2017:24 Sida Decentralised Evaluation

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Evaluation of Sida's research cooperation with Bolivia, 2007–2016

Synthesis Report

Sida

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Abbreviations and Acronyms

BTH	Blekinge Institute of Technology
CEUB	Comité Ejecutivo de la Universidad Boliviana (Executive committee of Bolivian Universities)
CICIPGIS	Comité de Coordinación de Investigación, Postgrado e Interacción Social (Committee to Coordinate research, postgraduate and social interaction)
DICyT	Dirección de Investigación Científica y Tecnológica (Directorate for Scientific and Technological Research)
DIPGIS	Departamento de Investigación, Postgrado e Interacción Social (Department for Research, postgraduate, and social interaction)
ICT	Information and communications technology
IDRC	International Development Resource Centre
KTH	Royal Institute of Technology (Kungliga Tekniska Högskolan)
PhD	Doctor of Philosophy
SEK	Swedish krona
Sida	Swedish International Development Cooperation Agency
UMSA	Universidad Mayor de San Andrés (University Mayor of San Andres)
UMSS	Universidad Mayor de San Simón (University Mayor of San Simon)
VMCyT	Viceministerio de Ciencia y Tecnología (Vice Ministry of Science and Technology)

Preface

This evaluation was contracted by the Swedish International Development Cooperation Agency (Sida) through the Framework Agreement for Evaluation Services and conducted by the consortium led by FCG Sweden (previously FCG SIPU International), with partners Itad and Sthlm Policy Group. FCG Sweden led this assignment.

The evaluation team consisted of the team leader, Ananda S. Millard, Ph.D., and team members Matti Tedre, PhD, Erik W. Thulstrup, PhD, Manuel Ramiro Munoz, PhD, and Pamela Velasco. The report was quality-assured by Kim Forss, PhD, and the project manager was Johanna Lindström in the Evaluation Unit at FCG Sweden.

The findings of the report are entirely the responsibility of the team and cannot be taken as expression of official Sida policies or viewpoints.

The team would like to thank stakeholders at Universidad Mayor de San Andrés, Universidad Mayor de San Simón, the Bolivian Vice Ministry of Science and Technology, the University of Stockholm, Blekinge Institute of Technology, University of Lund, Royal Institute of Technology in Stockholm, Sida, and the Swedish Embassy in Bolivia for constructive and useful cooperation throughout the evaluation process.

Executive Summary

Swedish research cooperation with two Bolivian universities—the University Mayor of San Andres (UMSA) in La Paz and the University Mayor of San Simon (UMSS) in Cochabamba was initiated in 2000 —and support to the Bolivian Vice Ministry for Science and Technology (VMCyT) was initiated in 2008 and the current funding phase is due to end in 2017. For the 2007- 2017 period, Sweden has thus far provided Bolivia with research cooperation support to the tune of 386 million SEK. The main objective of the last decade of support has been the strengthening of Bolivian research capacity to increase the country's ability to plan, conduct and utilize research to reduce poverty and support the country's development. This objective has been pursued through the enactment of a wide range of activities, most importantly among them the support of PhD training, support for research clusters, the capacity development of research management entities, and the provision of infrastructure and e-resources.

The purpose of this evaluation has been to assess the impact of the Sida-funded bilateral research collaboration with Bolivia from 2007 to 2016 in building **research capacity** as well as a **research environment; and to identify and provide key knowledge that can support the development of a national and institutional research plan that leads to sustainable results following a next tentative funding phase.**

This evaluation is based on a review of documents, and an extensive number of individual and group interviews, as well as focus groups with a wide range of respondents in Bolivia, as well as Sweden. Questionnaires were also used to collect standardised data on the postgraduate student experience. Lastly, bibliometric data was analysed and used as a proxy for academic impact. The data was collated, and analysed to ensure triangulation of findings. The analytical model which has guided the analysis of data and the structure of this report was inspired by a known organisational assessment model and national research capacity and university research capacity models. The report is composed of 8 chapters. These include an introduction to Swedish aid and specifically support for research cooperation. This is followed by a detailed description of the approach and methodology used for the assignment. Sida contribution to research cooperation during the period under evaluation is presented in chapter 3. Chapter 4, 5 focus on the national and university context specifically. Chapter 6 introduces the research capacity at each of the universities funded. Chapter 7 focuses on results, conclusions and lessons learned; and the final chapter (8) presents recommendations.

Academic and research capacity

- The Bolivia/Sida programme has strengthened the capacity of a number of individual researchers and staff at both UMSA and UMSS during the 2007-2016 period.
- In total 78 PhDs have been awarded, and a further 68 PhD candidates are currently undertaking their degree.
- The number of female vs male students was and is largely equal.
- Most PhD students from both UMSA and UMSS finished their degree within 8 years from the start, with over half of them finishing within 5 years. However, it is notable that a number of PhD graduates (three at each university) and a total of 8 PhD candidates from UMSA have passed their 9th year in the programme. The combined (UMSA, UMSS) average completion time is 6 years.
- UMSA and UMSS have thus far awarded is 6 Masters degrees as part of the programme. A further 98 candidates are currently undertaking their Masters.
- The UMSS Masters programme supported by Sida is so called a scientific Masters, which unlike other Masters programmes at the university focuses on the increase of research capacity. Some of these students will continue their studies as part of a local PhD programme.
- The sandwich model has been a key mechanism to develop research capacity in Bolivia.
- The degrees conferred by universities in Sweden are not recognized or automatically accredited in Bolivia.
- Universities have not consistently appointed PhD graduates in positions where their skills and expertise could be maximised. Currently 50, of 78, PhD graduates who received their degree with Sida support are employed full time by either university. It is noted that the majority of PhD graduates have returned to Bolivia.
- The compensation and incentive package at both universities does not favour new PhD graduates. The system relies excessively on seniority as the determining factor guiding compensation.
- The universities do not enforce a retirement age, and retirement often yields a pension considerably lower than a salary, causing reluctance to retire. That leads to few openings for permanent full time positions for new PhD graduates.

Research, social interaction/engagement with society and clusters

- The leather and food clusters in Cochabamba have successfully worked and made use of research conducted by PhD students in Sweden and in Bolivia. In contrast, the wood cluster in La Paz never matured. Clusters are likely unsustainable without direct funding support from Sida.
- There are no university mechanisms to facilitate partnerships between researchers and public or private sector. Although there are many collaborations, these are fundamentally dependent on the efforts and contacts of individual researchers.
- The use of a catalogue to showcase knowledge and skills to the public and private sector appears not to be the most effective mechanism to ensure engagement with

the public and private sector. A consistent strategy that is supported by the highest levels of management is required.
- The efforts by the VMCyT to support partnerships between universities, the public and private sector have not generated any visible impact thus far. Although the role of the VMCyT within the food cluster managed by UMSS has been regarded as positive.

Publications

- Both UMSS and UMSA have failed to adequately manage and report their research outputs.
- Based on publically available data (WoS database) between 2007 and2016, 81% of publications in UMSA and UMSS were journal articles, 9% were meeting abstracts, 2% conference proceedings and 8% other types.
- The annual number of publications during the period under review increased at UMSA and decreased at UMSS.
- Journal articles are published in high quality journals.

Infrastructure and e-resources

- The e-library implemented by the VMCyT is not being actively used by either of the universities included in this review.
- PhD students and researchers who have access to library resources through the university in Sweden use it, while other researchers try to find alternatives which suit their needs.
- The e-library implemented by the VMCyT is regarded as inadequate and low quality by all respondents, including those from other universities.
- Laboratory equipment funded by Sweden has been instrumental in the conduct of research. However, inefficient administration limits its use, and at this time there is no mechanism in place that will ensure its sustainability in the long term.

Overall results

Relevance

- The support has been particularly relevant to individuals who have benefited directly.
- The current policies and administrative university systems are not designed to strengthen and promote research, but rather to focus on the teaching of undergraduate staff.
- Without fundamental changes in administrative mechanisms, and their implementation thereof, including hiring, compensation, and promotion, the relevance of Sida support will remain limited.
- Infrastructure, e-resources, and management capacity development have all been relevant to the universities, but there is a general disregard for the value of research and postgraduate training at the university management level. Although it is noted that researchers do recognize its value.
- The research that has been supported by Sida funds is well aligned with clear University priorities, which in turn are aligned with broader Bolivian

development priorities. The impact of the findings varies depending on the degree to which research projects have been able to engage with relevant actors locally.

Impact

- The programme has enabled the training of PhD and Masters students who have the potential to strengthen research capacity in Bolivia.
- The development of clusters has been successful in Cochabamba and has enabled the sharing of knowledge and support for innovation.
- Research management bodies have gained considerable capacity for financial and organizational management of research activities.
- There are a number of projects that have had successful partnerships, including the vaccine programme on rotavirus which engaged directly with the ministry of health; the development of Evanta against Leishmaniasis; Bacteria producing bioplastics (carried out with UMSS); and research on energy systems, a priority in Bolivia. Research on biogas; as well as an effort focusing on nutrition (Breakfast programme) can also be highlighted. Specifically, government agencies, for example, have made direct requests to the Universities for support. The local government of Cochabamba, for example, approached UMSS and requested that information collected during on the Rocha river basin. In a separate case same local government approached UMSS to request support in the conduct of research on water treatment specifically on treatment of water for pork farms. Broader requests from the local government to UMSS soliciting technical support in general environmental matters were also noted. How the information has then been used by the local authorities is unclear from the available documentation. The dynamic has been similar with UMSA although request letters were not made available.

Sustainability

- None of the efforts of support are sustainable today.
- There is no sustainability plan, and there are no retention mechanisms in place to safeguard the capacity built.
- Still the results of research that has thus far been conducted, and the publications or findings thereof, can, if adequately used, yield sustainable impacts.
- Similarly, capacity built which is used can also lead to sustainability.

Cross-cutting

- Cross-cutting issues including gender, human rights and environment are not well understood and generally not included in the conduct of research at either university.
- The notable exceptions to the above are the environmental assessments that have been conducted. However, these are tied to individual efforts rather than a response to a broader need to play a key and systemic role in gender issues.

Recommendations

A number of options regarding Sida's future engagement are suggested below. Each has distinct implications for all parties.

Building research capacity and strengthening educational quality

Option A: The programme can be continued as-is, but Sida must recognise that not all PhDs trained will be hired by the universities, and even if they are, their positions may very well undervalue their qualifications, therefore hampering retention. Moreover, not all PhD recipients hired will have teaching obligations and thus their newfound knowledge and skills will not automatically influence undergraduate training in any way. Similarly, some of those hired might not have research tasks either, which means that their ability to utilise the skills learned is minimised. Simultaneously, many of those hired may not have research duties so their possibility to publish will be limited. This option is unsustainable and inefficient. Still, the aforementioned is worst case scenario, and the evidence shows that some PhD graduates will succeed to engage in teaching and research and may also engage in research that has a direct impact on Bolivian society.

Option B: Sida may choose to negotiate an agreement with the universities to ensure that all those who complete PhDs and Master's degrees are given proper positions at the university and remunerated following a revised system allowing for competitive compensation given their education level. While this could arguably mean that the university congress must first change the compensation mechanism to be based on academic attainment, university management could also compensate graduates with stipends for research that, together with the base salary, generate an adequate compensation package. In addition, the positions should include both research and teaching obligations and have reasonable targets for research output, including the generation of publications. This approach would slow down loss of the capacity built. As pertains publications specifically, the regard for these should be re-examined with scientific high calibre publications being adequately valued.

Option C: In addition to option B, university management, and particularly the administration, can be supported to ensure that they have the skills and expertise to maintain existing equipment, ensure its maximal use, and generally support the conduct of research (an administration that better understands their role in relation to research). This could ensure that researchers utilise the majority of their time on teaching or research and not on circumventing administrative hindrances. Additionally, the programmes could be expanded to include clear engagement with other universities to promote the professionalization of staff from these. In short, as PhD programmes develop, staff from other universities are actively invited to engage in their professionalization.

The PhD scholarship programme

Option A: The programme can continue as-is at this time. However, Sida should recognise that with the current model, Bolivian students often extend rather than reduce their study period because their research time in Bolivia is often inefficient

due to the lack of administrative support and resources and often substandard supervision. Following this option, the number of students graduating with a PhD will increase in Bolivia, while the costs will remain the same. However, there is no guarantee that the knowledge built will improve Bolivian research capacity.

Option B: The PhD scholarship programme can be modified so that students carry out all of their work in Sweden and only go to Bolivia if they require local data collection. This would most likely reduce the PhD study period. While costs might increase with longer stays in Sweden, there would be a higher likelihood that all students get quality support and students would have more opportunities to build international networks that can foster future collaboration. On the downside, however, limiting their time in Bolivia would weaken their Bolivian networks, which may affect their ability to secure employment or research partnerships upon their return. Moreover, this option would be much more focused on knowledge transfer than knowledge development,[1] and would considerably limit the possibility that any of the research findings would be adopted to use in Bolivia.

Option C: The PhD scholarship can continue using the current model, with Sida committing to increase its support to training for supervisors and administrative staff in order to ensure that research conducted in Bolivia is done more efficiently, effectively, and with the required support. This could be a foundation for designing a PhD training capacity in Bolivia. For their part, the universities would commit to recognise the PhD in Bolivia and also commit to hire all successful graduates in research and teaching faculty roles with compensation packages that are commensurate with the academic degree held. This would mean that the issue of accreditation would be nullified and universities would be able to more adequately benefit from the capacity developed. Over time it would allow universities to develop programmes locally. This approach would also require that the universities allocate more funding to research and teaching at the postgraduate level, which is not a challenge as funds are available, not least from the hydrocarbon tax.

Utilisation of research

Option A: The programme can continue as-is at this time, but Sida should recognise that with the current model, the utilisation of research by either the government or private actors is limited at best and that while clusters in Cochabamba have been

[1] Gynberg, V. B. (2013). *Swedish Research Aid Policy 1973-2008*. Linkoping Studies in Arts and Science, the Department of Thematic Studies-Technology and Social Change, p. 107.

successful, their continued success is directly dependent on continued Swedish funding. This does not mean that there are no successes. In fact there are clear examples of research conducted that has had a direct impact on the welfare of Bolivian population, but these efforts are not systematically supported by a mechanism that links the University and the public or private sector, but rather are largely a result of individual initiatives.

Option B: Sida may choose to further support the current approach by designing a mechanism that more effectively showcases each university's current research capacity. The data collected during this evaluation shows that the catalogue and fairs currently conducted do not generate further collaborations between the university and the private or public sectors. Therefore, effort could be made to identify a strategy that could more effectively and efficiently increase the visibility of the research conducted by both universities.

Option C: The support can be modified to require that all research projects include a solid interdisciplinary approach (inclusion from multiple sectors) that would serve to ensure that efforts are holistic and easy understanding and buy in from multiple actors. In addition all projects would need to have a partner in the public or private sector who has interest in using the study's findings. This would require that national partners be identified and that they be active contributors to research design, which in turn may require capacity development amongst partners in some fields. Otherwise, there is a risk that research favours fields in which there is a stronger history and culture of using research findings. An alternative would be to mobilise the Swedish embassy in Bolivia and use its other lines of support as conduits to partnerships between the university and government counterparts.[2] The latter model would have the added value that, if relevant, development aid support by Sida generally would benefit directly from Swedish research cooperation. This option could complement option B. However as noted in footnote 2, this is not a suggested approach as it goes against the grain of Swedish support.

Collaborations and Information Technology

Option A: The programme can be continued as-is at this time, but Sida should recognise that – despite their success – clusters are very fragile, that the VMCyT has thus far been unable to support ensure a substantial expansion of collaborations,

[2] Ensuring engagement between research cooperation and other development activities is not a new suggestion. See Eduards, K. (2006). *Review of Sida's research cooperation.* Stockholm: Sida

through its current efforts. This is not necessarily a failure of the institution, but recognition that developing a culture of engagement is a time demanding effort. The ICT element does show promise as both universities continue to move through the series of activities detailed in the respective master plans.

Option B: Sida may choose to support the identification of factors that currently threaten collaborations, such as reliance on individuals rather than institutions, and invest considerably on the development of support structures that rely on the mutual benefit of all parties engaged. Alongside this, efforts to continue the support for the implementation of the ICT master plan that can serve to consolidate institutional buy in, and other electronic resources such as the e-library should be examined carefully to identify what type of support, and by whom, would be required to enable a shift towards the wider strategic use of the specific tools.

Option C: In reference to undergraduate teaching, Sida can explore what type of support undergraduate instructors and students may need in order to strengthen learning environments and foment a culture of inquiry. Undergraduate students are currently not trained with the objective of developing potential researchers. Therefore, changes in undergraduate education might be central to improving the image of research.

Towards a next possible cooperation phase, 2018-2022

Choosing UMSA and UMSS as the main partner universities has made sense because they are by far the largest in the country and do, despite their shortcomings, produce the majority of research nationwide. The support provided to the VMCyT also makes sense from a strategic perspective since they are responsible for science, technology and innovation and therefore well placed to promote the use of research, partnerships, and innovation. However, this report found that while some progress has been made, serious structural issues threaten to limit the future potential for progress. The above options for how Sida may choose to approach their support in the future include a number of actions that would be required by the different stakeholders depending on the choices made. In addition, it is important to note that continuing with the current modus operandi will likely lead to numerous unsustainable results. Therefore, whichever options Sida chooses to pursue (aside from continuing on the same path) should be coupled with clear, actionable commitments by the different parties. Over the last decade, all funded organisations enjoyed considerable leeway regarding how they used the support and how achievements were measured. This has been positive, but the time is ripe for all parties to make clear, concrete, and actionable commitments if Sida support is to generate sustainable results in the next phase.

1 Introduction

1.1 SWEDISH DEVELOPMENT SUPPORT

From its onset, Swedish support has generally been tied to the idea that solidarity is a Swedish responsibility well aligned with Swedish cultural identity.[3] In addition, utilising foreign aid as an avenue to promote national values and political systems has been another clear motivation for development support not only for Sweden, but also other countries.[4] A third motivation for Swedish aid – international trade – has been considered by some as more significant than altruistically inspired objectives.[5]

Simultaneously, a focus on poverty and poverty reduction has been a consistent element of Swedish assistance since the 1960s, although not expressly mentioned in early documents. Understandably, however, interpretations on support for poverty reduction have varied and been influenced both by experience and changes in political doctrine over the years. In the 1960s, mainly through multilateral avenues, Swedish development aid focused on providing technical assistance to support self-help initiatives, which in turn could curtail the most egregious suffering. Concrete efforts relied on increasing local knowledge and capacity, as well as on modernising infrastructure. In the 1970s, as a response to what was considered the limited progress of the previous decade, Swedish support focused specifically on basic needs, and targeted countries whose social and economic policies would allow for considerable progress. Each country was then treated as a *project* while pursuing four overarching

[3] Dahl, G. (2001). *Irresponsibility and partnership in Swedish aid discourse.* Discussion paper. Uppsala: Nordiska Afrikanstitutet.
[4] Hook, S. W. (1995). The comparative record. In *National interest and foreign aid* (pp. 143-165). Boulder, Colo.: Lynne Rienner.
[5] Schraeder, P. J., Hook, S. W., & Taylor, B. (1998). *Clarifying the foreign aid puzzle: A comparison of American, Japanese, French, and Swedish aid flows* (pp. 294-323). In *World Politics*, vol. 50, no. 2. It was noted that the balance between solidarity and trade as leading priorities was contingent, in part, to the country's level of development. See Gynberg, V. B. (2013). *Swedish Research Aid Policy 1973-2008*. Linkoping Studies in Arts and Science, The Department of Thematic Studies-Technology and Social Change.

and interrelated objectives: economic growth, economic and social equality, economic and political independence, and the democratic development of society.

As aid entered the 1970s, there was an increased focus on recipient country macroeconomics and specifically how national debt affected poverty-reduction efforts. Sweden recognised that national efforts to provide for the poor had led to increasing national debt and that it was important to find a way to provide for the most impoverished as countries found methods to reform their economic structures. In the 1980s, Swedish priorities remained constant but came to include a clear concern for environmental issues. Following efforts to support economic restructuring, the 1990s ushered in a focus on social and political reform. This focus, however, was not to the exclusion of the emphasis on economic development. As in the 1980s, the 1990s also included an additional objective, this time gender. 'Contributing to the more equitable rights of men and women' was specifically highlighted[6] - – a timely move following the United Nations Fourth World Conference on Women in Beijing.[7]

Against this backdrop, Sweden has supported research capacity in low-income countries dating back to 1975. Since then, the central argument justifying the interventions has been that 'in order for a country to develop autonomously, there is a need for local/national capacity that can identify and produce the knowledge most suited to the particular context and problem'.[8] This position also implies a critique on low-income countries' dependence on high-income countries' capacity. Supporting local knowledge has, however, often overlooked the importance and value of indigenous knowledge systems. This issue in particular has surfaced in Bolivia (see Chapters 4 and 6). Indeed, in the 1980s, there was no recognition of potential contextual differences between aid recipients in the transfer of knowledge and technology. Acknowledgement that there are contextual particularities worth considering did, however, emerge during that decade. In short, research capacity was seen as an element of sustainable development in the 1990s, and as the decade came to an end, the focus shifted towards poverty reduction more specifically as did the

[6] Budget bill 1995/96:153 in Carlsson, J. (1998). *Swedish aid for poverty reduction: A history of policy and practice*. Overseas Development Institute [ODI]: Working Paper 107. Uppsala: Nordic Africa Institute

[7] Carlsson, J. (1998). *Swedish aid for poverty reduction: A history of policy and practice*. ODI: Working Paper 107. Uppsala: Nordic Africa Institute. Also see http://www.un.org/womenwatch/daw/beijing/.

[8] Gynberg, V. B. (2015). *An analysis of Swedish research aid policy 1973-2008*, p. 9. Dissertation brief. Expertgruppen för biståndsanalys [Expert Group for Aid Studies].

expectations of research and research capacity development. The focus on innovation as a systemic approach to turning research outputs into concrete poverty-reduction activities has also become a Swedish priority.[9]

Research cooperation pursued Swedish objectives in the early years by providing direct support to national research councils, which were soon found to be unable to set research priorities using scientific criteria.[10] This critical finding led to the development of the sandwich model, which is still in use today. The model, designed to train PhDs, is premised on students conducting their coursework, analysis, and write-up in Sweden and gathering data locally in their home country. The exact time period spent in each country has come to vary depending on research objectives and needs. While the model generated results, these were found to be insufficient to adequately respond to the donor's broad objectives. Hence, the need materialised for a more holistic approach moving away from individual support and toward institutional support.[11] Hence during the mid-1990s, there was a focus on identifying a university or universities, at the country level, to serve as a hub for research capacity that could receive long-term support. The institution focused approach has come to include a number of activities such as funding academic degrees, funding facilities such as research laboratories, facilitating access to publications through e-resources, supporting the development of research management structures, and direct funding for actual research.[12]

Aside from an expansion of the areas that have been funded, the Swedish International Development Cooperation Agency (Sida) has also made changes to how it defines and approaches specific objectives. For example, in its efforts to develop local research capacity and increase the number of trained researchers, Swedish support to higher education has started to move away from a full reliance on Swedish academic institutions as the knowledge builders; it has instead started to foster the development of in-country post-graduate programmes to allow for long-term, sustainable post-graduate education at the national level. This has been a result of the support itself which has enabled the development of ever growing local critical mass. Sida's approach to supporting innovation – based on its experience, Sida has come to

[9] Ibid.
[10] Boeren, A., Alberts, T., Alveteg, T., Thulstrup, E.W., & Trojer, L. (2006). *Sida/SAREC bilateral research cooperation: Lessons learned.* Stockholm: Swedish International Development Cooperation Agency [Sida].
[11] Ibid.
[12] Sida. (2014). *Bilateral cooperation – Development based on evidence*.

emphasise the use of clusters. Clusters bring together a number of actors, such as civil society organisations, universities and institutes, governmental actors and the private sector in an effort to promote innovation and utilise research outputs. The initial resistance within Sida to engaging the private sector has faded. Sida's support for innovation has also led it to encourage interdisciplinary collaborative work as a way to respond to complex problems. Throughout these changes, a central concern for Sida has been to ensure the provision of funding that does not lead to a governmental abdication of responsibility. Therefore, while recognising that building capacity in higher education is a long-term endeavour, Sida has remained cognizant of the importance of developing a sustainability plan.[13]

Much has changed in the way Swedish aid has been provided and how it has supported research over the decades. However, its underlying focus has remained constant since the realisation that focusing on individuals alone posed clear sustainability challenges. Strengthening of institutions through the development of individual capacity and supporting an enabling environment has become the core tenet of the support. The Sida strategy currently in effect (2015–2021) highlights this**.** More specifically, the strategy zeroes in on three main activities focused on low-income countries:

1. Building research capacity.
2. Focusing on global, regional, and national research of relevance to low-income countries and regions.
3. Promoting research that, through innovation, can contribute to poverty reduction and sustainable development.[14]

The focus of this evaluation is primarily on the first activity (see Section 1.2), although it also pays attention to innovation – and specifically to the establishment of innovation systems. In responding to the demands of this assignment, key elements of the history of Sida's development aid and of the lessons learned over the years have been kept in mind.

[13] Akuffo, Hannah. Sida. Key Informant Interview, 30.01.17
[14] Sida. (2015). *Strategy for research cooperation and research in development cooperation: 2015-2021*, p. 4.

1.2 PURPOSE AND SCOPE OF THIS ASSIGNMENT

This evaluation has focused specifically on Sida's support to the Universidad Mayor de San Andrés (UMSA), the Universidad Mayor de San Simón (UMSS), and the Vice Ministry of Science and Technology (VMCyT) in Bolivia between 2007 and 2016. The objectives of this assignment are twofold:

- First, to assess the impact of the Sida-funded bilateral research cooperation with Bolivia from 2007 to 2016 in building **research capacity,** as well as a **research environment.**[15]
- Second, to provide an evaluation document that will serve as a basis for identifying the **next steps required** for the country and its universities to **achieve national and institutional sustainability for research.**

1.3 HOW TO READ THE REPORT

In addition to this introduction, this report contains seven chapters:

- Chapter 2 details the approach and methodology that were used for this assignment.
- Chapter 3 outlines Sida's contribution to research cooperation in Bolivia over the evaluated period, as well as the outputs of said support.
- Chapter 4 introduces the Bolivian national context – setting the stage for how the government, the private sector, and society at large understand the role of research – as well as key policy and budgetary implications.
- Chapter 5 zeroes in on the university context, specifically on how UMSA and UMSS have understood the role of research historically, how research has developed, the policies that impact it, how it is funded, and the incentives and rewards that exist to promote research and postgraduate education.
- Chapter 6 details university capacity to conduct research. This includes a presentation of the research management mechanism, as well as the mechanism to select research efforts. Human resources, available infrastructure, and how innovation is understood and treated by the university are also detailed.

[15] Since this evaluation has focused on impact, its mandate did not include the evaluation of programme activities in relation to their individual specific outputs and outcomes.

- Chapter 7 focuses on results, conclusions and lessons learned. It explores how the outputs (Chapter 3) influenced by the national context (Chapter 4), university context (Chapter 5), and research management capacity (Chapter 6) have affected the relevance, impact, and sustainability of the support provided. The chapter also summarises how cross-cutting issues, which are introduced throughout the document as relevant, have been understood and treated by the different funded parties. Lastly the chapter identifies key lessons that can be learned from the Bolivian experience
- Finally, recommendations are provided in Chapter 8.

A series of annexes provide additional support information, including the terms of reference, bibliography, list of individuals interviewed or who participated in focus groups, interview protocols, the national research capacity model and university research capacity model used by the client; and lastly a financial data breakdown by institution.

2 Approach and methodology

The terms of reference included 26 questions concerned with relevance, impact, sustainability, and cross-cutting issues. In responding to these questions – and in keeping with the assignment's overall objective and scope whilst ensuring a cohesive presentation of findings – we have utilised an analytical model combining several relevant models (see Section 2.1) to structure this report.

2.1 ANALYTICAL MODEL

The analytical model used in this assignment is derived from the institutional and organisational assessment model elaborated by Universalia and the International Development Research Centre (IDRC),[16] combined with elements of the national research capacity model and university research capacity model used by the client, Sida (see annex 5). Additionally, the model follows an ecological model presentation in order to illustrate the relationships between elements (see figure 1).

- That combination of several models highlights the diverse range of elements that promote a strong research environment, which can in turn support poverty reduction and broader development of low-income countries. The model is composed of four main layers, represented as rings.
- The first layer (the outermost ring) consists of contextual factors at the country level. It includes support for research at the governmental level, the use of research outputs, and society's perceptions of research. These factors are considered to be central to enabling an environment conducive to research. Tangible factors at this level include elements such as funding for research; strategies and policies that promote research; mechanisms to support the interaction between research entities, the government, and private sector entities; and the active use of research outputs by the government and the private sector. Less tangible factors include how research is perceived by society (i.e., to what degree research is respected at the popular level and regarded as a good investment).

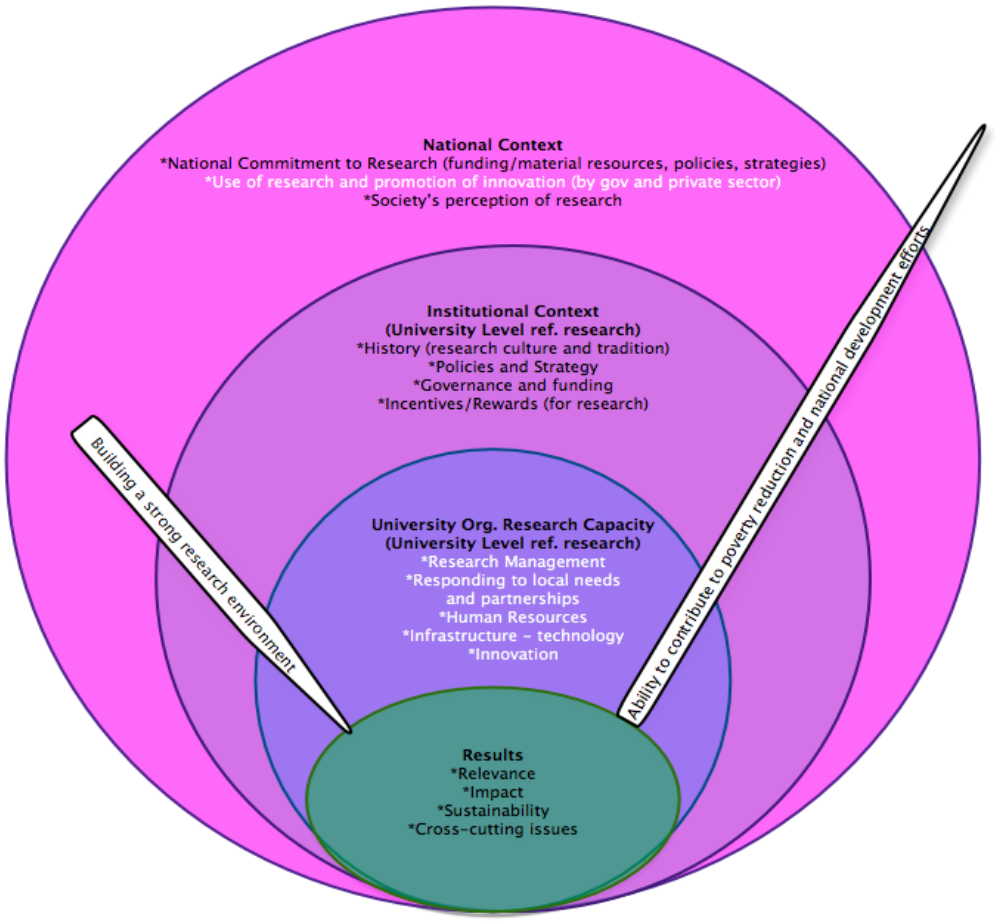
[16] See http://www.betterevaluation.org/en/theme/organizational_performance.

- The second layer consists of factors related to the university context, particularly those aspects relevant to research and higher education. This layer includes factors such as the university's history, postgraduate education and research culture, and tradition; policies and strategies relevant to postgraduate studies and research; governance structures and how these can be utilised (or not) to support postgraduate education and/or research; and issues related to incentives and rewards for research and the retention of human resources.
- The third layer consists of factors related to the university's organisational capacity to manage research. This element focuses on the university's ability to manage research – including, for example, research funding, staff to support research activities (administration), research's responsiveness to local needs, how partnerships with external actors materialise, human resources and research capacity, infrastructure, information and communications technology (ICT), and mechanisms that may foster (or suppress) innovation.
- The fourth layer focuses on research performance – specifically, how the elements on the first three layers impact the relevance, impact, and sustainability of the support provided, as well as how cross-cutting issues are understood and implemented.

The model is premised on the idea that the outer layers have a direct impact on building a strong research environment, which in turn has the potential to support poverty reduction and broader development. The model also assumes that each layer has a range of influence and the shortcomings at one level can to some degree be compensated for by strengths at another. Related to this there needs to be a dialogue between layers. This dialogue can influence both change and the capitalization on the support provided.

Clearly, there is some overlap among the different layers; still, an effort has been made to utilise the model to present a narrative that allows the complexity of the issues to be addressed while presenting findings in a largely linear and coherent fashion.

Figure 1 Analytical model used in this assessment



Note: In the model above, areas that have been financially supported by Sweden are highlighted in white. Most of the support has been in terms of organisational capacity; however, some support – mainly through the VMCyT and through clusters – falls within the national context layer. Importantly, Sida's support is also intended to support dialogue between actors at different levels within the model.

2.2 EVALUATION PHASES

This assignment used a highly participatory approach that aimed to engage stakeholders, particularly funding recipients in Bolivia, actively throughout the evaluation process. The assignment was conducted in four phases:

1. **Inception period:** During the inception period, preliminary information was collected and reviewed. This included documentation on programme interventions, previous evaluations, and Sida documentation, including policies and strategies. A draft inception report (including a detailed understanding of the assignment, proposed work plan, and methodology) was drafted and discussed with Sida and, via video-link, with stakeholders in Bolivia. The discussion led to

a revised inception note that included detailed data collection protocols and a refined work plan.

2. **Data collection:** The data collection process included three distinct components: review of bibliometric data, collection of original data in Sweden, and collection of original data in Bolivia. Data collection in Sweden was primarily carried out in February and March 2017 by Erik W. Thulstrup, with a limited number of interviews conducted by Ananda S. Millard; data collection in Bolivia was largely conducted between February 13 and 24, 2017, by a three-person team (Ananda S. Millard, Manuel Ramiro Munoz, and Pamela Velasco). Pamela Velasco collected some follow-up data after the field visit. The field visit to Bolivia culminated with an in-person debriefing of preliminary findings for Embassy of Sweden staff in La Paz, and a phone debriefing with the Sida desk officer. The bibliometric analysis was conducted in two phases: first, the global data were analysed in January, and then the data specific to the programme under review was analysed in March 2017.
3. **Data analysis and reporting:** The team knows that the programme is complex, therefore in an effort to correct any error, stakeholder review meetings were conducted with UMSA, UMSS and the VMCyT. The evaluation also builds on judgement and assessments. Therefore the online meetings have aimed to clarify these where relevant. At times, it is possible to interpret empirical data differently. Where stakeholders arrived at different judgements than those of the evaluation team, we have reflected on these, even if they did not change our own assessments. These meetings were conducted on-line, using go-to-meeting, on the 15th of May at UMSS, on the 19th of May at UMSA and on the 26th of May with the VMCyT. During each meeting participants were given the opportunity to discuss findings and invited to provide the evaluation team with information that could either further support claims made or which supported alternative views. The meetings included 64 participants at UMSA, 14 participants at UMSS and six participants at the VMCyT.
4. **Presentation:** The final report will be shared with Bolivian stakeholders as part of a workshop that will aim to both share findings and support Bolivian stakeholders in terms of how to actively use the findings to draft their programme plans as they apply for a next phase of Sida funding.

2.3 DATA COLLECTION PROCESS AND ANALYSIS

The evaluation used five data collection methods: document review, interviews (individual and group), focus groups, questionnaire, and bibliometric data extraction.

Document review: Relevant Sida documents, university documents, evaluations, secondary data, and programme documents from UMSA, UMSS, and the VMCyT were reviewed in order to understand the support provided, situate the findings within the broader Bolivian environment and the Swedish cooperation environment, and corroborate claims made in interviews and focus groups. A full list of documents reviewed is available in Annex 2.

Key informant interviews, group interviews, and focus groups: The evaluation team conducted a wide range of interviews (group and individual) and focus groups with Sida staff, supervisors in Sweden, and students currently conducting PhD research in Sweden, as well as with university staff (both administration and academics), PhD recipients, and current MSc, MA, and PhD students in Bolivia. Staff members from the VMCyT were also interviewed. A full list of respondents is available in Annex 3. All interviews and focus groups followed an informal discussion-like approach, while closely adhering to an interview protocol to ensure that all questions received adequate responses. The protocols were designed based on the information respondents could reasonably be expected to know in terms of the questions in the terms of reference. The protocols used are available in Annex 4. In total, 264 people were interviewed as part of individual or group interviews or focus groups.

Interview and focus group data were analysed as follows: First, the original data collected were transcribed. Then data were extracted from transcribed forms into summary finding data sheets, which were based on the questions in the terms of reference (see Annex 4). Responses by the different respondent categories were then compiled to assess the degree to which they were aligned. This process allowed for the triangulation of findings from the interviews and focus groups.

Questionnaire: The evaluation team administered a short written questionnaire to Master's and PhD students in Bolivia. Originally, this data collection strategy was planned as an online activity, which would allow for a wider response rate. However, representatives of both universities felt that this approach would not be effective; therefore, the team collected questionnaire data manually and entered it into the online survey platform to facilitate analysis. Questionnaire data were used to support findings from individual and group interviews with key informants, as well as from focus groups.

Sampling: Respondents were selected based on their relationship or engagement with the programme. The evaluation team interviewed university and VMCyT staff engaged with Sida activities. The participation of Master's and PhD students was voluntary, so while all students were requested to participate in some data collection exercise, some declined for unknown reasons. Similarly, representatives from other universities and the private sector participated on a voluntary basis; hence, some may have self-excluded from participating in interviews, a factor over which the evaluation team had no control.

Bibliometric data extraction: Data were extracted in January 2017 from two major databases: the Institute for Scientific Information's (previously Thomson-Reuters) Web of Science and Elsevier's Scopus. Due to their slightly different coverage and different data structures, the two databases were used for different tasks. The Web of Science data contained 3,881 publications associated with Bolivian research institutions from 1996 to 2016 (CU=BOLIVIA; SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI; TS=1997-2016). Of those, 996 publications were associated with UMSA (CU=BOLIVIA AND OG=(UNIVERSIDAD MAYOR DE

SAN ANDRES); SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI; TS=1997-2016) and 379 publications with UMSS (CU=BOLIVIA AND OG=(UNIV MAYOR SAN SIMON OR UNIV MAYOR DE SAN SIMON OR SAN SIMON UNIV); SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI; TS=1997-2016). Complete bibliometric and citation data were extracted and analysed on the international, regional, national, and university levels. National and international collaboration were analysed, as were regional and international ranking, and the country and university publication profiles were broken down into research sectors. Citations to Bolivian researchers were used as a proxy for academic impact. Web of Science's quartile-based, field-specific journal rankings were used as a proxy for journal quality. Bolivian national trends and university-level trends were analysed in relation to the outputs and impact of this programme.

2.4 CHALLENGES AND LIMITATIONS

The limitations and challenges in this assignment included:

Data availability: By and large following the initial draft report missing documents were made available by all three organizations. However, challenges experienced with bibliometric data see below (see below). Additionally, the way the programmes have been documented in the UMSA and UMSS material available to the evaluation team, limited the evaluators' ability to respond to three crucial, interrelated questions: what were the exact tangible activities which were planned under any given period; why were these activities prioritised during the planning and conceptualisation process; and were these activities conducted or not—and if not, why.

Bibliometric data: These data were restricted to Web of Science- and Scopus-indexed research publications. Both are very selective in accepting journals, and both exclude a very large number of quality journals that are accredited by, for instance, the NSD register that is adopted by a large number of Scandinavian universities. For that reason, universities' own bookkeeping of publishing activity would be essential for fair evaluation, but neither university was able to provide a coherent, error-free list of publications either in general or associated with the Sida cooperation in particular. Although it is noted that individual researchers, at UMSS, specifically, were able to provide data on their own work. While this is able to show that research derived publications have been drafted, and in some cases which have resulted from

Sida funded interventions, the information does not enable a change to the bibliometric findings.

UMSS staff changes: UMSS has experienced considerable administrative changes in the last six months. The changes – including the identification of a new rector (November 2016)[17] and new management across the university – mean that at the time of data collection, many staff members were new to their posts or uncertain of their job security. These two factors combined meant that some interviewees did not know the Sida programme well enough to be able to comment or were concerned that their responses might affect their future employment prospects. Efforts to identify previous staff were made, but their positions might have also been politically motivated.

Measuring contextual support for research: Assessing in a replicable and verifiable manner how society perceives research and researchers was not possible within the scope of this assignment. Therefore, this component of the assessment is based exclusively on the perceptions of interviewees at UMSA, UMSS, and the VMCyT; hence, it excludes the direct views of members of society at large.

Discord between response to interviews and documentation: In some cases, views expressed by respondents seemed to be at odds with documented information the evaluation team was able to collect and respondents were unable to supply alternative supporting materials. Multiple reasons could account for these disparities. Therefore, the team has recognised these issues as shortcomings and ensured that the language used clearly reflects the sources and the degree to which information could be verified.

Attribution: The direct impact of supported activities on poverty reduction and overall development is impossible to ascertain given the myriad of factors that contribute to results. As a way to mitigate this challenge, an effort has been made to assess if and how Sida support has potentially contributed to poverty reduction and Bolivian development.

[17] In comments to this report UMSS management maintained that administrative changes that have taken place at UMSS are “natural” periodic leadership changes. These they pose have occurred in 2006, 2011 and 2016. This suggests that there is a grave shortcoming in how UMSS manages leaderships shifts. This issue however was not assessed.

3 The programme under review

Swedish support to Bolivia's universities – and specifically collaboration with Bolivia's two main universities (UMSA and UMSS) and the VMCyT – dates back to 2000 (VMCyT in 2008). The initial support was evaluated in 2006.[18] Support has recently been provided over two phases: the first phase covering the 2007-2012 time period and the second and current phase covering the 2013-2017 time period. This evaluation covered both funding phases.

The Swedish funding's funding has focused on strengthening the research capacity of UMSA and UMSS so that they are individually able to support efforts to improve the living standards of Bolivians through efforts that aim to reduce poverty and promote development. In pursuit of these objectives, funding was intended to support existing structures, as well as foster new ones that might jointly be able to expand the country's research capacity. Similarly, support provided to the VMCyT has been intended to strengthen Bolivia's overall research capacity and improve universities' ability to engage with public- and private-sector actors. Although a detailed review of project documents reveals an extensive number of objectives and potential outputs for each phase of Sida support, they generally fall within the following categories:

- Building/strengthening research management capacity.
- Building/enabling/facilitating the development of innovation systems.
- Strengthening research capacity through postgraduate training (Masters and PhD) and through the provision of research funding.
- Facilitating/enabling the conduct of research through the improvement of infrastructure and expansion of resources (e.g., ICT, e-resources, and laboratories).

The underlying assumption has been that the support provided in pursuit of these objectives would lead to a stronger research capacity within each of the two universities and that this capacity, in turn, would be able to (through research) support poverty reduction endeavours and generally support Bolivian development. The

[18] Thulstrup, E. W., Munoz, M. R., & Decoster, J. J. (2006). *Building research capacity in Bolivian universities.* Stockholm: Sida.

principal objectives of the activities that have been executed with Swedish funding, and the most relevant associated outputs, are detailed in the following sections. The chapter concludes with a sub section which highlights changes or differences between what was found by the 2005 evaluation and this one.

3.1 MANAGEMENT CAPACITY DEVELOPMENT

Both UMSA and UMSS have highlighted the development of research management capacity as an institutional weakness (see Chapters 5 and 6). Hence, it has been a key area of Sida support. The support has focused on training university staff on managing research projects, financial management, use of e-resources, and development of policies and guidelines. Overall, the evaluation team's document review suggests that a large number of activities have taken place and guidelines and policies have been produced. Moreover, interviewees reported that the training and technical support they received has been instrumental in strengthening the research coordination departments at both UMSA and UMSS. This has led to the strengthening of institutional capacity which can remain even when staff are changed.

3.2 CAPACITY DEVELOPMENT IN ICT

ICT has been a specific area of capacity development for the research management departments, and the evaluation team treated ICT as a separate area of support because of the substantial investment in this field. Here, too, clear progress has been made. Equipment has been delivered and installed, and key training has been conducted on the use of e-resources and the capabilities of ICT. Specifically, a master plan, which was based on extensive participatory data collection, has been developed, which focuses on project based benchmarks. At UMSA the master plan has been approved by the University council and its implementation is currently being initiated. Some projects in the UMSA plan have not been implemented yet due to budgetary constraints. Representatives from UMSA note that they hope that meeting with Sida in July 2017 will be able to resolve budgetary issues as Sida may choose to support currently pending projects.

The objectives from the plan which are currently being pursued include the updating of information and communication systems across the university. This, it is hoped, will serve to considerably improve both the administrative capacity of the university, but also teaching capacity/approach. It is also hoped that this update will promote greater visibility of the research accomplishments of the university. UMSA highlights that the master plan for ICT has been designed in a manner that enables the consistent update of information and course correction as may be necessary. UMSA further highlights that the way the process to develop the plan was carried out served to secure buy in from different university stakeholders. To this end the process itself was important. Still it is important to highlight that the development of the ICT plan required considerable support and according to some of those interviewed, the process could have benefitted from even further engagement from the Swedish counterparts.

At UMSS the master plan was approved as Resolution from the Rector (RR 333/16) in June 2016. Currently the strategic elements are being implemented with hydrocarbon tax funds. Elements of the ICT plan already concluded include the equipping of a video conference and the provision of key ICT infrastructure to research centres, additionally a system that can govern information and project management across the university has been developed. The plan's elements under implementation currently include the acquisition of specialised software, ICT infrastructure for research centres. Additionally, a web portal is being designed, as well as a library and archival system. Combines these efforts are expected to enable wider engagement with entities outside Bolivia, as well as ensuring that the university is better able to manage and share key information. Overall UMSS expects that by using ICT more effectively they will be able to better position the institution nationally as well as internationally. This includes an increased ability to showcase their capabilities, but also improve their performance as a research and academic institution.

Overall the progress made thus far is commended by entities at both universities as a valuable investment that holds notable potential and which has thus far enabled more efficiency and or greater access and dissemination of information. Aside from the progress made is it important to note that the ICT efforts of each university have not been integrated with those at the other institution, which has limited the opportunities for the inter-institutional exchange of knowledge.

3.3 MASTERS PROGRAMME

An important feature of the Masters programme funded by Sida was the development of the scientific Masters at UMSS. Masters at UMSS fall into one of two categories: professionalization or scientific. The latter focuses specifically on developing research capacity, while the former is intended to further professional skills and targets individuals who are not pursuing employment in research of a PhD. Of the 49 Masters offered 6 are scientific. The scientific masters are equivalent to European standards, while the others are equivalent to the Swedish magister. These 6 Masters programmes are those funded by Sida. These are on:

1. Chemical Technology, Food and Bioprocesses
2. Water, Quality and Environment Management
3. Renewable Energy Technologies
4. Genetic Improvement and Biotechnology
5. Epidemiology
6. Research in Social Sciences

UMSS and UMSA are currently planning to develop PhD programmes. The initial focus is on 2 o 3 programmes, which will focus on one of the above subject areas. While the main focus will be to invite graduates from the Scientific Masters to continue their studies and focus on research, UMSS also notes that efforts to engage some students from professionalization Masters into their PhD programmes will be made. This will require that graduates from professionalization Masters undergo a

process of equalization so that they may gain the adequate research knowledge and skill.

At UMSA, while the two modalities are reflected in the focus of the curricula and a modality to distinguish is currently under development, at the moment all Masters are governed by the same parameters and are not distinguished in title. The students receiving Sida funding are exclusively enrolled in Scientific Masters programmes which can be considered equal to a masters in Europe. There are clear plans at UMSA for students who are currently in the final phases of their Masters programmes to receive scholarships to pursue PhDs.[19]

The Master's programmes, developed locally at both universities, have succeeded to train students and all indications show that the students have, by and large, received the necessary support. Although some noted that supervision was minimal, generally focus group participants felt pleased with the support they had received. Thus far the total number of Masters awarded is 6 in the previous phases, but a further 98 candidates are currently undertaking their degree (see table 1).

Table 1 Masters students, both graduated and current candidates, by university and by gender

	Master recipients		Master candidates	
	Male	Female	Male	Female
UMSA	2	3	9	14
UMSS	0	1	37	38

Regarding the selection of Master's student scholarship recipients, all survey questionnaire respondents (n=55; 22 from UMSA, 33 from UMSS, current students) noted that they had either responded to a call for proposals or been awarded them based on their high grade point average. This was the first scholarship for the majority of the survey respondents (83.33%), and only two of the respondents reported receiving a scholarship after their Master's degree, one of whom specified that it was to continue with a PhD.

Amongst the Master's students included in the UMSS focus groups, 14 were working on subjects that required their engagement with social organisations; 11 others were working with state institutions, seven were engaged in research in collaboration with private enterprises, and only four were working independently. At UMSA, the

[19] At UMSA, Sida has funded Masters level scholarships, not the development of new Masters programmes.

situation was similar. While the evaluation team was unable to collect data on who might be involved in dissertation work with external partners, it noted that the calls for proposals included several guidelines pertaining to engagement with public-sector partners.

All respondents noted that the Master's programmes have been successful; however, management at both institutions and the Executive Committee of Bolivian Universities noted that often Master's and diploma programmes are created, accredited, and discontinued after a few iterations, as opposed to updated or modified. This approach means that the resources invested in developing a programme are largely lost when it is discontinued, and that proportionally high levels of resources (including knowledge) are utilised on a quasi-regular basis to develop new programmes. Financing is one key factor for discontinuing programmes. Still, it is important to note that respondents stressed that the Masters which have received funding through Sida would remain part of the standard university offer. Lastly it is important to underscore that a system to evaluate the quality of the Masters programmes has not yet been developed. This, some respondents argue, is central to ensuring that the capacity built does indeed meet basic requirements that can be recognized internationally.

3.4 RESEARCH FUNDS

The majority of the research funds are allocated to research projects that include multiple researchers and incorporate PhD training (the sandwich programme, section 3.5). The principal result has been PhD graduates and publication outputs, although some work has also been directly tied to the efforts on clusters (see section 3.6). There have also been some funds provided to short-term research projects not affiliated with PhD programmes in which researchers, as well as undergraduate and postgraduate students (not PhD) have participated. It is difficult to know with exactitude how many researchers participated in any given year as some projects are longer than others, some projects are more that 12 months, while some less, and the start dates affect which year they fall on. Keeping all this in mind, it was observed that at UMSS between 2000 and 2016 there were 150 projects resulting in a total of 372 student dissertations, of which 342 were undergraduate dissertations. As of 2016, 68 dissertations had been successfully defended. In addition, during the same time period, the research conducted led to the development of 345 technical reports, 37

books (not refereed), 33 specialized journals, 77 journal articles, 48 academic texts, 98 presentations, 80 databases, and 47 audio-visual items.[20] Table 2 shows how many individuals have been engaged in research at UMSA since 2007.

Table 2 Number of individuals engaged in research per year at UMSA

Role	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coordinator	16	16	16	16	16	16	15	15	15	15	15
Co-coordinator	1	1	1	1	1	1	2	2	2	2	2
Masters students	14	14	14	14	14	14	31	31	77	77	77
Doctoral student	16	20	23	27	24	19	45	42	41	40	39
Researcher	51	51	51	51	51	51	25	25	25	25	25
TOTAL	**98**	**102**	**105**	**109**	**106**	**101**	**118**	**115**	**160**	**159**	**158**

The latter have come to constitute a central mechanism for graduating PhDs to continue conducting research, as well as to foster the further promotion of research at each of the universities. The funds provided for research through the Sida engagement is unique because it has thus far been based on internal tendering processes. According to UMSA the overall objective of the funds, and of the research funded, has been the promotion of research capacity at UMSA ensuring that the work funded is scientifically sound, relevant to the Bolivian environment and innovative. The process which leads to the selection of funded projects includes 10 steps. These are: call for proposals; receipt of proposals; internal evaluation of proposals; external evaluation of proposals; development of ranking of bids; coordination meetings, which includes the project coordinators of all winning bids; registration of projects in the financing system; regular meetings for planning and reporting; and closure of projects. The system of evaluation of projects during project selection, execution and after completion used for the Sida funded projects at UMSA has been later adopted by UMSA to manage hydro carbon research funding allocations as well. According to UMSA the adoption of the 10 step system has been instrumental in fostering transparency and confidence that the projects selected are the legitimate recipient of funds. Still two issues need to be noted, first that the administration of funds is carried out by each faculty and that at the faculty level systems can be highly bureaucratic and not research friendly; second, that although the system has led to an

[20] It is important to note that some of the materials listed may fall under more than one category. UMSS. 2016. Programma de cooperacion a la Investigacion Cientifica Convenio ASDI-UMSS (2000-2016)

improvement in perceived transparency, there was still considerable discord amongst those interviewed regarding the results of the research funds allocation.

At UMSS the development of normative and regulatory documents has been a key contribution of the Sida support. The plan of action 2002-2012; the conceptual framework for research at UMSS 2012-2021; the conceptual note 2013-2017; the system for methods and tools for research 2002-2010. These documents, which will be updated if funding continues, are an important framework for UMSS which permits the clear and transparent allocation of funds for research, including PhD scholarships. It is clear that the development and design of these parameters is important, unfortunately due to the political challenges faced by UMSS the implementation of these norms has not been tested widely in recent years. Therefore it is possible that further refinement to respond to real-life challenges might be needed. Still their existence must be recognized as a step towards the professionalization of research activities at the university level. Aside from the generation of norms and regulations, numerous individual projects have taken place and like at UMSA, these funds have enabled the conduct of important research work, which in turn have led to multiple publications, for example.

3.5 PHD SCHOLARSHIPS (SANDWICH MODEL)

The sandwich model has encountered a diverse set of reactions. The evaluations of African programmes show that on the one hand, individuals – especially those with families – have found it hard to leave their families behind for extended periods of time.[21] On the other hand, the study periods in Sweden added prestige, credibility, chances to actually devote time to studies, access to facilities and online materials, high-quality courses, and active expert supervision. In Bolivia, while some of the same concerns were raised, the principal concern was that students did not have access to an environment or resources in Bolivia even remotely comparable to those they accessed in Sweden. If anything, students felt they wanted their time in Sweden to be extended as long as possible. In Africa, the high workload in students' own universities was noted as a principal factor that slowed down the pace of studies.[22] In

[21] Kruse, et.al. 2017. *Evaluation of Swedish government research cooperation with Eduardo Mondlane University, Mozambique 2011–2016*. p. 60-61. Sida: Stockholm

[22] Kruse, et.al. 2017. *Evaluation of Swedish government research cooperation with Eduardo Mondlane University, Mozambique 2011–2016*. p. 60-61. Sida: Stockholm; Kruse, et.al. 2014. *Evaluation of Swedish government funded research cooperation support to Uganda.* Sida: Stockholm; Kruse, et al. 2014. *Evaluation of the Swedish Research Cooperation with Tanzania 2009-2013.* Sida: Stockholm

Bolivia, students mentioned the workload expectation as a clear hindrance, but highlighted that bureaucracy and the lack of a supportive administration was the main challenge they consistently encountered. The result was that in all cases, Bolivian (and African) students noted that most progress was almost always made while in Sweden.

Bolivian PhD candidates also noted that the quality of supervision in Bolivia varied, as did the collaboration between Swedish and Bolivian supervisors. In some cases, there was active collaboration and alignment in terms of the support provided; in others, there was no collaboration or alignment at all. UMSS students particularly noted that in many cases, their supervisors in Bolivia provided limited academic support, were unable to showcase students' work or support publications, or were unwilling or unable due to language constraints to engage with the Swedish counterparts. This challenge is not indicative of all Bolivian supervisors, however, but rather a concerned raised by multiple respondents and hence highlighted here.

One issue highlighted by current PhD students was that while the culture of interaction between PhD candidates and their advisors in Sweden was a non-hierarchical one in which the student was seen to provide value to the relationship, the supervisor-student relationship in Bolivia was often fundamentally different and fostered a top-down approach in which PhD candidates were not seen as value providers. This culture, PhD candidates argued, did not capitalise on their knowledge. Again, these concerns are not ones that were highlighted by all students, but rather ones that were noted by some and recognized as important by others. None of the Bolivian supervisors noted any of the aforementioned concerns, except for the lack of administrative support, which was consistently noted as the principal challenge to the conduct of research (see Section 6.1).

In contrast, the views of current PhD candidates interviewed in Sweden noted other more positive aspects. A number of students currently in Sweden noted that their Bolivian supervisors had facilitated engagement with research groups locally and were supportive. For their part, Swedish supervisors who participated in this evaluation noted good partnerships with Bolivian counterparts, but specified that their local counterparts were individuals that were able to secure funding independently and were well positioned. This suggests that those individuals are independently well regarded despite the lack of university support rather than because of it. It is not

possible within the scope of this assignment to evaluate the quality of supervision. However, the experiences and perspectives clearly vary. Overall, it was noted that Swedish support itself has not focused specifically on the development of stronger supervision capacity in Bolivia. PhD students learn how to become supervisors of PhD students based on their own experience as PhD candidates. While this approach is common in many university systems, in Sweden would be supervisors are provided specific support to develop and strengthen their supervisor capabilities.

Students in Bolivia, particularly those in Cochabamba, highlighted that compensation packages in Bolivia, unlike those in Sweden, were meagre and insufficient to enable them to work effectively. At UMSS, the compensation package provided to a PhD candidate is almost the same as those given to part-time undergraduate student lab assistants. UMSA does not guarantee employment after the completion of the PhD, nor does it require PhD recipients to work for the university to compensate for their scholarship. At UMSS, on the other hand, students are required by contract to work for the university for a time double what they took to complete their PhD work. However, this requirement is not coupled with a guarantee of proper employment. According to respondents, the result is that PhD recipients at UMSS are often given short-term contracts, are not hired in positions that enable them to use their newly gained skills, or are made to wait for contracts or risk being sued for not complying with their scholarship obligations. Sida does not condone this approach. It is important to note that UMSS highlights that it has university regulations which require that a contract that is longer than 3 months be transformed into a permanent contract, but the experience noted by respondents suggests that this is not fully straight forward and that short term contracts are a possibility faced.

While the perspectives presented by respondents in Bolivia were grim, the views of those currently in Sweden were quite different. Respondents in Sweden felt that their prospects upon return were quite good and that their work is being valued. Notably, many current PhD students and PhD recipients noted that they had unrealistic expectations of what awaited them in Bolivia; perhaps this explains the disparity in views between students in Sweden and students who have returned. Despite the hardships experienced in Bolivia, the evaluation team found that the majority of PhD students (97% of UMSA graduates and 86% of UMSS graduates) are currently living in Bolivia.

The PhD programme funded through Sweden has thus far trained 40 PhDs from UMSA, with a further 33 currently in training. At UMSS, there are currently 30 PhD candidates and 38 PhD recipients. The gender distribution of PhD candidates and recipients is detailed in Table 2.

Table 3 Gender distribution of PhD recipients and candidates by university

	PhD recipients		PhD candidates	
	Male	Female	Male	Female
UMSA	52%	48%	45%	55%
UMSS	63%	37%	60%	40%

As the following table indicates, the majority of PhD students have completed or are expected to complete their theses within eight years, with more than half finishing within five years. However, there are individual cases that exceed the norm, although these should be evaluated on a case-by-universidad case basis, as there appear to be special circumstances governing each case. The average completion time at UMSA is 5.7 years, and at UMSS only marginally higher at 6.07 (combined average of both universities is 5.92 years.[23]

Table 4 PhD completion times and on-going PhD periods by university

		3-5 years	6-8 years	9+ years
UMSA	Completed PhD	20	17	3
	Candidates	25	0	8
UMSS	Completed PhD	20	15	3
	Candidates	27	0	0

At UMSA, the proportion of PhD recipients that currently conduct research at the university in some capacity is greater than the same proportion at UMSS (82.5% versus 76.3%). Although the proportion is comparatively high, the data available does not reveal, if the positions that PhD recipients hold at either institution capitalises on all the knowledge gained. During the group interview PhDs from both universities respondents noted that they are often employed in positions that are short term, low level, and where their skills are considerably under used.

[23] It is important to underscore that since the number of PhD graduates is relatively small (40 at UMSA and 38 at UMSS) the average is disproportionally influenced by a limited number of PhD Candidates.

Table 5 Number of PhD graduates vs number of PhD hired by university

	Total number of PhD obtained	Number of PhD recipients working at their home university in some capacity	Number of PhD recipients conducting research elsewhere
UMSA	40	33	3
UMSS	38	29	Unknown
Total	78	62	1 (known)

Additionally 7 PhD candidates from UMSS abandoned the programme prior to completion, 2 of whom started since 2007. At UMSA 7 PhD candidates have abandoned their studies3 of whom were part of the 2002-2006 programme period and 4 from the 2007-2012 programme period, additionally an 8th candidate is due to abandon their studies this year as the time spent on the PhD has far exceeded the expected period. Regarding the latter an agreement to discontinue support has been arrived to between the candidate and the University. Jointly the PhD and Masters programmes trained students from 11 faculties at UMSA and 8 faculties at UMSS, with 3 faculties, all in the science field, currently holding the majority of the scholarships (see figures 2 and 3).

Figure 2 Number of current and past students by gener and faculty who are or have been engaged in Sida funded postgraduate training (Masters and PhD) at UMSA

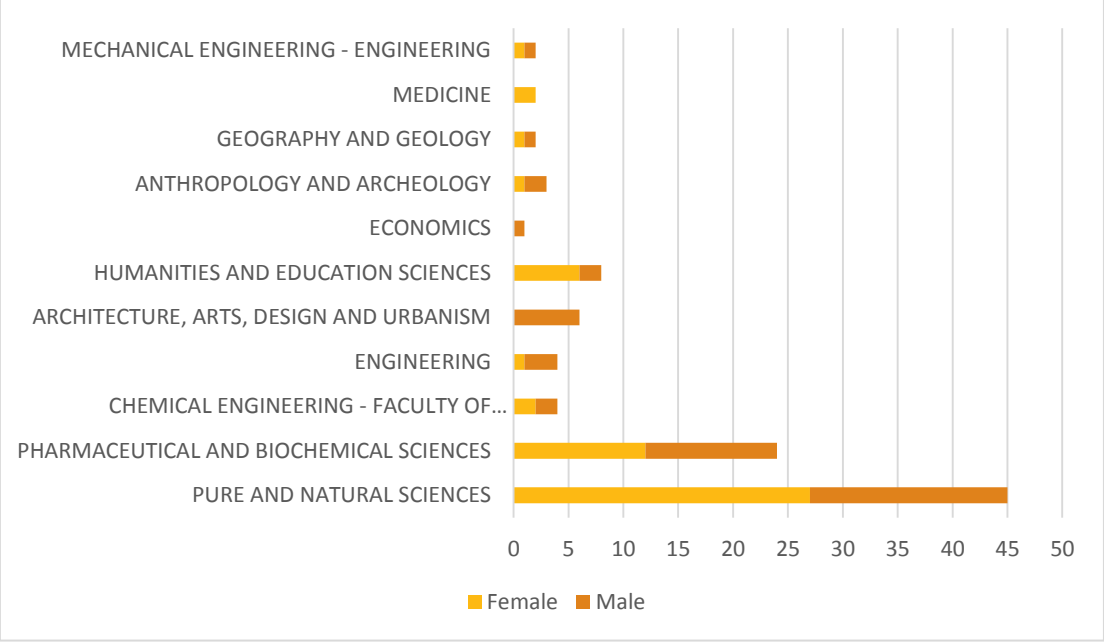
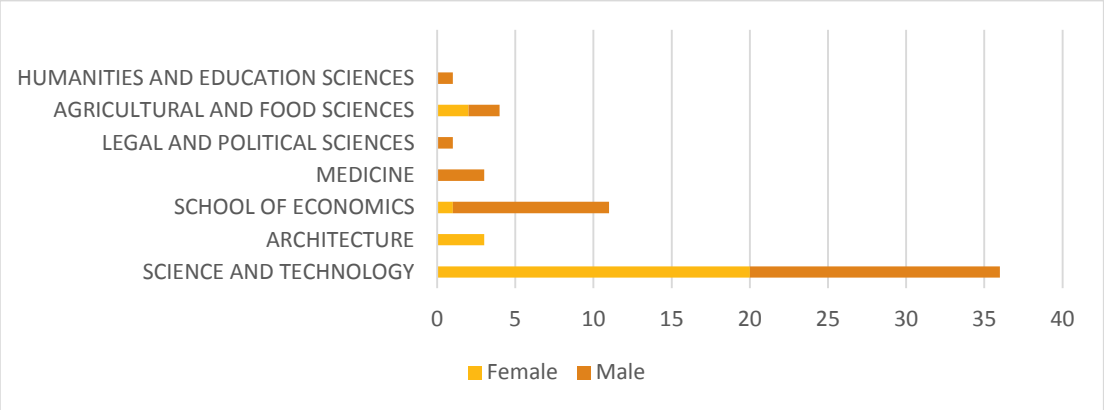


Figure 3 Number of students current and past by gender and faculty who are or have been engaged in Sida funded postgraduate training (Masters and PhD) at UMSS



The selection of thematic areas is a deliberate exercise which is aligned with the national development plan. Indeed, the broad focus on agronomy and its specific focus on food science, natural resources for development, technological and productive development, health and research management, are interpreted by UMSA as directly aligned with the national development plan, and specifically under the productive and dignified Bolivia subheadings noted in said plan. It is worth noting that the plan itself is very broad, but that the consideration undertaken by UMSA demonstrates a clear strategic view of how the university can contribute to the furthering of specific areas of focus at the national level. At UMSS the selection of thematic areas has been a little different than at UMSS. The initial focus (2002-20212) was on subject areas where the University felt it had the ability and the need for creating thematic area critical mass. Since then the focus has turned outwardly and focused more specifically on subject areas that can have a social or economic impact or fill a known gap. The subject areas identified for the current phase include Food security; Technological and industrial development; Health; Energy; Environment and human settlements; Social development and citizen participation. These issues can also be seen as aligned with the national development plan.

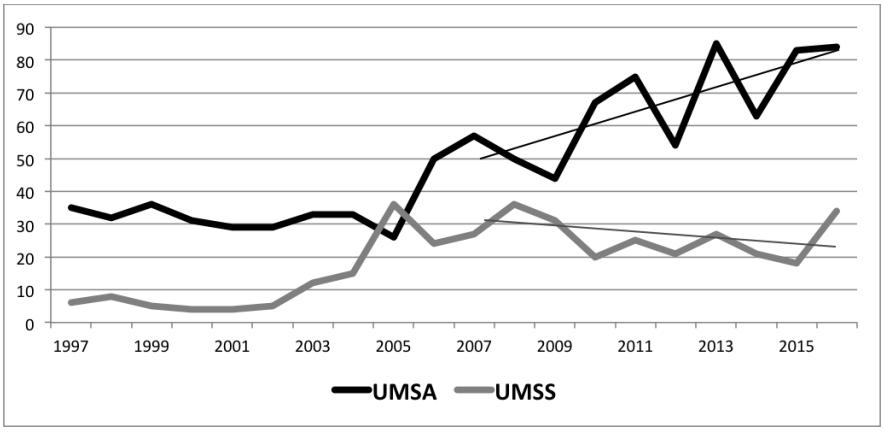
3.6 PUBLICATION OUTPUTS

University-specific publication data (1997-2016) were extracted from Web of Science, which lists 40% more publications for UMSA than Scopus does, but 11%

fewer publications for UMSS.[24] Indexes offer only partial subsets of all research output, and only universities' and programmes' own bookkeeping could track all research activity – and despite publications being an important indicator, this programme kept no consolidated list of publications associated with the programme. For that reason, this section focuses on university-level analysis.[25]

In order to show longer-term trends, 20 years of publication data were extracted from Web of Science, resulting in 996 publications for UMSA and 379 publications for UMSS. The results show that between 2003 and 2005, UMSS had a significant boost in its research output effectively quintupling the university's publishing activity (see **Error! Reference source not found.**). However, after that quick spurt, the growth of MSS publishing stopped, and between 2007 and 2016, UMSS publications activity has slowly dwindled. UMSA had a similar boost in 2006, and although results fluctuated significantly between years, the growth trend of UMSA publishing activity is strongly positive. Over the evaluation period (2007-2016), UMSA had 673 Web of Science-indexed publications in total, while UMSS had 282.

Figure 4 Publication outputs of UMSA and UMSS, with trend lines for 2007 - 2016 (Source: Web of Science data)

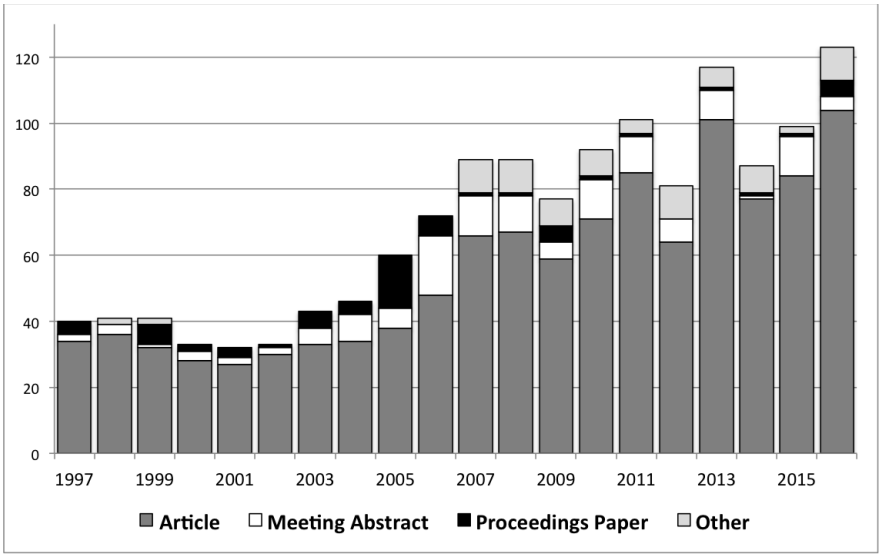


[24] The Institute for Scientific Information's Web of Science reported more publications for UMSA than Scopus did (Web of Science=996, Scopus=711), while Scopus reported more publications for UMSS than Web of Science did (Web of Science=379, Scopus=430 under three name variants: 'Universidad Mayor de San Simon', 'San Simon University', and 'Univ. Mayor San Simon') To make the results commensurable, only one database (Web of Science) was used (indexes: SCI-EXPANDED, SSCI, A&HCI, ESCI).

[25] It is noted that individual researchers could provide information highlighting their own accomplishments, but while this serves to showcase work done it did not serve to fill the noted information gap.

Over the current evaluation period (2007-2016), 81% of publications from UMSA and UMSS were journal articles, 9% meeting abstracts, 2% conference proceedings, and 8% other types such as reviews, letters, book reviews, and editorials. The ratios were similar between the universities, with UMSA publishing slightly more in conference proceedings than UMSS. Figure 5 presents the combined number (UMSA and UMSS) of journal articles, meeting abstracts, conference proceedings, and other publications from 1997 to 2016. The upward trend from 2007 to 2016 shown in Figure 5 is primarily due to UMSA's numbers growing faster than UMSS' numbers

Figure 5 Breakdown of publication types, UMSS and UMSA combined (Source: Web of Science data)



UMSA collaboration partners were predominantly French. Nine of UMSA's 15 most important collaborators were French (the others being two U.S. institutions, one Swiss, one Brazilian, one Argentinian, and one Swedish – Lund). With 39 joint articles from 2007 to 2016, Lund University was UMSA's third most important collaboration partner university. UMSS had a more heterogeneous partnership profile, with a top-15 collaboration list consisting of four French universities, three countries with two universities each (the United Kingdom, Brazil, and Sweden – Lund and KTH), and a mix of other partners. UMSA was the eighth most important collaboration partner of UMSS, but UMSS was only in position 33 among UMSA's most important collaboration partners.

The average number of authors in both universities' publication records from 2007 to 2016 was 6.8 after excluding mega-articles with more than 50 authors. UMSA had eight mega-articles, of which six had over 400 authors each. UMSS had only one article with more than fifty authors.

The quality of publications can be evaluated in a large number of ways, both qualitative and quantitative. This evaluation looked at the number of citations and the Web of Science classification of publication venues. By March 2017, the UMSA publications from 2007 to 2016 were cited 6,344 times in Web of Science-indexed

publications (excluding self-citations), yielding an average of 10.4 citations per item. UMSS publications from the same period were cited 2,926 times, yielding an average of 11.9 citations per item.

A sample of 27 articles from UMSA publications and 26 articles from UMSS publications were randomly selected. The average journal impact factors in the sample were 2.54 for UMSA publications and 2.65 for UMSS publications. However, as impact factor is not a good indicator for evaluations that cover a large number of disciplines publications were also evaluated for their Web of Science classification that divides journals into four quartiles in their fields of research. While UMSA results were excellent (30% in the highest quartile, 48% in the second quartile, and 22% in the third), UMSS were even more impressive: 46% in the highest quartile, 35% in the second, 15% in the third and 4% (one article) in the lowest quartile. Although the sample was not representative, both universities have succeeded in having their articles accepted to the best journals in their fields of research.

Innovation clusters: Innovation clusters are efforts that include a large number of actors within the university, public sector, and private sector coming together to innovate solutions to known problems. They have served to bring together parties from different sectors to explore solutions to singular problems. The cluster system aims to develop a mechanism to promote innovation. In Bolivia, both UMSA and UMSS have aimed to develop clusters. In UMSA, the cluster focused on wood resources, while at UMSS the focus has been leather and food. The UMSA cluster conducted a series of notable activities including a workshop on the objectives of the initiative, a document detailing the management plan for the wood cluster which included a scientific assessment of the field; four undergraduate scholarships which led to the conduct of undergraduate research on single issues of relevance to the cluster and a symposium on the wood sector. The latter led to a number of actionable recommendations regarding how the cluster could move forward. In addition, research on the state of technological and innovation aspects in the wood sector was also carried out. The effort at UMSA was not successful in the long term. The documentation suggests that a miss-assessment of the amount of funds needed to succeed was the main constraint, and UMSA adds that a lack of concrete interaction between actors led to the paralysis of activities in 2015. The difficulties encountered by UMSA in establishing the cluster led to the recognition that human resources focusing on innovation were needed. This in turn led to an open call for applicants to the position of *innovation managers* which was issued in 2015. The call sought to secure 4 positions for which it received 15 applicants. After a thorough selection process which included senior university management, four candidates were selected. Following the identification of candidates, in agreement with Sida, a capacity development course focusing on innovation was developed. This was followed in 2016 by the development of an innovation plan which focuses on the development of an innovation system; incubators, spin off and intellectual property; clusters and transferring technology.

At UMSS, clusters appear to have worked effectively. Indeed, the UMSS experience has shown that it is possible to bring together a wide array of actors and facilitate a process where they may all contribute with their experiences and where research can serve to systematically support innovative development. Indeed, the food cluster includes 90 companies, as well as three relevant associations; the National Service of Agricultural Health and Food Safety, as well as the VMCyT as well as key departmental and municipal offices. The leather cluster includes 86 companies, in addition 6 government and 5 private entities are also included in the activities of the cluster. This highlights the broad scope of the UMSS clusters thus far. Indeed, the effort has been successful at generating new knowledge through research and sharing the knowledge with interested stakeholders, as well as using stakeholders to challenge research findings. PhD candidates currently in Sweden pose that through clusters; their research is being highlighted and tangibly used in Bolivia. The 2015 and 2016 progress reports on Clusters at UMSS highlight that the overall objective of the clusters is the development of institutional competence and capacity for studying (conducting research), promoting and actively participating in systems, processes of innovation at local, regional and national levels.[26] The document goes on to highlight that the ultimate aim of the programme is to have a *Centre for Innovation* which serves as national reference for both theoretical and action oriented research. As part of this effort PhD scholarships have been awarded and respective studies are currently ongoing; PhD students have participated in key innovation events and submitted papers for publication and others published; a series of meetings aimed to bring together cluster members and strengthen relationships have been conducted. A series of collaboration agreements have been drafted, and key equipment has been purchased. In addition information has been disseminated through a variety of means including Facebook and non-electronic formats. Additional to the PhD students six researchers have been trained as innovation leaders in 2015; and a course detailing how to prepare and profile thesis work was conducted. The course was tended by 150 individuals. An additional capacity development effort included the inclusion of 6 undergraduate students in innovation work. An additional set of students to work on cluster relevant research topics were recruited and have conducted relevant work. Moreover a series of cluster specific events to coordinate the effort, as well as numerous efforts to showcase the cluster work including the organization of meetings that included external speakers were carried out. Importantly in 2016 the work on clusters led to the signing of a number of agreements between key entities and the

[26] Annual report 2015 INNOVA and Annual report 2016 INNOVA

cluster. Specifically the agreement between PROEX (Exportation Programme) and the Food Cluster; a second agreement was signed between The Unit for Transfer of Technology and CAPN which serves to ensure a 30% reduction in price for the conduct of physiochemical and microbiological analysis for the firms involved in the food cluster. In addition plans to ensure food safety of member companies was put in place and cluster members participated in meetings of the National food Research Network which have been organized by the VmCyT. Along the same vain considerable efforts have been made to support certification processes of member firms including relevant trainings. The leather cluster has also focused extensively on engagement for external parties and the development of agreements. One such agreement has been signed with the Export Chamber CADEX to strengthen export potential. Specific progress in the industry has been noted with the clean production measures and specifically achieved with four tanneries involved in the cluster upholding to said measures. The clusters have been represented at a series of local and regional events. Lastly, in 2016, UMSS started to explore a new cluster in the field of metal mechanics. Overall it is noted that for the 2015 and 2016 years UMSS has achieved its principal activities.[27] The issue of staffing, and staff capacity was responded to differently at UMSS than at UMSA. At UMSS, an effort to train at PhD level (currently in Sweden) two staff, who are currently managing the clusters in Bolivia, has been made. As alluded to above, Masters students have also been trained. Specifically, DICyT, with Sida funding, has supported two Masters students on an innovation focused degree ('Management, Science and Innovation'). In turn said Master students have written dissertations on aspects of innovation at the university level. Indeed these dissertations have led to the implementation of innovation interface model to be implemented within the UMSS. Lastly, the INNOVA programme is currently developing a scientific Masters in innovation, which will be presented in June 2017. Importantly the cluster work at UMSS has made use of Hydrocarbon tax funding as complementary to Sida funding.

The document review is not able to shed light on why the clusters at UMSS appear to have been so much more successful, even though at UMSA a large number of activities have been conducted. It appears reasonable to assume that individuals have played a key role both in mobilising cluster participants and in capitalising on the outputs of clusters. It is also worth noting that the cluster in Cochabamba was initiated before the one in La Paz.

[27] Annual report 2015 INNOVA and Annual report 2016 INNOVA

3.7 INFRASTRUCTURE (LABORATORIES, LIBRARY AND E-RESOURCES)

Infrastructure support can be divided into support for the purchase of laboratory equipment and the establishment of e-resources**.** The equipment provided to labs has been central to enabling the conduct of numerous projects, however neither UMSS nor UMSA have made a consolidated efforts to ensure that these materials are used to their maximum capabilities. The question of maintenance of equipment has been a central issue of concern. At UMSA this issue was resolved in 2016 following a series of meetings with University management structures. The result of these was an agreement that each faculty is responsible for insuring and maintaining the equipment and furthermore that faculties are not permitted to buy new equipment unless they can demonstrate they are able to keep and secure the existing equipment. In 2016 insurance for equipment was purchased for all Sida funded equipment by the relevant faculties. Still it is notable that respondents interviewed in Bolivia felt ill at ease with the current mechanism to manage equipment and ensure their use specifically their upkeep and materials needed to employ equipment to their full capacity. At UMSS a national norm that details equipment be ensured was translated into a Regulation from the Rector detailing this requirement. The exact dates of this are not known, but it is presumed the Rectoral Regulation was drafted in 2009 or 2010. Still Sida required that the equipment be secured in minutes to meetings in 2015. This did lead to the insuring of equipment.[28] It is important to note that even when there is a national norm, and an institutional regulation, things may still not materialize. Hence, the need for Sida to highlight the shortcomings. The discord between national norms, university regulations and practice is important as at the normative/documentation level Bolivian institutions are often well served.

Support for the VMCyT has received funding to promote the access to scientific information through multiple electronic resources, promote the quality and visibility of local and national scientific publications; to develop capacity in the use of e-libraries and to promote the use of e-libraries. These activities were complemented by efforts to augment the physical library at the VMCyT; coordinate the national research education network. These objectives have led to a key effort –the development of the e-library- which is detailed below, as well as to a number of

[28] Proof of the purchase of insurance was provided. The document appears to be an annual insurance purchase.

activities including the development of a Science and Technology Programme document, the establishment of the National Research and Education Network, which includes the participation of the Executive committee of Bolivian Universities (CEUB), and the conduct of activities to foster cooperation between the scientific community including the conduct of a wide range of workshops and trainings, and even a congress on Research Information and Communication (2011) was conducted. In addition the VMCyT supported the registration of Bolivian journals in SciELO (the Scientific Electronic Library Online). Overall at the activity level, with limited exceptions (according to the 2016 report), the majority of the VMCyT led activities have been met or have been justifiably delayed.[29] Specifically the total number of people trained on the use of e-resources, by 2016 was 7 389. In addition 80% of Bolivian universities have gained access to online resources. Five journals have been registered in SciELO exceeding the expected output by 3.

Specifically as pertains the e-library, the VMCyT put in place a system that can be used by students and staff across all public universities in Bolivia. The expectation has been that universities pay for a subscription based on their student enrolment, now that the system has been established. However the effort has met some challenges. Deans and research coordinators from both universities, as well as representatives from other higher education institutions in Bolivia, said the system put in place by the vice ministry has been poorly implemented. A number of factors were noted as important. University staff at both institutions, and from multiple faculties, said that they previously had subscriptions to e-libraries more aligned to their needs. They argued that the current database is not of the standard or quality that they require in order to make adequate use of it; the vice ministry responded by saying that the current library collection is the best on offer, and by highlighting that the process of selection has been an inclusive one and accounted for the views and perspectives of university representatives. Here it is important to highlight that the process itself is not well documented. Who was involved and under what conditions, and how inputs from universities were incorporated is unclear. Another issue in terms of the library's relevance is its utility. That problem ties directly to the limited number of instructors with post-graduate degrees, and the lack of value bestowed on research. These factors collide to create an undergraduate education environment that does not promote the use of original material and hence restricts the outputs of this

[29] Activity reports for 2009-2016 were reviewed, but the reports for all years prior to 2015 covey limited information.

investment. Indeed, all respondents agreed that the undergraduate lecturer expects that students will limit their reading to material assigned – in fact lecturers discourage the use of additional material, as this would require they become familiar with it. Researchers noted the active discouragement of library use, stating that their superiors have reprimanded them for sharing their access code with interested students. While this can be understandable as access codes should be individual, students should have access to their own codes in the first place. Along the same lines, all current students that have access to the libraries in Sweden argued that it was this resource, rather than the one in Bolivia, that they used most often. Unsurprisingly, students in Sweden also use their universities' libraries rather than the Bolivian counterparts. The result is that although the e-library is available, it is not widely used (see Table 5). It is possible, however that under use is also a symptom of lack of promotion within the universities themselves and that researchers with access to alternatives fall back on these instead of actively engaging with the VMCyT offer to ensure that it is better able to meet their needs. The latter is important as it is the only definitive sustainable tool. Indeed those with access to Swedish resources will not have this permanently.

According to the VMCyT, 48 institutions have access to the database. In 2016, there were 73,235 users, with some entities having as few as two users (the Pan-American Organization of Health, Bolivian Office) and others with more than 13,000 (the Catholic University in San Pablo and the Universidad Mayor Real y Pontifica de San Francisco Xavier de Chiquissaca). UMSA has a total of 3,344 registered users, and UMSS has 5,182 divided between the university proper (5,077) and the faculty of medicine (105). A close examination reveals the low use of the information available (see Table 5). Although the statistics only reflect the use of the library in 2016, it does support the views noted by all those interviewed: that the value of the resource has been minimal at best. Importantly, as Sweden has now phased out funding the resource and its continuation is dependent on contributions by the institutions that use it and on their will to capitalize on this resource opportunity.

Table 6 Use of the e-library in 2016

Institution	Users	Searches	Access to full-text document
UMSA	3,344	344,370	4,581
UMSS	5,182	484,734	7,752

Despite all the challenges encountered and the level of under use and large disregard by those interviewed, the effort does require some commendation. While it has faced challenges the VMCyT has been able to bring together 48 institutions to take part in the engagement and this alone should be commended. Not least that aside from the disgruntlement noted by the respondents participating universities have agreed to pay for the service, which suggest they consider it to have value.

3.8 THE FINANCIAL CONTRIBUTION BY SIDA

The total funding provided to Bolivian institutions since 2007 under this programme has exceeded 386 million SEK with in excess of 199 million disbursed to the Bolivian organizations directly. UMSA has received the most funding, in excess of 100 million SEK direct funding and in excess of 198 million in total; UMSS has received in excess of 98 million SEK directly and a total of over 175 million SEK, and the VMCyT have been awarded in excess of 13 million SEK. Annual funding instalments fluctuated during the funding period, as did expenditures. The funding allocations appear to have shifted in a manner allowing compensation for expenditures over the whole funded period. The fluctuations in funding and expenditures demonstrate both the donor's flexibility and the realities of how budgets may easily shift when conducting research. The latter can be attributed to more or less expensive years due to purchase of equipment and increased support required for the conduct of research activities.

Importantly, while budgets are generally aligned with expenditures (and, in the case of UMSA, with expenditure lines specifically stipulated in programme documents), an analysis of the received budget data does not permit a clear identification of exact expenditures. Moreover, budget lines are broad which means that a wide range of expenses can be legitimately allocated under multiple budget lines (see annex 6).

It is important to note that both universities, as well as the VMCyT, contribute directly to the programme also. Their respective contribution includes salaries, venues, indirect costs. It is also important to note that the e-library which has been supported by Sida will is currently dependent on the financial contribution of the universities using it. While it is difficult to quantify what proportion of costs has been covered by whom, it is important to note the respective contributions. Still it is also important to note that between 2013-2016 at UMSS, Sida has provided for between 42-49% of all funds destined to research.[30]

[30] Resumen de Ejecución Presupuestaria Gestión 2013-2016. Donaciones Externas
Similar data from UMSA and the VMCyT was not made available.

3.9 EXPECTED VERSUS ACTUAL OUTPUTS AND ACTIVITIES PRIORITIZED

The previous sections detail the type of activities and objectives that the programme has pursued. It is evident that the expected number of activities, versus those conducted, or expected outputs versus those attained, are largely missing from this presentation. This is due to a number of reasons: First, the programme has been very flexible in how it has provided support, allowing for activities to be identified as progress was made. This has also included, for example, that the number of PhD candidates be tied to the needs of research projects and included in research project proposals rather than strictly predefined. The drawback of this approach is that it is difficult for the evaluation team to determine if all that should have been done in the two phases has been done. Secondly, on aspects where clear activities were detailed the number of activities attached to single interventions has often been very numerous. For examples activities conducted in relation to clusters, ICT master plan implementation and by the VmCyT. Therefore, in an effort to assess the overall effort, these have been amalgamated in the analysis. Still it is important to highlight that by and large these have been met or reasonable explanations for the shortcomings provided. It is important to stress that. It is important to highlight that the lack of detail concerning financial data disallows an assessment of what elements were the costliest.

3.10 CHANGES BETWEEN THE EVALUATIONS

In 2005 the programme under review was evaluated. This sub section focuses on changes noted between the first (2005) and second(the current) evaluation at UMSA and UMSS respectively. The questions asked during each assignment were different as were the analysis approaches taken, however here we focus attention key findings noted in both assignments.

One of the visible changes noted was a loss of geographic focus. In 2005 Swedish cooperation support was on two specific regions Lake Po and the Chapare. Indeed this was clearly reflected in the research focus at both universities. Today, there is no geographic focus to the selection of research projects.

It has also been noted that the research capacity at both universities has increased, not least, due to the number of PhDs that have graduated, Master students that are in training and research which has been funded and enabled the improvement of local research capacity. In this vain, it is important to highlight that in 2005 it was highlighted that the focus on undergraduate teaching, the compensation systems for teaching and research staff could, and would, hinder the development of research capacity. This evaluation has found that there have been no major administrative reforms to improve conditions. The need for an administrative reform remains central. It is also clear that the improved capacity at the different institutions has not been paralleled with an improved system to ensure that research conducted

maximises its impact on poverty reduction. Indeed, systems to ensure this remain lacking.

4 National context

The Bolivian environment has very few elements that are conducive to the development and use of university research capacity. The role played by researchers in the national development discourse is not systematically publicised by the government, and government agencies do not systematically look to either UMSS or UMSA for support to solve challenges facing the nation even though the priorities of both universities are aligned to national ones.

4.1 NATIONAL COMMITMENT TO RESEARCH

The national commitment to research is limited, but not wholly non-existent. There are some guidelines that apply to research, as well as limited funding resources. Additionally, the Ministry of Education, responsible for all education and education-related efforts in the country, has a vice ministry that is responsible for oversight of the research and innovation field.

Patriotic Agenda 2025

In 2013, Bolivia published the *Patriotic Agenda 2025*, also known as Agenda 2025.[31] The agenda lays out the development objectives of the country leading up to the 200th anniversary of its independence in 2025. It includes the following 13 pillars:

1. Eradication of extreme poverty.[32]
2. Socialisation and universalisation of basic services with sovereignty for living well.
3. Health, education, and sport for the formation of an integral human being.
4. Scientific and technological sovereignty with its own identity.

[31] See See http://comunicacion.presidencia.gob.bo/docprensa/pdf/20130123-11-36-55.pdf and http://extwprlegs1.fao.org/docs/pdf/bol141864.pdf.

[32] The 13 pillars have been translated from the Spanish version. Still it is worth highlighting that concepts such as 'living well' in pillar 2 do not have a particularly clear meaning in Spanish, thus the translation is also ambiguous in its meaning.

5. Communitarian financial sovereignty without subservience to financial capitalism.
6. Productive sovereignty with diversification and integral development not dictated by the capitalist market.
7. Sovereignty over our natural resources with nationalisation, industrialisation, and commercialisation in harmony and balance with Mother Earth.
8. Food sovereignty through the construction of food knowledge to live well.
9. Environmental sovereignty with integral development, respecting the rights of Mother Earth.
10. Complementary integration of sovereign peoples.
11. Sovereignty and transparency in public management under the principles of not stealing, not lying, and not being lazy.
12. Enjoying and being made happy by our festivals, our music, our rivers, our jungles, our mountains, our mountaintops, our clean air, and our dreams.
13. Sovereign reunion with our joy, happiness, prosperity, and our sea. [33]

The implementation of the agenda is understood as a collective effort that is to be led by ministries and vice ministries. Universities, including the role they might play, are not explicitly mentioned, but research, science, and technology are mentioned as sub-elements of pillars 3, 4, and 6. More specifically, the importance of innovation is highlighted as part of pillar 4, with a focus on the need to develop technology generally, as well as food technology and medical technology in particular. In that context, the agenda makes specific reference to products that are indigenous to Bolivia.

Each pillar contains a number of

Box 1- Environment as a cross cutting issue

Bolivia has been a pioneer in the enactment of regulations and laws aimed at protecting the environment. Examples include Mother Earth's Right Law no. 071 (2010) and the Rights of Mother Earth and Integral Development to Live Well Law no. 300 (2012). These pieces of legislation propose approaches that ensure balanced environmental, social, cultural, and economic order. This has clear implications for many specific fields and particularly for innovation efforts. However, neither UMSA nor UMSS has an institutional position on the environment or protocols to detail environmental concerns and practices associated with research conducted. In short, any effort to include environmental concerns into research occurred only when it was seen as central to the topic studied, not as a matter relevant to all fields systematically.

[33] See http://comunicacion.presidencia.gob.bo/docprensa/pdf/20130123-11-36-55.pdf and http://extwprlegs1.fao.org/docs/pdf/bol141864.pdf.

elements. Different ministries and vice ministries are responsible for overseeing individual elements. The Ministry of Education and its vice ministries are responsible for supporting the attainment of aspects of pillars 3, 4, and 8. The VMCyT (see below) is explicitly mentioned as the co-leader of one element of pillar 4.

The research administrators at UMSA and UMSS, as well as researchers and academics interviewed during this assignment, highlighted that insofar as there is a Bolivian agenda to govern research objectives, Agenda 2025 is it. They also pointed out that the objectives are very broad, as are the areas in which work can be conducted to align with the agenda's objectives. A review of the agenda confirms this. The agenda does, however, provide an opportunity for government ministries and universities to come together in pursuit of any of the agenda's objectives. To some degree, this has been done; however, collaboration between government entities and university researchers cannot be attributed to the agenda per se, but to bilateral relationships between government offices and researchers or research units.

Hydrocarbon tax

The hydrocarbon tax was codified into a national law on May 17, 2005. The law recognises hydrocarbon as a Bolivian strategic resource that should thus contribute to the country's economic and social development objectives. The tax is to be applied to the production of hydrocarbon at the wellhead and must be measured and paid in the same way as the royalties. The funds emerging from the hydrocarbon tax are to be distributed amongst the central government, municipalities, and universities. More specifically, the legislation stipulates that:

- Four per cent of the revenue from the tax should be allocated to hydrocarbon-producing departments;
- Two per cent of the revenue should be allocated to each non-producer department (the law further stipulates some variations depending on the departments' total revenue);
- The remaining balance is to be allocated to the national treasury, indigenous and native peoples, peasant communities, municipalities, universities, armed forces, national police, and others.[34] The funds are to be used for education, health, and

[34] Centro de Estudios para el Desarrolllo Laboral y Agrario [Center for Studies on Labor and Agrarian Development]. (2005). *El impuesto directo a los hidrocarburos* [The direct tax on hydrocarbons]. Retrieved from http://www.cedla.org/content/517

roads; productive development; and any other activity that can generate employment.

The exact amount to which universities (and other beneficiaries) are entitled has been an issue of contention. According to the Ministry of Economy and Public Finance, 15% of the hydrocarbon tax has been allocated to universities nationwide on an annual basis. This percentage is equal to 700 million bolivianos. Moreover, universities are largely at liberty to define how they want to allocate the funds they receive. The government has established that a maximum of 8% of the 15% allocated to universities may be used for higher education activities, including human resources, equipment and infrastructure, capacity development, research, and technical development; an additional 2% may be used to support students who have excelled academically to receive additional training or capacity (including internships in Bolivia or foreign countries). This means that the university could, in effect, allocate 10% of the 15% hydrocarbon tax funding received to research and research-related activities if desired.[35] According to UMSA's concept note, it has benefitted considerably from the tax, with amounts averaging 450 million Bolivianos a year. [36] In 2005, the proportion of funding allocated to research was approximately 6.4% of the total amount received, but this amount steadily increased to 10% in 2011.[37] Although research has been allocated a limited percentage of funding, the tax is still regarded as a key source of income. Respondents (deans, research coordinators, and researchers) identified the carbon tax as the principal source of national funds for research. At UMSS 25% of the total received by the university is allocated to research. However what can be funded with the available funds is very limited. Indeed the funds can only be used for infrastructure and equipment. Indeed funds cannot be used for maintenance of equipment or any other related expense. At UMSS this has meant that funds destined to research remained unused. Respondents maintained that the rigid rules determining what can and cannot be funded with hydrocarbon tax funds are determined by the Ministry of Education.[38]

[35] Ministerio de Economía y Finanzas Públicas de Bolivia [Bolivian Ministry of Economy and Public Finance]. (2012). *Ahora las universidades tiene mas recuros del IDH para la educacion e infrastructura* [Universities have more HDI resources for education and infrastructure].

[36] Exact current figures were not made available. 1 SEK is equal to 0.78 Bolivianos at the time of writing (April 2017).

[37] Exact current figures were not made available.

[38] Reglamento especifico del Sistema de invercion y administracion de recursos del impuesto hydrocarburos-IDH UMSS. Rector resolution 05/10. Programam marco de invercion de fondos IDH.

Ministry of Education and the Vice Ministry for Science and Technology

The VMCyT was established in 2007, through the supreme decree 29894, as a branch subordinate to the Ministry of Education.[39] The vice ministry's principal responsibilities include the planning, support, and development of activities in the fields of science, technology, and innovation. Overall, the VMCyT exists to support Bolivia's development by capitalising on these areas. Alongside these objectives, the vice ministry is expected to support a culture that promotes scientific knowledge and to ensure the protection and responsible use of local and cultural heritage (ancestral knowledge and skills). In short, the VMCyT's principal role is to foster the increase in scientific research and innovation while safeguarding the cultural heritage of Bolivia.[40]

In pursuit of its objectives, the Vice Ministry is divided into two distinct units, one that focuses on science and technology and one that focuses on ICT. The main functions of the unit on science and technology are threefold: first, to promote and consolidate Bolivian innovation through research networks at the national level; second, to improve access to information resources; and third, to conduct the science Olympics (science fair) that brings together primary and secondary school students on an annual basis. The ICT unit's main functions include: conducting research on the use of ICT for teaching in order to develop ICT teaching strategies; implementing remote capacity development training centres; developing norms and regulations on the use of ICT; and providing capacity development support in the ICT sector.[41] Furthermore, the VMCyT is identified in Agenda 2025 as the body which, together with 16 other ministries and vice ministries, must pursue a sub-objective of pillar 4: to support the development and increased use of technology emerging from the collaborations between modern science and ancestral knowledge in the fields of food, the extractive industry, biotechnology, and renewable energy.[42]

Overall, the mission and objectives of the vice ministry recognise that science, technology, and innovation are important to Bolivia's development and that they are

[39] Government of Bolivia. *Decreto Supremo N. 0429*. Retrieved from http://www.cienciaytecnologia.gob.bo/uploads/decreto_supremo_429_vcyt.pdf
[40] See http://www.cienciaytecnologia.gob.bo/contenido/OrganigramaDeLaInstituciÓn.
[41] See http://www.cienciaytecnologia.gob.bo/contenido/DirecciÓnGeneralDeTicAs.
[42] See http://comunicacion.presidencia.gob.bo/docprensa/pdf/20130123-11-36-55.pdf, http://extwprlegs1.fao.org/docs/pdf/bol141864.pdf, and http://www.cienciaytecnologia.gob.bo/uploads/decreto_supremo_429_vcyt.pdf

inextricably tied to the academic process. Those institutional objectives of the VMCyT are well aligned with Sida's strategic objective of supporting research as a mechanism to support poverty reduction and development. However, this alignment in strategy has not, according to those interviewed, materialised into active support of research at the university level. This is true even though in 2013 the Ministry of Education produced a National Plan for Science Technology and Innovation in which the objectives of the VMCyT are clearly highlighted, as are needed linkages between different actors, including universities, government agencies, and the private sector.[43]

The VMCyT has received funding to facilitate access to scientific information at universities in Bolivia, improve the visibility and outputs of local research, and support activities that showcase the results of science and academia. While tangible outputs, such as the e-library, are discussed in Chapter 3, it is important to note the disparity between the VMCyT's perception of its efforts and the views of academics and researchers from both universities receiving Sida funding. The VMCyT representatives emphasised during the interviews that bringing together university researchers and the private sector was not only important, but a priority task for them. They listed a number of roundtables that aimed to promote further engagement between universities and the public and private sector. Indeed in the VmCyT documents numerous roundtables or networks are listed, with participants and noted events fostering engagement. However, with the exception of one junior researcher at UMSS, no other researcher interviewed was aware of such initiatives beyond vague knowledge that the vice ministry may have organised such an effort. The latter suggests that the initiative, while relevant, may not be effective at this time either because the people engaged are not the most relevant and or because communication lines within the universities do not promote the transfer of information internally. In addition to this, however, their annual reports list a wide range of activities including workshops, a congress as well as the science price, as well as other activities aimed at both engaging actors from varied sectors and at bringing together universities and furthering regard for science, technology, and innovation.

Despite their efforts, there was no evidence that the vice ministry is currently able to meet its mandate's demands to any considerable degree. One of the challenges noted

[43] Ministerio de Educación del Estado Plurinacional de Bolivia [Ministry of Education of the Plurinational State of Bolivia]. (2013). *El Plan Nacional de Ciencia, Tecnología e Innovación* [National Plan for Science, Technology, and Innovation]. It is worth noting that the plan mentions it is the third of its kind and that the previous two have been unable to achieve their goals.

by interviewees at UMSA and UMSS was that the vice ministry is unable to control the universities, as they are autonomous; similarly, the vice ministry does not have the authority to demand the engagement of government actors (ministries and vice ministries) to support research and innovation. In short, its mandate is not coupled with the authority or tools to deliver on it. Therefore, its ability to promote science, technology, and innovation is limited to the degree to which it is able to entice other government offices, universities, and the private sector to join its efforts. Until now, university research efforts have partnered with government entities and the private sector on a bilateral ad-hoc basis, and none of the respondents at either university saw the value of engaging the VMCyT as a party to collaborations.

4.2 USE OF RESEARCH AND PROMOTION OF INNOVATION

In terms of using research and innovation as tools to further national development, both the government and the universities appear to fail to efficiently capitalise on existing knowledge and skills; this is true even though the government has highlighted the importance of research (e.g., researcher training) and innovation either directly or implicitly in multiple elements of its development agenda (Agenda 2025). More recent government initiatives, such as the effort to make Bolivia the region's energy centre by 2020, also allude to the need for engaging in and supporting research and innovation. The plan to ensure Bolivian energy supremacy includes additional investment in hydrocarbon, consolidation of a national and international market in gas, the industrialisation of the gas sector, and the export of electricity.[44] How all of these efforts will be achieved is not clearly spelled out in public documents, but it is clear that such an ambitious agenda will require considerable national development and innovative responses to problems of access, distribution, and so forth. This provides a clear opportunity for research and researchers to play a key role and some relationships between researchers and the government or the private sector may develop as a result of this initiative. However, as with all other efforts, these relationships will most likely emerge from a bilateral agreement

[44] See http://es.aleteia.org/2016/07/13/bolivia-aspira-a-ser-un-centro-energetico-en-la-region/, http://www.datos-bo.com/Economia-a-Finanzas/Actualidad/Bolivia-puede-ser-centro-energetico-de-la-region, and http://www.la-razon.com/index.php?_url=/economia/Bolivia-pilares-convertirse-energetico-region_0_2525747437.html.

between research coordinators/administration and relevant government or private sector counterparts.

It is important to highlight that there are multiple examples of bilateral partnerships. For instance, different research groups from UMSA or UMSS have engaged with government agencies and the private sector to conduct research and utilise research findings. Indeed, successful efforts include: at UMSA the vaccine programme on rotavirus which engaged directly with the ministry of health; as well as the development of Avanta against Leishmaniasis, which is currently being shared with Ethiopia; Bacteria producing bioplastics (carried out with UMSS); and research on energy systems, a priority in Bolivia. Notably however the documentation that showcases these research efforts does not highlight the engagement with third parties government or private, nor how findings have been used in Bolivia or elsewhere. This shows that limited attention is paid to highlighting partnerships and that partnerships and their success or failure is not systematically understood as a central element worth reporting on. At UMSS research on Biogas was reported as having led to national investment in the field; as well as an effort focusing on nutrition (Breakfast programme). Again, however, identifying the partners that have been part of the effort and showcasing this appears not to have been a university priority judging by available documentation and the format thereof.

However, despite numerous successful examples (alongside many unsuccessful ones), staff from both universities (deans, researchers, and coordinators) underlined that the government does not actively pursue them as a matter of course. Simultaneously, the universities appear to have largely failed to demonstrate their broad areas of competence in a manner that is appealing to potential government or private sector partners. Since many of the partnerships have resulted from personal contacts or because individual researchers are known and respected in a particular field, newly trained researchers may encounter challenges in promoting their findings, securing government support for their research, or ensuring that their research has an impact on poverty reduction and development unless they count on the direct support of well-established researchers.

Similarly, according to researchers, research coordinators, and academics at both universities, the private sector does not actively seek out collaborations with universities. The interviewees unanimously agreed that Bolivian private sector is underdeveloped and that it does not have a culture of empirical inquiry. During the

data collection in Bolivia, an effort was made to engage with private-sector entities that value and use research. That effort found a single company with solid ties to a university department at UMSA, and that company was established by university researchers who conducted their PhD research with the support of Sida and who noticed that one way to fund their own research work at the university was to establish their own private enterprise.[45]

In general the interviewees, with the exception of PhD researchers currently in Sweden, felt that their roles and value are not clearly understood or used by either the private sector or the government. They noted that in 2015, the Bolivian government organised a conference to bring together Bolivian academics and researchers, but only included Bolivians who currently live in foreign countries. This, interviewees suggested, was a demonstration of the disconnection between the government's rhetoric on supporting research and innovation and the practice of largely ignoring in-country knowledge.

Specifically on innovation, the experiences are largely similar. Efforts to pursue innovation often rely on foreign know-how, according to respondents from all categories. Exceptions are ad hoc, as with all other research endeavours described above. Among the more successful efforts, interviewees cited the clusters in the field of leather and food (UMSS) that have received support from Sida, and which includes the engagement of the VMCyT. Those, however, do not reflect a shift in how innovation is targeted and how universities are included, but rather the success of a specific program (See chapter 3).

4.3 SOCIETY'S PERCEPTION OF RESEARCH

Assessing how research is regarded by society at large is difficult within the scope of this assignment. The perception amongst staff from both universities was that the role played by researchers is largely invisible to the wider public, except amongst the populations specifically targeted or in some way directly affected by research projects. Multiple researchers at both universities said population groups in areas where research has been conducted often do not see research or innovation as beneficial to them. In fact, representatives from both UMSA and UMSS noted that there have been many cases in which researchers have been seen as not delivering on their promises and cases in which the time lapse between data collection and results is

[45] Requests for interviews with other private-sector parties were not honoured.

so long that communities – failing to understand the research process – feel that their engagement has been for naught.

The above is further exacerbated by the lack of a clear system to protect populations' rights and ensure that they see the benefits of both research and innovation. As highlighted above, safeguarding cultural heritage and ancestral knowledge is a priority of Agenda 2025 and part of the VMCyT mandate. Still, university research management staff at both UMSA and UMSS noted that there are multiple related areas of concern. First, Bolivia does not have an easy-to-navigate system for patents, and pursuing a patent is expensive. The result is that there are very few patents to begin.[46] This challenge is exacerbated by unclear guidelines on how to ensure that indigenous populations are adequately compensated for the roles they play in research efforts. Indeed, the evaluation team was given numerous examples of what can be best described as the appropriation of knowledge through research. In some cases, these efforts have been led by university researchers, but stand to benefit the private sector today, leaving both the universities and source communities with no evident positive results. Bolivian indigenous communities are generally regarded as adverse to foreign intrusion; hence, the aforementioned experiences do nothing to improve the perception of research or researchers or to maximise on research's potential to foster positive change.

[46] Interviewees consistently noted the total number of patents was two, but this could not be independently verified

5 Institutional context

Neither UMSS nor UMSA have traditionally focused on research or postgraduate education. The institutional contexts have not fundamentally changed in either university, but there are signs that research and postgraduate work are increasingly regarded as institutional assets. How UMSA and UMSS view and treat research are also important elements to developing a sustainable research environment that can interact with national actors (public and private) in pursuit of national development objectives and poverty reduction. Thus far, the administrative mechanisms that govern staff retention, compensation, and promotion at both universities do not foster the consolidation of a solid research environment.

5.1 UNIVERSITY HISTORY, CULTURE, AND TRADITION

UMSA, based in La Paz, is the second-oldest university in Bolivia, founded in 1830. UMSS, with its main campus in Cochabamba, was founded two years later, in 1832. Both universities gained autonomy in 1930. Currently, both universities have 13 colleges each, although UMSA established most of its colleges in the 1980s, while UMSS did so much later. UMSS originally focused on law and medicine only and established additional faculties starting in 1862 and added new ones until as recently as 2009.[47] Currently, UMSA and UMSS are the largest higher education institutions in Bolivia.

When established, both universities focused exclusively on undergraduate education; only in 1979 during the Fifth National Congress of Universities was the importance of postgraduate training and research for Bolivian universities first highlighted. This view was repeated one year later at the Sectoral Meeting on Scientific Research and Postgraduate Training.[48] As a result of these events, the universities took a number of steps – among them, establishing research management units within the universities

[47] See http://www.umss.edu.bo/pdf/explorandosansimon.pdf.
[48] See http://www.umss.edu.bo/pdf/explorandosansimon.pdf, p. 15.

(see Chapter 6) and starting to focus attention on the development of postgraduate programmes. Today, UMSA has 162 postgraduate degrees of which 45 are Masters.[49] Side funds, through scholarships, 23 students partaking in any one of three different Masters programmes, all of which are in the Science field. At UMSS 46 Masters are offered, of which 6 are scientific Masters and receive Sida funding. Generally, these efforts have been supported by donors such as Sida, through the hydrocarbon tax, and through other sources on a case-by-case basis. Still, despite progress towards expanding the research capacity at both institutions, only 6%[50] of all research and teaching staff hold a PhD. Despite this, and as a testament to the research capacity nationwide, UMSA, UMSS, and the Universidad Gabriel René Moreno in Santa Cruz represent 80% of Bolivia's total research capacity.[51]

Table 7 Estimated student enrolment and staff distribution statistics from UMSA and UMSS[52]

	UMSA[53]	UMSS[54]
Registered students	75,503	62,472
Postgraduate students	4,686	estimated 2000, but not confirmed
Teaching staff	1937	1,744[55]
Teacher-researchers[56]	462	--*
Assistant teachers	--*	678
Administrative staff	1,200	1,098

[49] See http://dipgis.umsa.bo/?ofertas=ofertas-de-postgrado-gestion-2017. See also Guia de Postgrado UMSA 2017.

[50] The data collected and presented here leads to a 5.8% which presumably was rounded up in the concept note.

[51] UMSA Concept Note. (2013).

[52] Data used was the most current that could be confirmed from an official source. '--' means data not available. UMSA data is based on its 2013 Sida programme concept note; UMSS data reflects statistics published on its home page as of April 2017.

[53] UMSA Concept Note. (2013). The data does not coincide with the information provided by UMSA as a response to this report, which notes that teaching and teacher-researcher staff lead to a total of 2263. Still these discrepancies do not gravely affect the proportions of teaching staff with specific qualifications.

[54] See http://www.umss.edu.bo/pdf/explorandosansimon.pdf, p. 10.

[55] This data was provided as a response to the draft report, but noted as an approximate number

[56] At UMSA *researcher* is not a position currently. Teacher-researcher is the closest to a research post. At a minimum a teacher researcher must dedicate 1/3 of his/her time to teaching. However it is noted that in some cases 100% of the time is focused on teaching and none to research. At UMSS however there are researchers who are not teachers.

Table 8 Teaching staff by qualification

Teaching staff	UMSA		UMSS	
	Number	%	Number	%
With PhD	146	6.45	65 in Research Units, and a total of 92 University wide with teaching and/or research obligations.	5.27
With MSc	628	27.8		
With Licenciatura (Undergraduate degree)	1388	61.8		
With Technical Degree	94	4.2%		
Without degree	7	.3%		

While the 1979 congress represented a shift in thinking and marked a clear turning point on how Bolivian universities viewed research, it is worth noting that research and postgraduate training are still not well established or prioritised as clear mechanisms through which the universities can make a substantial contribution to Bolivian society. During the course of this assignment, the Rector of UMSA stressed that a clear, detailed vision of the future of research at the university was required to ensure progress and growth; however, he added that the university's current main priority was facilitating access to undergraduate education for students from impoverished and rural areas. The UMSS Rector also highlighted the importance of postgraduate education and research, but subsequently noted that he saw no reason for why teaching staff should preferably have postgraduate degrees. These views were consistently expressed by respondents from all categories at both universities (deans, research coordinators, researchers, current Master's students, and current and former PhD students) – namely, that research is not a key university priority at either institution at this time. These statements reflect the recognition that while significant advances have been made at both universities, each is a long way from consolidating a strong research culture or a vision of academic excellence based on academic merit. In light of this, despite the leadership's low regard for the significance of academic achievement in universities, which is reflected in some of its normative documents and practices, and is illustrated in how funds are distributed and staff hiring and promotion practices, the administration at both universities underscored that Swedish support is fundamental to continuing to make progress.

Despite the limited postgraduate and research programme, some noteworthy changes are also evident. Researchers, research coordinators, and deans noted, for example, that there is a small but growing culture of publishing and of conducting research that aims to respond to practical applied problems. The evidence collected through interviews consistently pointed to the fact that individuals spearheaded these efforts and relied mainly on their own contacts and abilities, rather than having university support (see Section 4.2). Simultaneously, the evaluation data also established that while postgraduate students and researchers support a culture of inquiry, the education culture in undergraduate education (which contains the bulk of registered university students) does not foster or promote investigation or deviation from assigned syllabi. Respondents at both universities and from all categories agreed that because the majority of instructors do not have a research background themselves and do not wish to engage in research, they do not encourage students to seek knowledge beyond the material assigned to them (see Chapter 3).

Box 2: Changes to Bolivia's publication research profile over time

Bolivia's research profile has slightly changed over the past two decades. In 1996, 81% of the country's publications were in three broad areas: natural sciences and mathematics, agriculture-related fields, and medicine-related fields. At its peak in 1998, medicine-related fields accounted for 42% of Bolivian publications. By 2016, the dominance of those three areas was still significant (61%), but other research areas had caught up. As other fields gradually increased their output, the share of medicine dropped from more than 40% of publications to below 30%. Those Bolivian trends stand in contrast with other countries – for instance, Mozambique, which has also been recently evaluated as a recipient of similar Sida support. In Mozambique, the share of publications from medicine-related fields grew significantly over the same period of time (1996 to 2016), while the relative importance of agriculture-related research greatly diminished (Kruse et.al, 2017).

Medicine losing its dominant position does not, however, mean that medical research is stagnating in Bolivia – only that other research areas have more rapidly increased their output and share of the country's research profile. In absolute terms, even though agriculture- and biology-related fields now compete with medicine in terms of the amount of published research, medicine-related fields are still essential to the country's research output.

The view that Bolivia's research output has increased is confirmed by an analysis of publication outputs showing they started to rapidly grow in the mid-1990s. [57] With an

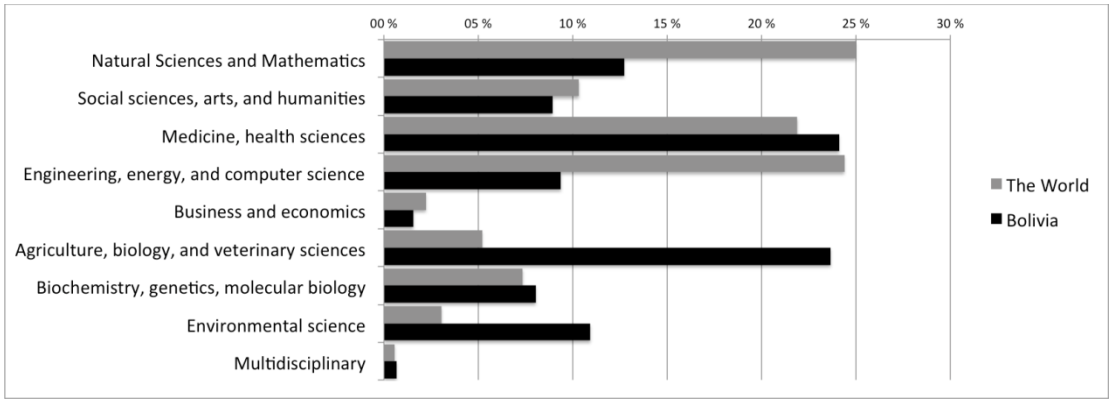
[57] To gather an overview of Bolivia's research output, publication data from 1996 to 2016 were extracted from Elsevier's Scopus. (Scopus is an academic bibliographic database that includes 22,000 journals from 5,000 publishers, including nearly 400 Spanish-language journals.) The national

annual average growth of 12.2%, the country's number of publications grew from a few dozen per year in the early 1990s to slightly more than 300 annually in the past few years. The country's research output saw a significant, temporary drop in 2000; that decline was not due to any single factor, but a systemic phenomenon that happened across disciplinary borders. While Bolivia's research output has grown quickly, so have those of the other countries in the region. The country's regional ranking has remained stable over the past twenty years (16th of 18 countries in the 'Latin American' region in Scopus data). However, the country's growth has not been on a par with the competition in global growth, resulting in Bolivia steadily declining in global rankings; for the 1996-2016 period, Bolivia has dropped more than 20 ranks from its peak (100th out of 216 countries in 1999 to 123rd out of 231 countries in 2015).

One should avoid comparing fields in terms of number of publications, as different fields have different research and publishing traditions and concepts of "least publishable units." In fields such as history and philosophy, the output of a multiyear project may be a single book (which is counted as one publication), while a similarly successful research project in engineering, the natural sciences, or medicine typically yields a large number of much shorter and more focused publications. How Bolivia's publication profile compares with other countries within research areas is noteworthy. On one hand, agriculture, biology, and veterinary science-related fields are much more pronounced in Bolivian research (23.7%) than they are globally (5.2%). On the other hand, the shares of natural sciences and mathematics, as well as engineering, energy, and computer science, play a much smaller role in Bolivia (12.7% and 9.4%, respectively) compared with globally (25.0% and 24.4%).

research output analysis included 3,881 articles published between 1996 and 2016 in which at least one author's country record was Bolivia. See https://www.elsevier.com/solutions/scopus.

Figure 6 Bolivia's research profile versus the world average, by percentage of articles published (source: Scoupus data)



Citations to Bolivian research are at a good global average. Articles published from 1996 to 2005 have gathered 26.6 citations per article on average,[58] and more recent publications are also gathering interest.

Another noteworthy change in the Bolivian research profile is the growth of research teams in publications. In 1996, 8% of articles had more than 10 authors. But in 2015, one in four articles (25%) had more than ten authors, and 13 articles had more than 50 authors. Even if mega-articles with more than 50 authors are excluded, the average size of research teams in publications has grown from five to seven authors in just two decades.

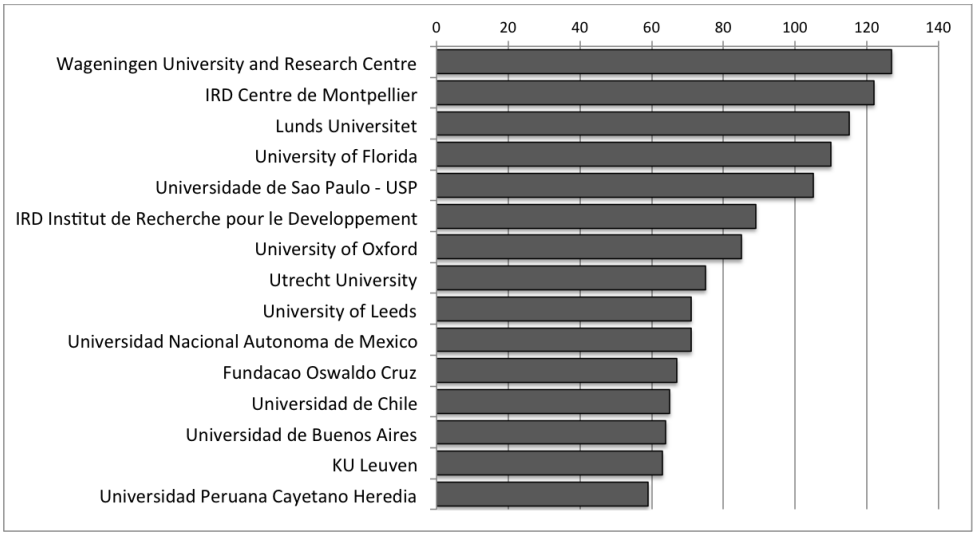
At the same time, research teams have become more international. The majority of international co-authors in Bolivian articles between 1996 and 2016 have come from the United States (1,145 publications with U.S. co-authors), France (593), and Brazil (487). Swedish co-authors appeared in 219 publications. However, although U.S. based researchers had the most co-authorships with Bolivian researchers, those U.S. co-authors were spread over a very large number of universities and institutions. A look at the most active partner institutions renders another picture of collaboration: The largest numbers of co-authorships in terms of partner institutions came from Dutch (127 co-authored articles), French (122) and Swedish (115) institutions.

It is important to note that the university sector today produces roughly half of Bolivia's research output. In 2016 Web of Science statistics, UMSA was in the author list of 26.2% of indexed publications that had any Bolivian authors, and UMSS took

[58] Six anomalies (articles with more than 50 authors) were removed.

part in 10.6% of publications.[59] A large number of smaller universities each contributed 1 to 2% of the country's research output. The rest of Bolivia's research output in 2016 was attributed to a broad range of institutions, such as hospitals, clinics, foundations, international organisations that had an office in Bolivia, and private companies. In Elsevier's Scopus data, UMSA was involved in 71 of 315 publications (23.6%), and UMSS in 36 (12.0%)[60].

Figure 7 Foreign academic insitutions with the most co-authorships with bolivian authors from 1996 to 2016, in terms of number of publications (source: Scopus data)



5.2 POLICIES AND STRATEGY

Both UMSA and UMSS have policy documents and action plans that detail their respective positions on the conduct of research and research activities. UMSA's current policy on research, postgraduate work, and social interaction notes that 'research is a fundamental element of higher education … which serves to inform and advance both undergraduate and post graduate teaching … and which can play a fundamental role in the development of the country'.[61] The policy goes on to

[59] Web of Science, the database, 2017.
[60] Elsevier Scopus; AFFILCOUNTRY(Bolivia) AND PUBYEAR=2016.
[61] UMSA. (2011). *Políticas de investigación, postgrado e interacción social de la Universidad Mayor de San Andrés* [Policies of research, postgraduate, and social interaction of Universidad Mayor de San

highlight that its aim is to address the totality of the university community, including students, faculty, and administration. The document further notes that the rector and all other management and leadership roles are responsible for ensuring that the policy is adequately applied. The specific objectives of the policy include:

- Establish an efficient organisation and management structure to ensure that research, graduate education, and social interaction are developed to guarantee the development of holistic education models, and responses to the regional and national needs experienced by the country are identified.
- Establish that basic, applied, and scientific research – as well as technical, scientific, and cultural innovation – are central tenets of the development of university activities through the implementation and execution of inter-, multi-, and trans-disciplinary research and innovation projects and programmes that respond directly to knowledge and development gaps at both the regional and national levels.
- Implement guidelines and mechanisms of social action to promote integration between the university, state, private sector, and society to achieve a system of research and innovation that is coordinated and inclusive of all actors.[62]

The main objective of UMSS' Directorate for Scientific and Technological Research (DICyT) – the body charged with managing research activities – is to promote, coordinate, and propose scientific and technological research plans. Central elements of its mission of particular relevance here include the promotion of interdisciplinary work, the promotion of the development of human resources, and the building of institutional relationships with international actors that may lead to scientific or technical collaboration and/or to funding.[63] In 2002, the directorate started implementing a new action plan. The plan highlighted five thematic priority research areas:

1. Agricultural production, post-harvest technology, agroindustry, and food security.
2. Social and human sciences.
3. Health.
4. Biodiversity and renewable natural resources.

Andrés]. La Paz: UMSA.

[62] UMSA. (2011). *Políticas de investigación, postgrado e interacción social de la Universidad Mayor de San Andrés* [Policies of research, postgraduate, and social interaction of Universidad Mayor de San *Andrés*]. La Paz: UMSA.

[63] See http://www.umss.edu.bo/pdf/explorandosansimon.pdf, p. 15.

5. Land, water, and non-renewable natural resources.[64]

The plan also included the following seven cross-cutting issues or themes: inter-culturalism (see Box 4), gender, information technology, energy use (renewables), food security and sovereignty, pedagogy, and climate change. Together with the cross-cutting thematic areas, the priority areas are the key factors considered in the identification of research projects and programmes.

In addition, the action plan identified the development of research policies as a key area requiring attention. This is reasonable since the UMSS' general regulation on technical and scientific research, dated March 1992, states that conducting research that may assist the country in securing its development and independence (article 1) and developing spaces that enable the conduct of research and education (article 2) are key university responsibilities; however, this regulation fails to provide any clear guidance on policy priorities. Indeed, although it may be understood as implicit, the document does not even explicitly mention postgraduate degrees or researchers qualified to a specific postgraduate degree.[65] The UMSS development plan for 2014 to 2019 highlights research and innovation as key to ensuring that the university can respond to the country's tangible socioeconomic needs and that the university gains and maintains prestige. The document makes a direct link between research, education, available funding, and institutional prestige. However, given that the document was drafted during the political turmoil that affected the institution, it is not clear how many of the proposed tenets are aligned with the views of the new leadership.[66]

Overall, UMSA's policy[67] and UMSS' action plan, development plan, and regulation[68] are all aligned with Sida's views and respond to the majority, if not all, of

[64] UMSA. (2002). *Plan de acción para la organización y desarrollo del sistema de investigación de la Universidad Mayor de San Simón. Cochabamba* [Plan of action for the organisation and development of the research system of Universidad Mayor de San Simón. Cochabamba.]; Gutierrez Garcia, F., Zurita Mercado, E., Arzabe Maure, O., & Chavez Alba, O. (2006). *Potencial científico y tecnológico de la Universidad Mayor de San Simón* [Scientific and technological potential of Universidad Mayor de San Simón] . Cochabamba: UMSS.

[65] UMSS. (1992). *Reglamento general de la investigación científica de la UMSS* [General regulation of scientific research for UMSS]. Cochabamba: UMSS.

[66] UMSS. *Plan de desarrollo 2014-2019* [Development plan 2014-2019].

[67] UMSA. (2011). *Políticas de investigación, postgrado e interacción social de la Universidad Mayor de San Andrés* [Research, postgraduate, and social interaction policies of Universidad Mayor de San Andrés]. La Paz: UMSA.

[68] UMSS. (1992). *Reglamento general de la investigación científica de la UMSS* [General regulation of

the concerns that may be faced when ensuring that the development of a university's research capacity is robust. However, interview respondents at both universities consistently suggested that policies, regulations, and action plans have not been implemented effectively; rather, the environment at the university level is far from able to effectively and systematically support the conduct of research or ensure that research capacity feeds back into undergraduate or graduate education in a systematic fashion. This inability was directly attributed to governance structures and funding prioritisation.

5.3 GOVERNANCE AND FUNDING

Both UMSA and UMSS are considered autonomous,[69] meaning they are public institutions, receive funding from the state, are able to confer degrees, and subscribe to the Executive Committee of Bolivian Universities standards. In relation to autonomous universities, the Ministry of Education's role is normative. In addition, the ministry monitors university activities and certifies their constitution and degrees.[70]

The autonomy that universities enjoy is important to research and postgraduate training because it means that most decisions that affect how the university handles these areas can be made internally. The allocation of funds, prioritisation of subjects, compensation packages, and other internal issues are all determined at the institutional level. Therefore, while a conducive national context is important (see Chapter 4), the institutional context plays a considerable role (section 5.1). The Institutional University Congress plays a central role on how funds are allocated, areas prioritised, and incentives determined (see Figure 8). The congress is comprised of academic staff and student representatives; and academic staff members (deans) are elected by the students. This system, according to interviewees, makes it highly susceptible to institutional politics and self-serving decisions. A key example noted repeatedly was the incentive system (see Section 5.4); although it can be reviewed by the Institutional University Congress, management staff at both universities agreed

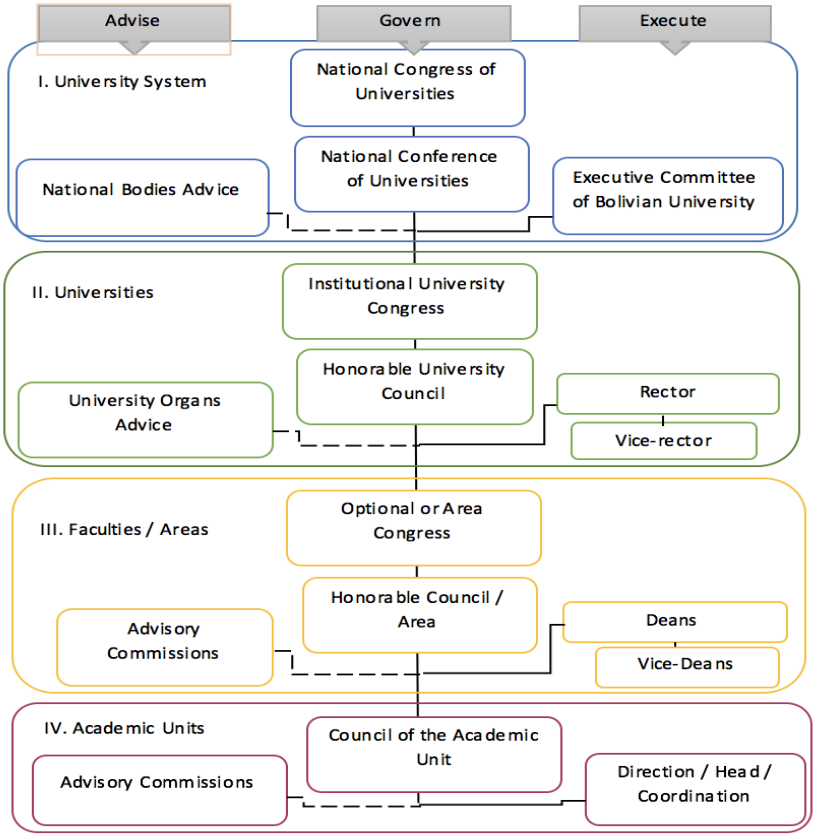
scientific research for UMSS]. UMSS: Cochabamba. See http://www.umss.edu.bo/pdf/explorandosansimon.pdf, p. 15.

[69] In Bolivia, there are five types of universities. Aside from autonomous universities, there are private universities that are part of the Executive Committee of Bolivian Universities system, as well as private universities that aren't. In addition, there are indigenous universities and special regime universities (which include, for example, the military and policy universities).

[70] See http://www.ceub.edu.bo.

would most likely not be modified because the current system is in the best interest of the majority of congress members. In short, this system of self-governance is positive in that it allows universities to independently determine their focus, priorities, distribution of funds, and other similar internal decisions, but it can also lead to a system that is rigid and resistant to change.

Figure 8 Organisational structure of the Bolivian university system[711]



As noted in Chapter 4, the hydrocarbon tax is a major income generator for universities, although, the amount allocated to research is comparatively small (see Chapter 4.1). Aside from the hydrocarbon tax revenue funding for research, currently the main direct source of research funding at UMSA is Sida support. However,

[71] Riviero, R. D., & Padilla Omiste, A. (2014). *Regulación de la educación superior en Bolivia. La nueva normativa* [Regulation of higher education in Bolivia. The new regulations]. UDUAL, no. 62. Mexico.

between 2001 and 2009, UMSA received support from the European Community, the Organization of American States, the European Economic Area, the United Nations Educational, Scientific, and Cultural Organization (UNESCO), and the World Health Organization, as well as multiple countries (including Spain, Switzerland, Belgium, England, Portugal, Germany, Denmark, Austria, France, Japan, and Italy). In total, UMSA reported 86 sources for research funding.[72] UMSS also counts on multiple donors including Danish, Dutch, Belgian, French, Swiss, German, Italian, and Spanish funding.[73] Indeed, in 2002, UMSS noted in its action plan for the organisation and development of the university's research system that foreign development aid was a main source of funding that should continue to be pursued.[74] In the case of UMSS, specifically the institutional problems that plagued the university since 2012 and that led to a change of rector and a shuffle of most management positions at the university in 2016 has had some clear implications in terms of governance and funding.[75] Since the administration of the university was virtually (and, at times, actually) closed down, it was not possible to sign agreements or allocate and transfer funds. Therefore, it is fair to say that the political turmoil at UMSS has put an end to some research initiatives in recent times.

Despite numerous donors and the hydrocarbon tax allocation, respondents at both universities insisted that funding availability was a main hindrance to further developing the universities' research capacity. This is particularly odd since in 2013 the Ministry of Economy and Public Finance highlighted that universities nationwide were routinely unable to use all the funds allocated to them by the government. The

[72] See http://dipgis.umsa.bo/?p=70. Department for Research, Post-Graduate, and Social Interaction [DIPGIS]. (2010). *Resultados de la autoevaluación de la investigación de la UMSA* [Results of the self-assessment of the UMSA research]. La Paz: UMSA.

[73] See http://www.umss.edu.bo/pdf/explorandosansimon.pdf.

Neither UMSA or UMSS were able to provide information on the proportion of funding provided by different donors. Hence an analysis of how Sida funding compares is not possible. However it was noted that at UMSS that the agreement with Belgium has led to the current support for 10 PhD candidates, while the support by Sida currently funds 27 candidates.

[74] UMSA. (2002). *Plan de acción para la organización y desarrollo del sistema de investigación de la Universidad Mayor de San Simón. Cochabamba* [Plan of action for the organisation and development of the research system of Universidad Mayor de San Simón. Cochabamba.]

[75] UMSS Management highlighted in response to the draft report that the change in management that took place in 2016 was a routine periodical change of staff. Those interviewed noted that the individuals chosen and the management decisions that have accompanied the changes in staff have been politically influenced and been particularly disruptive. On further discussion the degree to which this happens each time there is a change in leadership appears likely, however.

ministry added that despite the inability to use funds, universities continued to ask for additional funding, which led to considerable surpluses in university bank accounts. This, the ministry proposed, showed that there were shortcomings in the ability of universities to execute all of their goals and objectives on schedule. This suggests that the funds are available for stronger research capacity, but that the universities are unable to adequately allocate funds.[76]

In relation to research specifically, this evaluation's findings strongly suggest that the governance and funding mechanisms currently in place are not favourable to strengthening and expanding university research capacity.

5.4 STAFF INCENTIVES AND REWARDS

Both universities have employment structures and mechanisms that date back to the 1980s, when research was not yet a point of consideration. The system is not premised on academic excellence, but on seniority as the single most important factor for promotion and for determining compensation. In addition to seniority, staff may accumulate points for additional compensation, but the point system is also antiquated, according to researchers interviewed by the evaluation team.[77] Researchers highlighted, for example, that a peer-reviewed journal article is worth a fraction of a self-published book that has no quality control and that prizes, no matter how prestigious, virtually do not count. Multiple respondents noted that a researcher could theoretically be awarded a Nobel Prize for their research and still not be promoted if they had yet to attain seniority or were not in an employment path that allowed for it; most importantly, the points gleaned from such an award are virtually nil. None of those interviewed saw any incentive, beyond personal and professional fulfilment, for publishing in well-recognised venues. At UMSA teaching staff must secure 57 points annually to meet their basic requirements. A total of 30 points may be secured through teaching activities; a further 50 points may be secured through engagement in research with the majority of points (35) tied to the evaluation or conclusion of the programme. Extension programmes (external engagement) can secure a maximum of 10 points. Additionally participation in university life can secure 20 points, which is equal to the maximum points that can be attained from

[76] Ministerio de Economía y Finanzas Públicas de Bolivia [Bolivian Ministry of Economy and Public Finance]. (2013). *Hasta julio de 2013, las universidades públicas sólo gastaron un 32% de su presupuesto* [Until July 2013, public universities only spent 32% of their budget].

[77] Compensation systems were noted as a concern in the previous evaluation in 2006.

efforts in capacity development or participation in conferences. Securing a PhD for example can lead to a maximum of 10 points; which is equal to participation in any form of capacity development that requires 60 or more hours of participation. This is a clear example of the unbalanced nature of the point system. Similarly a book can secure 30 points even if not yet published, and or self-published, while a scientific article published will only secure 5 points.[78] At UMSS individual faculties are responsible for the evaluation of their own staff. A university wide regulation is currently pending approval.

Unsurprisingly, neither university states any requirements for publishing activity for its teaching staff unless they are part of a project that requires it as an output. Still the creation of the position of researcher at UMSS can be seen as a step forward, while UMSA notes that at their institution the combination of research and teaching obligations is standard and adds value to the university capacity overall. It has not been within the scope of this assignment to examine what are the benefits or draw backs of this distinction, but it is noted than in a parallel assessment of the quality of higher education in Bolivia, the need to combine research and teaching was highlighted as important.[79]

While some entities within the universities do value highly trained staff, their ability to hire well-qualified individuals is limited. Both universities have tenure systems that protect the rights of senior teaching staff. Neither university has an obligatory retirement age for teaching staff. Pension plans are determined by the amount of savings that individuals have voluntarily allocated. In addition, the university may choose to augment the individual pension by providing retirees with a monthly compensation that is equal to 30% of the employee's last salary. Respondents insisted that often compensation packages, combining both the voluntary pension plan and university allocation, are still a fraction of the salary earned if still working and therefore voluntary retirement is rare.

All of the aforementioned factors create an environment in which newly qualified researchers often are unable to secure employment at the university at all, and when

[78] Staff evaluation sheet UMSA.

[79] *Ståhle, L. and A. Millard 2017.* External Evaluation of the Quality Assurance Systems of Research and postgraduate training at Universidad Mayor de San Andrés (UMSA) and Universidad Mayor de San Simón (UMSS) in Bolivia, as well as the national system through Comité Ejecutivo de la Universidad Boliviana (CEUB). Not yet published

they do, their entry-level position often does not acknowledge or make use of the skills they have. This is primarily due to the aforementioned reasons, but it is also important to highlight that Bolivia does not automatically recognise foreign doctoral degrees, and currently there is no automatic system of accreditation for students who gain their PhD from Swedish universities through Sida funding. This means that upon their return to Bolivia, they need to either secure accreditation for their degree – a time-consuming and costly process – or apply for jobs based on their Bolivian academic credentials. While neither UMSS nor UMSA adjust salaries according to academic degree held, other universities such as the Catholic University in La Paz do adjust compensation to degrees held.[80]

Retention of senior staff does not appear to be a problem for either university, but attracting and retaining new staff appears to be a more pressing issue. According to interviewees since there are few staff openings, newer staff – who, incidentally, are often the most qualified in terms of academic degrees – are routinely offered positions that are underpaid compared to other fields, are below their level of training (for instance, PhD holders may work as research assistants alongside colleagues without undergraduate degrees), and are based on short-term contracts. At this time, not all of the students who have received a PhD though the Sida-funded programme are employed by either university. These views were underscored by multiple respondents including researchers, teaching staff and former PhD graduates. However, the data provided by the universities is more encouraging than expected (see table 8). At UMSA of 37 PhD graduates of 40 who have received their degree already are employed by the university, but only 22 have full time positions. At UMSA of the 38 PhD graduates 28 have positions. It is worth highlighting that under Bolivian labour law after three months of full time employment, the contract transforms itself into a permanent position. At UMSS this legislation has been codified into a university regulation. Said regulation focuses specific attention on the inclusion of PhD graduates returning from Sweden into the university teaching or research body. While this should be regarded as clear progress, it is important to highlight that the process is not automatic. In addition to required proof that the degree has been completed in Sweden, a number of additional criteria out of the direct control of the PhD graduate must be met. This includes research capacity and interest in lines of inquiry relevant to the University, but most importantly the university must have the budget to fund the position. As is noted in the previous sub-

[80] This information was confirmed during the group interview with Bolivian university representatives

section of this report autonomous Universities, such as UMSA and UMSS, have ample budgetary freedoms and available funds are not used in their entirety, which means that having the funds to hire returning students is largely a political rather than budgetary decision, although it can appear tied to funds. [81]

Table 9 PhD Graduates currently employed by each university

	UMSA	UMSS
Full time employees with teaching and or research obligations	22	28
Part time employees with teaching and or research obligations	10	NA
Are recognized by the university, but have no position	3	NA
Individuals with contracts at UMSA who have died	2	NA

Another issue worth noting is the salary cap. The current Bolivian government, and specifically the president, have dictated that no employee of a public institution may earn a salary greater that than the country's president. This order had clear implications for some of the staff already employed by the universities. Indeed, some of the respondents acknowledged that before the order was passed, they received higher compensation than the president. The universities responded by recalculating compensation (e.g., salary, bonuses, and reimbursable expenses) to ensure that individuals who already received above the maximum permitted compensation did not experience a salary drop. However, respondents maintained that the ruling has had implications for salary increases in recent years. Proponents of the president's position argue that compared to other sectors, senior Bolivian university staff have secure employment with compensation packages that, even if capped, are considerably high given the local economy. Opponents of the ruling, a view largely manifested in this evaluation by the deans interviewed, noted that this regulation limits the universities' ability to retain staff and that Bolivian university compensation is substantially lower than compensation in other countries. It is not possible within the scope of this assignment to ascertain the degree to which the cap on compensation has hindered staff recruitment or retention. However, that was no evidence that staff had left their posts due to the salary cap. It was also noted that those who opposed the cap had an unrealistic expectation/understanding of the

[81] Rector Regulation UMSS, no 14/09

compensation packages in neighbouring countries such as Chile and Argentina.[82] Moreover according to the Ministry of Economy and Public Finance, academic staff at multiple Bolivian universities earn more than top government officials, including the vice president.[83]

[82] Interview responses on expected compensation were compared with statistics on actual compensation packages. See https://chileno.co.uk/chile/academic-salary-in-29-countries/.

[83] Ministerio de Economía y Finanzas Públicas de Bolivia [Bolivian Ministry of Economy and Public Finance]. (2012). *Las universidades publicas gastan el 40% de sus ingresos en salaries* [Public universities spend 40% of their income on wages].

6 Organisational research capacity

Institutional capacity to support research at both universities has improved as a result of Sida support. However, the degree to which current organisational research capacity can counter national (Bolivia) and institutional (UMSA and UMSS) limitations, as well as build strong and sustainable research capacity that is able to make a substantive contribution to poverty reduction and national development appears limited.

6.1 RESEARCH MANAGEMENT

Both UMSA and UMSS have research management departments: the Department for Research, Post-graduate, and Social Interaction (DIPGIS) and DICyT, respectively. DICyT was founded as a direct result of the 1979 Congress (see Section 5.1), and it is one of three directorates overseen by the vice rector's office. DIPGIS was founded much later, in 1998. However, the department was preceded by the Committee to Coordinate Research, Postgraduate and Social Interaction, founded a decade earlier following an internal university congress.[84] Like DICyT, the director of DIPGIS also reports to the university vice rector.[85] The responsibilities of both DIPGIS and DICyT are largely similar. They are to manage research, postgraduate work, and engagement with non-university actors. They are also responsible for managing research cooperation funds and for promulgating the university's research activities and achievements.

Interviews with management at UMSA found that DIPGIS is responsible for ensuring that the research conducted meets local socioeconomic needs, but went on to note that there were no clear guidelines or policies on how to ensure this. These points are also

[84] Department for Research, Post-Graduate, and Social Interaction [DIPGIS]. (2010). *Resultados de la autoevaluación de la investigación de la UMSA* [Results of the self-assessment of the UMSA research]. La Paz: UMSA.

[85] Konigson, A., Rodriguez-Acosta, C.A., Rosenbaum, A., & Svenson, A. (2012). *System-based audit of the Departments of Research, Postgraduate and Social Interaction (DIPGIS) at Universidad Mayor de San Andrés*. Stockholm: Sida.

highlighted in the DIPGIS strategic plan for 2014-2025.[86] Multiple interviewees also highlighted that although attention to property rights and respect and preservation of ancestral knowledge are understood as clear cross-cutting elements to all work conducted, there have been many instances in which these elements have not been successfully addressed. Gender was not considered an issue of particular concern at UMSA (see box 3).[87]

DIPGIS has detailed guidelines on how funding proposals need to be presented, but lacks detailed guidelines on how subject areas are defined and how compliance with priority areas is evaluated.[88] For its part, DICyT has administrative protocols and procedures that detail the technical and academic processes to be followed in the research selection process, as well as has detailed thematic priorities. However, academic guidelines that may shed light on how thematic priorities or cross-cutting issues are understood and applied are lacking. Interview respondents noted that interpretations varied and that this had consequences

Box 3 - Gender

Gender unlike sex includes cultural and social constructions, including how these affect men and women differently and how society most often has lost out on the full contribution of its female population. This understanding has not been collectivised the world over. Indeed, in Bolivia, respondents across all categories (with the exception of those whose research focus was gender) equated gender to the number women involved in research/academia (researchers, university staff or research subjects), and limited the inclusion of gender to the disaggregation of data.

While in Sweden, one research supervisor interviewed stressed the use of gendered approaches to research as an issue relevant to all subject areas, no PhD candidate or PhD graduate interviewed showed any understanding of how gender might affect their work, the findings themselves, or the use of information locally. Given this lack of regard for gender, it is not possible to know the degree to which gender has played a role in the choice of research topics or the use of the data collected. Since Bolivia has a gender identity law (May 21, 2016), the opportunity exists for universities to become active proponents of gender equality and of development that is gender equitable.

[86] UMSA. (2014). *Plan estratégico de investigación, postgrado e interacción social 2014-2015* [Strategic Plan for Research, Postgraduate and Social Interaction 2014-2015].

[87] Konigson, A., Rodriguez-Acosta, C.A., Rosenbaum, A., & Svenson, A. (2012). *System-based audit of the Departments of Research, Postgraduate and Social Interaction (DIPGIS) at Universidad Mayor de San Andrés*. Stockholm: Sida.

[88] Convocatoria UMSA-Asdi Postulacion Projectos concursables 2015; Terminos de referncia evaluacion Concurso 2015; Formulario para presentacion de proyectors concursables, gestion 2015-2017, Financiamiento cooperacion Sueca, Programa UMSA-ASDO

for how projects were understood and prioritised. Most often, the concern was that the interpretation of cross-cutting issues was very narrow. For example:

- Gender often meant the inclusion of women in some way (researchers or subjects).
- Inter-culturalism was understood by some as meaning the inclusion of indigenous communities in some capacity, such as respondents in data collection.
- Interdisciplinary was often understood as meaning multiple researchers from different departments within a single faculty. Teams that might include, for instance, social science, natural science, and humanities were few.

This happened despite the recognition that having a team with experts from a wide range of fields often may have proven beneficial, particularly for projects that worked directly with indigenous peoples or in areas where indigenous communities reside. Still it is clear that Sida support has promoted a wider view of multidisciplinary work and that this has manifested best with the work on clusters (see Chapter 3).

The lack of clear guidelines of how priority areas are defined within thematic areas or thematic priorities understood led to some discord regarding project selection. This was true at both universities, but perhaps felt less at UMSS because new research has not been identified as of late (the university has experienced political turmoil since 2012 and things have only recently started to normalise). The general sentiment amongst interviewees was that some departments were awarded projects far more often than others despite the submission of proposals that meet the criteria. Staff interviewed at UMSA (deans, research coordinators, and researchers) all agreed that while there was a clear correlation between the number of research project awards a

Box 4- Intellectual property

Intellectual property concerns a set of rights that allow creators or patent holders to enjoy economic benefits and public recognition from their creations or inventions. These rights are enshrined in the article 27 of the Universal Declaration of Human Rights and were for the first time recognised in the Paris Convention for the Protection of Industrial Property in 1883 and in the Berne Convention for the Protection of Literary and Artistic Works in 1886. The World Intellectual Property Organization, a United Nations agency created in 1970, currently administers both treaties and provides a forum for the harmonisation of rules and practices that protect intellectual property in member countries.

In the research field, intellectual property rights are a highly sensitive matter that includes issues of developing a strong research capacity and environment while also protecting the rights of researchers and the communities and peoples who have participated in the research in some capacity. In Bolivia, the universities are the intellectual owners of all research conducted by their staff. However, how this materialises and is supported is less clear. Who, for example, is responsible for securing patents and for paying for the patent process? The rights of communities or people engaged in research have been codified or the issues of concern clearly explored. This is true even though governmental policy generally, and Agenda 2025 specifically, consistently highlight national cultural and ancestral heritage as protected and/or deeming protection. Still, interviews in Bolivia on inter-cultural engagement and the safeguarding of cultural and ancestral knowledge illustrated how the universities have played a key role in enabling the commercialisation by private companies of indigenous knowledge, providing the source communities with no recognition or benefit. These issues are of central concern as they contravene Indigenous intellectual property rights specifically and human rights more broadly, a key cross-cutting issue for Sweden.

department received and the number of PhD holders working in the department; however, there was reticence amongst those interviewed to recognise that this correlation, far from demonstrating favouritism, might reflect capacity. Still, the discussion within UMSA has led to an on-going review on the equitable allocation of research funds across all faculties. This would mean that the available human resources in a faculty would not be a factor in determining the proportion of research funds allocated. This would be a clear set back, since the rigour that was introduced for the selection of research projects funded by Sida has been adopted for hydrocarbon tax funded efforts as well (see chapter 3).

Box 5. Intercultural research

Intercultural studies and intercultural approaches are founded on an alternative approach to deriving meaning. Unlike traditional research that may rely on quantitative data collection, including the use of surveys or experiments, intercultural approaches derive findings from iterative interactions based on interviews and observations. Intercultural dialogue is founded on the assumption that different groups of people have different perspectives and that these are central to the collection of information. Therefore, the data collection tools are iterative and evolve throughout the data collection period, and the relationship between the researcher and subject is more fluid and aims to be more egalitarian. In Bolivia, the intercultural research concept was mentioned often; however, when asked to explain its implementation, more often than not, the explanation was limited to the collection (extraction) of data from indigenous communities without direct regard for the approach or method used. Unsurprisingly, both universities recounted multiple instances in which research projects that included indigenous populations did not lead to positive collaborative relationships. Rather, indigenous groups were wary of researchers and felt that they often extracted knowledge and provided nothing in return (see box 3).

While the aforementioned issues were considered management shortcomings or concerns, the principal challenge noted at both universities in terms of curtailing research (highlighted by researchers and coordinators alike) was the lack of flexibility of the administrative staff. Interviewees indicated that administrative staff at both universities lacked a clear understanding of what research entailed and hence enforced rigid rules and regulations, which often delayed work, prevented the adequate follow-up and conduct of work, and could even lead to researchers having to cover costs of work undertaken or materials used. Examples included restrictions on access time to laboratories, which prevented researchers from adequately caring for cultures and conducting tests that were time-intensive, and the inability to purchase materials that had not been expressly detailed in the research budget.

Overall at UMSA, the main shift in research management since 2007 deals with how funding for research is distributed and managed by the university as a whole. Previously, funding destined for research could be reallocated to other tasks or activities. This shift has been instrumental in ensuring that research is adequately financed. Additionally, capacity development support for research management was hailed as an important step forward and a clear asset to the work of the department. DICyT lacked a solid institutional memory, partially due to the major university staff reshuffling since 2012; however, respondents generally agreed that support for

research management was essential. In fact, the importance of solid research management capacity was also highlight in the UMSS DICyT 2002 action plan.[89] Specifically, the plan noted that managing and securing funding for research projects were two central management concerns. Through its support, Sida has promoted capacity development in terms of planning and financial management of research funds and engaging in innovation projects, as well as developing ICT and strengthening access to e-resources (see chapter 3).

6.2 RESPONDING TO LOCAL NEEDS AND PARTNERSHIPS

Respondents at both universities consistently mentioned ***links with community***, ***responding to community needs, and inter-cultural approaches*** as central to the selection of research projects. However, how each of these terms is understood and implemented was far more vague and not clearly codified in any document provided to the evaluators. It was generally unclear who participated in the identification of community needs or how intercultural approaches are implemented.

The UMSS rector said that aside from ensuring that priority areas are the focus of research, ensuring that projects were directly linked to entities outside the university was a key factor for selection. The majority of Master's students at UMSS, for example, have had to identify dissertation topics that include work with external actors (government, civil society, or the private sector). These efforts were highlighted as a clear demonstration that the university values and pursues inter-organisational linkages. However, interviewed Masters and PhD students said they were often unsure of how engagement with external parties would lead to any tangible results or how the data they collected would be used, if at all, by partner agencies. PhD students specifically explained that often their research projects do not match research efforts in Bolivia. Therefore, they may join Bolivian research projects during their required stay in Bolivia, but doing so bears no advantage to their own research objectives (i.e., securing their PhD at a Swedish university).

In an effort to promote partnerships between the public and private sector and the universities, both UMSS and UMSA have produced print catalogues detailing the range of research activities they each engage in (thereby highlighting their

[89] See http://www.umss.edu.bo/pdf/explorandosansimon.pdf, p. 15.

competence). However, respondents across both universities noted that neither the catalogues nor the university fairs in which university areas of interest are showcased had led to concrete partnerships. Similarly, while the national development agenda (Agenda 2025) has clearly identified line ministries as responsible for attaining each goal and sub-goal, it does not appear, however, that this has facilitate engagement with government actors (see Chapter 4).

Despite the aforementioned there are also some successes – including cases in which research has been directly tied to larger efforts. In the field of lithium, water, and energy, UMSA told the evaluation team that it currently has on-going research projects and partnerships with South Korea, China, and Japan.[90] Similarly, the work on clusters (see Chapter 3) may also have direct impact locally, as has been the case with lake sustainability projects conducted by UMSS in Cochabamba and with public health efforts conducted in collaboration with the Ministry of Health at UMSA. Overall, there are numerous individual examples of collaborative work by current PhD students and researchers with government and private-sector entities (see section 4.2).

6.3 HUMAN RESOURCES

Both universities have competent and highly qualified researchers, albeit limited in number. This has clear implications for both the conduct of research and the development of postgraduate programmes. The problem is the low number of PhD recipients in the country (currently it is estimated that there are 253 individuals holding a PhD working in research or academic work[91]), exacerbated by the recruitment and incentive practices of both universities (see Chapter 5). Although there is discussion that the upcoming University Congress at UMSA will lead to changes in staff compensation systems, this is highly unlikely (see Chapter 5); additionally, if things remain the same, the possibility of dramatically increasing the proportion of qualified research and teaching staff with research experience and tandem research duties is limited. Indeed, a substantial number of PhD recipients who have teaching posts are not in positions that include research. At UMSS alone, the evaluation team was informed that 60 PhD recipients have only teaching duties, meaning that if these individuals engage in research activities, they must do so on

[90] Hector Cordova, Key informant Interview, la Paz, 13.02.17
[91] See VMCyT Studio de Potencial 2011. It is important to note that there is a

their own time and without university support.[92] This means only researchers who can carry out research without the need for supplementary funding, and who do not require equipment, can engage in research in the first place. In general, all stakeholders agreed that the only secure impact resulting from the PhD training funded by Sida at this time is the knowledge gained by the individuals who have been trained. In short that increasing knowledge is, independent of all other factors, positive. In order for the PhD program to have its intended result at a minimum the following factors would have to be met: PhD graduates secure employment in Bolivia, in the research sector, and be engaged in the conduct of research that has poverty reduction objectives. As has been noted in this report, some norms to support this are in place, but their implementation is, according to respondents, far from full proof. Additionally, in order for the capacity to be maintained PhD graduates would need to be engaged in research activities that push them to remain at the forefront of their fields to ensure that the skills acquired during training (PhD education) are further developed and expanded. The PhD should not be the end-goal, but rather a starting point from which researchers can further develop, and contribute.

The low numbers of qualified research staff has multiple implications for both universities. It means, for example, that academic supervisors qualified to support Master's students are few and those able to supervise PhDs, are even fewer. In this vein, it is also important to highlight that supervisors in Bolivia, unlike those in Sweden, do not receive training or capacity development on supervision specifically. Rather there is a reliance on learning from experience, meaning that PhD candidates learn how to supervise based on their own experience with their respective supervisors. The lack of specific support to supervisors to systematically improve supervision skills has meant that students experienced a clear disparity in the support they received among supervisors in Bolivia and even more when comparing those in Bolivia and those in Sweden. In short some students have benefited from very good supervision, while others far from it.

Moreover, there are many positions which are not permanent, which leads to a high staff turnover. This was noted as a challenge in relation to ICT (administrative staff), but also highlighted amongst junior level researchers. High level administration is also subject to changes. Specifically rectors have the authority to appoint new

[92] Similar data for UMSA was not available since teacher-researcher positions do not have a standardized split of activities.

management to key university positions. Recently this has affected UMSS in particular.

Both universities have a comparatively large administrative staff (see Table 6), which could be interpreted as the university counting on a support system that could facilitate research. However, as noted earlier, researchers at both UMSS and UMSA (including PhD students funded by Sida) said administrative and support staff members often obstruct rather than facilitate their work. Some suggested that the number of administrative staff was not conducive to a streamlined research process. However, the challenges experienced cannot be simply attributed to a seemingly disproportionate number of administrative staff. Many recognised research hubs, such as Harvard University, have administrative bodies that far outnumber faculty and research capacity.[93] This observation suggests that the problem is not number of staff per se, but rather that roles and responsibilities are not clearly understood. That being said, universities can also be effectively run with many fewer administrative staff members if administration is handled efficiently, as Nordic universities show.

Overall multiple respondents noted that in order to ensure that research becomes mainstream there needs to be a critical mass of PhD graduates. At this time, however, the numbers of PhD graduates in Bolivia overall and at both UMSA and UMSS are far from reaching critical mass status.

6.4 INFRASTRUCTURE

Available infrastructure, particularly laboratory equipment and materials, was limited or non-existent prior to Sida's support. Some researchers interviewed noted that prior to the Swedish support some departments existed on paper only, as there was no infrastructure (i.e., labs) to conduct key courses. Thus, it is clear that the support from Sida has been central to expanding specific departments and research units; however, the ability of the universities to maintain and supply laboratories independent of Swedish funding remains limited. The lack of support from the government in import processes for both equipment and materials was also noted as demonstrating the fragility of the available infrastructure. Still universities have made progress. Both UMSA and UMSS have been able to insure existing equipment, and at UMSA university faculties have been made responsible for the maintenance of equipment.

[93] See http://oir.harvard.edu/fact-book/faculty_and_staff.

Costs associated with maintenance and insurance should according to UMSA, precede the purchase of additional material.

It was noted that the administration of infrastructure at both universities was not user-friendly and that as a consequence existing infrastructure was under used. Challenges with importing equipment, and substances to use the equipment were also noted by researchers and faculty staff. These included both delays and expense. However, there have been some clear successes. In some cases import duties have been waved on an ad hoc basis. Aside from this it must be highlighted that some of the equipment purchased with Sida funding is the only of its kind not only in the country, but the region. This kind of equipment attracts partnerships not only with other universities in the region but also industry.

The other piece of key infrastructure available for research and intended to strengthen university research capacity in Bolivia has been the e-library managed by VMCyT. Prior to the e-library's establishment, each faculty subscribed to a relevant e-resource that met the faculty's specific research needs. Since the VMCyT e-library's introduction, previous subscriptions have been allowed to lapse (see Chapter 3). As has been noted earlier (see chapter 3), the e-library is not favoured by many of the researchers and staff interviewed. Those with access to Swedish resources use those, and those without argue they find alternatives. While this can be seen as a failure of the effort, it must be recognized, as was highlighted earlier in this report, that having a resource common to all universities is an important step forward. The good will of researchers and staff to use the resource and actively engage in its improvement will ultimately determine the overall success of the effort.

6.5 INNOVATION

Both universities have stated their commitment to innovation in institutional documents.[94] Despite successes noted below they have faced challenges. These are mainly conceptual – for example, according to some respondents, efforts to strengthen ICT programmes at UMSA have been confronted with a very narrow view by the university, of what ICT is and how it should be integrated into the research environment. The views presented in UMSS have the potential to be broader in their understanding, but this cannot be verified with certainty based on the available

[94] See http://dipgis.umsa.bo/?p=2261 and http://www.umss.edu.bo/pdf/explorandosansimon.pdf.

documentation.[95] Despite these challenges, considerable progress has been made in the implementation of the ICT master plan at both universities. Respondents at UMSA noted that the approach used to develop the ICT master plan has led to considerably buy in from university authorities. In addition to the current on-going implementation of the master plan (see chapter 3), innovation has been a focus at both UMSA and UMSS. At UMSA a focus on innovation has led to the recruitment of four staff whose role is to focus on innovation. At UMSS innovation is promoted broadly, but specifically through the clusters in food and leather. These are managed by staff who is currently undertaking relevant PhD in Sweden. The possibility for additional clusters is currently under exploration. While clusters at UMSS have been successful, there is no evidence to suggest that these could be sustained without external support. The main reason for their fragility is, according to respondents, the reliance on individuals rather than on a system that can support the initiative. This view is supported by a UMSS document published in 2016 that details the opportunities for innovation in Bolivia generally and in Cochabamba in particular. The document concludes that the ad hoc approach to partnerships between the universities and government and private sector actors that has characterised collaborations in Bolivia (see Chapter 4) is a double-edged sword. It further highlights that this approach has enabled faculties and institutes to be creative and innovative, but it has also resulted in an overall disorganised system that has not been able to systematically benefit from lessons learned and support synergies.[96] Still, the introduction of administrative staff, at both universities, the development of their capacity and what appears to be an improved regard for innovation could mean that innovation seeds at both universities have been planted and may continue to grow in future.

[95] UMSS. (n.d.). *Plan maestro de tecnología de información y comunicación* [Master plan for information and communications technology].

[96] Gutierrez Garcia, F. C., & Zurita Mercado, E. N. (2016). *Estrategia y planificación de la UMSS con El Entorno.* Cohabamba: UMSS.

7 Conclusions on results and lessons learned

This chapter focuses on the results of the support provided to Bolivia, specifically on relevance, impact and sustainability – the main issues of concern highlighted in the terms of reference. Cross-cutting issues are also addressed in this chapter. Lastly key lessons learned are presented in this chapter as well. These have been presented in italics.

7.1 RELEVANCE

In exploring the general context in Bolivia, the evaluation data suggests that although there are some strategies and policies (Agenda 2025), agencies (VMCyT), and funding (hydrocarbon tax) that can be funnelled towards research, university-based national research capacity is not actively regarded as a government resource. There appears to be a general disconnect between the different elements of the research and innovation ecosystem and how these can be used to maximise the use of existing national research capacity and invest in future research capacity. As things stand today, the degree to which government agencies and the private sector utilise university research resources is determined by case-by-case bilateral agreements that are highly dependent on the ability of individual researchers to mobilise and connect with interested parties. While this is not necessarily negative, it means that name recognition plays a considerable role, as do connections. It complicates the coordination of resources and optimisation of research capital. Unfortunately, the mechanism to support collaboration – which could include, for example, dialogue regarding the allocation of hydrocarbon tax research funds or capitalising on the VMCyT's mandate – are not currently considered by any of the parties interviewed.

Despite the aforementioned contextual challenges, the programme in Bolivia, as with others funded by Sweden, rests on the assumption that PhD training in strategic research areas increases the countries' capacity to plan, produce, and use research for their fight against poverty. In Bolivia, work on public health and nutrition can be an example of this. In the evaluations of the African programmes, malaria research and HIV/AIDS research can also be seen to have immediate applications that directly impact the lives of the poorest and most marginalised people. But the effects of many other fields of research may be much longer-term and require a large number of auxiliary hypotheses about diffusion and spread of benefits.

Previous evaluations have pointed out that the programme's modality for change (doctoral training) may not be sufficient for the transformative effects it intends to trigger. PhD training is basic researcher training, and it does not explicitly train for research leadership, education, supervision, grant writing, administration of research projects, or management of research groups. PhD training alone cannot be expected to

improve areas such as curriculum design, pedagogy, courses, securing funding, supervision, or administration of research. In Bolivia specifically, there is an added challenge: The universities have shown no tangible institutional desire to become research hubs and to make a contribution to policy and development priorities at the national level. Their commitment to research is largely rhetorical and depends on the efforts and commitment of individuals whose hard work is often made harder by policies and administrative procedures that are at best counterproductive and at worst destructive of research efforts.

Therefore, while the support has been relevant to individuals in their personal pursuit as professionals, and in some cases has led to the strengthening of departments or faculties, opportunities are limited for trained individuals to generate changes at the university level that may lead to a more solid and sustainable research capacity. Moreover, in view of a university system that does not systematically and effectively promote university research to external actors, engagement between university research projects and government and/or the private sector are few and the direct result of researchers' individual efforts. While some results have been commendable, the approach is very dependent on the connections of individuals and their willingness to pursue partnerships. In turn, this means that the relevance of the support provided by Sida to contribute to Bolivian development and poverty reduction efforts rest in the hands of individual researchers.

The aforementioned shortcomings aside, it is important to stress that for individual PhD and Master's students and researchers alike, the funding has been instrumental in enabling their access to graduate education and/or their ability to conduct their research. The sandwich model specifically has largely been regarded as positive, both in Bolivia and elsewhere.[97] However, some participants felt that the time in Bolivia could be reduced and that since the degrees are not accredited in Bolivia and supervisors in Bolivia did not receive supervision training, there was limited value in using the model. Conversely it has been argued that the Sandwich model promotes the return of PhD candidates after the completion of their degrees at rates that are higher compared to other scholarship systems. However, the available data does not permit a systematic evaluation of the veracity of this argument in the Bolivian experience since many PhD scholarships are secured by individuals independent of any local institution in Bolivia.

[97] Thulstrup, E. W. (2010). *North-south research cooperation: How can contributions from Swedish Universities be sustained and improved?* Stockholm: Sida

This funding model used by Sida presupposes that universities want to expand their research capacity and hence will use the newly skilled manpower – that new researchers will fuel not only more research, but also improve the training of undergraduate students. However, the model overlooks the gap between a pro-research rhetoric that might even be codified in policy documents (as is the case in Bolivia) and reality. In Bolivia, a noted proportion of PhD recipients emerging from the Sida-funded programme have not been employed full time by the university, with some not being hired at all, and even if they have, they may or may not conduct research as part of their employment activities. Clearly, the programme has resulted in a net gain of research capacity in Bolivia, but a central emergent lesson is that its full utilisation depends on both universities making more clear commitments to issues such as hiring PhD recipients when they graduate, providing them compensation commensurate with their training, supporting the recognition of Swedish degrees in Bolivia, and ensuring the use of their skills and expertise to promote the improved quality of teaching and the conduct of relevant research. Without these clear steps, the support provided will not maximise on its promise.

7.2 IMPACT

The research environment in Bolivia has not changed substantially since the start of the Swedish funding, with three notable exceptions: capacity development for research management, access to PhD training in Sweden, and the ability to conduct lab work with equipment that was not previously available. Yet, despite these changes and the fact that UMSA and UMSS combined account of almost 80%[98] research conducted in Bolivia, these universities have not been able to establish themselves as the systematic 'go-to' entities to resolve development or poverty-reduction challenges. The modality and level of engagement with government agencies and the private sector is reliant on individual researchers rather than institutional efforts; this has not changed with Swedish support. This is largely due to a number of factors:

- First, although the research capacity (staff and equipment) has been increased, the increase has not been sufficient to merit an automatic shift in how the two universities are regarded in the broader Bolivian context (by government bodies, the private sector, and society at large). Basically, the output level is not sufficient to gain automatic recognition. Although it is noted that individuals working at the

[98] Statistic quoted in the ToR, this data was not independently verified.

different universities are recognized as the authorities in individual fields and hence as the go-to people.

- Second, the university's efforts to showcase the research conducted by the universities have not been effective in gleaning the attention of the private or public sector. Similarly, neither have been the efforts by the VMCyT. Although it is noted that numerous efforts have been carried out by both the universities and by the VMCyT, which suggests that the approaches used might require evaluation.
- Third, both universities have failed to make organisational and administrative reforms to ensure that the capacity generated through the Sida programme is used fully or make a plan to increase the institutional capacity even more. To this end, it is important to note that while both universities are the main producers of research at the national level, this does not mean that the output level is particularly high. Indeed, the publication ranking of the country has dropped between 1999 and 2015, which shows that Bolivia has been unable to keep up with worldwide expansion in research despite the support received.
- Fourth, the VMCyT has not succeeded in bringing together university and private and public sector actors to support active collaboration in pursuit of development challenges. They have conducted numerous activities pursuing this objective, but their level of success (impact level) appears limited. This suggest that either the approach is inappropriate; those engaged are not the most relevant; and or that the organizations engaged do not have themselves mechanism that promote engagement and hence the efforts fail to automatically or systematically garner institutional support.

The successful implementation of a sandwich program requires that participating students gain from the engagement in their home universities. In Bolivia, more often than not, the support (academic and administrative), resources, and environment were not comparable to the conditions experienced in Sweden. More pressingly, the administration locally is one that appears to fail to understand how research is conducted and how it could support research efforts. Therefore, in a majority of cases, the stay in Bolivia elongated the research period rather than effectively supported the learning process for PhD candidates. Moreover, supervision of students is an important skill that has been somewhat overlooked.

Turning to research outputs specifically, the evaluation team found the focus on innovation at both UMSA and UMSS has started to gain attention. Clusters have been supported by Sida at both universities. However, the cluster organised by UMSA (wood sector) has not been consolidated. Although there have been multiple activities, the cluster has not yet been able to materialise as a mechanism to produce innovation or develop an innovation-gleaning system. In Cochabamba, at UMSS, results with clusters have been more positive with both the clusters on leather and food resulting in a more solid cooperation structure between participants. Current PhD students highlighted the cluster system (citing the UMSS experience as an example) as a key way to ensure that their research was both relevant and used in an effort to further Bolivian development. Notably, the tangibles of these claims could

not be verified, but this is understandable since many research efforts do not lead to clear, direct, immediate, or verifiable results when evaluated as part of a much larger development effort. Still, the programme documents do highlight that research topics followed up by researchers and students associated with clusters were identified because they had direct relevance to the cluster. Moreover, the clusters have led to collaborations between organisations and institutions of relevance (see chapter 3). Hence, while the direct impact of clusters on Bolivian development cannot be verified, the data collected suggests that results are promising for cases in which the clusters have been consolidated.

In addition securing staff that focuses on innovation specifically, innovation officers at UMSA and cluster managers at UMSS, has been a focus at both universities. This is a noted step forward in ensuring that innovation has a prominent position in Bolivia. Since these efforts are in their early stages, how they materialise and the degree to which they are able to support consistent innovation remains to be seen. At UMSS, if the effort succeeds in ensuring that clusters become sustainable long term the impact from clusters will continue to be felt. At UMSA efforts to support innovation have a potential, but the effort is young and hence impacts are not yet visible.

The support to research management structures generally and ICT specifically was hailed as a key positive result of the support provided. Both UMSA and UMSS noted that their ability to manage research had been substantially improved as a result of the Sida-funded interventions. As pertains to research management, the data reviewed suggests that support has led to the development of numerous policies, guidelines, and action plans. However, evidence of how these have been implemented is less clear. In UMSS particularly, there appears to be a long list of documents that have been produced since 2012, when the institution started experiencing political turmoil. Given the changes in leadership and the ambiguous support for research at the highest levels, it is unclear how influential these documents will be in terms of the expansion, consolidation, or professionalization of research practices at the university level. At UMSA, the generation of policy and strategy documents appears lower and institutional politics have been more stable. However, tangible support for research at the highest levels is unclear, and therefore it may be that at both universities the consolidation of management mechanisms is restrained by the capacity that each research management unit has to influence overarching university policies and practices. As pertains to ICT specifically, the development of the master plan has been a clear step forward. The respective plan is currently being implemented at both universities. However, it is too early to assess the impact that these efforts will have.

The provision of material support (i.e., laboratories) has been central to enabling the conduct of certain kinds of research. However, its impact in the short term is dependent on its use, and in the long term on Bolivia's willingness and ability to maintain the equipment. In the short term, at the university level, inadequate administrative processes have led to the underuse of equipment. It was noted that management often do not understand the costs of operating modern research

equipment. Additionally, from a broader perspective, there are numerous examples of cases in which researchers were unable to use the equipment because required products were not permitted through customs. This shows that the universities have failed to engage the right government offices in a dialogue that is able to demonstrate the importance of the equipment and the value of its use. Again, this demonstrates that the universities at an institutional level have failed to partner with government offices in demonstrating their role as part of broader national development. In the long term, equipment needs maintenance and housing facilities, neither of which is currently secured without the support by Sida. However, progress has been made. Equipment at both universities has been insured in 2016 and at UMSA faculties have been made responsible for the equipment and regulations that make faculties responsible for the maintenance of equipment instated.

The e-library managed by the VMCyT specifically has generally failed to generate the required outcomes. Although e-resources are an important tool for academic research today, this particular output has not evolved into one that is considered useful by any of the university representatives or researchers. This finding extended to universities other than UMSA and UMSS. However, the bringing together of 48 universities willing to join in a common e-library effort and willing to pay for the service is a clear step forward. The materialisation of the impact of this tool will require that relevant stakeholders at the different universities choose to use the tool and actively engage in its improvement.

In terms of research output, the country's research activity remained stagnant over the first half of the 2007–2016 period and grew rapidly over the second half. That growth is significant, but it is solely due to rapid growth of publishing activity at UMSA. At UMSS, publishing activity decreased over the 10-year period despite Sida support. A large proportion of articles were published in high-quality journals, however, usually with foreign co-authors. At the programme level, one of the objectives of the Sida programme was to increase Bolivian research output, and that objective was achieved. Alas, universities' insufficient bookkeeping on programme outputs makes it impossible to establish what impact Sida funding had on Bolivia's growing publication numbers. The growth can be attributed to a very large number of factors and might have happened despite Sida support altogether. The decrease of UMSS publishing activity supports the latter interpretation. A consolidated list of publications related to Sida funding would have helped solve those questions.

It is noted, however that both UMSA and UMSS have conducted research that has had the potential for a direct positive impact on the Bolivian population. There are a number of projects where either or both universities have collaborated with government agencies, or where government has requested information and/or support from the Universities. The local government of Cochabamba, for example, approached UMSS and requested that information collected during on the Rocha river basin. In a separate case same local government approached UMSS to request support in the conduct of research on water treatment specifically on treatment of water for pork farms. Broader requests from the local government to UMSS

soliciting technical support in general environmental matters were also noted. How the information has then been used by the local authorities is unclear from the available documentation. The dynamic has been similar with UMSA although request letters were not made available.

A number of lessons emerge from this experience, not least the importance of actual tangible commitment mentioned earlier. *Supporting the managerial processes and systems is important, but equally so the administrative and academic support should not be overlooked. The administration must be supported to better define their own role and act accordingly. Similarly supporting academic staff on aspects of supervision of postgraduate students, and on how to best use the skill set of postgraduate students to create a research/inquiry conducive environment are also important lessons that can be drawn from the Bolivian experience. Likewise, capacity development support that complements technical support in the ICT field should not be undervalued as it can be central to ensuring the maximum benefit from the efforts made. Lastly aside from supporting e-resources there needs to be a strategy and action plan for how these resources will be utilised at the university level, which includes a mechanism to ensure buy-in from relevant stakeholders. Introducing new resources without such an effort is likely to lead to under use.*

7.3 SUSTAINABILITY

At this time, neither UMSA nor UMSS have a clear plan on how to secure the sustainability of the progress made through Sida's support once the funding ends. The ability of both universities to conduct research has increased as a result of Sida's funding, yet neither university has fully capitalised on the totality of the knowledge generated. While the number of PhD recipients has increased in Bolivia, not all graduates have been hired by either university, and those who have do not necessarily carry out activities that capitalise on the knowledge they have gained. At the university level, there are no ongoing efforts to change this predicament. Similarly, as noted above, while the equipment secured with Sida funding has been instrumental to conducting certain research activities, the current plans on how the technology will be maintained and continue to be utilised in the absence of Sida support is vulnerable. While faculties are responsible for upkeep at UMSA (where costly equipment has been funded by Sida), this does not guarantee it will be so. Particularly since the administration within the university has consistently been found to be incapable of adequately supporting research needs, including the administration of material resources (i.e. equipment). Despite these challenges, individual researchers and faculty at certain departments are exploring the possibility of expanding their postgraduate training programmes. In UMSA in particular, there is a current effort to design a local PhD programme. If such initiatives are successful they may serve as role models for others. However, the effort at UMSA lacks university funding, and without external funding the likelihood that it will materialise is limited.

As pertains to the Masters program, while respondents consistently agreed that the effort has been successful; management at both institutions and the Executive

Committee of Bolivian Universities noted that often Master's and diploma programmes are created, accredited, and discontinued after a few iterations, as opposed to updated or modified. This approach means both that the resources invested in developing a programme are largely lost when it is discontinued and that proportionally high levels of resources (including knowledge) are utilised on a quasi-regular basis to develop new programmes. Financing is one key factor for discontinuing programmes. The end result is that the sustainability of the Master's programme is unclear. Notably, however, universities noted that the areas of focus of the Masters supported with Sida funding are priority areas for the respective institutions and therefore less likely to be discontinued. At UMSS specifically the focus on the development of a scientific Masters, which focuses on research, is highlighted as a clear step forward towards increasing the research capacity of the university. This too is noted as a reason for which these courses will be sustained long term.

The VMCyT has not been able to actively, sustainably and consistently engage the universities in mechanisms that might lead to longer collaborations between the universities and other actors. Or perhaps more accurately parties engaged by the VMCyT appear to differ from those which pursue collaborations or were parties that lacked the mandate to ensure the development of institutional collaborations. In the absence of any other entity that might be able to bring together different actors or universities, any collaboration is reliant on the initiative and ability of individual university staff. At this time, there is no institutional plan at either UMSA or UMSS that would lead to active collaboration with other universities. In a discussion with representatives of other universities, their main concern was not how to engage with Bolivian universities, but rather how they too could secure Swedish funding. Still, since neither UMSA nor UMSS employ all PhD graduates, this leaves some qualified researchers free to work with other universities. Generally, however, there is no evidence that this opportunity is being capitalised upon.

The challenge of translating innovation systems to social and political action is not new to Sida[99]; Bolivia is not unique in this regard. The concern is not that progress is not being made, but rather that even when successful (clusters in Cochabamba, for example), the mechanism in place, for example increased staff positions, may or may not remain and or have the authority to sustain and expand on the effort made in the

[99] Gynberg, V. B. (2013). *Swedish Research Aid Policy 1973-2008*. Linkoping Studies in Arts and Science, The Department of Thematic Studies-technology and Social Change.p 107

absence of Swedish support. This is true even though the university has funding that it can allocate to research (hydrocarbon tax). In general it seems that mobility among Bolivian researchers is very low and this is costly, both for individuals and for the country.

One of the areas that appears to not have been explored to any length thus far is how UMSA and UMSS can engage other universities in an effort to further the development of research capacity more broadly in Bolivia. Indeed, there appears to be no effort to support the hiring of PhD graduates for whom there is no place at other institutions.

Capacity development at the university level is a long term effort. However, a key lesson emerging from the Bolivia experience, where sustainability is weak, is the importance of having universities have a plan for how they will incrementally take on responsibility for augmenting their institutional capacity.

7.4 CROSS-CUTTING ISSUES

In relation to the support provided to UMSA, UMSS, and the VMCyT, Sida has been particularly interested in how gender, environment, and human rights perspectives have been integrated into the programmes. Unfortunately, we found that all three thematic areas are defined very narrowly. Meaning that gender is understood to mean women versus men, with a focus on how many women versus men participate in Masters and PhD programmes. The conduct of research does not systematically address any gender issues, unless the research itself is on gender. None of the respondents we spoke with in Bolivia understood gender as an element that may affect research at many levels, including how projects are conceptualized, and selected; data collected, and analysed; and even how findings are presented. While respondents recognized that gender was an issue of concern to Bolivian society there was no evidence that there had been any reflection on what gender might mean for the university generally or research specifically. Indeed multiple respondents openly admitted that while interesting, it had been an issue that had been thus far overlooked. PhD students in Sweden echoed the sentiment, although one supervisor in Sweden highlighted the importance of a gendered approach to research and stressed that her work included a gendered perspective as a matter of course. Indeed gender is most often reflected only in the disaggregation of data by sex; and in the inclusion of female staff.

The understanding of what entails human rights has also been very limited. Generally, respondents felt it was a legal or political issue, and hence one of limited relevance to research at either university, particularly since the main areas of focus was in the science fields. In short unless a specific ‘right’ or ‘right violation’ was the subject of the research, rights generally were not relevant. When it was highlighted that working with human subjects, or in locations that affected specific populations/communities, automatically meant that issues of rights should be addressed, respondents agreed that indeed the issue was relevant. However, as with gender, it was recognized that there had been no effort, thus far, to ensure that human

rights were systematically considered during the conceptualization, design, or execution of research projects. In some cases, and particularly in relation to research involving indigenous populations, there were multiple examples of cases where research projects had not considered the rights of target populations although they clearly should have. Most examples had to do with intellectual property, and respect for cultural practices. The systematic disregard for human rights was at odds with the clear recognition that not carefully considering the engagement of communities (indigenous or not) and ensuring that they felt (and were) respected has led to a general rift between university researchers and target populations/communities.

Environment was also considered specifically relevant only to research that included environmental elements. If the research was on environmental questions, or made direct use of nature, or natural resources, then environment and its safeguarding were considered. This included conducting environmental assessments and investments into the improved understanding of environmental questions. How the universities generally, and their researchers specifically, could contribute to the respect for the environment in broader terms, beyond the specific threats associated with single projects, was not specifically considered. While some respondents noted their concerns regarding Bolivia's political focus on becoming the energy centre of the region (Chapter 4), and the environmental implications this might have for the country, there were no indications that either university wanted to take up the issue.

Moreover, there was no evidence that the VMCyT has or intends to engage on any of the three cross-cutting issues, beyond the disaggregation of data by gender, which they understand as meeting the demands of a gendered approach. The sentiment expressed was that these issues fell outside the vice-ministries purview. Although arguably the VMCyT could play a role in redefining how these concepts are understood and applied.

Hence while gender, human rights and environment might be well understood by Sida, it cannot be assumed the same is so for its counterparts. Clearly the Bolivian experience shows this. Therefore it would be wise to consider including support that aims to improve the understanding of these concepts and how they apply to academia overall and research and innovation more specifically.

8 Recommendations

The support to Bolivia is at a crossroads. On one hand, it is clear that funding has been instrumental for individuals who have received support (PhD and Master's students), and even for researchers who have been able to secure research projects. It is also worth noting that some research projects have had a direct impact on the country's development and/or poverty reduction. However, these efforts have not been part of a systematic process of university engagement in Bolivia's development and poverty-reduction efforts.

Given that the overall objective of Sida's support is not to assist individuals, but rather to strengthen university systems and make them more able to actively engage in research and systematically contribute to poverty reduction and development, the programme has not yet been able to meet its central tenet. While this is understandable because changing structures is a long-term endeavour, the structural mechanism at both universities in Bolivia governing the allocation of funds, compensation packages, hiring systems, retirement schemes, and administrative support mechanisms, all combine to truncate rather than promote the attainment of Sida's goal. At the same time it is also important to underscore that at the individual level, researchers have been able to engage in projects and programmes of relevance to Bolivia. While alone Sida's efforts cannot build critical mass without the active institutional engagement of the Universities, they can, and have, supported the conduct of research projects that demonstrate the value of solid research capabilities. With this in mind, it is pertinent to consider how Sida would like to move forward, considering also that there was a consensus amongst those interviewed that sustainability is not a factor under any serious consideration either now or being considered for the end of a next phase (if one were to come). Thus, each recommendations below is premised on what Sida might take into account and realistically be able to expect, and is followed by the implications each choice would have in relation to other actors.

Building research capacity and strengthening educational quality

Option A: The programme can be continued as-is, but Sida must recognise that not all PhDs trained will be hired by the universities, and even if they are, their positions may very well undervalue their qualifications, therefore hampering retention. Moreover, not all PhD recipients hired will have teaching obligations and thus their newfound knowledge and skills will not automatically influence undergraduate training in any way. Similarly, some of those hired might not have research tasks either, which means that their ability to utilise the skills learned is minimised. Simultaneously, many of those hired may not have research duties so their possibility to publish will be limited. This option is unsustainable and inefficient. Still, the

aforementioned is worst case scenario, and the evidence shows that some PhD graduates will success to engage in teaching and research and may also engage in research that has a direct impact on Bolivian society.

Option B: Sida may choose to negotiate an agreement with the universities to ensure that all those who complete PhDs and Master's degrees are given proper positions at the university and remunerated following a revised system allowing for competitive compensation given their education level. While this could arguably mean that the university congress must first change the compensation mechanism to be based on academic attainment, university management could also compensate graduates with stipends for research that, together with the base salary, generate an adequate compensation package. In addition, the positions should include both research and teaching obligations and have reasonable targets for research output, including the generation of publications. This approach would slow down loss of the capacity built. As pertains publications specifically, the regard for these should be re-examined with scientific high calibre publications being adequately valued.

Option C: In addition to option B, university management, and particularly the administration, can be supported to ensure that they have the skills and expertise to maintain existing equipment, ensure its maximal use, and generally support the conduct of research (an administration that better understands their role in relation to research). This could ensure that researchers utilise the majority of their time on teaching or research and not on circumventing administrative hindrances. Additionally, the programmes could be expanded to include clear engagement with other universities to promote the professionalization of staff from these. In short that as PhD programmes develop staff from other universities are actively invited to engage in their professionalization.

The PhD scholarship programme

Option A: The programme can continue as-is at this time. However, Sida should recognise that with the current model, Bolivian students often extend rather than reduce their study period because their research time in Bolivia is often inefficient due to the lack of administrative support and resources and often substandard supervision. Following this option, the number of students graduating with a PhD will increase in Bolivia, while the costs will remain the same. However, there is no guarantee that the knowledge built will improve Bolivian research capacity.

Option B: The PhD scholarship programme can be modified so that students carry out all of their work in Sweden and only go to Bolivia if they require local data collection. This would most likely reduce the PhD study period. While costs might increase with longer stays in Sweden, there would be a higher likelihood that all students get quality support and students would have more opportunities to build international networks that can foster future collaboration. On the downside, however, limiting their time in Bolivia would weaken their Bolivian networks, which may affect their ability to secure employment or research partnerships upon their return. Moreover, this option would be much more focused on knowledge transfer

than knowledge development,[100] and would considerably limit the possibility that any of the research findings would be adopted to use in Bolivia.

Option C: The PhD scholarship can continue using the current model, with Sida committing to increase its support to training for supervisors and administrative staff in order to ensure that research conducted in Bolivia is done more efficiently, effectively, and with the required support. This could be a foundation for designing a PhD training capacity in Bolivia. For their part, the universities would commit to recognise the PhD in Bolivia and also commit to hire all successful graduates in research and teaching faculty roles with compensation packages that are commensurate with the academic degree held. This would mean that the issue of accreditation would be nullified and universities would be able to more adequately benefit from the capacity developed. Over time it would allow universities to develop programmes locally. This approach would also require that the universities allocate more funding to research and teaching at the postgraduate level, which is not a challenge as funds are available, not least from the hydrocarbon tax.

Utilisation of research

Option A: The programme can continue as-is at this time, but Sida should recognise that with the current model, the utilisation of research by either the government or private actors is limited at best and that while clusters in Cochabamba have been successful, their continued success is directly dependent on continued Swedish funding. This does not mean that there are no successes. In fact there are clear examples of research conducted that has had a direct impact on the welfare of Bolivian population, but these efforts are not systematically supported by a mechanism that links the University and the public or private sector, but rather are largely a result of individual initiatives.

Option B: Sida may choose to further support the current approach by designing a mechanism that more effectively showcases each university's current research capacity. The data collected during this evaluation shows that the catalogue and fairs currently conducted do not generate further collaborations between the university and the private or public sectors. Therefore, effort could be made to identify a strategy that could more effectively and efficiently increase the visibility of the research conducted by both universities.

[100] Gynberg, V. B. (2013). *Swedish Research Aid Policy 1973-2008*. Linkoping Studies in Arts and Science, the Department of Thematic Studies-Technology and Social Change, p. 107.

Option C: The support can be modified to require that all research projects include a solid interdisciplinary approach (inclusion from multiple sectors) that would serve to ensure that efforts are holistic and easy understanding and buy in from multiple actors. In addition all projects would need to have a partner in the public or private sector who has interest in using the study's findings. This would require that national partners be identified and that they be active contributors to research design, which in turn may require capacity development amongst partners in some fields. Otherwise, there is a risk that research favours fields in which there is a stronger history and culture of using research findings. An alternative would be to mobilise the Swedish embassy in Bolivia and use its other lines of support as conduits to partnerships between the university and government counterparts.[101] The latter model would have the added value that, if relevant, development aid support by Sida generally would benefit directly from Swedish research cooperation. This option could complement option B. However as noted in footnote 2, this is not a suggested approach as it goes against the grain of Swedish support.

Collaborations and Information Technology

Option A: The programme can be continued as-is at this time, but Sida should recognise that – despite their success – clusters are very fragile, that the VMCyT has thus far been unable to support ensure a substantial expansion of collaborations, through its current efforts. This is not necessarily a failure of the institution, but recognition that developing a culture of engagement is a time demanding effort. The ICT element does show promise as both universities continue to move through the series of activities detailed in the respective master plans.

Option B: Sida may choose to support the identification of factors that currently threaten collaborations, such as reliance on individuals rather than institutions, and invest considerably on the development of support structures that rely on the mutual benefit of all parties engaged. Alongside this, efforts to continue the support for the implementation of the ICT master plan that can serve to consolidate institutional buy in, and other electronic resources such as the e-library should be examined carefully to identify what type of support, and by whom, would be required to enable a shift towards the wider strategic use of the specific tools.

[101] Ensuring engagement between research cooperation and other development activities is not a new suggestion. See Eduards, K. (2006). *Review of Sida's research cooperation.* Stockholm: Sida

Option C: In reference to undergraduate teaching, Sida can explore what type of support undergraduate instructors and students may need in order to strengthen learning environments and foment a culture of inquiry. Undergraduate students are currently not trained with the objective of developing potential researchers. Therefore, changes in undergraduate education might be central to improving the image of research.

Towards a next possible cooperation phase, 2018-2022

Choosing UMSA and UMSS as the main partner universities has made sense because they are by far the largest in the country and do, despite their shortcomings, produce the majority of research nationwide. The support provided to the VMCyT also makes sense from a strategic perspective since they are responsible for science, technology and innovation and therefore well placed to promote the use of research, partnerships, and innovation. However, this report found that while some progress has been made, serious structural issues threaten to limit the future potential for progress. The above options for how Sida may choose to approach their support in the future include a number of actions that would be required by the different stakeholders depending on the choices made. In addition, it is important to note that continuing with the current modus operandi will likely lead to numerous unsustainable results. Therefore, whichever options Sida chooses to pursue (aside from continuing on the same path) should be coupled with clear, actionable commitments by the different parties. Over the last decade, all funded organisations enjoyed considerable leeway regarding how they used the support and how achievements were measured. This has been positive, but the time is ripe for all parties to make clear, concrete, and actionable commitments if Sida support is to generate sustainable results in the next phase.

Annex 1: ToR

Terms of Reference for the evaluation of the impact of Sida's research cooperation with Bolivia 2007-2016

Date: 2016-10-19

Case number: 13/000287 (2)

1. Background

General background on Swedish research cooperation

Sweden has supported research capacity in low-income countries since 1975. It was then a new, innovative and quite controversial approach within the area of development cooperation. As many low income countries lacked sustainable systems to generate evidence based knowledge, the support to research was seen as key to address many of the problems these countries grappled with and that affected poor people the most.

The modality of the Swedish support has not been static; it has rather developed organically over time. Creating capacity through doctoral training is at the core of the support. The focus, however, is not on individual research capacity but on institutional research capacity. At the same time as doctoral students are trained abroad, funding is provided to establish research environments at their home university i.e. research infrastructure (ICT, laboratory facilities, and access to scientific journals), research management (research policies, research structures, and research grants), and university reform (administration& finance) to establish sustainable research environments.

The sandwich model has for many years been the modus operandi of Swedish research cooperation. Universities in partner countries find the model highly valuable. Firstly, research training at a Swedish university offers an international research environment, with opportunities for networking, access to well-equipped labs and literature. Other opportunities are participation in international conferences, publishing in international journals and obtaining a worldwide recognized doctoral degree. Secondly, since the students are recruited among university staff at partner universities and data collection is carried out at their home institution, the sandwich model contributes to retain staff and diminishes the risk of losing human capital to foreign countries.

Gradually, Sweden is shifting focus from the sandwich doctoral training, with graduation only at Swedish universities, to support the establishment of local doctoral training at collaborating institutions in the south. What occurs is not really a change in the nature of support, but rather a change based on the progress of the research

capacity within a country. In this regard support to the establishment of local MSc programs is an important first step to establish local PhD programs. The sandwich modality serves its purpose well at a given point in the development of a country´s research system where such did not exist before. Its purpose is to create a critical mass of PhD graduates/researchers for a partner university in selected disciplines. When achieved, the critical mass of trained researchers can create, manage and sustain local MSc- and PhD-programs.

Many countries involved in Swedish research cooperation now have the capacity and the conditions to develop their own doctoral programs. While the sandwich model was directed to university staff, the local MSc- and PhD-programs can increase in scale and offer training to larger number of doctoral students and respond better to national demands. It is also a further step towards sustainability.

Swedish research cooperation in Bolivia

Sweden has supported research capacity building in Bolivia since 2000 through cooperation with the two major public universities: Universidad Mayor de San Andrés (UMSA) and Universidad Mayor de San Simón (UMSS). The Viceministry of Science and Technology (VCyT) has received a limited support since 2008. The cooperation focuses on institutional research capacity building of the two universities, who by tradition have been more focused on undergraduate training. UMSA and UMSS both have units for the management of research, DIPGIS and DICyT respectively. Together the two universities represent around 80% of the country's research.

Well-trained researchers can pose and pursue questions relevant for poverty reduction, national development in many sectors of the society, and enhanced standard of living. The aim of the programme was to support the existing structures and encourage the development of new structures that would create an environment that is conducive for research training and in so doing assist to identify and improve upon structures that hinder university research. The programme was built around international research collaboration, principally with Swedish universities. The aim of the Swedish research cooperation has been institutional support, aimed at building sustainable research capacity at UMSA and UMSS which would as a next step spread to other universities in the country.

Sida signed agreements with UMSA and UMSS in 2007 and with the VCyT in 2008, followed by a next phase 2013-2017. The total current agreement amount for 2013-2017 stipulates approximately 212 million SEK for both universities UMSA and UMSS. The support has been directed to support an environment that is conducive for research and research training. Support has also been provided to university postgraduate training, facility and research funds, research management and coordination, as well as the training of around 70 PhD students, of which a majority in life sciences and technology.

Sida is presently assessing the possibilities for a continued support to Bolivia, and an evaluation of the impact of the program would be helpful in the set-up of a next

phase. In addition to this, the evaluation will be most helpful in discussions with potential financing institutions in Bolivia.

The three collaboration partners UMSA, UMSS and VCyT have provided comments to the Terms of Reference of this evaluation. The direct intended users of this evaluation are the collaboration partners, incl. university management, researchers and PhD students, Embassy of Sweden in La Paz, the Sida Research unit and other Embassies who handle research cooperation. In addition, this evaluation will be important for all collaborating partners in the ongoing and future research collaboration with Bolivia, as well as other development cooperation partners and national stakeholders in the area of research and higher education such as the Ministry of Education and "Comité Ejecutivo de la Universidad Boliviana", CEUB.

2. Evaluation Purpose

The purpose of the evaluation is:

- Firstly, to analyse and assess the impact of the Sida-funded bilateral research cooperation with Bolivia during the years 2007-2016 in building research capacity as well as a research environment.
- Secondly, it is expected that the outcome of the evaluation will serve as basis for identifying the next steps required for the country and its universities to achieve national and institutional sustainability for research.

The assessment shall be made in the relation to the overall objective of the Strategy for research cooperation and research in development cooperation 2015 – 2021:

Strengthened research of high quality and of relevance to poverty reduction and sustainable development, activity 1. Focusing on capacity-building for research[102]. More information on Sida bilateral research cooperation is found on Sida's website[103]

The evaluation will be used by Sida as well as by the universities UMSA and UMSS and the Viceministry of Science and Technology in Bolivia. The evaluation is intended to give directions for future program design as well as understanding the impact that research may have on society in Bolivia.

[102] http://www.regeringen.se/contentassets/35640f803c554f5abe17800242c5bcb3/strategi-for-forskningssamarbete-pdf-for-webb-eng-2.pdf

[103] http://www.sida.se/English/partners/our-partners/research-cooperation/guidelines-for-partners/national- research-development

3. Evaluation Questions

The evaluation has the broad scope as described above, and the following questions have been identified as relevant questions. The evaluation is not limited to those issues. Please exemplify as much as possible.

Impact

- How has the research environment developed in Bolivia in general and at UMSA and UMSS in particular since 2007? Can any of these changes be derived from the Swedish cooperation?
- How has the role of research changed at UMSA, UMSS and in Bolivia since 2007?
- How has the role of research changed at UMSA, UMSS and in Bolivia?
- In which way has the research programme (people, systems and/or results) had an impact on policy development, collaboration with ministries, industry and civil society?
- How has the programme contributed to enhanced innovative processes and innovative thinking within the universities and among stakeholders?
- Is there any effort by the universities to promote the use of research in society with respect to communication of research and research results, extension services, dialogue with stakeholders, protection of national knowledge production through patents, intellectual property rights etc.
- Describe the role and impact of the research funds at the universities on research capacity.
- To what extent has the purchase of research infrastructure, including research equipment of initial value above 10 000 USD, contributed to the research environment and how much is it currently being used.
- How has the access to e-publications and the activities coordinated by the VCyT contributed to improved research capacity and environment?
- Has the number of publications increased in indexed international and national scientific journals respectively?

Sustainability

- Has the number of active researchers with a PhD increased at UMSA and UMSS? How many PhDs and MScs have been formed within the programme? How are they using, and have they been using, their training today? (gender disaggregated, and limited to the universities' knowledge)
- What are the challenges in retaining the researchers after training? Are there any specific efforts made by the country and the universities to retain researchers?
- What are the incentives to carry out research? What are the career opportunities for researchers at the universities and in Bolivia?
- What are the main bottlenecks for the improvement of research capacity at the universities and in Bolivia, and to sustain the achieved research capacity? How can those bottlenecks be approached?

- Are there systems in place at the universities and in the country to sustain the achieved results?
- Is there a system in place to assure the long term use of expensive research equipment?
- Assess the sustainability of research and research training at the universities after the Swedish programme ends. What is the current planning for sustainability?
- What strategies are in place to transfer knowledge/research results of relevance to the stakeholders?
- How could the improved capacity achieved at the universities UMSA and UMSS be transferred to other public universities in Bolivia?
- Imagining a phase out after 2022; which aspects would be necessary to focus on in the next five years?

Relevance

- Describe how the research projects (for PhD and MSc students and as part of the research fund) in the programmes have been identified and selected.
- Describe how the VCyT programme has been developed.
- Are the three programmes (UMSA, UMSS and VCyT) consistent with the needs and priorities of the universities?

Cross-cutting issues

- Please describe how gender has been integrated in the programme.
- Please describe how environmental aspects have been integrated in the programme.
- Please describe how a human rights perspective has been integrated in the programme.

The evaluation shall provide recommendations in the short and the long term, based on an in-depth analysis of the entire evaluation, be unambiguous and possible to act upon (divided into university, Bolivian government or agencies, and donors). The evaluation should provide specific recommendations for the design of a possible new phase of the research cooperation 2018-2023.

4. Delimitations

The evaluation is not to focus on specific research questions, nor to assess the development of specific research fields, even if those of course can be used as examples whenever considered necessary.

The focus is on the two universities UMSA and UMSS where Swedish support has been given since 2000. Still, the evaluators may consider it necessary to get an idea of how other universities have developed their research capacity. In that case the analysis must be of limited scope.

In parallel to this evaluation these is a review of the quality assurance systems of higher education and research at UMSA, UMSS and in Bolivia. An efficiency audit was performed on UMSA and UMSS in 2012, and the actions taken since then were

evaluated in 2015. Both UMSA and UMSS are currently in the process of auto evaluations, and there is a draft for a National Research Strategy.

These evaluations and this strategy shall be taken into consideration.

5. Approach and Method

The evaluation process is seen as a process of learning and improvement and thus participatory evaluation methods are perceived critical. This implies that representative samples of stakeholders (such as coordinators; management; supervisors; researchers; MSc and PhD students; other staff; the Management Team) should be consulted. The evaluators should describe the groups (gender disaggregated data) that have been consulted and why they were selected. Organisations that should be included are: UMSA, UMSS, VCyT, Comité Ejecutivo de la Universidad Boliviana (CEUB), Swedish Embassy in La Paz, and Sida.

The evaluators shall propose an evaluation methodology, including particular evaluation techniques in the proposal, and elaborate them further in an inception report. The inception report should include a specified time and work plan with delivery dates for the reports, field visits and dissemination activities. The inception report will form the basis for the continued evaluation process and methods to be used.

The methodology to be used must be identified and elaborated by the evaluators, but will include

- Document review and analysis
- Semi-structured interviews using interview instruments, with individuals and groups
- Surveys
- Field visits
- Ensure that stakeholders are given the opportunity to comment on findings, conclusions, recommendations and lessons learned.

The evaluation must be conducted in a professional and ethical manner. The evaluation process must show sensitivity to gender, beliefs, manners and customs of all stakeholders and is undertaken with integrity and honesty. The rights and welfare of participants in the evaluation must be protected.

Anonymity and confidentiality of individual informants shall be protected when requested and/or as required by law.

The methodology used shall be described and annexed to the final report. All conclusions should be supported by data, and if not, it should be stated that the conclusions are based on the opinions of the authors.

6. Evaluation Quality

All Sida's evaluations shall conform to OECD/DAC's Quality Standards for Development Evaluation[104]. The evaluators shall use the Sida OECD/DAC Glossary of Key Terms in Evaluation[105].

The evaluators shall specify how quality assurance will be handled by them during the evaluation process.

A reference group will be attached to this evaluation to review draft reports and provide comments for improvement. The reference group will consist of research advisors working in Sida/Sweden-funded research cooperation.

7. Time Schedule, Reporting and Communication

The assignment shall commence no later than December 5th 2016 and be completed no later than May 30th 2017. The prolonged time is due to the long vacation period in Bolivia at Christmas and Carnaval, which means that the first field visit in Bolivia (La Paz and Cochabamba) can only be taken late February. An Inception Report outlining the methodology and a detailed time schedule shall be presented to Sida within three weeks after signing the contract. A meeting with Sida will take place to further discuss in detail the objective and methods of the evaluation. Close contact with Sida will take place all along the assignment.

At the end of the field visits a debriefing meeting shall be held at the Swedish Embassy in La Paz with video link to Sida. A draft of the final report shall be shared with the three partner institutions for their comments and submitted to Sida no later than April 15th 2017 followed by a revised and final version two weeks upon receiving Sida's comments. A final presentation of the results and recommendations is suggested to take place in Bolivia.

[104] DAC Quality Standards for development Evaluation, OECD 2010
[105] Glossary of Key Terms in Evaluation and Results Based Management, Sida in cooperation with OECD/DAC, 2014

A proposed methodology (which may be refined in the inception phase), an overall time and work plan is requested as part of the consultancy proposal, including essential delivery dates for the reports, field visits, and dissemination activities. A more specified time and work plan shall be included in the inception report and approved by Sida.

- The draft and final reports shall be written in English and Spanish, not exceeding 50 pages (excluding appendices). The final report shall be professionally proof read and presented in a way that enables publication without further editing. The reports are to be submitted in electronic format.
- The report shall include an executive summary which shall provide an overview of the report highlighting the main conclusions and recommendations.
- The report shall answer all the issues addressed in the Terms of Reference. If this is not possible, reasons and explanations shall be provided.
- The evaluators shall, upon approval of the final report, insert the report into the Sida template for decentralised evaluations and submit it to Sida's consultant responsible for Sida's graphic profile (currently Sitrus), for publication and release in the Sida publication data base.

8. Resources

The budget cannot exceed 1 400 000 SEK.

9. Evaluation Team Qualification

The team must include a Team Leader. The team should include persons with:

- Broad knowledge of higher education, research and research management
- Knowledge of sustainable research capacity building in low- and low-middle income settings
- Thorough knowledge of how Sida supports research capacity building in the bilateral research cooperation programs, with emphasis on research supporting elements and building a research-enabling environment
- Knowledge of academic contexts and circumstances in low- and low-middle income settings
- One member of the team shall be based in the region and have experience from academic research
- One member shall have a PhD
- All team members must have a minimum of Masters' degree
- Good knowledge of Spanish

It is a merit if a member has conducted research in low-income settings, has performed an evaluation of bilateral Sida-funded research cooperation programs, has knowledge of Sida and its policies, strategies and methods for capacity building within research cooperation and postgraduate education, and has thorough understanding of laboratory-based research.

The evaluators must be independent of the evaluated activities and have no stake in the outcome of the evaluation.

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Note: In addition to the documents noted here concept notes, contracts, annual reports, self-evaluations, comments from Sida, project proposals, articles and miscellaneous project and programme related documents were also reviewed. Statistics used have all been supplied by UMSA, UMSS or the VMCyT as might be relevant. The VMCyT has provided progress reports for 2009-2016 as well as data on the use of the e-library. Additional documents provided listings of activities, as well as detailed lists of publications by individual researchers working at either UMSS or UMSA, as well as agreements with counterparts.

Annex 3: Interview respondents

Note: an asterisk is denoted to highlight individuals who participated in multiple group interviews/discussions owing to their multiple roles.

In Sweden

Individual and group Interviews by Category/Institution

Sida, University Staff and independent experts

1. Hannah, Akuffo, Sida, 31.01.17
2. Milton Rene Soto, Bolivian Ambassador to Sweden, 31.01.17
3. Nils Jensen, Stockholm University, 30.01.17
4. Teresa Soop, Sida, 31.01.17
5. Lena Trojer, Supervisor, Blekinge Institute of Technology (BTH), 13.02.17
6. Bo Mattiason, Supervisor, Lund University, 27.03.17
7. Björn Bergenståhl, Supervisor, Lund University, 27.03.17
8. Rajni Hatti-Kaul, Supervisor, Lund University, 27.03.17
9. Mark Howells, Supervisor, Royal Institute of Technology (KTH) , 27.03.17
10. Anders Malmquist, Supervisor, Royal Institute of Technology (KTH), 27.03.17
11. Yohannes Kiros, Superviso, Royal Institute of Technology (KTH), 27.03.17

Focus Group, Group Interview, PhD Candidates

University of Lund

1. Carla Fernández
2. Claudia Canedo
3. Daniel Osorio
4. Maribel Lozano
5. Paola Terrazas
6. Roxana Quiroga
7. Sander Perez, Vanesa Castro

Blekinge Institute of Technology (BTH)

1. Carlos Gonzalo Acevedo Peña, PhD Candidate, 13.02.17
2. Wendy Sofia Sanzetenea Ramirez, PhD Candidate, 15.03.17

Royal Institute of Technology (KTH)

1. Jenny Balderrama
2. Jerry Valdivia

In Bolivia

Individual and group interviews by category/institution

University Mayor of San Andress

1. Waldo Albarracin, Rector, 16.02.17

Administration, DIPGIS, UMSA, 13.02.17, 17.02.17

1. Angela Vargas Hinojosa, Information Systems Unit
2. Cristina Mejia Alarcón, Communication
3. Dionicia Lourdes Apaza Laura, Archive
4. Elizabeth Guzmán, Social Interaction
5. Ignacio Chirico*, DIPGIS General Coordinator in UMSA-ASDI program
6. Johnny Clavijo Santander, Systems Unit
7. Judith Susana Flores Hermosa, Accounting
8. Karina Apaza Coca, Innovation
9. Lola Calle Vega, IDH project
10. Marcus Salas Oliva, Accounting
11. Mónica Díaz Ortuno, IDH project
12. Paulo Marcelo Cabrera Vadivia, Accounting
13. Rosario Darma Choque Poma, Accounting
14. Roxana Vania Pillco Yanez, Archive
15. Sandra Quispe Quia, Archive

Research project coordinators-UMSA, 14.02.17

1. Alberto Giménez, Farmaco Biochemistry Research Institute - Faculty of Pharmaceutical Sciences and Biochemistry
2. Celeste Rodríguez, Department of Pathology - Faculty of Medicine, Nursing, Nutrition and Medical Technology
3. Eduardo González, Farmaco Biochemistry Research Institute - Faculty of Pharmaceutical Sciences and Biochemistry
4. Flavio Ghezzi, Physics Degree - Faculty of Pure and Natural Sciences
5. Giovanna Almanza*, Institute of Chemical Research - Degree in Chemical Sciences
6. Jorge Quintanilla Aguirre, Institute of Chemical Research - Degree in Chemical Sciences
7. Juan Antonio Alvarado, Institute of Chemical Research - Degree in Chemical Sciences
8. Mario Blanco Cazas, Institute of Geological and Environmental Research - Faculty of Geological Sciences
9. Ninoska Flores, Farmaco Biochemistry Research Institute - Faculty of Pharmaceutical Sciences and Biochemistry
10. Noemí Tirado Bustillos, Genetics Institute
11. Volga Iñiguez*, Institute of Molecular Biology and Biotechnology - Faculty of Pure and Natural Sciences
12. Waldo Yapu, Institute of Chemical Research - Career of Chemical Sciences

Research Coordinators, and Deans, UMSA 15.02.17 and 16.02.17 (different groups)

1. Alejandro Mayori, Faculty of Engineering (Vice-Dean)
2. Carla Crespo*, Farmaco Biochemistry Research Institute - Faculty of Pharmaceutical and Biochemical Sciences
3. Carlos Salinas, Instituto Boliviano de Biología de Altura (IBBA) - Faculty of Medicine, Nursing, Nutrition and Medical Technology
4. Carlos Santelices, Chemical Sciences Career - Faculty of Pure and Natural Sciences
5. Eddy Martinez, Institute of Research in Health and Development (IINSAD) - Faculty of Medicine, Nursing, Nutrition and Medical Technology
6. Francisco Callejas Huanca, Faculty of Geological Sciences (Vice-Dean)
7. Gonzálo Taboada López, Institute of Genetics - Faculty of Medicine, Nursing, Nutrition and Medical Technology
8. Iván Larico, General Coordinator of the Postgraduate - Faculty of Medicine, Nursing, Nutrition and Medical Technology
9. Maria del Pilar Navia Bueno, Faculty of Medicine, Nursing, Nutrition and Medical Technology
10. Mauricio Peñarrieta, Institute of Chemical Research - Faculty of Pure and Natural Sciences
11. Miguel Calla Carrasco, Faculty of Engineering (Dean)
12. Oswaldo Ramos*, Chemical Sciences Career - Faculty of Pure and Natural Sciences
13. Patricia Brieger, Center for Psychopedagogy and Research in Higher Education (CEPIES)
14. Tito Estevez Martini, Faculty of Pharmaceutical Sciences and Biochemistry (Dean)
15. Walter Pérez, Faculty of Pharmaceutical Sciences and Biochemistry (Vice-Dean)
16. Wendy Soria, Institute of Chemical Research - Institute of Molecular Biology and Biotechnology - Faculty of Pure and Natural Sciences
17. Xavier Salazar, Center for Psychopedagogy and Research in Higher Education (CEPIES)

Quality Assurance department, UMSA, 17.02.17

1. Jaime Tola, Responsible for the quality unit
2. Elizabeth Guzman, Responsible for the unit of social interaction

University Mayor of San Simon General, UMSS, 23.02.17

1. Juan Ríos del Prado, Rector UMSS

Administration DICyT, UMSS, 21.02.17

1. Julio Medina, Director DICyT
2. Jacqueline Maldonado, Director's assistant
3. Fernando Gutierrez García*, DCA
4. Ivan Fuentes*, DCA

5. Carlos López*, INFOCYT
6. Rodrigo Echeverría Herrera*, GETEC
7. Nando Zurita Mercado*, FORPRO
8. Ruth Antezana, Assitant
9. Xavier Grigoriu Rocha*, FORPRO
10. Ruth Pradel Serrano, Assitant
11. Alex Yañey Paz, UGB
12. Carlos Cuenca Santander, Administration
13. Ebert Caballero, Administration
14. Silvia Michel Salinas, Administration
15. Jorge Anonio Mayorga Lazcano, Administration
16. Lilian Aguilar Iglesias, Administration

Deans, and Directors, UMSS, 20.02.2017 and 21.02.17

1. Carlos Espinoza Aguilar, Medicine
2. Cesar Cabrera Román, DISU- Director
3. Hernán Flores García, DUEA- Director
4. Jannette Maldonado Murgica, Head of Department of Distance Education Graduate
5. Jhonny Limbert Ledezma Rivera, Director FACSO
6. Jorge Villazón Urquidi, Director Postgraduate Medicine
7. José Limberg Camacho Acosta, DUEA - Teacher and researcher
8. Juan Carlos Soto Pareja, Head of department training Graduate School UMSS
9. María del Rosario Aro Arispe, Academic Coordination EUPG
10. María Kathia Cladera Portugal, Dean FHCE
11. María del Rosario Aro Arispe, EUPG- Head of Unit
12. Omar Delgado Zeballos, Director Postgraduate Agronomy
13. Paul Pineda Gamorra, Director CLAS
14. René Gonzales, Director EUPG
15. René Gonzalez*, EUPG- Director
16. Ronald López, Graduate Director Rural Development
17. Richard Martinez Yucra, Director of Postgraduate Dentistry
18. Vicente A. Limachi, Postgraduate Humanities

Researchers and Coordinators, Sida Programme, UMSS, 17.02.17

1. Alfredo Durán Nuñez del Prado, Water Resources Coordinator
2. Carmen Ledo García, Coordinator, Habitat and human settlements
3. Cinthia Carola Rojas Arnez, Researcher-Instructor - faculty of science and technology
4. Daniel Illanes Velarde, Health Coordinator
5. Daysi Perez Rea, Researcher-Instructor - - faculty of science and technology
6. Eduardo Zambrana*, Innovation Coordinator
7. Eliana Maldonado Gutierrez, Researcher CTA
8. Jorge Quillaguamán Leytón, Bioprocess Coordinator
9. José Gino Aguirre Villaroel, Agronomy Coordinator
10. Jose Luis Balderrama Idina, Researcher-Instructor - - chemistry

11. Lucio Alejo Espinoza, Energy Coordinator
12. Omar Orlando Arce García*, Director of the Research Institute of the Faculty of Science and Technology
13. Rosmery Salazar Anaya, Social Sciences Coordinator

Former leadership from UMSS and DICyT, 23.02.17

1. Omar Orlando Arce, Ex-director of the DICyT and Head of the Department of Academic Coordination - DCA.
2. Eduardo Zambrana Montán, Ex- Director of DICyT
3. Virginia Vargas Vallejos, Ex- Head of Training and Promotion Department - FORPRO
4. Jennifer Cahill Mangudo, Ex- director of the EUPG / UMSS (2012 - 2016)
5. José Guillermo Bazoberry Chali, Ex- Director of DICyT (2012-2016)
6. Lucio Gonzalez, Ex - Rector UMSS (2011-2014)

Vice-Ministry of Science and Technology

1. Alex Pantoja Montán, Technical II in Information Resources in Science and Technology
2. Cecilia Molina Canedo, Professional V Scientific and Institutional Communication
3. Cindy Baez Orozco, Head of Science and Technology Unit
4. Erika Montes Menacho, Director General of Science and Technology
5. Faruk Dosserich Rodríguez*, Professional V in Science and Technology
6. Jenny Ofelia Carrasco Arredondo, Deputy Minister of Science and Technology
7. Mario Velasco Alcócer, Professional V in Science and Technology Information Sources
8. Mauricio Céspedes Quiroga, Specialist II in Science and Technology
9. Sandra Loayza Cala, Professional V in Science and Technology

Other Parties

Comité Ejecutivo de la Universidad Boliviana (CEUB), 14.02.17

1. Edgar Lima Torrez, National Secretary of Technology and Research
2. Lucio Eduardo Álvarez Paredes, National Secretary of Postgraduate and Continues education
3. Luis Ernesto Valdivia Baldomar, National Secretary of Evaluation and accreditation
4. Sandra Villafani Echazú, National Secretary of Institutional Development

Representatives from other Universities, 17.02.17

1. Alvaro Alvarez G., Director - Universidad Amazonica de Pando (UAP)
2. Alvaro Pedro Melgar Quevedo, Escuela Militar de Ingenieria (EMI)
3. Daniel Biggermann, Universidad Católica Boliviana (UCB)
4. Edgar Lima Torrez, Comité Ejecutico de la Universidad Boliviana (CEUB)
5. Juan C. Mercado de Heredio, Jefe de Posgrado - Universidad Policial (UNIPOL)
6. Marcela Rabaza V., Universidad Católica Boliviana (UCB)
7. Marcos Zenteno Santa Cruz, Escuela Militar de Ingenieria (EMI)

8. María Angélica Suárez, Universidad Autónoma Gabriel René Moreno (UAGRM)
9. Richard Mercado Gemio, Escuela Militar de Ingenieria (EMI)
10. Richard Robles Rodriguez, Escuela Militar de Ingenieria (EMI)
11. Robert Moreno Jaramillo, Director Escuela Postgrado -Universidad Autonoma Gabriel Rene Moreno (UAGRM)
12. Sandro Centellas, Diretor DICyT - Universidad Publica El Alto (UPEA)

Private companies

1. Jose Mauricio Peñarrieta Loria (SWEBOL) ***
2. Patricia Andrea Mollinedo Portugal (SWEBOL) ***
3. *** Both participants were researchers at UMSA and hence are listed twice

Independent experts

1. Hector Cordova, Pro-rector of Catholic University, 13.01.17
2. Marcelo Bascopé, Head of Centro de Investigaciones Químicas CIQ, 3.03.2017

Focus group by category/institution

Researchers-UMSA, 17.02.17

1. Alberto Jose Giménez Turba, Farmaco Biochemistry Research Institute - Faculty of Pharmaceutical Sciences and Biochemistry
2. Carla Crespo Melgar*, Farmaco Biochemistry Research Institute - Faculty of Pharmaceutical Sciences and Biochemistry
3. Cristhian Alvaro Carrasco Villanueva, Institute for Research and Development of Chemical Processes - Faculty of Engineering
4. Jose Mauricio Peñarrieta Loria*, Institute of Chemical Research - Career of Chemical Sciences
5. Leslie Tejada Pérez, Institute of Chemical Research - Career of Chemical Sciences
6. Luis López, Institute of Chemical Research - Career of Chemical Sciences
7. María Eugenia García Moreno, Institute of Chemical Research - Career of Chemical Sciences
8. María Teresa Alvarez Aliaga, Farmaco Biochemistry Research Institute - Faculty of Pharmaceutical Sciences and Biochemistry
9. Mauricio Rodolfo Ormachea Muñoz, Institute of Chemical Research - Career of Chemical Sciences
10. Patricia Andrea Mollinedo Portugal*, Institute of Chemical Research - Career of Chemical Sciences
11. Yonny Flores Segura, Institute of Chemical Research - Career of Chemical Sciences

PhD Candidates –UMSA, 14.02.17

1. Pamela Canaviri Paz, Institute of Chemical Research – Degree in Chemical Sciences
2. Claudia Teresa Canedo Rosso, Institute of Hydraulics and Hydrology - Career of Civil Engineering

3. Luis Alejandro Romero Soto, Institute for Research and Development of Chemical Processes - Faculty of Engineering
4. Daniel Martín Salas, Farmaco Biochemistry Research Institute - Faculty of Pharmaceutical Sciences and Biochemistry
5. Cesario Ajpi, Institute of Chemical Research - Degree in Chemical Sciences
6. Wendi Soria Sotillo, Institute of Chemical Research - Institute of Molecular Biology and Biotechnology - Faculty of Pure and Natural Sciences
7. Silvia Tatiana Zambrana Santander, Farmaco Biochemistry Research Institute - Biology - Faculty of Pharmaceutical Sciences and Biochemistry
8. Lidia Nina Quiroz, Institute of Geological and Environmental Research - Faculta de Ciencias Geologicas
9. Gustavo García, Institute of Chemical Research - Institute of Metallurgical and Materials Research
10. Ariana Zeballos, Institute of Chemical Research - Institute of Metallurgical and Materials Research
11. Atma-Sol Bustos Zenteno, Chemical Sciences Career
12. Israel Quino Lima, Chemical Sciences Career

Master Students –UMSA, 14.02.14

1. Ximena Padilla Lizarazu, Institute of Diagnostic Laboratories and Health Research (SELADIS)
2. Diandra Arévalo López, Farmaco Biochemistry Research Institute - Faculty of Pharmaceutical Sciences and Biochemistry
3. Freddy Chambi Chiri, Farmaco Biochemistry Research Institute - Faculty of Pharmaceutical Sciences and Biochemistry
4. Sonia Jimenez Pacohuanca, Institute of Molecular Biology and Biotechnology - Faculty of Pure and Natural Sciences
5. Juan Yujra Cárdenas, Farmaco Biochemistry Research Institute - Faculty of Pharmaceutical Sciences and Biochemistry
6. Naviana Leiva Quispe, Institute of Chemical Research - Career of Chemical Sciences
7. Vanessa Aliaga Condori, Institute of Chemical Research - Career of Chemical Sciences
8. Mery Laura Saniz, Institute of Chemical Research - Career of Chemical Sciences
9. Karen Palebral Velarde, Institute of Chemical Research - Career of Chemical Sciences
10. Max Vargas Mena, Institute of Chemical Research - Career of Chemical Sciences
11. Raúl Vidal Quispe Choque, Institute of Chemical Research - Career of Chemical Sciences**(1)
12. Virgina Veliz Apaza, Farmaco Biochemistry Research Institute - Faculty of Pharmaceutical Sciences and Biochemistry
13. Joaquín Soliz Gutiérrez, Farmaco Biochemistry Research Institute - Faculty of Pharmaceutical Sciences and Biochemistry
14. Elba Janeth Colque Zacarias, Farmaco Biochemistry Research Institute - Faculty of Pharmaceutical Sciences and Biochemistry

15. Patricia Suxo Tutila, Institute of Chemical Research - Career of Chemical Sciences
16. Teresa Maya Pacheco, Institute of Chemical Research - Career of Chemical Sciences
17. Angela San Martin Ortiz, Institute of Chemical Research - Career of Chemical Sciences
18. Marisel Mercedes Mamami Mamani, Farmaco Biochemistry Research Institute - Faculty of Pharmaceutical Sciences and Biochemistry
19. Mauricio Claure Zeballos, Institute of Chemical Research - Career of Chemical Sciences
20. Oscar Rollano Peñaloza, Institute of Research in Natural Products - Chemical Sciences Career, ** (2)
21. Orlando Mamami Calle, Farmaco Biochemistry Research Institute - Faculty of Pharmaceutical Sciences and Biochemistry
22. Adalid Alfaro Flores, Farmaco Biochemistry Research Institute - Faculty of Pharmaceutical Sciences and Biochemistry
23. Susana Huanca López, Chemical Sciences Degree
24. Marco Quino Huasco, Chemical Sciences Degree

** Participants of these focus groups were not part of the Masters programme (1) is a researcher and (2) is a PhD candidate.

Researchers-UMSS, 22.02.17

1. Alejandra Ramirez Soruco, CESU
2. Alvaro Mercado G., CASA-FCyT
3. Ana María Romero Jaldín, CASA-FCyT
4. Angel Galarza Barrón, FCAP-UMSS
5. Crecencio Alba Pinto, IESE-UMSS
6. Cristina Karen Ovando Crespo, CISTEL
7. Eduardo Córdova Eguivar, IIA
8. Ernesto Rojas Cabrera, IIBISMED
9. Galo Muñoz, LH UMSS
10. Henry Antezana F., CASA-FCyT
11. Ivan del Callejo Veracc, Centro de Agua
12. Marko Quiroga Berazaín, CEPLAG
13. Miguel Guzman Rivero, IIBISMED-CUMETROT

PhD Candidates-UMSS, 23.02.17

1. Benjamin Gossweiler Herrera, CLAS/ CEPLAG
2. Carla Fernández Espinoza, ULRA
3. Carlos Acevedo Peña, UTT-IIFCyT
4. Claudia Cossio Grageda, CASA/FCyT
5. Daniel Bernardo Aviles Ribera, CEPLAG
6. Daniel Eid Rodriguez, Medicine
7. Evelyn Villaneva Gutierrez, Fitotecnia
8. Fabricio Montaño Antezana, CEPLAG

9. Israel Rodrigo Rocha Romero, CTA/ Energy
10. Jerry Luis Salas Valdivia, CTA/ Energy
11. Jhonny Villaroel Schneider, CTA/ Energy
12. Karina Ustariz Olivera, CIF-Lokoleta
13. Luis Antonio Choque Camaero, CTA/Energy
14. Luis Fernando Perez Mercado, CASA/ CEPLAG
15. Mariel Nataly Perez Zabaleta, CBT
16. Mónica Alejandra Guevara Martínez, CBT
17. Paola Jimena Ledo Espinoza, CEPLAG
18. Vladimir Cossio Rojas, Centro de Agua
19. Wendy Sofia Sanzetenea Ramirez, UTT-IIFCyT
20. Yercin Mamani Ortiz, IIBISMED

Master students-UMSS, 23.02.17

1. Alades Valentin Oxa Geronimo, CEP
2. Alex Rudy Ojeda Copa, INCISO
3. Ana Esther Mamani Colque, IIFHCE
4. Arturo José Bandoin Salguero, FCAyP
5. Carla Daniela Agular Elias, CESU
6. Carmen Gandarilla Salazar, FCAyP
7. Carola Zenteno Saavedra, INIAM
8. Cintia Patricia Angola García, CTA
9. Efrain Gómez Lara, INCISO
10. Fabiola Patricia Gonzales Coro, CAPN
11. Fernando Aguilar Saravia, IIJP
12. Gaid Navia Lara, CASA
13. Gualberto Rodriguez Gandarillas, INCISO
14. Ida Alejandra Peñaranda, CESU
15. Jeanett Daga Quisbert, Tecnología
16. Jhim Terrazas Salvatierra, CEPLAG
17. José Israel Flores Vargas, Centro de Agua
18. Karen Ustariz Z., CASA
19. Lily Marcela Suarez Lagraba, IESE
20. Lluvithza Yadranka Carvajal Aubraucic, IIJP
21. Luis Alejandro Jaimes Prado, Centro de Agua
22. Marcela Maldonado Rocha, PRATIC
23. Marcelo Marcial Felipe Lima, Centro de Agua
24. María del Rosario Ponce Guzman, LH-UMSS
25. María Reneé Nogales Z., CESU
26. Martinez Caliva Virgilia Efraín, LH-UMSS
27. Mauricio Alexey Pozo Rojas, CED
28. Maya René Choque Aguilar, CASA
29. Mery Doga Quisbert, Bioprocesos
30. Nancy Ortiz Veizan, Bioprocesos
31. Paola Daniela Castro Molina, INIAM

32. Redner Céspedes Quiroz, IIFHCE
33. Rodrigo Alvaro Quispe Condori, IESE
34. Sulmayra Zarate Guzman, LH-UMSS
35.

Annex 4: Interview protocols and summary data sheets

Interview protocol for Bolivian University Management and Staff Managing Projects Receiving Funding

General information:
Name of respondent(s):
Title of respondent(s):
Institution:
Contact details (including email, phone):
Location of interview:
Date of Interview:
Name of team member(s) who conducted the interview:
Name of team member chiefly responsible for the transcript:
Note: Since this protocol includes current and former staff it will be important to adapt the question to the appropriate time period, where relevant.

Questions:

Impact	
EQ1: How has the research environment in your group changed since 2007? Has this primarily happened due to the Swedish cooperation?	
Have efforts to engage the wider society (industry, etc) been made? If yes, please detail. If no, why not?	Answer section
Have efforts been made to engage with other Bolivian Universities? If yes, please detail. If no, why not?	
Have efforts to engage other parts of the university (not involved directly with the project) been made? If yes, please detail. If no, why not?	
Are there any key changes in your field that have taken place since 2007? If yes, what do you think has been the reason for these?	
Are there any issues (changes or not) that can be attributed to Swedish funding? If yes, how/why do you attribute it to Swedish funding. If no, why has Swedish funding not been able to support any changes?	
EQ 2: How has the role of research changed at UMSA, UMSS and in Bolivia since 2007?	
How would you describe the role of research within your institution today? How would you have described the role of research in within your institution before the	

project started in 2007?	
What do you think are the main factors that determined the role of research back in 2007? Are these factors the same today? If yes, why has nothing changed? If No, what are the main factors that have contributed to the change you speak of.	
Has the Sida project in any way influenced the role of research in your institution? If yes how? If yes, has this influence extended to departments that are not directly funded.	
Is the role of research the same within departments funded by Sida as departments that do not have funding from Sida? Please explain.	
Do you think the role of research at your institution is similar to what is experienced at other universities in Bolivia?	
Do you think that the political climate in any way affects the role of research in Bolivia? If yes, how?	
What do you think could be done to further increase the role of research within your university?	
EQ 3: How has the role of research changed at UMSA, UMSS and in Bolivia?	
Have there been changes that have occurred in the role of research that are not tied to the date of the project start? Please describe any change issue not covered by previous questions?	
EQ 4: In which way has the research programme (people, systems and/or results) had an impact on policy development, collaboration with ministries, industry and civil society?	
Do you have any concrete evidence that the research conducted has had any impact on policy development? If yes explain. If no, why not? What is needed in order for such an impact to materialize?	
Do you have any concrete evidence that the research conducted has had any impact on collaboration with ministries? If yes explain. What is needed in order for such an impact to materialize?	
Do you have any concrete evidence that the research conducted has had any impact on collaboration with industry? If yes explain. What is needed in order for such an impact to materialize?	
Do you have any concrete evidence that the research conducted has had any impact on collaboration with civil society? If yes explain. What is needed in order for such an impact to materialize?	
EQ 5: How has the programme contributed to enhanced innovative processes and innovative thinking within the universities and among stakeholders?	
Has the programme contributed to enhanced innovative	

processes and innovative thinking within this university? If yes how? If no, what do you think would facilitate this type of impact?	
Has the programme contributed to enhanced innovative processes and innovative thinking within other stakeholders or at other universities? If yes how? If no, what do you think would facilitate this type of impact?	
EQ 6: Is there any effort by the universities to promote the use of research in society with respect to communication of research and research results, extension services, dialogue with stakeholders, protection of national knowledge production through patents, intellectual property rights etc.	
Are there any effort currently undertaken by this university to promote the use of research in society? For example through the communication of research and research results, extension services, dialogue with stakeholders, protection of national knowledge production through patents, intellectual property rights etc.? If yes, what are these efforts? If no, Why not?	
Are any of these efforts limited to any one department or university wide. If only individual departments, why?	
Are departments which do not receive direct funding from Sweden involved in this type of initiative? If yes, is this a result of the influence of the Swedish funded project? Can these initiatives be tied to Swedish funding in any way?	
EQ 7: Describe the role and impact of the research funds at the universities on research capacity.	
What efforts have been made to increase research capacity as part of this programme?	
What efforts have been made to increase research capacity at the university overall?	
Has this programme had any impact on broader research capacity investment at the University?	
EQ 8: To what extent has the purchase of research infrastructure, including research equipment of initial value above 10 000 USD, contributed to the research environment and how much is it currently being used.	
How important has the purchase of research equipment been to the research environment?	
How much (how often, and by whom, and hoe is access allocated/determined) is the equipment being used? Would it be possible to use it more? If yes, why is it not used at full capacity?	
Would the research environment have evolved differently had the investment not been made? If yes, how?	
EQ 9: How has the access to e-publications and the activities coordinated by the VCyT contributed to improved research capacity and environment?	

Do you have access to e-publications and other activities coordinated by the VCyT? If no, why not?	
If you have access, has this access improved, in any way the research capacity at your university? If yes, how. If no, why not?	
If you do not have access, what mechanism could be put in place to ensure that your university has access in future.	
EQ 10: Has the number of publications increased in indexed international and national scientific journals respectively?	
Are there any requirements for publication numbers/rates?	
What type of incentives do you have to support publications?	
Is there a system to support access to international and or national journals?	
Sustainability	
EQ 11: Has the number of active researchers with a PhD increased at UMSA and UMSS? How many PhDs and MScs have been formed within the programme? How are they using, and have they been using, their training today? (gender disaggregated, and limited to the universities' knowledge)	
How many PhD and active researchers have been at your university annually since the start of the project (data should be supported by documentation)? Answer to be substantiated by data.	
How many PhD students have received their degree as part of the programme? Answer to be substantiated by data.	
How have these PhD students and researchers been recruited? Have there been any efforts to target women, minorities (ethnic, disability etc)? Answer to be substantiated by data.	
How long has it taken for PhD students to complete their degrees? What requirements does the university impose? What challenges to completion have been met? Answer to be substantiated by data.	
Are PhD graduates employed at the university at this time? Answer to be substantiated by data.	
What are the main activities conducted by PhD students after they graduate? Where do they live (do they return to Bolivia)? Answer to be substantiated by data.	
EQ 12: What are the challenges in retaining the researchers after training? Are there any specific efforts made by the country and the universities to retain researchers?	
What employment opportunities do Bolivian PhD graduates have? (In Bolivia and elsewhere)	

Is it difficult to keep PhD Graduates as staff? if yes why?	
What efforts does the University engage in to make a position at the university seem attractive?	
EQ 13: What are the incentives to carry out research? What are the career opportunities for researchers at the universities and in Bolivia?	
Are there any incentives to working at the University in Bolivia? Compared to other sector? If yes what are they. If no, why not and how can this be changed?	
How do the incentives (if any) at this university compare to those at other universities in Bolivia?	
EQ 14: What are the main bottlenecks for the improvement of research capacity at the universities and in Bolivia, and to sustain the achieved research capacity? How can those bottlenecks be approached?	
How can research capacity at this university be improved?	
What are the main challenges to increasing research capacity? How can these be overcome?	
Are there differences between different departments at this university? If yes, what are the differences and why are there differences?	
EQ 15: Are there systems in place at the universities and in the country to sustain the achieved results?	
What systems are in place at this university to sustain results achieved? If yes, what are these systems (please describe). If no, why not?	
Are the systems (or lack thereof) at this university any different from what is experienced at other universities? If yes, what are those differences?	
Are there any mechanism at the country level to ensure the sustainability of results?	
EQ 16: Is there a system in place to assure the long term use of expensive research equipment?	
Is there a system in place to govern the use of research equipment? If yes, what is this system? How does the system ensure the equipment is used to its maximum capacity, adequately maintain and available to all those who need it without prejudice?	
If a system is in place, is the system itself sustainable? If there is no system, will a system that is sustainable be put in place? (when, by whom?)	
EQ 17: Assess the sustainability of research and research training at the universities after the Swedish programme ends. What is the current planning for sustainability?	
What will happen to the current research programme when Swedish funding ends?	
Are there current plans to overcome/ replace/	

compensate for the end of Swedish funding?	
Will the impact of the end of funding affect specific departments? The university as a whole?	
EQ 18: What strategies are in place to transfer knowledge/research results of relevance to the stakeholders?	
Are there any efforts in place to transfer current knowledge or results from work undertaken to other stakeholders? If yes, what are these efforts? If no, why not?	
What stakeholders are mainly focused on?	
Are there any differences in the way that the programs funded by Sweden operate vs those which do not receive funding?	
Does this university operate differently than other universities in Bolivia on issues of how to transfer knowledge to relevant stakeholders? If so how?	
EQ 19: How could the improved capacity achieved at the universities UMSA and UMSS be transferred to other public universities in Bolivia?	
Is this university involved in any efforts to transfer their knowledge (improved capacity) to other public universities in Bolivia? If yes, what efforts are being made. If no, why not?	
If efforts are being made, are these university wide or just programme wide?	
EQ 20: Imagining a phase out after 2022; which aspects would be necessary to focus on in the next five years?	
Are there any issues which need to be at the centre of a phase out strategy?	
What should be the areas of focus for this university in the next 5 years? Why? Will this focus in any way affect the post program sustainability?	
Relevance	
EQ 21: Describe how the research projects (for PhD and MSc students and as part of the research fund) in the programmes have been identified and selected.	
Does the university have a detailed procedure of how research projects are selected within the programme? If yes, describe (please support with relevant written documents)	
Is the selection process different between departments? If yes, why?	
EQ 23: Are the three programmes (UMSA, UMSS and VCyT) consistent with the needs and priorities of the universities?	
What are the factors the determine programme priorities?	
Are the current programmes aligned with this universities priorities? If yes, how so? If no, why not? If no, what could make them aligned with this	

university priorities?	
Cross Cutting issues	
EQ 24: Please describe how gender has been integrated in the programme.	
Has gender been integrated into the programme? If yes, how?	
Is the way gender has been or not integrated into this programme differ in any way from how gender is integrated into other programmes?	
EQ 25: Please describe how environmental aspects have been integrated in the programme.	
Have environmental aspects been integrated into the programme? If yes, how?	
Is the way environmental aspects been or not integrated into this programme differ in any way from how gender is integrated into other programmes?	
EQ 26: Please describe how a human rights perspective has been integrated in the programme.	
Have human right aspects been integrated into the programme? If yes, how?	
Is the way human rights aspects been or not integrated into this programme differ in any way from how gender is integrated into other programmes?	
Are there any measures taken to ensure the equitable access of resources associated with this programme by all (ethnicity, disability, gender, etc)	

Interview protocol for VCyT Management

General information:
Name of respondent(s):
Title of respondent(s):
Institution:
Contact details (including email, phone):
Location of interview:
Date of Interview:
Name of team member(s) who conducted the interview:
Name of team member chiefly responsible for the transcript:

Questions:

Impact	
EQ1: How has the research environment in your group changed since 2007? Has this primarily happened due to the Swedish cooperation?	
Are you aware of any changes in the research environment since 2007? If yes, what have these changes been?	Answer section
If yes, have any of the ministry's efforts in any way affected these changes? If yes, how?	
EQ 2: How has the role of research changed at UMSA, UMSS and in Bolivia since 2007?	
How would you describe the roles of UMSA and UMSS respectively as regards research in Bolivia?	
Has their respective roles changes in any way since 2007?	
EQ 4: In which way has the research programme (people, systems and/or results) had an impact on policy development, collaboration with ministries, industry and civil society?	
Do you have any concrete evidence that the research conducted by UMSA or UMSS has had any impact on policy development? If yes explain. If no, why not? What is needed in order for such an impact to materialize?	
Do you have any concrete evidence that the research conducted by UMSA or UMSS has had any impact on collaboration with ministries? If yes explain. What is needed in order for such an impact to materialize?	
Do you have any concrete evidence that the research conducted has had any impact on collaboration with industry? If yes explain. What is needed in order for such an impact to materialize?	
Do you have any concrete evidence that the research conducted by UMSA or UMSS has had any impact on collaboration with civil society? If yes explain. What is needed in order for such an impact to materialize?	
EQ 5: How has the programme contributed to enhanced innovative processes	

and innovative thinking within the universities and among stakeholders?	
Do you think Swedish funding has contributed to enhanced innovative processes and innovative thinking within the two universities university? At other universities or institutions? At the ministry? Elsewhere? If yes how? If no, what do you think would facilitate this type of impact?	
EQ 6: Is there any effort by the universities to promote the use of research in society with respect to communication of research and research results, extension services, dialogue with stakeholders, protection of national knowledge production through patents, intellectual property rights etc.	
Do youn see any evidence that the funded universities promote the use of their research by wider audiences? If yes how? If no, what could be done to facilitate this? Could the ministry play any role? If yes, what would this role be?	
EQ 7: Describe the role and impact of the research funds at the universities on research capacity.	
From the ministries perspective what has been the role and impact of research funds provided to the universities in question?	
EQ 9: How has the access to e-publications and the activities coordinated by the VCyT contributed to improved research capacity and environment?	
How does the VCyT disseminate its e-publications?	
Do the UMSS and UMSA have access to your e-publications? If yes, do you know if they use them? If no, why not?	
Who has access to your e-publications?	
EQ 10: Has the number of publications increased in indexed international and national scientific journals respectively?	
Does the ministry in any way incentivise publishing? If so how. If no why not?	
Sustainability	
EQ 12: What are the challenges in retaining the researchers after training? Are there any specific efforts made by the country and the universities to retain researchers?	
What employment opportunities do Bolivian PhD graduates have? (In Bolivia and elsewhere)	
Is it difficult to keep PhD Graduates in the country? if yes why?	
EQ 13: What are the incentives to carry out research? What are the career opportunities for researchers at the universities and in Bolivia?	
Are there any incentives to working at the University in Bolivia? Compared to other sector? If yes what are they. If no, why not and how can this be changed?	
Are there any incentives to working at the Ministry in	

Bolivia? Compared to other sector? If yes what are they. If no, why not and how can this be changed?	
EQ 14: What are the main bottlenecks for the improvement of research capacity at the universities and in Bolivia, and to sustain the achieved research capacity? How can those bottlenecks be approached?	
How can research capacity at in Bolivia been improved through this programme?	
What are the main challenges to increasing research capacity? How can these be overcome?	
Are there differences between different field of study? If yes, what are these differences?	
EQ 15: Are there systems in place at the universities and in the country to sustain the achieved results?	
Are there any mechanism at the country level to ensure the sustainability of the results of this programme?	
EQ 17: Assess the sustainability of research and research training at the universities after the Swedish programme ends. What is the current planning for sustainability?	
What will happen to the ministry's funded initiatives Swedish funding ends?	
Are there current plans to overcome/ replace/ compensate for the end of Swedish funding?	
EQ 19: How could the improved capacity achieved at the universities UMSA and UMSS be transferred to other public universities in Bolivia?	
Is the ministry involved in any efforts to support the transfer knowledge gained by the universities in the programme funded (improved capacity) to other public universities in Bolivia? If yes, what efforts are being made. If no, why not?	
EQ 20: Imagining a phase out after 2022; which aspects would be necessary to focus on in the next five years?	
Are there any issues which need to be at the centre of a phase out strategy? How will the ministry sustain its current products and outputs?	
What should be the areas of focus for the ministry in the next 5 years? Why? Will this focus in any way affect the post program sustainability?	
Relevance	
EQ 22: Describe how the VCyT programme has been developed.	
How has the VCyT programme been developed? What have been its main tenets? And how does it link to other educational, research and development efforts in the country?	
EQ 23: Are the three programmes (UMSA, UMSS and VCyT) consistent with the needs and priorities of the universities?	
What are the factors the determine VCyT programme priorities?	

Are the current programmes aligned with the broader ministerial priorities? If yes, how so? If no, why not? If no, what could make them aligned?	
Cross Cutting issues	
EQ 24: Please describe how gender has been integrated in the programme.	
Has gender been integrated into the programme? If yes, how?	
Is the way gender has been or not integrated into this programme differ in any way from how gender is integrated into other programmes conducted by the ministry?	
EQ 25: Please describe how environmental aspects have been integrated in the programme.	
Have environmental aspects been integrated into the programme? If yes, how?	
Is the way environmental aspects been or not integrated into this programme differ in any way from how environmental aspects are integrated into other programmes conducted by the ministry?	
EQ 26: Please describe how a human rights perspective has been integrated in the programme.	
Have human right aspects been integrated into the programme? If yes, how?	
Is the way human rights aspects been or not integrated into this programme differ in any way from how human rights integrated into other programmes by the ministry?	

Interview protocol for Bolivian University Management at Universities that Did not Receive Funding

General information:
Name of respondent(s):
Title of respondent(s):
Institution:
Contact details (including email, phone):
Location of interview:
Date of Interview:
Name of team member(s) who conducted the interview:
Name of team member chiefly responsible for the transcript:

Questions:

Impact	
EQ1: How has the research environment in your group changed since 2007? Has this primarily happened due to the Swedish cooperation?	
Does your university make efforts to engage the wider society (industry, etc)? If yes, please detail. If no, why not?	Answer section
Does your university make efforts to engage with other Bolivian Universities? If yes, please detail. If no, why not?	
Have there been any notable changes to the research environment in your university in recent years, and particularly since 2007?	
Have there been any notable changes to the research environment In Bolivia in recent years, and particularly since 2007?	
EQ 2: How has the role of research changed at UMSA, UMSS and in Bolivia since 2007?	
How would you describe the role of research within your institution today?	
What are the main factors that determine the role of research at your institution? Have these factors changed in recent years? If yes, why.	
EQ 3: How has the role of research changed at UMSA, UMSS and in Bolivia?	
What is the role played by UMSA, and UMSS in the Bolivian research environment?	
Has the role of UMSA and UMSS changed in recent years? If yes, to what do you attribute this change?	
EQ 4: In which way has the research programme (people, systems and/or results) had an impact on policy development, collaboration with ministries, industry and civil society?	
Does research conducted by your university have an impact on policy development? Does the research conducted by UMSA and UMSS have an influence on policy Development?	

Does research conducted by your university have an impact on collaborations with ministries? Does the research conducted by UMSA and UMSS have an influence on collaborations with ministries?	
Does research conducted by your university have an impact on collaborations with industry? Does the research conducted by UMSA and UMSS have an influence on collaborations with industry?	
Does research conducted by your university have an impact on collaborations with civil society? Does the research conducted by UMSA and UMSS have an influence on collaborations with civil society?	
EQ 5: How has the programme contributed to enhanced innovative processes and innovative thinking within the universities and among stakeholders?	
Do you see any evidence that your university is a leader in innovative thinking in the Bolivian environment? If yes how so. If no why not?	
Do you see any evidence that either UMSA or UMSS are leaders in innovative thinking in the Bolivian environment? If yes how so. If no why not?	
EQ 6: Is there any effort by the universities to promote the use of research in society with respect to communication of research and research results, extension services, dialogue with stakeholders, protection of national knowledge production through patents, intellectual property rights etc.	
Are there any effort currently undertaken by this university to promote the use of research in society?	
Do you see any evidence that UMSA or UMSS are promoting the use of their research in society?	
EQ 7: Describe the role and impact of the research funds at the universities on research capacity.	
Do you see any evidence that UMSA and UMSS have increased their research capacity? If yes, has this increase had any impact on your university? If yes, how. If no, why not?	
EQ 8: To what extent has the purchase of research infrastructure, including research equipment of initial value above 10 000 USD, contributed to the research environment and how much is it currently being used.	
Does your university have research equipment? (tie to the type of equipment held at UMSS and UMSA) If yes, how did it purchase it/who funded it? If yes, how has this changed the research enviroment if at all?	
EQ 9: How has the access to e-publications and the activities coordinated by the VCyT contributed to improved research capacity and environment?	
Do you have access to e-publications and other activities coordinated by the VCyT? If no, why not?	
If you have access, has this access improved, in any way the research capacity at your university? If yes, how. If no, why not?	

If you do not have access, what mechanism could be put in place to ensure that your university has access in future.	
EQ 10: Has the number of publications increased in indexed international and national scientific journals respectively?	
Are there any requirements for publication numbers/rates for your staff?	
What type of incentives do you have to support publications?	
Is there a system to support access to international and or national journals?	
Sustainability	
EQ 11: Has the number of active researchers with a PhD increased at UMSA and UMSS? How many PhDs and MScs have been formed within the programme? How are they using, and have they been using, their training today? (gender disaggregated, and limited to the universities' knowledge)	
Amongst your teaching and research staff, which proportion have PhD? Do you hope to increase this number/proportion? If yes, how do you plan to do this (provide details).	
Do you hire PhD graduates from UMSA and UMSS? If yes, why? How do you choose them and what incentives do you provide them with?	
EQ 12: What are the challenges in retaining the researchers after training? Are there any specific efforts made by the country and the universities to retain researchers?	
What employment opportunities do Bolivian PhD graduates have? (In Bolivia and elsewhere)	
Is it difficult to hire PhD Graduates as staff ? if yes why?	
What efforts does the University engage in to make a position at the university seem attractive?	
EQ 13: What are the incentives to carry out research? What are the career opportunities for researchers at the universities and in Bolivia?	
Are there any incentives to working at your University in Bolivia? Compared to other sector? If yes what are they. If no, why not and how can this be changed?	
How do the incentives (if any) at this university compare to those at other universities in Bolivia?	
EQ 14: What are the main bottlenecks for the improvement of research capacity at the universities and in Bolivia, and to sustain the achieved research capacity? How can those bottlenecks be approached?	
What are the main challenges to increasing research capacity? How can these be overcome?	
Are there differences between different departments at this university? If yes, what are the differences and why are there differences?	

EQ 18: What strategies are in place to transfer knowledge/research results of relevance to the stakeholders?	
Has UMSA or UMSS worked with you in any capacity to share or transfer their research knowledge? If yes, please explain.	
Relevance	
Cross Cutting issues	
EQ 24: Please describe how gender has been integrated in the programme.	
How are issues of gender, environment and human rights, if at all, dealt with by your university? Hiring processes? Selection of research tasks etc?	

Interview protocol for Supervisors in Bolivia and Sweden (Cater as may be appropriate)

General information:
Name of respondent(s):
Title of respondent(s):
Institution:
Contact details (including email, phone):
Location of interview:
Date of Interview:
Name of team member(s) who conducted the interview:
Name of team member chiefly responsible for the transcript:

Questions:

Impact	
EQ1: How has the research environment in your group changed since 2007? Has this primarily happened due to the Swedish cooperation?	
Have efforts to engage the wider society (industry, etc) in Bolivia been made in your field of work and/or through the work of your students? If yes, please detail. If no, why not?	Answer section
EQ 2: How has the role of research changed at UMSA, UMSS and in Bolivia since 2007?	
Bolivia only: How would you describe the role of research within your institution today? How would you have described the role of research in within your institution before the project started in 2007?	
Bolivia only: What do you think are the main factors that determined the role of research back in 2007? Are these factors the same today? If yes, why has nothing changed? If No, what are the main factors that have contributed to the change you speak of.	
Bolivia only: Has the Sida project in any way influenced the role of research in your institution? If yes how? If yes, has this influence extended to departments that are not directly funded.	
Bolivia only: Do you think the role of research at your institution is similar to what is experienced at other universities in Bolivia?	
Bolivia only: Do you think that the political climate in any way affects the role of research in Bolivia? If yes, how?	
Bolivia only: What do you think could be done to further increase the role of research within your university?	
EQ 4: In which way has the research programme (people, systems and/or results) had an impact on policy development, collaboration with ministries, industry and civil society?	
Do you have any concrete evidence that research you	

have supervised has had any impact on policy development? If yes explain. If no, why not? What is needed in order for such an impact to materialize?	
Do you have any concrete evidence that research you have supervised has had any impact on collaboration with ministries? If yes explain. What is needed in order for such an impact to materialize?	
Do you have any concrete evidence that research you have supervised has had any impact on collaboration with industry? If yes explain. What is needed in order for such an impact to materialize?	
Do you have any concrete evidence that the research you have supervised had any impact on collaboration with civil society? If yes explain. What is needed in order for such an impact to materialize?	
EQ 5: How has the programme contributed to enhanced innovative processes and innovative thinking within the universities and among stakeholders?	
Bolivia only: Do you feel that the work by your student has contributed to enhanced innovative processes and innovative thinking within this university? If yes how? If no, what do you think would facilitate this type of impact?	
Do you feel that the work by your student has contributed to enhanced innovative processes and innovative thinking with the stakeholders in Bolivia, or elsehwere? If yes how? If no, what do you think would facilitate this type of impact?	
EQ 6: Is there any effort by the universities to promote the use of research in society with respect to communication of research and research results, extension services, dialogue with stakeholders, protection of national knowledge production through patents, intellectual property rights etc.	
Has the work of your student been promoted by the University in any way? Has the work been promoted by any other actors? If yes who/how?	
EQ 7: Describe the role and impact of the research funds at the universities on research capacity.	
How has university funding impacted the work of your student? (timing, resources, etc)	
EQ 8: To what extent has the purchase of research infrastructure, including research equipment of initial value above 10 000 USD, contributed to the research environment and how much is it currently being used.	
Has your student made use of the research equipment purchased through this programme? If yes, how did/he/she secure access? If no, why not?	
EQ 9: How has the access to e-publications and the activities coordinated by the VCyT contributed to improved research capacity and environment?	
Has your student made use of VCyT e-publications? If	

yes, how so? How valuable have they been? If no, why not?	
EQ 10: Has the number of publications increased in indexed international and national scientific journals respectively?	
Has your student published any of his/her work? If yes, where (type of publication)?	
Did your student have any incentives to publish his/her work? If yes, what were these?	
Sustainability	
EQ 11: Has the number of active researchers with a PhD increased at UMSA and UMSS? How many PhDs and MScs have been formed within the programme? How are they using, and have they been using, their training today? (gender disaggregated, and limited to the universities' knowledge)	
How many PhD students have you supervised since 2007? How many males/females/minority groups	
How long did it take each student to complete their thesis? (if the number of students is large, what was the average time) What factors contributed to the length of time it took to complete their degree?	
How many of your students have gone back/remained in Bolivia? How many have stayed or moved to Sweden?	
How many of your students have remained in Academia?	
In your opinion what are the principal incentives/disincentives to working in Bolivia? In Bolivian academic institutions?	
EQ 12: What are the challenges in retaining the researchers after training? Are there any specific efforts made by the country and the universities to retain researchers?	
What employment opportunities have your students have had?	
Did any of your students have secured employment before finishing their PhD?	
What employment challenges have your students faced?	
EQ 13: What are the incentives to carry out research? What are the career opportunities for researchers at the universities and in Bolivia?	
Has your student had any incentives to conduct his/her PhD research?	
For Swedish supervisors: compared to students coming from other countries, have the incentives given to Bolivian students been similar? Yes, no, how have they differed?	
EQ 14: What are the main bottlenecks for the improvement of research capacity at the universities and in Bolivia, and to sustain the achieved research capacity? How can those bottlenecks be approached?	
In your opinion how can research capacity be improved in Bolivia?	

EQ 15: Are there systems in place at the universities and in the country to sustain the achieved results?	
Bolivia only: How are the results of the work undertake by your student maintained/used after the completion of his her degree?	
Swedish only: Have you seen any evidence that the research conducted by your student is being sought after within Bolivia? If yes, by whom? Has the university in Bolivia been supportive of this?	
Relevance	
EQ 21: Describe how the research projects (for PhD and MSc students and as part of the research fund) in the programmes have been identified and selected.	
How were your students selected? (details, please)	
How were you selected as a supervisor? (details, please)	
Cross Cutting issues	
EQ 24: Please describe how gender has been integrated in the programme.	
Has the selection process to identify students and research topics paid any attention to gender issues?	
EQ 25: Please describe how environmental aspects have been integrated in the programme.	
Has the selection process to identify research topics paid any attention to environmental aspects issues?	
EQ 26: Please describe how a human rights perspective has been integrated in the programme.	
Has the selection process to identify students and research topics paid any attention to human rights issues?	

Interview protocol for PhD Students and Researchers (cater where appropriate)

General information:
Name of respondent(s):
Title of respondent(s):
Institution:
Contact details (including email, phone):
Location of interview:
Date of Interview:
Name of team member(s) who conducted the interview:
Name of team member chiefly responsible for the transcript:

Questions:

Impact	
EQ1: How has the research environment in your group changed since 2007? Has this primarily happened due to the Swedish cooperation?	
Have efforts to engage the wider society (industry, etc) in Bolivia been made in your field of work and/or through your research work? If yes, please detail. If no, why not?	Answer section
EQ 2: How has the role of research changed at UMSA, UMSS and in Bolivia since 2007?	
How would you describe the role of research within your university in Bolivia today?	
What do you think are the main factors that currently determine the role of research (did at the time of your degree and since)?	
EQ 4: In which way has the research programme (people, systems and/or results) had an impact on policy development, collaboration with ministries, industry and civil society?	
Do you have any concrete evidence that your research has had any impact on policy development? If yes explain. If no, why not? What is needed in order for such an impact to materialize?	
Do you have any concrete evidence your research has had any impact on collaboration with ministries? If yes explain. What is needed in order for such an impact to materialize?	
Do you have any concrete evidence that your research has had any impact on collaboration with industry? If yes explain. What is needed in order for such an impact to materialize?	
Do you have any concrete evidence that your research has had any impact on collaboration with civil society? If yes explain. What is needed in order for such an impact to materialize?	
EQ 5: How has the programme contributed to enhanced innovative processes and innovative thinking within the universities and among stakeholders?	

Do you think that your research has contributed to enhanced innovative processes and innovative thinking within this university? If yes how? If no, what do you think would facilitate this type of impact?	
Do you think that your research has contributed to enhanced innovative processes and innovative thinking with the stakeholders in Bolivia, or elsehwere? If yes how? If no, what do you think would facilitate this type of impact?	
EQ 6: Is there any effort by the universities to promote the use of research in society with respect to communication of research and research results, extension services, dialogue with stakeholders, protection of national knowledge production through patents, intellectual property rights etc.	
Has your work been promoted by the University in any way? Has your work been promoted by any other actors? If yes who/how?	
EQ 7: Describe the role and impact of the research funds at the universities on research capacity.	
How has university funding impacted your work? (timing, resources, etc)	
EQ 8: To what extent has the purchase of research infrastructure, including research equipment of initial value above 10 000 USD, contributed to the research environment and how much is it currently being used.	
Have you made use of the research equipment purchased through this programme? If yes, how did you secure access? If no, why not?	
EQ 9: How has the access to e-publications and the activities coordinated by the VCyT contributed to improved research capacity and environment?	
Have you made use of VCyT e-publications? If yes, how so? How valuable have they been? If no, why not?	
EQ 10: Has the number of publications increased in indexed international and national scientific journals respectively?	
Have you published any of your work? If yes, where (type of publication)?	
Did you receive any incentives to publish your work? If yes, what were these?	
Sustainability	
EQ 11: Has the number of active researchers with a PhD increased at UMSA and UMSS? How many PhDs and MScs have been formed within the programme? How are they using, and have they been using, their training today? (gender disaggregated, and limited to the universities' knowledge)	
When did you start/finish your PhD? What factors contributed to the length of the process?	
EQ 12: What are the challenges in retaining the researchers after training? Are there any specific efforts made by the country and the universities to retain researchers?	

What employment opportunities have your had?	
Did you have post PhD secure employment before you finished your PhD?	
What employment challenges have you faced?	
EQ 13: What are the incentives to carry out research? What are the career opportunities for researchers at the universities and in Bolivia?	
What incentives did you have to conduct your PhD?	
Were the incentives you had the same as other students in the programme?	
EQ 14: What are the main bottlenecks for the improvement of research capacity at the universities and in Bolivia, and to sustain the achieved research capacity? How can those bottlenecks be approached?	
In your opinion how can research capacity be improved in Bolivia?	
EQ 15: Are there systems in place at the universities and in the country to sustain the achieved results?	
Have the results of your work undertake been maintained/used after the completion of your degree? If yes, by whom?	
Relevance	
EQ 21: Describe how the research projects (for PhD and MSc students and as part of the research fund) in the programmes have been identified and selected.	
How were you selected? (details, please)	
How was your supervisor selected? (details, please)	
Cross Cutting issues	
EQ 24: Please describe how gender has been integrated in the programme.	
Did gender issues affect your selection or the selection of your topic of research? If yes, how?	
EQ 25: Please describe how environmental aspects have been integrated in the programme.	
Did environmental aspects affect the selection of your research topic? If yes, how?	
EQ 26: Please describe how a human rights perspective has been integrated in the programme.	
Have human rights issues affected your selection or the selection of your research topic? If yes, how?	

Interview protocol Sida staff, and embassy staff that may be/have been associated with the programme

General information:
Name of respondent(s):
Title of respondent(s):
Institution:
Contact details (including email, phone):
Location of interview:
Date of Interview:
Name of team member(s) who conducted the interview:
Name of team member chiefly responsible for the transcript:

Note: Unlike other protocols, this protocol is not semi structured, but rather open. This is because the experience of the different respondents may vary widely. Therefore the question set starts with a case history approach.

Questions: (please select questions as may be appropriate, where questions have the same number they are intended to be regarded as alternates)

Q1. Could you describe your role and ties to the programme under evaluation?	
Q2.Could you describe the programme/history/trajectory as you know it? If not familiar with the project, but rather Swedish policy, could you please describe the aims of the policy and how this policy has aimed to be implemented?	
Q3.What have been the main constrains/challenges to implementing the programme in Bolivia? To supporting the policy?	
Q4. What do you think could have been improved in the Bolivia programme?	
Q5. What are your impressions of the different partnersand over time in Bolivia? Explain in detail	
Q6. What do you think will be the main sustainability issues faced in Bolivia (elsewhere)?	
Q7. What are the main differences between Bolivia and elsewhere (other programmes)?	
Q8. What other issues would you like to highlight?	

Interview protocol for Policy Makers/general

General information:
Name of respondent(s):
Title of respondent(s):
Institution:
Contact details (including email, phone):
Location of interview:
Date of Interview:
Name of team member(s) who conducted the interview:
Name of team member chiefly responsible for the transcript:

Questions:

Impact	
EQ1: How has the research environment in your group changed since 2007? Has this primarily happened due to the Swedish cooperation?	
How would you describe the current research environment in Bolivia?	Answer section
Have you experienced any changes to this research environment in the last decade? If yes, what changes?	
What factors are the most influential in determining the research environment in the country? Have any policies affected the research environment?	
Are you familiar with Swedish support? If yes, in your view what has been the impact of this support?	
EQ 3: How has the role of research changed at UMSA, UMSS and in Bolivia?	
What is the role played by UMSA, and UMSS in the Bolivian research environment?	
Has the role of UMSA and UMSS changed in recent years? If yes, to what do you attribute this change?	
EQ 4: In which way has the research programme (people, systems and/or results) had an impact on policy development, collaboration with ministries, industry and civil society?	
Does the research conducted by UMSA and UMSS have an influence on policy Development?	
Does the research conducted by UMSA and UMSS have an influence on collaborations with ministries?	
Does the research conducted by UMSA and UMSS have an influence on collaborations with industry?	
Does the research conducted by UMSA and UMSS have an influence on collaborations with civil society?	
EQ 5: How has the programme contributed to enhanced innovative processes and innovative thinking within the universities and among stakeholders?	
Do you see any evidence that UMSA and UMSS are leaders in innovative thinking in the Bolivian environment? If yes how so. If no why not?	
EQ 6: Is there any effort by the universities to promote the use of research in society with respect to communication of research and research results,	

extension services, dialogue with stakeholders, protection of national knowledge production through patents, intellectual property rights etc.	
Are there any policies that currently aim to promote research capacity? If yes, what do they say/do? How were they born?	
EQ 7: Describe the role and impact of the research funds at the universities on research capacity.	
Do you see any evidence that UMSA and UMSS have increased their research capacity? If yes, has this had any policy impact? If yes, what?	
EQ 9: How has the access to e-publications and the activities coordinated by the VCyT contributed to improved research capacity and environment?	
Do you have access to e-publications and other activities coordinated by the VCyT? Do these have any policy impact?	
Sustainability	
EQ 11: Has the number of active researchers with a PhD increased at UMSA and UMSS? How many PhDs and MScs have been formed within the programme? How are they using, and have they been using, their training today? (gender disaggregated, and limited to the universities' knowledge)	
Are PhD graduates well regarded in government? Is this a qualification that is seen as positive to the policy environment? (research supporting policy decisions)	
EQ 12: What are the challenges in retaining the researchers after training? Are there any specific efforts made by the country and the universities to retain researchers?	
What employment opportunities do Bolivian PhD graduates have? (In Bolivia and elsewhere)	
EQ 13: What are the incentives to carry out research? What are the career opportunities for researchers at the universities and in Bolivia?	
Are there any incentives to carrying out research in Bolivia? Do policy makers request research be conducted to guide their decisions?	
EQ 18: What strategies are in place to transfer knowledge/research results of relevance to the stakeholders?	
Do you think that Bolivian universities share their knowledge sufficiently? If yes, how? If no, why not	
Relevance	
EQ 23: Are the three programmes (UMSA, UMSS and VCyT) consistent with the needs and priorities of the universities?	
Are the research projects conducted at Universities relevant to the country more broadly?	

Focus Group Protocol for PhD Students and Researchers

General information:
Location of interview:
Date of Interview:
Name of team member(s) who conducted the interview:
Name of team member chiefly responsible for the transcript:

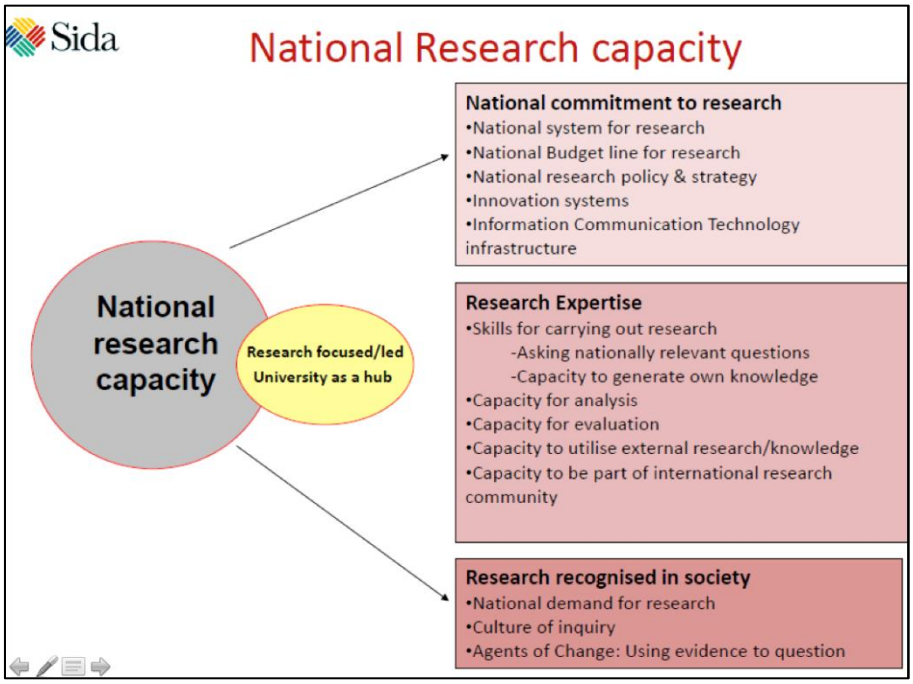
Name of participant	Current position	Dates when PhD was conducted/started if ongoing	Email

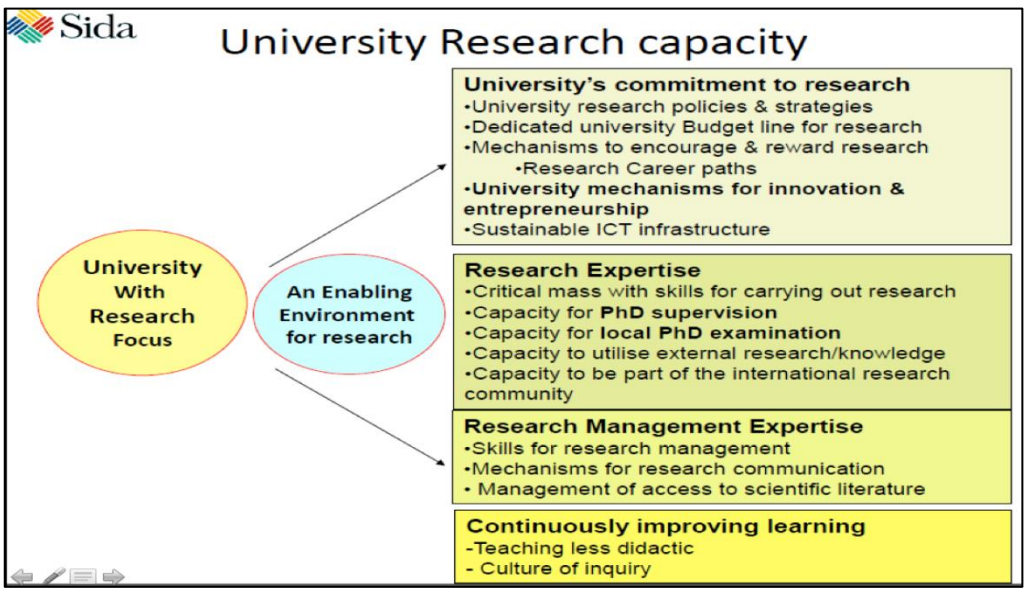
Lead questions/discussion points:
The discussion will develop, so these questions are only indicative.

Impact	
EQ1: How has the research environment in your group changed since 2007? Has this primarily happened due to the Swedish cooperation?	
EQ 2: How has the role of research changed at UMSA, UMSS and in Bolivia since 2007?	
How would you describe the current research environment in Bolivia?	
EQ 4: In which way has the research programme (people, systems and/or results) had an impact on policy development, collaboration with ministries, industry and civil society?	
Do you think the research programme has a broader impact? How, where, why not, etc	
EQ 5: How has the programme contributed to enhanced innovative processes and innovative thinking within the universities and among stakeholders?	
Is innovation promoted in Bolivia? Yes/no/why…	
EQ 7: Describe the role and impact of the research funds at the universities on research capacity.	
How does funding affect innovation, the conduct of research, publishing, completion rates, etc	
EQ 10: Has the number of publications increased in indexed international and national scientific journals respectively?	
How would you describe the publishing culture?	
Sustainability	
EQ 12: What are the challenges in retaining the researchers after training? Are there any specific efforts made by the country and the universities to retain	

researchers?	
What employment challenges have you faced after completion/expect to face?	
EQ 14: What are the main bottlenecks for the improvement of research capacity at the universities and in Bolivia, and to sustain the achieved research capacity? How can those bottlenecks be approached?	
How can research capacity be improved in Bolivia?	
EQ 15: Are there systems in place at the universities and in the country to sustain the achieved results?	
How is work conducted used more broadly?	
Relevance	
EQ 21: Describe how the research projects (for PhD and MSc students and as part of the research fund) in the programmes have been identified and selected.	
How are students and topics selected?	
Cross Cutting issues	
EQ 24: Please describe how gender has been integrated in the programme.	
Does gender play a role in the selection of students and/or topics?	
EQ 25: Please describe how environmental aspects have been integrated in the programme.	
Do environmental play a role in the selection of students and/or topics?	
EQ 26: Please describe how a human rights perspective has been integrated in the programme.	
Do human rights issues play a role in the selection of students and/or topics?	

Annex 5: National research capacity model and university research capacity model





Source: Both models are available in an internal Sida presentation.

Annex 6: Financial data

The table below includes the summary financial resources that have been allocated by Sida, the expenses incurred and the difference between the two. Itemised accounts were not available, so it was not possible to assess what proportion of the funds is used for overhead costs, additional administration, actual research activities, etc.

	UMSA		UMSS		VMCyT	
	2007	%	2007	%	2007	%
Resources	11,158,401.74	100%	8,108,673.04	100%		100%
Expenses	7,226,328.48	65%	3,000,826.29	37%		
Difference	*3,932,073.26*	*35%*	*5,107,846.75*	*63%*		
	2008	%	2008	%	2008	%
Resources	8,645,581.67	100%	13,597,918.65	100%	553,441.60	100%
Expenses	8,811,397.75	102%	8,601,896.20	63%	195,795.12	35%
Difference	*-165,816.08*	*-2%*	*4,996,022.45*	*37%*	*357,646.48*	*65%*
	2009	%	2009	%	2009	%
Resources	8,908,931.54	100%	9,496,588.35	100%	1,355,990.01	100%
Expenses	11,575,011.83	130%	4,729,437.74	50%	1,378,685.67	102%
Difference	*-2,666,080.29*	*-30%*	*4,767,150.61*	*50%*	*-22,695.66*	*-2%*
	2010	%	2010	%	2010	%
Resources	3,736,292.96	100%	3,528,106.82	100%	979,878.05	100%
Expenses	8,812,941.90	236%	7,657,000.00	217%	915,909.19	93%
Difference	*-5,076,648.94*	*-136%*	*-4,128,893.18*	*-117%*	*63,968.86*	*7%*
	2011	%	2011	%	2011	%
Resources	8,044,461.46	100%	136,798.00	100%	1,004,632.89	100%
Expenses	8,431,497.51	105%	9,877,957.00	7221%	970,256.53	97%
Difference	*-387,036.05*	*-5%*	*-9,741,159.00*	*-7121%*	*34,376.36*	*3%*
	2012	%	2012	%	2012	%
Resources	8,049,550.77	100%	5,807,083.13	100%	996,665.68	100%
Expenses	5,516,028.04	69%	5,646,934.00	97%	999,759.75	100%
Difference	*2,533,522.73*	*31%*	*160,149.13*	*3%*	*-3,094.07*	*0%*
	2013	%	2013	%	2013	%
Resources	13,541,704.88	100%	12,721,894.32	100%	2,019,630.48	100%
Expenses	4,875,758.45	36%	2,856,308.27	22%	952,535.24	47%
Difference	*8,665,946.43*	*64%*	*9,865,586.05*	*78%*	*1,067,095.24*	*53%*
	2014	%	2014	%	2014	%
Resources	7,170,556.18	100%	10,066,426.40	100%	2,049,400.83	100%
Expenses	13,014,025.61	181%	8,855,406.26	88%	1,231,916.72	60%

	UMSA		UMSS		VMCyT	
Difference	*-5,843,469.43*	*-81%*	*1,211,020.14*	*12%*	*817,484.11*	*40%*
	2015	*%*	*2015*	*%*	*2015*	*%*
Resources	**8,399,238.29**	**100%**	**8,094,604.87**	**100%**	**1,509,949.33**	**100%**
Expenses	**10,548,758.90**	**126%**	**11,701,755.31**	**145%**	**1,563,875.82**	**104%**
Difference	*-2,149,520.61*	*-26%*	*-3,607,150.44*	*-45%*	*-53,926.49*	*-4%*
	2016	*%*	*2016*	*%*	*2016*	*%*
Resources	**8,734,910.58**	**100%**		**100%**	**296,911.00**	**100%**
Expenses	**7,688,401.62**	**88%**	**7,471,252.78**	**#DIV/0!**	**1,356,218.90**	**457%**
Difference	*1,046,508.96*	*12%*	*-7,471,252.78*	*#DIV/0!*	*-1,059,307.90*	*-357%*
	Grand total	*%*				
Resources	**86,389,630.07**	**100%**	**70,886,770.53**	**100%**	**10,766,499.87**	**100%**
Expenses	**86,500,150.09**	**100%**	**70,398,773.85**	**99%**	**10,768,676.27**	**100%**
Difference	*-110,520.02*	*0%*	*487,996.68*	*1%*	*-2,176.40*	*0%*

Funding data provided by Sida

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
UMSA program	17,060,000	17,214,650	17,523,435	12,794,000	15,461,338	11,290,124	23,684,166	20,600,000	21,709,000	17,046,000	23,646,000	**198,028,713**
UMSS program	10,550,000	17,210,000	14,228,250	8,803,356	7,022,308	11,947,291	21,990,675	21,253,000	20,304,000	17,077,324	25,165,677	**175,551,881**
VCyT	-	478,110	1,521,890	1,000,000	1,000,000	959,814	2,000,000	2,000,000	1,800,000	379,613	2,220,387	**13,359,814**
Total	27,612,007	34,904,768	33,275,584	22,599,366	23,485,657	24,199,241	47,676,854	43,855,014	43,815,015	34,504,953	51,034,081	**386,962,540**
Directly to UMSA	9,465,000	8,534,650	9,417,675	4,285,000	8,621,338	5,809,953	13,966,776	7,978,000	10,370,000	11,216,000	11,216,000	**100,880,392**
Directly to UMSS	7,550,000	12,995,000	9,746,250	3,796,400	1,680,002	4,210,291	16,177,675	11,000,000	10,172,000	10,583,325	10,872,000	**98,782,943**
Total	**17,015,000**	**21,529,650**	**19,163,925**	**8,081,400**	**10,301,340**	**10,020,244**	**30,144,451**	**18,978,000**	**20,542,000**	**21,799,325**	**22,088,000**	**199,663,335**
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	**Total**

Evaluation of Sida's research cooperation with Bolivia, 2007–2016

This report presents the findings and conclusions of an evaluation of the Swedish research cooperation with Bolivia. Swedish research cooperation with two Bolivian universities – the University Mayor of San Andres (UMSA) in La Paz and the University Mayor of San Simon (UMSS) in Cochabamba was initiated in 2000 – and support to the Bolivian Vice Ministry for Science and Technology (VMCyT) was initiated in 2008 and the current funding phase is due to end in 2017. The purpose of this evaluation has been to assess the impact of this funding in the period from 2007 to 2016 in building research capacity as well as a research environment; and to identify and provide key knowledge that can support the development of a national and institutional research plan that leads to sustainable results following a next tentative funding phase.

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