GEORG-AUGUST-UNIVERSITÄT GÖTTINGEN

HAWK HOCHSCHULE FÜR ANGEWANDTE WISSENSCHAFT UND KUNST Hildesheim/Holzminden/Göttingen

CIEFAP
Centro de Investigación y Extensión Forestal Andino Patagónico

Kartographie
GIS
Fernerkundung

UNIVERSIDAD NACIONAL DE LA PATAGONIA SAN JUAN BOSCO

International Summer School

Argentina, Patagonia

Date: 03.11-16.11 2019

How to meet UN sustainable development goals in Patagonia/ Argentina. Value of Patagonian forest and large scale natural landscapes for climate change mitigation.

Organised by:

Georg-August-University of Göttingen (**GAUG**), Department of Geography, Cartography, GIS & Remote Sensing represented by Prof. Martin Kappas in cooperation with University of Applied Sciences and Arts Hildesheim/Holzminden/Göttingen **(HAWK**), Faculty of Natural Resource Management, represented by Prof. Martin Thren.
The Patagonia co-partners were: Forestry Research and Technology Transfer Centre of the Andean Patagonia (Centro de Investigación y Extensión Forestal Andino Patagónico (**CIEFAP**) represented by Dr. Jose D. Lencinas and Dr. Jose Bava, and the National University of Patagonia San Juan Bosco (**UNPSJB**) represented by Dr. Fabián Scholz

Funded by

DAAD
Deutscher Akademischer Austauschdienst
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Promoting German Higher Education and research collaborations

Contents

Background and objectives

The Georg-August University of Göttingen has a long tradition of international cooperation in research and education through joint scientific research programs and faculty and students exchanges. The University of Applied Sciences and Arts (HAWK) is keeping close partnership with several Universities in Latin America like collaboration with Forestry Research and Technology Transfer Centre of the Andean Patagonia (CIEFAP). CIEFAP together with the National University of Patagonia San Juan Bosco (UNPAT) were the organizers of International Summer School on site.
The principal objectives of International Summer School were:

1. Winning qualified master and PhD students for German Universities.
2. Professional training in current research areas.
3. Professional and cultural exchange between German and foreign participants (students and researchers).
4. Positioning of German Universities in the international education market.
5. Getting an insight into the German education and research praxis for Argentinian co-partners and students.
6. Presentation and recommendation of DAAD programs for education and exchange of foreign students.
7. The promotion of University education in Germany and creation of joint research program.
8. Preparation of joint research project.

All listed goals of International Summer School were consequently aspired and fulfilled. The choice of Patagonia as the location for hosting the International Summer School was inspired by the large scale natural landscapes important for biodiversity protection and mitigation of climate change and close scientifically contacts of Prof. Thren and Dr. Hohnwald with the CIEFAP.
Patagonian forest is crucial both for climate stability, human wellbeing and for maintenance of forest dependent species. This ecosystem is mostly threated by forest fire and grazing with cattle and sheep. Degradation by fire or overgrazing of natural habitats, land grabbing by foreign investments, invasion by non-native introduced species, land use changes are calling for new solutions and actions. The topics like multiple-use forest management, natural forest regeneration and reforestation with native species were important points of our meeting. Interdisciplinary approaches were discussed and several solutions were presented. The importance of the holistic education of Argentinian students with taking into account environmental, social and economic challenges in Argentina and South America confronting nowadays were deliberated.

Participants

The International Summer School was successfully organized at the campus of Forestry Research and Technology Transfer Centre of the Andean Patagonia (Centro de Investigación y Extensión Forestal Andino Patagónico (**CIEFAP**)) and at the National University of Patagonia San Juan Bosco (**UNPAT**). The program of this event comprised plenary sessions and 3 days of external field excursions (see attached program).
Extraordinary commitment and financial support of the Summer School from the side co-partners should be mentioned and appreciated. The number of participants has exceeded our expectation and the maximum number of contributors reached 70 persons. The planned number of participants was achieved and the courses were integrated into the teaching curricula. The number of students reached 27 persons included 23 students from different

Argentinian Universities, one Argentinian student from Stephen F. Austin State University SFA USA (APN), two students from INFOR Instituo Forestal de (Chile) and one person from Administration of National Parks.
The lectures from Germany (6 persons), 19 lectures from Patagonia including the invited guests from nature conservation institutions and administration, 9 authorities and collaborators lecturing in the field have ensured the high scientific and professional level of our International Summer School.
The target groups of the meeting were the PhD and Master students mostly with special field of forestry with focus on forest services, bio-technology, forest restauration, ethno-mycology, soil sciences, forest fire management, natural regeneration, invasive species, reforestation, conservation and protection of native forest and sustainable use of natural forest products.
The participants were informed about International Summer School through web announcements at the home pages of Universities and relevant departments. The participants were selected on the basis of their working /study topics fitting into the main working topics of this event. The selection of candidates for participation in the Summer School was done on the basis of written applications giving evidence of interest to begin the Masters, PhD or Post-doctoral study at the German Universities. The interest in the main working subjects of the summer school and recognition of relevance of networking for sustainable use of natural resources were important criteria for selection of participants as well.
Opening Ceremony was inaugurated by welcome speech from the organizers and presentation of goals and program by Prof. Dr. H. Walentowski (HAWK) – Prof. Dr. M. Kappas (GAUG) - Dr. J.D. Lencinas (CIEFAP) – Dr. F. Scholz (UNPSJB) – Dr. F. Carabelli (UNPSJB) - Dr. L. Chauchard (UN Comahue) – and Msc. R. Roveta (SsBeI) (see the attached program).

Figure 1. Opening ceremony

Lectures from Germany and DAAD representative

The topics of the lectures from German and Argentinian scientists were global change, climate change, biodiversity loss, large-scaled natural landscape, fragmentation, degradation of natural forest ecosystems and grasslands, the use of GIS and remote sensing as methods for monitoring

of land use changes, utilization of natural resources and nature conservation programs, forest management for sustainable use of natural resources, renaturation of degraded forest, land use conflicts, species of nature conservation concern, indicator species, flagship species , invasive species, nature protection, trans-border conservation and wildfires.
The six invited lecturers from Germany delivered talks on topics ranging from presentation of current study programs and research projects of GAUG - Cartography, GIS &Remote Sensing (Prof. Martin Kappas) and of HAWK, Faculty of research management (Prof. Martin Thren and Prof. Helge Walentowski). The education program „Master of International Nature Conservation" from Lincoln University, New Zealand and GAUG, Department of nature conservation was presented by Dr. Margaretha Pangau Adam. The lectures on "The role of science and education in nature conservation" and "The significance of large scale landscape for conservation of biodiversity" were demonstrated by Dr. Jolanta Slowik. Dr. Margaretha Pangau Adam delivered lectures on the importance of local knowledge for nature conservation and sustainable use of natural resources. She has also explained about the role of frugivorous birds in natural regeneration of tropical forest. Dr. Stefan Hohnwald delivered a talk on Aro-Silvo- Pastoral System in humid tropical and temperate biomes in Germany, and Patagonia. He was also speaking about "Ecological tipping points along ecotones in Romania and Patagonia during climate change. The subject of Impact of climate change on European beech forest and its dynamics and vegetation ecology were explained by Prof. Helge Walentowski. Prof. Martin Thren was speaking about "Degradation and rehabilitation of forest ecosystems in Latin America and Prof. Kappas lectured on "Measurement of land use changes by means of remote sensing.
During the video conference with the head of the Information Office of DAAD Argentina Mrs. Judith Lehmann, participants of our meeting had put many questions concerning study and research at the German Universities, DAAD programs and possibilities for scholarships.

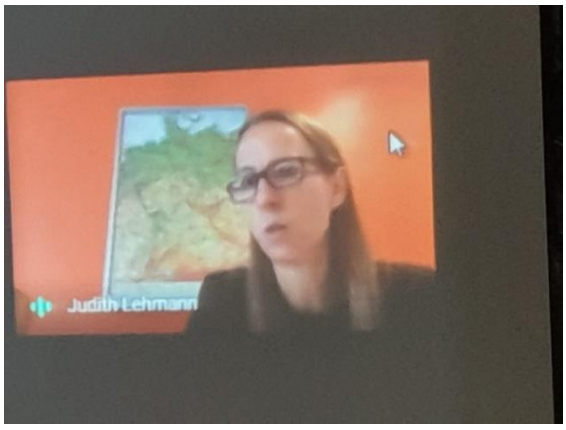

Figure 2. Video conference with Mrs. Judith Lehmann the head of the Information Office of DAAD Argentina.

Lectures from Argentina

Lectures from Argentina were focused on the aspects of natural forest loss, forest and landscape fires, forest degradation and regeneration and native forest strategies of conservation. Sustainable use of timber and utilisation of secondary forest products were as well on the agenda.
Representative of Wildlife Conservation Society informed about the definition of priority sites for conservation in Patagonia. Conservation of the National Park Los Alerces and conservation of protected areas in Chubut Province were presented by National Park authorities.

Some interesting aspects of new forest protection strategies were presented in lectures about monitoring of native forest and conifer afforestation and aspects of REED+ to reduce emissions from deforestation and forest degradation. Title of presentations and names of presenters are available in the attached program.

Excursions

One core element of our event were the outdoor field trips. Excursion to Los Alerces National Park with its large scale natural landscape of Patagonian Andes and vegetation dominated by dense temperate forests, which give way to alpine meadows higher up under the rocky Andean peaks had impressed the participants. Successive glaciations have formed the landscape in the region creating moraines, glaciers, and clear-water lakes. The National Park was already created in 1937 to protect forests of alerce trees (*Fitzroya cupressoides)*, and other endemic and threatened flora and fauna of the Patagonian Andes.
Since 2017 Los Alerces has been established as a World Heritage Site. The National Park has the largest alerce forest in Argentina. The alerce, Genus ***Fitzroya*** is represented by only one endangered species *Fitzroya cupressoides.* The largest and oldest known alerce tree in Argentina is located there. It is 57 metres tall, 2.2 metres in diameter, and about 2,600 years old.

Figure 3. A 2600 year's old Alerce, *Fitzroya cupressoides*

The excursion to Los Alerces National Park was led and guided by the Natural Park guides and colleagues from CIEFAP.

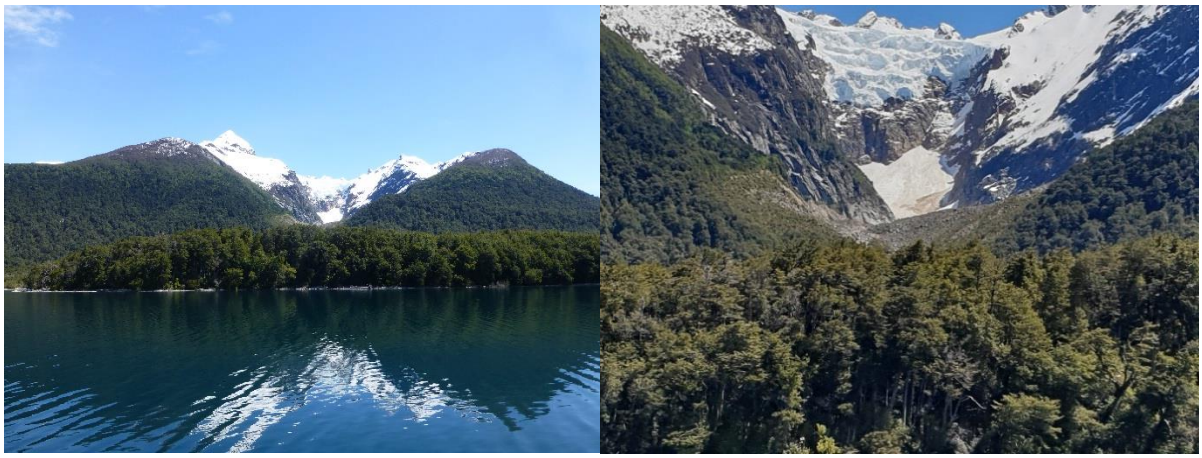

Figure 4. Lakes and glaciers are forming the landscape of Alerces National Park.

The next excursion was organised to Puerto Patriada (see group photo on the shore of the lake Epuyen), and to the Reserva Forestal Lago Epuyén, and this was leaded by the scientists of CIEFAP.
Patagonian Andean forest is a type of temperate to cold forest located in southern Chile and western Patagonia in Chile and Argentina at the southern end of South America.The forest is dominated by trees of the genus Nothofagus like Coihue ;*Nothofagus dombeyi* , Ñire; *Nothofagus antarctica*, and Lenga; *Nothofagus pumilio*. Other native tree species of Bosque Andino Patagónico are near threatened Chilean cedar, *Austrocedrus chilensis* and dense forests of evergreen trees with Radal, *Lomatia hirsuta*.
During this excursion the methods and problems of afforestation were presented and discussed.

Figure 5. Participants of the excursion

Figure 6. Invasion of *Pinus radiata* after the forest fire

Regeneration of native forest is slowed down or even stopped by the dense growth of rejuvenation of the Monterey pine *Pinus radiata.* In the 60s and 70s the Reserva Forestal Lago Epuyén (Patagonia-Argentina) implemented an afforestation plan with exotic conifer species, among which were *Pseudotzuga menziesii*, *Pinus ponderosa*, *Pinus contorta*, and *Pinus radiata.* As a consequence of the exotic conifer introduction, the fire-frequency in the area was drastically increased. Currently, the reserve area is long invaded by *P. radiata*, a species adapted to fire.
A total of 50 bird species was observed during the field excursions, and most of them are native to Patagonia region.
During the third excursion we have visited a small city El Bolsón which is famous for its agriculture, artisan crafts exhibited for sale at the local market and hippie atmosphere, and impressive natural landscape in the vicinity.

Figure 7. El Bolsón artisan craft market

We have also visited El Manso valley, the study sites of current German-Patagonian research program.

Figure 8. El Manso valley

Cultural Program

During the International Summer School, cultural program played an important role to bring participants together and to demonstrate cultural and natural treasures of Argentina and Germany.
On the 11 of November the local, not professional chamber orchestra “Arcos string of Trevellin” played music of Georg F. Händel, Johann J. Quantz and Argentinian Composers. Director of this orchestra was Damian Luaces and solo Flute played by Prof. Martin Thren. Prof Martin Thren informed the public about the Händel Festival in Göttingen and the musician Johann Joachim Quantz a famous German flutist, flute maker and baroque music composer born in Scheden close to Göttingen. Argentinian music was composed by the young composer and conductor of the local chamber orchestra Demian Luaces. The audience was impressed of this cultural event.
In the frame of cultural program a German film entitled “German Wilderness Area and Green Belt” was shown. In the year 2019 the 30th anniversary of the founding of Green Belt was celebrating. Thirty years ago along a death strip of 1,400 km long and 50 to 200m wide, one of the world's most unusual nature reserves, was created. Prior to broadcasting of this film Dr. Jolanta Slowik explained the historical and natural history, and the importance of the Green Belt of Germany.

This informative film shown connection between nature and human history on the former inner German border.

Figure 9. Music evening in Esquel

Still relating to the culture, the Patagonian co-partner organised for the participants of International Summer School such an integrating, idyllic evening of Argentinian barbecue, wine and tango.

Figure 10. Farewell ceremony

Evaluation

The evaluation for summer school event was done through a list of questions addressed to the students. Following are the results:

1. What is your overall opinion on the event?
   Excellent 100 %, good 0% , satisfactory 0% , insufficient 0%
2. Do you think the subjects discussed during the event were?
   Important 61 %, relevant 30%, interesting 38 %, new 23 %

3. The goals of the Summer School were:
   Clearly stated 100%, not clearly stated 0%
4. The quality of most presentations was:
   So high that made them difficult to follow 19 %, just right, providing interesting insights 81%, pour, boring, and/or unprofessional 0%
5. Did the Summer School trigger your interest for undergoing graduate studies in Germany?
   Yes 90 %, maybe 10%, not really 0%
6. How did you enjoy the cultural evening?
   Very much 86%, it was ok 14%, not so much 0%
7. How did you enjoy the field trips?
   Very much 86%, they were ok 9%, not so much 0%, could not attend 5%.
8. Do you think that cooperation between Argentina and German Universities, as well as higher education institutions, is important?
   Yes 100%, maybe 0%, I do not know 0%, I don't think so 0%

The participants have very much appreciated the lectures, knowledge and new information, and opportunity for their further education, research and training.

Degree of achievement of the goals

International Summer School delivered exemplary knowledge transfer between Patagonia High Education Institutes (CIEFAP, UNPSJB) and German Universities (GAUG, HAWK) and provided contribution to achievement of the UN Sustainable Development Goals 2030. It fulfilled the expectations of the students and all participants. The delivered lectures and group discussions were very useful for their regular course curricula at the universities. The central topics on global change, biodiversity degradation, nature conservation, Patagonian natural forest, forest regeneration and afforestation, traditional ecological knowledge, forest fire, land grabbing, large-scaled natural landscape, the use of GIS and remote sensing for research and practice provided an interdisciplinary platform for good interactive discussions. The main debated subjects of common German Argentinian interests were:

- Exchanging experiences from sustainably managed forests (integrative multifunctional forest management to reconcile biodiversity conservation and timber production) in Germany
- Exchanging experiences from Patagonian *Nothofagus dombeyi* primeval forests
- Learning about effects of forest fires on succession dynamics and ecosystem functions from Patagonia
- Learning from concepts of potential natural vegetation (PNV) and forest development types (FDT) from Germany
- Learning from ecosystem services of pine plantations from Patagonia (storage and sink of carbon, soil protection; additional income opportunities through cattle pasture and mushroom cultivation)
- Learning from concepts of biodiversity compatibility of pine plantations and functional connectivity of grassland habitats from Germany and Europe.
- Comparison of different types of agro-silvo-pastoral systems in Germany and Patagonia: Historical, current and future significance / indicators of sustainability and biodiversity / ecosystem services
- Cultivating non-native tree-species as a result of climate change.

- Invasiveness potential of Douglas fir in Patagonia and Germany: role of fire regime / risk assessment and conclusions
- Consideration whether any tree species from Patagonia should be cultivated in Germany in the future?
  Natural hazards in Patagonia and Germany (ranking and comparison of rankings, cause of different weightings), common strategies
- Ideas and concepts for risk diversification, resource-efficient and climate-efficient land use
- Expansion of non-wood forest products (Mycoforestry, truffle growing / mushroom cultivation on deadwood / forest farming)
- Cascade use to increase the efficiency of carbon storage.

The plenary talks, group discussions and the external field excursions were very useful and interesting for the participants as they were mostly representing their regular course curricula topics and therefore there was good integration between the summer school activities and the academic interests of the partner university.
Based on the feedback from the students, most of the participating Masters' students showed interest in pursuing a PhD program at Universities in Germany.

There are some difficulties to realize all DAAD expectation concerning International Summer School like insufficient knowledge of English language by some students and limited capacities for candidates at several German Universities. In spite of these problems the good candidates could be chosen as PhD students and sandwich programs for Master students and short course programs.
International Summer School has definitely increased the interest on German universities by the students and researches and positioned Germany on the international education market. Longtime collaboration in research and education between CIEFAP, UNPSJB, GAUG and HAWK, and Patagonian partners has started. During the International Summer School, a joint research program between the HAWK (Prof. Martin Thren, Prof. Walentowski, Dr. Stephan Hohnwald) and Prof. Kappas represented Department of Cartography, GIS & Remote Sensing, University of Göttingen has been developed.

Perspectives and outcome

The International Summer School has made possible the intensive exchange of collaborative research interests and other academic programs, and facilitated the personal interactive dialogues. It was undoubtedly the best way to raise awareness and interests on cooperation and exchange between Patagonian and German universities. This meeting also helped in drawing attention towards nature conservation and forest protection, and deepening an appreciation of the value of biodiversity and sustainable use of natural resources. The value of natural, large scale Patagonian landscape and natural Patagonian forest giving shelter for many endangered and endemic species have been underpinned.
The new methods of assessment, evaluation and monitoring of global change by means of GIS and remote sensing was clearly demonstrated. In continuation of our efforts in developing new connections between Patagonian Universities and German higher education institutes, Prof. Martin Thren and Prof. Walentowski together with Dr. Jolanta Slowik and Dr. Margaretha Pangau-Adam are planning to undertake the German Alumni Summer School 2021 in Argentina. This plan is fully supported by the Patagonian partners (CIEFAP and UNPSJB). The assimilation of internationality in teaching and research exchange together with the creation of a strong networking for nature conservation and sustainable development is the best approach for promoting German Universities in South America.

Figure 11. Closing ceremony/Presidium

At the closing day event on the 14th of November, an important summary of all lectures was presented by Dr. Jose Bava (CIEFAP), certificates were awarded to all participants and farewell speeches were delivered by the program coordinators.

On the 16th of January 2020, a follow-up meeting attended by all lectures from Germany was carried out at HAWK. This was to discuss the exchange and study programs including scholarship possibilities for the Patagonian students and scientists, and the potential further collaborative activities as well.