐

Outstanding

☒

Very Good

☐

Good

☐

Regular

☐

Poor

☐

Not Qualify