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**UNIVERSITÄT
BERN**

CDE
CENTRE FOR DEVELOPMENT
AND ENVIRONMENT



Centre for Development and Environment

GLOBAL CHANGE AND ITS IMPACTS ON SUSTAINABLE DEVELOPMENT

REPORT 2011

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Cover photo: Large-scale and small-scale farming, north of Mount Kenya. (Photo by Urs Wiesmann)

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Foreword

At the time of writing this foreword I am just back from Rio+20, the UN Conference on Sustainable Development held twenty years after the UN Conference on Environment and Development, both in Rio de Janeiro, Brazil. Nearly 30,000 accredited participants were registered at this recent event, including 191 member states, as well as 93 inter-governmental organisations and specialised agencies. At the end of the conference, on 22 June 2012, the outcome document was adopted unanimously after many months of prior negotiations in New York and Rio de Janeiro. So far, commitments have been made to invest more than USD 513 billion into sustainable development, including in the areas of energy, transport, green economy, disaster reduction, desertification, water, forests and agriculture, alongside nearly 700 voluntary commitments.

The mass media in the global North were not very excited about the outcome of the negotiations: only a minimum consensus was reached between the different power groups, which broadly comprised the global North (USA, EU, and many more), on the one hand, and the global South, on the other, the latter representing a vast majority of the world population and including the oil states and the rapidly developing BRICS countries (Brazil, Russia, India, China, and South Africa). Nonetheless, what I see as a positive outcome is the unanimous agreement on a number of issues by all states: (a) they are fully committed to sustainable development, with its three dimensions, as a vision for their nations; (b) they emphasise the need to uphold their previous commitments made during earlier UN initiatives, such as the Millennium Development Goals; (c) they want to develop a set of Sustainable Development Goals; and (d) they agree to put sustainable development high on the UN's agenda, including the necessary institutional reforms.

For the Centre for Development and Environment (CDE) at the University of Bern, this shows that the direction it has chosen – to do global change research for sustainable development – places it at the forefront of the global efforts envisaged for the coming years. Science, research, and capacity development are indispensable for all, including for CDE's partner countries in the global South. Global change research will be key to developing knowledge societies and creating a future that all countries and many of their inhabitants are committed to making a reality, not only for present generations, but particularly for future generations. However, the transition needed for this future to become a reality will be challenging to define, the road maps hard to outline, and their implementation an enormous effort.

I am convinced that CDE and its partners are very well equipped to contribute to these endeavours.

Hans Hurni, President, CDE Board



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The Centre for Development and Environment (CDE)

Gaining momentum in research for sustainable development

Peter Messerli, Director



Daniel Messerli

People and goods on the move, Nepal.

CDE on the right track

In spring 2012, the international Planet under Pressure conference in London brought together the global change research community to discuss solutions to global sustainability challenges in preparation for the Rio+20 summit. At this conference, the International Council for Science (ICSU) presented Future Earth – a new 10-year initiative aiming to deliver knowledge that will enable societies to reach their sustainable development goals in the coming decades. Three key innovations proposed to researchers and donors run like a thread through the initiative: (1) further integration of cutting-edge research from a wide range of disciplines, (2) transdisciplinary co-designing of research together with non-scientific actors and users, and (3) increasing linkage of global change research to regional nodes.

CDE researchers attending the conference experienced this presentation to the international science community with pride and reassurance, as these key innovations form an integral part of the CDE Strategy 2010–2015 presented in detail in last year's annual report. In order to fulfil our mission to produce knowledge for sustainable development, we need a research approach that allows linking scientific specialisation with application, and knowledge emerging from local contexts with generalised, more universal knowledge at regional and global levels (Figure 1). We clearly recognise that this is a challenging and ambitious undertaking; yet we are convinced that such a research approach is not only a key to success but also defines CDE's specific position within the Swiss science and development landscape and beyond.

One strategy – six thematic clusters

During 2011 we continued to implement our new strategy: all current and new projects are oriented towards sustainable development and have adopted the overall research approach outlined above and in Figure 1. Our activities and the researchers involved are grouped into six thematic clusters, each headed by a senior research scientist. Three of these clusters ensure a broad and comprehensive perspective on sustainable development, each providing outcomes in terms of research, capacity building, policy, and implementation: Global Change Impacts, Innovations in Sustainable Development, and Education for Sustainable Development (Figure 2). At the same time, CDE pursues thematic specialisation in the fields of Natural Resources and Ecosystem Services, Multidimensional Disparities, and Governance of Land and Natural Resources. In all clusters, we strive for excellence and an outstanding international reputation.

The further consolidation of our strategy is reflected in many concrete activities and events of the past year. These include:

-> **Thematic and integrative research:** Along with the continuation of research projects implemented through the National Centre of Competence in Research (NCCR) North-South in collaboration with the Department of Integrative Geography (DIG), University of Bern, CDE successfully acquired two new projects funded by the Swiss Network for International Studies, one Ambizione project funded by the Swiss National Science Foundation, and one project under the EU's Seventh Framework Programme. Training and

capacity building is carried out through the International Graduate School (IGS) North-South, involving over 70 PhD students.

-> **Regional research projects:** The production of contextual knowledge in partnership with research networks in six world regions was strengthened through various research and development projects. Highlights include the renewal of the Eastern and Southern Africa Partnership Programme (ESAPP) financed by the Swiss Agency for Development and Cooperation (SDC) for 3 years, the expansion of research in Laos to comprise a broader regional perspective including Vietnam, Cambodia, and Southern China, new projects on climate resilience in Central Asia, as well as the production of knowledge for combatting desertification in Mongolia.

-> **Knowledge for transformation:** Besides ongoing efforts to design and test innovations for agrobiodiversity and poverty alleviation in Southeast Asia and for biofuels in Eastern Africa, our flagship programme World Overview of Conservation Approaches and Technologies (WOCAT) continues to systematically document approaches and technologies for sustainable land management across the globe. With renewed funding from SDC, it strives to overcome persistent cross-scale knowledge gaps and intends to become a standard knowledge management and decision support partner for the United

Nations Convention to Combat Desertification (UNCCD) and other international initiatives in the coming 4 years.

-> **Products for policy and practice:** The reporting period provided many important opportunities to synthesise knowledge from various CDE studies and regions and transfer it to sustainable development policy within Switzerland and at the international level. Highlights include support for Federal Councillor Micheline Calmy-Rey as a member of the UN Global Sustainability Panel, participation in the Swiss parliament's hearings regarding the decision to increase Swiss development assistance, support for SDC and the federal administration in defining a position on a green economy and for Rio+20, and global studies on large-scale land acquisitions to support the International Land Coalition in its policy dialogue with the World Bank, FAO, and other institutions.

Developing and maintaining partnerships

.....
 These activities and events would not have been possible without a concurrent organisational consolidation of our six thematic clusters (Figure 2). Under the guidance of their heads, the six clusters developed their respective strategies, took over responsibility for a portfolio of various projects, successfully acquired new ones, and defined outcomes for policy and practice in collaboration with

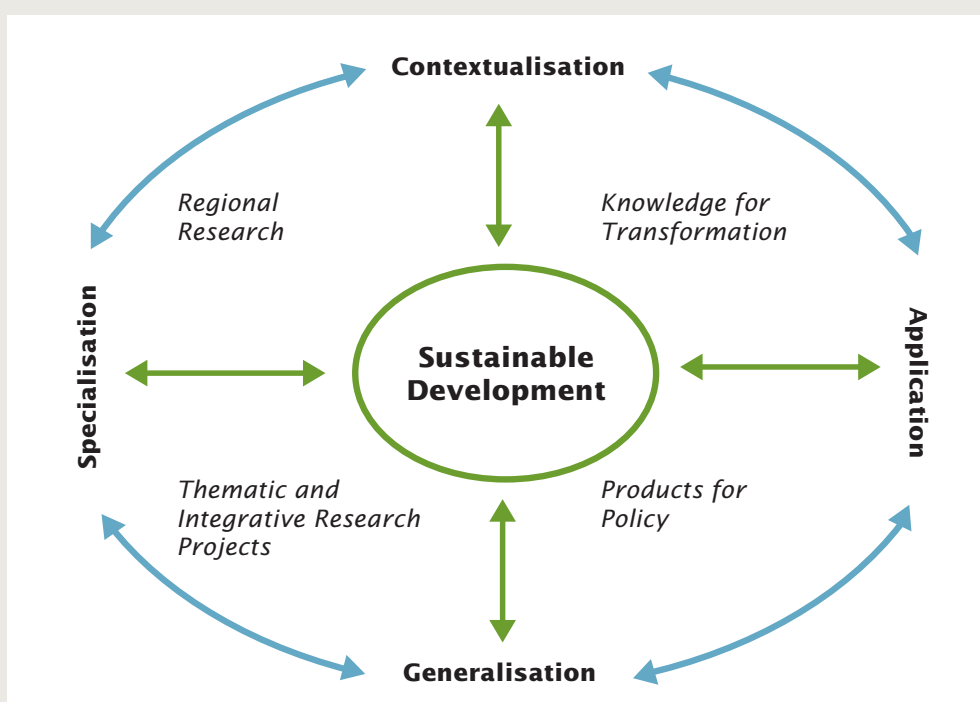


Figure 1: Key components of research for sustainable development as pursued by CDE in line with its Strategy 2010–2015. (Source: Adapted from Hurni and Wiesmann 2011, see Publications in 2011, Chapters in books, p. 32 of this report)

partners in Switzerland as well as in different world regions and international networks. In the six core regions covered by CDE's research partnerships (South America, East Africa, Horn of Africa, Central Asia, Southeast Asia, and the Swiss Alps), efforts to secure and strengthen long-term collaboration remained a top priority. Within the University of Bern, we progressively built bridges to other departments with a view to increasing the number of individual and institutional CDE members. Besides the continued and very close collaboration with the Department of Integrative Geography we intensified our partnerships with the Institute of Social Anthropology and the World Trade Institute (WTI), and initiatives to broaden our collaboration with the institutes of Sociology and Biology are underway.

CDE benefits from an efficient services unit that supports research and implementation activities in various ways. The experience and professionalism acquired during the management of the NCCR North-South in terms of publishing and communicating research results, producing policy briefs, and creating visibility through events and media work represents an important asset for our future work as an interdisciplinary research centre at the University of Bern.

Within Switzerland, relations with science and development partners remained important. The IGS North-South allowed establishing structures

between the universities of Bern, Basel, and Zurich that will continue beyond completion of the NCCR North-South in 2013. We consider these partnerships and the renewal of other existing networks of competence (with the Federal Institutes of Technology in Zurich and in Lausanne, and the Graduate Institute in Geneva) as a crucial asset for future acquisition of research and development funds in Switzerland and at the international level. We also count on the Commission for Research Partnerships with Developing Countries (KFPE) as an important facilitator and platform for continued learning and capitalisation on experiences.

In conclusion, CDE was able to gain considerable momentum during the year 2011 towards implementing its research strategy. This would not have been possible without the generous support, the confidence, and the commitment that we received from the University of Bern, for which we are very grateful. It allows us to address with enthusiasm the challenges of linking research with application, and concrete local contexts with overarching global debates. Even if this endeavour is sometimes still at odds with current funding levels and reference schemes, international initiatives such as ICSU's Future Earth programme are encouraging and confirm that we are on the right track towards a promising future.

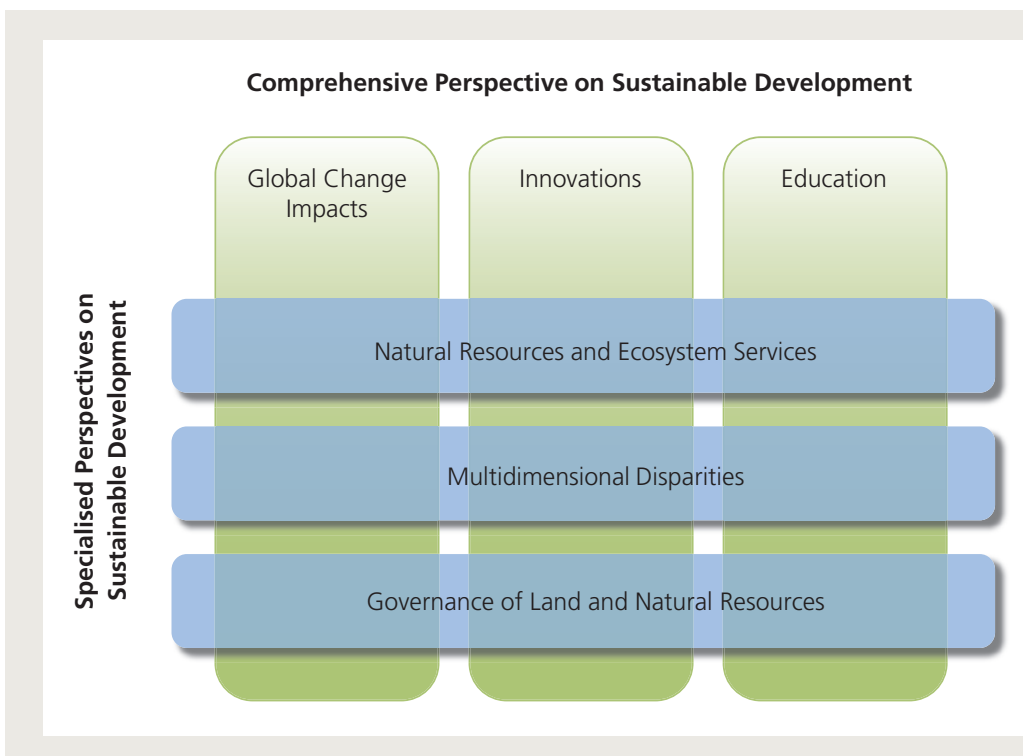


Figure 2: CDE's six thematic clusters.

Programme work

Highlights in 2011

Thomas Breu, Deputy Director

Building a bamboo bridge across the Nam Khan river, near Luang Prabang (Lao PDR).



Thomas Breu

After a major organisational development process, CDE started 2011 with newly composed interdisciplinary teams in six thematic clusters and one services unit. In line with its new strategy, CDE aims to bridge research and practice and thus promote dialogue between the scientific community and society at large. We do so by conducting sound disciplinary and interdisciplinary research and translating its results into concrete implementation on the ground. To this end, CDE analyses interrelations between impacts of global change at different scales and attempts to link local contexts with generalised observations. Below we outline some of CDE's highlights in 2011, which we achieved in cooperation with our committed partners in Switzerland and abroad.

From research-based knowledge production ...

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In 2011, the NCCR North-South published the second synthesis volume of its Perspectives series. The book, entitled *Research for Sustainable Development: Foundations, Experiences, and Perspectives* (Wiesmann and Hurni 2011), presents 29 articles by authors from CDE and its partner network. It synthesises the experiences gained in a decade of inter- and transdisciplinary research in nine regions of the world, and reflects on the foundations of sustainability-oriented research, on concepts, tools, and approaches to overcome the challenges of such research, and on specific issues of sustainable development. The volume is available online at www.north-south.unibe.ch. With the end of the NCCR North-South approaching, CDE increased its efforts to obtain research funding. Among various successful applications, two proposals on land gov-

ernance issues were selected by the Swiss Network for International Studies (SNIS). These projects are ideally suited to complement CDE's ongoing research and implementation activities in the field of large-scale land acquisitions. In the context of the EU Seventh Framework Programme, CDE and its international research partners were able to acquire EUR 6 million in funding for a project entitled CASCADE. This 4-year programme aims to enhance understanding of sudden ecosystem shifts that may lead to major losses of ecosystem services, and seeks to find options for sustainable natural resource management. This new research programme is a perfect complement to CDE's manifold outreach activities in the field of sustainable land management. The journal *Mountain Research and Development (MRD)* is now well known in its online and open access format, with over 120,000 downloads in the past year. Its 2-year impact factor rose from 0.476 (2010) to 0.676 (2011), and the 5-year impact factor from 0.833 to 0.837.

... to outreach and implementation in partner regions ...

.....
The Water and Land Resource Centre Project, which started in 2011, successfully set up two Regional Resource Centres in Ethiopia and Kenya for water and land-related issues. These centres support the work of regional water management experts and decision-makers. They aim to improve the quality of information available to water users with a view to maintaining regional stability and supporting cooperation in the areas of water and land policies. In combination with complementary initiatives of CDE in the Horn of Africa and East Africa, the cen-

tres could, in the long run, become much-needed observatories of global change. CDE was also able to markedly increase its activities in Central Asia and East Asia. In 2011, the National Desertification Monitoring System (NDMS) project was launched. Implemented jointly by CDE and various agencies of the Mongolian Government, this project aims at developing a land degradation and desertification monitoring system, making use of the latest GIS and remote sensing techniques. At the same time, CDE's ongoing activities in Central Asia were further consolidated. For example, the agriculture and sustainable land management component of the World Bank's Pilot Program for Climate Resilience (PPCR) was successfully concluded. This project identified land management practices that help to improve rural livelihoods and resilience to climate change, and assessed land-related policy and legal frameworks to pinpoint obstacles to scaling up these practices. Research-based implementation activities in Southeast Asia continued at a high pace. Cornerstones in 2011 included, among others, the DECIDE Info project and the mandate for running a knowledge and information-sharing system together with the Lao Agrobiodiversity Initiative. Both projects aim to support knowledge sharing across institutional and sectoral borders with a view to evidence-based decision-making for sustainable development, and their continuation is currently under negotiation.

... to policy dialogue

In 2011, CDE continued its efforts to translate and disseminate its research findings and implementation experiences to policymakers and a wider audience, in support of equitable and informed negotiations and decision-making. CDE's policy advice was in strong demand by policymakers, which is also reflected in the high number of media appearances of our staff. Major areas of policy dialogue included the green economy approach in relation to the Rio+20 conference, food security and climate issues, mountain development, and the land governance debate. To support policy dialogues, CDE was actively involved in the preparation of major policy-oriented publications. As one of the most prominent publications, a large compendium appeared under the title *Sustainable Land Management in Practice: Guidelines and Best Practices for Sub-Saharan Africa* (Liniger et al 2011), prepared by the World Overview of Conservation Technologies and Approaches (WOCAT). Two other, very prominent publications addressed mountain issues: *Mountain Forests in a Changing World* (Price et al 2011) and *Highlands and Drylands* (Berrahmouni et al 2011), jointly prepared by FAO and CDE. These publications highlight the importance of mountain forests



Thomas Kohler

Mount Ruwenzori seen from the Ugandan side.

and dryland mountains for their surrounding areas. Further, CDE released a book entitled *Reshaping Rural Extension* (Gabathuler et al 2011), which summarises more than 20 years of experience with social learning processes and stakeholder dialogues. Policy-related activities will gain further momentum through new mandates from international and national donors. Two new backstopping and training mandates within SDC's Global Programme on Food Security (GPFS) and Global Programme on Climate Change (GPCC) are exemplary in this respect. These mandates, which will replace a long-running advisory mandate on natural resources, assign CDE the role of a think tank providing advice for the further development of these major programmes.

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Programme work

Programme overview

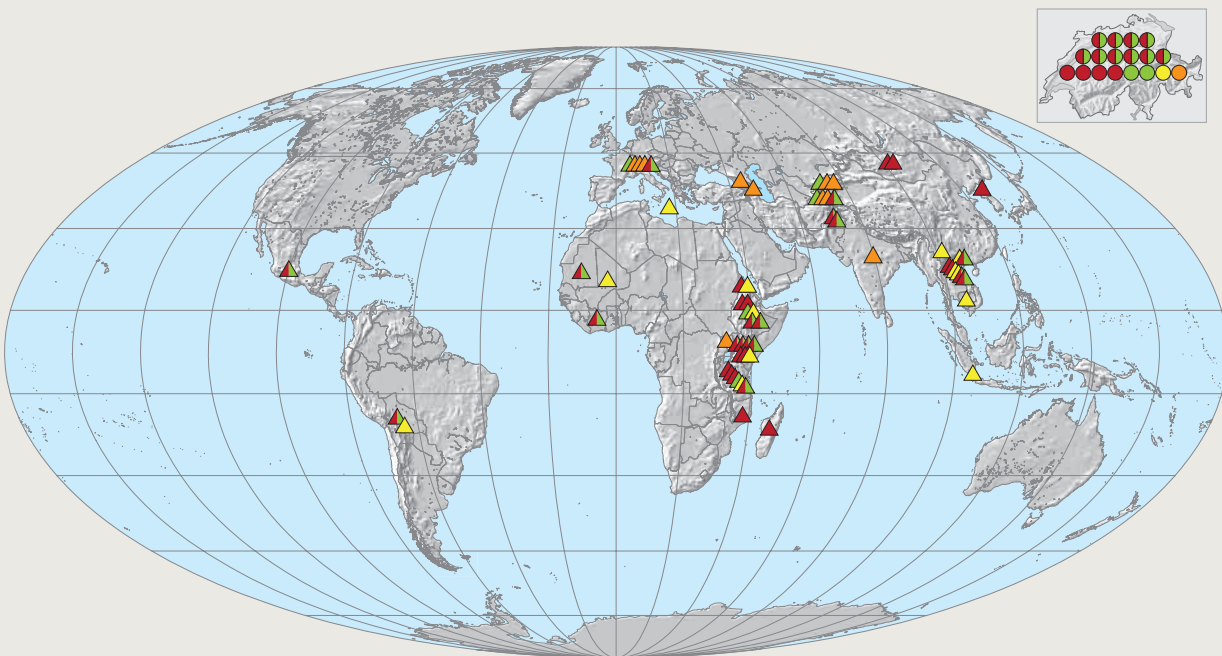
Urs Balsiger, Thomas Kohler, Associate Directors

CDE's research and development activities include national and regional programmes as well as global mandates and are funded from diverse sources. Key regions of our engagement are East and Southern Africa and the Horn of Africa, the lower Mekong region, and the countries of Central Asia; programmes in the Andes, Central America, South Asia, West Africa, and other regions, including Switzerland, complement our portfolio (large map below). CDE's rather unique selling points are the diversity of development contexts it covers worldwide, the link between research and application, and the long-term engagement that many of our programmes represent. Such engagement has been possible thanks to trusted partnerships with institutions and personalities in the different regions and with funding partners willing to support activities that have a longer-term horizon.

Many of our programmes and mandates have a global reach and are managed from our headquarters in Bern, Switzerland (small map below). The activities of these networks reinforce our regional engagements, but include other regions or cover specific development contexts worldwide. One

example is the international peer-reviewed journal *Mountain Research and Development (MRD)*, of which CDE hosts the editorial office and which covers all major mountain regions of the world.

Funding for our programmes and mandates is largely provided by third parties and includes entrusted funds (see table on next page). The Swiss Agency for Development and Cooperation (SDC) is our most important funding partner, contributing 43% of CDE's overall funding; it is followed by the Swiss National Science Foundation (SNSF) with 22%. Together, the two institutions co-fund the National Centre of Competence in Research (NCCR) North-South, CDE's largest programme. Funds received from the University of Bern are based on CDE's official mandate as a university centre and cover services for the NCCR North-South and other research programmes, as well as for selected global networks. Following the establishment of CDE as an interdisciplinary centre of competence, this contribution has more than doubled in recent years, from 9% in 2007 to 19% in 2011. Other funding partners such as various research funders and international and national donors together account for 16% of our finances.

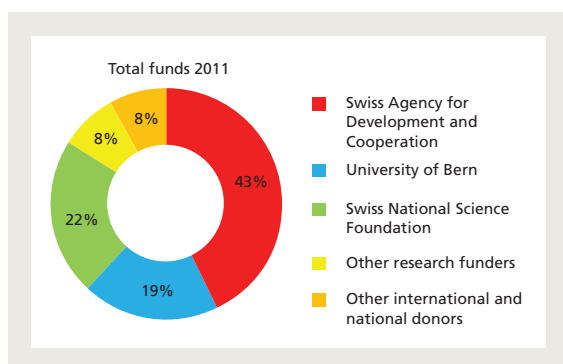


Funding partners	Programmes with regional and country focus	Global networks hosted at CDE Bern
Swiss Agency for Development and Cooperation	▲	●
Swiss National Science Foundation	▲	●
Other research funders	▲	●
Other international and national donors	▲	●

Cartography: Ulla Gämperli Krauer, Alex Hermann, 2012
 Map projection: Mollweide
 List of CDE programmes and mandates:
 Urs Balsiger, Peter Messerli

Programme work

Programmes and mandates in 2011



Sources of funding for CDE's projects and programmes by type of donor in 2011, as percentages.

Swiss Agency for Development and Cooperation	6,726,000
University of Bern	2,953,800
Swiss National Science Foundation	3,386,000
Other research funders	1,303,000
Other international and national donors	1,320,000
Total	15,688,800

Sources of funding for CDE's projects and programmes by type of donor in 2011, including entrusted funds, in absolute figures (CHF rounded). For details, see table below.

Programmes and mandates by cluster (bold)	Funds (CHF)	Project type ¹	Main donors ²	Countries / regions
Natural Resources and Ecosystem Services				
Coping with Desertification Project (CODEP)	100,000	C	SDC	Mongolia
DESIRE – Desertification Mitigation and Remediation of Land	100,000	C	EU-FP7	Mediterranean Basin
GEF Sustainable Land Management in the High Pamir and Pamir-Alai Mountains (PALM)	100,000	C	GEF	Tajikistan
Advisory Services on Geoinformation Systems	290,000	C	SDC	Mongolia
Impacts of Reducing Emissions from Deforestation and Forest Degradation and Enhancing Carbon Stocks (I-REDD+)	40,000	C	EU-FP7	Laos, Vietnam, China, Indonesia
NCCR North-South Research Project on Land Resource Potentials	195,000	A	SNSF, SDC	Tajikistan, Ethiopia, Kenya
NCCR North-South Special Research Project on Water	125,000	A	SNSF, SDC	Global
Pilot Program for Climate Resilience (PPCR) Component on Agriculture and Sustainable Land Management	80,000	C	World Bank	Tajikistan
Sustainable Land Management Programme	35,000	C	Syngenta Foundation	Eritrea
World Overview of Conservation Approaches and Technologies (WOCAT)	600,000	C	SDC, others	Global
Multidimensional Disparities				
Lao DECIDE Info	265,000	C	SDC	Laos
NCCR North-South Research Project on Access and Welfare	267,500	A	SNSF, SDC	Laos, Vietnam, Tanzania, Kenya, Mauritania
NCCR North-South Research Project on Adaptation to Climate Change	100,000	A	SNSF, SDC, others	Kenya, Swiss Alps, Côte d'Ivoire, Pakistan
NCCR North-South Special Research Project on Climate	50,000	B	SNSF, SDC	Global
NCCR North-South Special Research Project on Food	125,000	B	SNSF, SDC	Global
NCCR North-South Special Research Project on MDGs	50,000	B	SNSF, SDC	Global
Joint Research Project on Landless Pastoralists	90,000	B	SNSF, SDC	Pakistan
Governance of Land and Natural Resources				
Capacity Building for Environmental Impact Assessment	80,000	C	FOEN	Central Asia, Azerbaijan
MontanAqua (under National Research Programme 61)	70,000	B	SNSF	Switzerland
NCCR North-South Research Project on Rural Transformation	127,500	A	SNSF, SDC	Bolivia, Mexico

Environment and Security in Water Management	50,000	C	FDFA	Caucasus
Governance of Forest Multiple Outcomes in the Bolivian Lowlands (GOFORBO)	95,000	B	SNIS	Bolivia
Swiss Alpine Research	70,000	B	UNESCO World Heritage	Switzerland
The Water and Land Resource Centre Project	900,000	B	SDC	Ethiopia, Kenya, Tanzania
Global Change Impacts				
Backstopping Mandate on Environment and Development	600,000	C	SDC	Global
Capacity Development in Geoinformation	100,000	C	SDC	North Korea
Mountain Research and Development (MRD) International Scientific Journal	200,000	B	SDC, CDE, IMS, others	Global
NCCR North-South Research Project on Landscape Transformation	215,000	A	SNSF, SDC	Laos, Ethiopia, Kenya
NCCR North-South Special Research Project on Land	125,000	B	SNSF, SDC	Global
NCCR North-South Thematic Node 3 core funding	100,000	A	SNSF, SDC	Global
Mountains at Rio+20	110,000	C	SDC	Global
Large-scale Land Acquisitions in Southeast Asia	50,000	C	SNIS	Laos, Cambodia
Innovations in Sustainable Development				
ArcGIS Server Implementation Project	100,000	C	Canton of Lucerne	Switzerland
Eastern and Southern Africa Partnership Programme (ESAPP)	700,000	B	SDC	East Africa
Bioenergy in Africa and Central America (BIA)	150,000	C	EU-ERA-ARD	Ethiopia, Kenya, Tanzania
Long-term Monitoring of Syngenta Foundation's Involvement	150,000	C	Syngenta Foundation	Mali
House Insulation and Efficient Stoves to Reduce CO ₂ Emissions	70,000	C	REPIC	Kyrgyzstan
Biofuel Production: Spatial Impacts and Normative Powers	100,000	A	SNSF	Global, Ethiopia, Tanzania
The Agrobiodiversity Initiative (TABI)	270,000	C	SDC	Laos
Education for Sustainable Development				
Training Course on Climate Change Adaptation	15,000	C	GIZ	Uganda, India
International Graduate School (IGS) North-South	90,000	B	SNSF, universities of Bern, Basel, Zurich	Global
Training Course on Climate Change	125,000	C	SDC	Global
Various teaching mandates, e.g. Zurich University of Applied Sciences, NADEL, University of Lucerne	20,000	C	Various	Switzerland
Geoprocessing for Natural Resource Monitoring: Capacity Strengthening	130,000	C	SNSF	Tajikistan, Kyrgyzstan
Training Module for IGS North-South	150,000	B	SNSF	Global
Services Unit				
Various books, brochures, editing of publications	50,000	B	Various	
NCCR North-South Partnership Regions (JACS)	900,000	B	SNSF, SDC	Global
NCCR North-South Management Centre	1,000,000	B	SNSF, SDC	Global
NCCR North-South Thematic Nodes 1 and 2	1,800,000	B	SNSF, SDC	Global
NCCR North-South Thematic Nodes 3 and 4	1,500,000	B	SNSF, SDC	Global
University Funds³				
University Funds	2,863,800			
Overall Total	15,688,800			

¹ Project types: A = Projects of the Department of Integrated Geography that are of strategic interest for CDE; B = Projects led jointly by CDE and the Department of Integrative Geography, in terms of both strategic guidance and content; C = CDE projects of strategic interest for the Department of Integrative Geography

² Acronyms: SDC = Swiss Agency for Development and Cooperation; EU-FP7 = European Union Seventh Framework Programme; GEF = Global Environment Facility; NCCR = National Centre of Competence in Research; SNSF = Swiss National Science Foundation; FOEN = Swiss Federal Office for the Environment; FDFA = Federal Department of Foreign Affairs; SNIS = Swiss Network for International Studies; UNESCO = United Nations Educational, Scientific and Cultural Organization; IMS = International Mountain Society; EU-ERA-ARD = European Union, European Research Area, Agricultural Research for Development; REPIC = Swiss Interdepartmental Platform for Renewable Energy and Energy Efficiency Promotion in International Cooperation; GIZ = Deutsche Gesellschaft für Internationale Zusammenarbeit

³ University of Bern, in compensation for research, services in teaching and supervision, and general university functions

Spotlight: Global change and its impacts on sustainable development

Selected features of CDE's programme work

Increasing interest in natural resources of the global South is once again in the limelight of the international policy arena. High prices for natural commodities, strong demands from emerging economies, climate policies of the global North, biodiversity conservation efforts, and growing populations set the scene for increasing claims to land and water resources of the global South. These processes put ecosystems under stress and create inequalities regarding the distribution of benefits and drawbacks. With its efforts in research, education, and policy dialogue, CDE's Global Change Impacts Cluster aims to enhance capacities to manage these processes in a way which leads to outcomes that are more beneficial for human well-being and less destructive to the environment.

Markus Giger, Head of Global Change Impacts Cluster

Over the past decade we have observed a rush for land, and countries with large supplies of land – be it in Africa, Asia, or Latin America – are becoming attractive targets for investments. At the same time, a number of resource-rich countries have emerged as strong actors in the global arena. Private-sector companies have become powerful players in international development, challenging conventional development assistance as they invest huge amounts in infrastructure, extractive activities, production, and value chains, but also increasingly in the delivery of services such as agricultural extension and innovation. Globally, rural transformation, driven by deforestation, agricultural commercialisa-

tion, mining, tourism, infrastructure development, and climate change is advancing at a rapid pace.

Against this background, CDE understands global change as the simultaneous and manifold changes occurring in the economic, social, and environmental spheres and emerging from or aggregating to a global level. CDE's Global Change Impacts Cluster implements a number of projects that deal with such global changes. We focus on the related rural transformation processes and how they alter the opportunities and constraints for sustainable development. Our research examines questions such as:



Global concepts and local reality meet at a rural market in Lao PDR.

How will global change affect their lives? Girls in Cape Verde.



- How do global change processes affect rural transformation and, as a consequence, local economies, people's livelihoods, and the environment?
- Do the rapid changes we can observe in many parts of the world follow predictable patterns that we can understand, describe, and forecast by applying better methodologies and more sophisticated tools?

Each year, CDE's annual report spotlights one of our six thematic clusters. This year, the focus is on the Global Change Impacts Cluster. On the following pages we present selected highlights of the cluster's ongoing projects.

The world might not run out of resources soon if new products and rapid technical innovation succeed in tapping new potentials for resource extraction and production of renewable commodities and energy sources. But the run for these resources is putting ecosystems under increasing stress. Planetary boundaries appear to have been approached or exceeded in many respects. At the same time, the outcomes of global change in terms of economic and social benefits are often highly inequitable, depending on the context and the quality of governance processes at different levels.

CDE works with actors and governance structures at different levels to support collective management of global change processes so that they contribute towards a sustainable future.

Spotlight: Global change and its impacts on sustainable development

Transnational land acquisitions as drivers of rural transformation in the global South

Between 2000 and 2011, an area of land in the global South the size of France and Germany combined, was subject to negotiation for acquisition by foreign investors for agricultural purposes. This corresponds to 1.7% of the world's total agricultural area. Research conducted by CDE and its partners has shown that activities to implement agriculture have begun on about one quarter of this land. A report recently issued in collaboration with the International Land Coalition (ILC) has analysed the most up-to-date and reliable information in order to provide evidence of the extent and impact of large-scale acquisitions of land.

Markus Giger, Head of Global Change Impacts Cluster
Peter Messerli, Director

Following the dramatic rise in prices for agricultural commodities in 2007/2008, a sudden increase in land acquisitions – purchase, lease, or concessions – by foreign investors has been reported worldwide. Many civil-society and farmer organisations at the global and national levels have mobilised against this rush to acquire farmland (“land grabbing”), pointing to the risk that smallholders and pastoralists could lose their rights and access to land and, consequently, their most precious livelihood assets.

Although several organisations have begun to collect and analyse data on this development, verifiable and reliable data on the scale, location, and actors behind land deals for this purpose have, until recently, been scarce and contradictory. There was no systematic monitoring, and a lack of sufficient information on impacts and drivers of this global phenomenon.

A unique database on land acquisitions

CDE, in partnership with CIRAD (Centre de coopération internationale en recherche agronomique pour le développement) of France, the German Institute of Global and Area Studies (GIGA), and ILC, began to systematically collect data on large-scale land acquisitions with the aim of revealing the global dimensions of this phenomenon. This consortium, known as the Land Matrix Partnership, set up a database containing information on over 1000 land deals, and worked to prepare publication of initial analyses in early 2012. Analyses of cross-referenced data revealed that the rush for land is real and not just a media hype or a short-term reaction to the food price spikes in 2008/2009. Activities to implement agriculture have started on about one quarter of the area of the land in question, and one third of the deals reported have so far actually



Albrecht Ehrensperger

Sisal plantation near Fort Dauphin, Madagascar.

led to signed contracts. But our data also show that many transactions may as yet be unknown; we assume that current data still underestimate the scale of the phenomenon.

Besides allowing for a first assessment of the phenomenon's overall scale, the large database makes it possible to identify emerging global patterns. Transnational land acquisitions are heavily concentrated in Africa. Worldwide, 70% of the reported deals have taken place in 11 countries, 7 of which are in Africa. The map in Figure 3 shows national-level data on land deals compared to the agricultural area in each country, and indicates the importance of the phenomenon. The map shows

that in some countries the area covered by land deals adds up to more than 40% of the respective country's agricultural area. Many of the countries concerned are also affected by a high incidence of hunger and have economies that are heavily dependent on agriculture.

The database also identifies three categories of investor countries: emerging economies, the Gulf States, and the global North. One interesting trend shows the emergence of new regional patterns, for example in Southeast Asia, where a majority of the investors come from within the region (China, Vietnam).

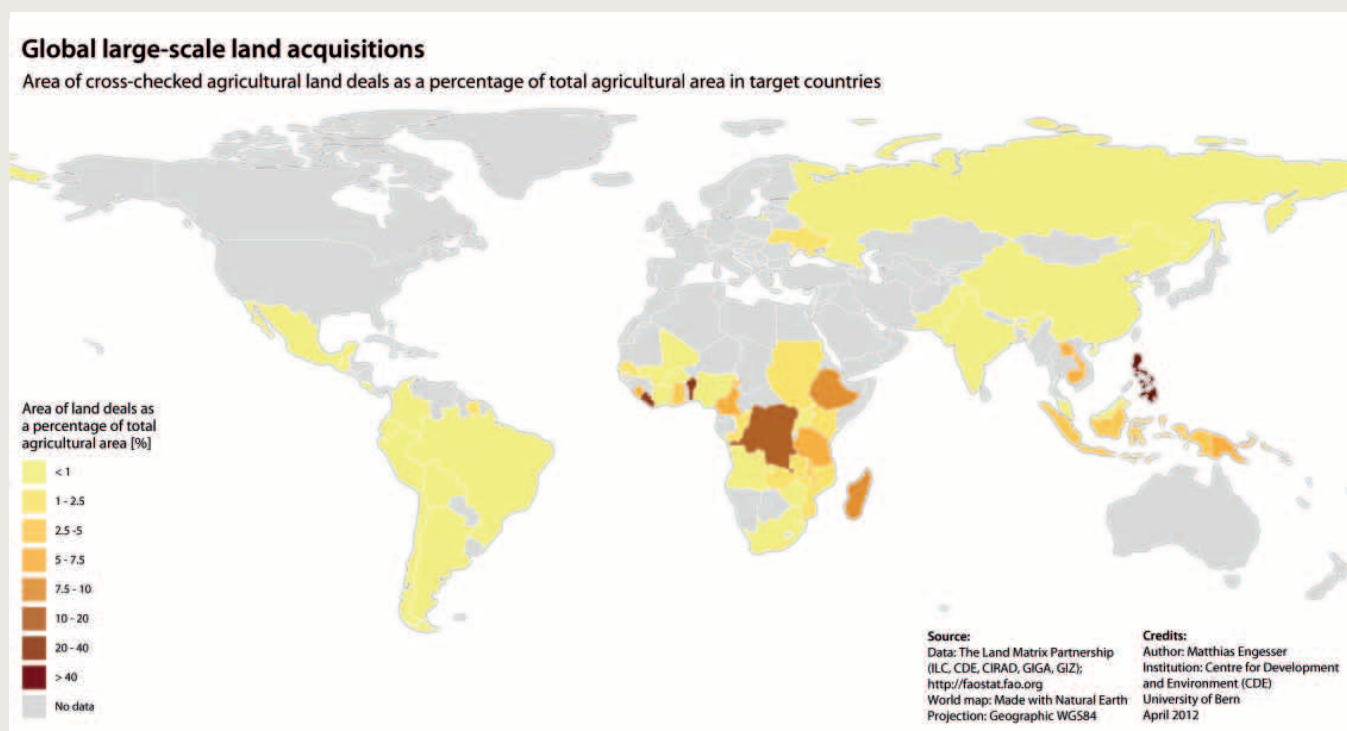


Figure 3: The map shows the surface area of 625 cross-checked land deals as a percentage of the total agricultural area for each country. Shading in yellow and brown indicates the high importance of land deals for the countries concerned. (Source: ILC, FAO)

Using geo-referenced data to investigate land deals

Are investors looking for land that is already being farmed or for so-called “underused land” such as pastures and forests? Are investors targeting areas that are already populated and easily accessible? Is the rush for land also a rush for water resources? To answer such questions, CDE analysed the available data set with the help of geo-referenced data (Figure 4). Preliminary analysis of 246 land deals covering more than 14 million ha, for which geo-referenced data are available, shows that in many cases, investors are targeting land that is already being used for agriculture by local communities: 43% of all deals are in this category. Thus, inves-

tors have a tendency to overproportionately target land already used as cropland by local communities. Using other data layers, it can be shown that the land acquired often has a relatively high population density and is easily accessible. Therefore, even though analysis at the global scale reveals a tendency to contract land in countries with a relative abundance of available land, in almost half of the cases the land targeted is already used by local farming communities. Intense competition and conflicts with farmers are thus unavoidable. But forested land (24% of the deals) and open and closed shrubland/grassland (28% of the deals) are also concerned, leading to trade-offs between the objectives of biodiversity conservation, climate policies, and food security.

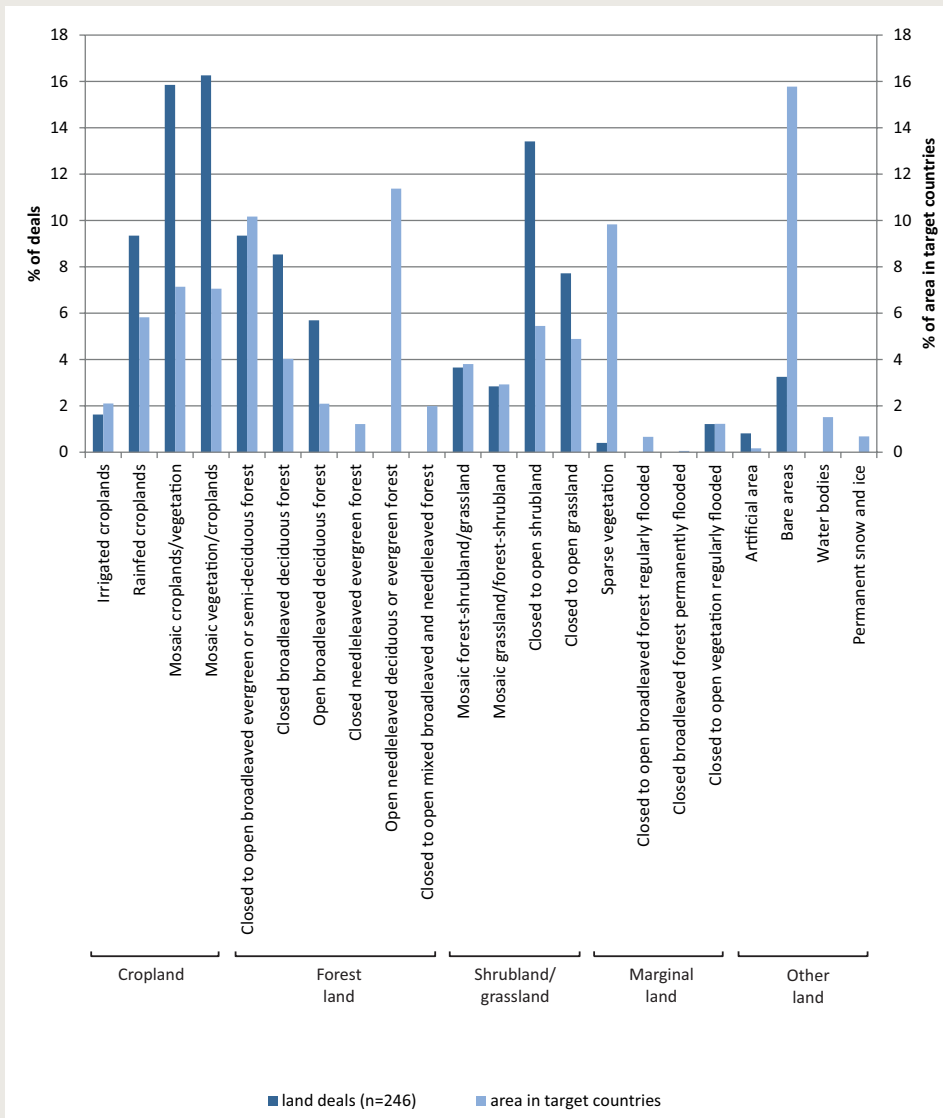


Figure 4: Share of land acquisitions in different global land cover classes. Note: The y axis on the left represents the share of all agricultural land deals affecting a given land cover class, whereas the y axis on the right indicates what share of the combined area of all destination countries falls within a specific land cover class. (Source: Anseeuw et al 2012)

Local labourers drying cassava which was grown on a large-scale land concession, Lao PDR.



Continued outreach and research activities in hotspots of land acquisitions

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To create greater transparency regarding land acquisitions, CDE and ILC, with funding from the Swiss Agency for Development and Cooperation (SDC), have now launched an innovative pilot project in 5 countries that aims to improve data collection and analysis as well as policy dialogues on land deals and their impacts by means of an interactive web-based GIS platform. Other research projects at CDE, such as Bioenergy in Africa and Central America (funded by SDC) and Large-scale Land Acquisitions in Southeast Asia: Rural Transformations between Global Agendas and Peoples' Right to Food (funded by the Swiss Network for International Studies), investigate the deeper impacts of land deals in East Africa and Southeast Asia.

Land acquisitions have become a direct driver of rural transformation and global change in the countries of the global South. CDE views land acquisitions as one form of the growing claims to resources being made by remote and global stakeholders. Other such claims include the use of land for production of global goods such as carbon sequestration, biodiversity conservation, and access to water resources. In the coming years, CDE will conduct further research regarding the impacts of these claims, the actor networks driving the changes that they bring, and governance approaches to support equitable decision-making and empowerment of the population groups potentially marginalised as a result.

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Climate change and land use in Central Asia

Tajikistan is particularly exposed to the risks of climate change. Its widely degraded landscapes are poorly prepared to cope with changes in precipitation patterns, temperature increase, drought, and the spread of pests and diseases. Implementation of sustainable land management practices will ensure that land becomes healthy and less vulnerable to climate extremes. An evaluation carried out by CDE for the World Bank Pilot Program for Climate Resilience in Tajikistan revealed that encouraging individual initiatives in land management exist, and it underscores the importance of decision support tools for adapting land use to climate change.

Bettina Wolfgramm, Senior Research Scientist

Encouraging initiatives for sustainable land management

While land degradation in Tajikistan is widespread, an increasing number of largely private initiatives have been aiming to prevent it, and experience with sustainable land management practices is accumulating. Many of these practices are traditional; others were introduced in Soviet times or developed by innovative farmers after the late 1980s when private land tenure was introduced, while still others have been developed by international programmes since the 1990s.

A consortium of local and regional partners, led by CDE and the Swiss National Centre of Competence in Research (NCCR) North-South, has taken up the task of documenting these practices for Tajikistan in the context of a specific project of the Pilot Program for Climate Resilience (PPCR) in Central Asia, funded by the World Bank. The project has identified no fewer than 70 technologies and approaches throughout the country. These were documented in a standardised format using an appraisal tool provided by the World Overview of Conservation Approaches and Technologies (WOCAT), a long-term global initiative whose secretariat is hosted by CDE. The sustainable land management (SLM) practices identified by the project were divided into 10 technology groups, according to their capacity to cope with the impacts of climate change (see table).

Technology groups	No. of SLM technologies identified	Climate change impact being addressed by technology group
Improved grazing land	4	Vegetation degradation due to decreased soil moisture availability
Irrigation infrastructure management	7	Changed patterns of water availability and water shortage
Water harvesting	3	Drought due to less frequent but extreme rainfall
Land productivity enhancement	7	Productivity decline due to spread of pests and diseases after warm winters
Cross-slope measures: on-site protection	5	Soil erosion due to extreme rainfall events
Cross-slope measures: off-site protection	4	Landslides due to extreme rainfall events
Agroforestry	10	Crop failure in monoculture systems caused by changed climate patterns
Planted and natural forest	3	Riverbank erosion due to extreme rainfall events
Tree belts	4	Change in microclimate caused by changed rainfall patterns
Indirect SLM measures (improved stoves)	2	Increased desertification due to changing rainfall patterns and human pressure

Overview of groups of sustainable land management technologies and the specific climate change impact they address. (Source: Wolfgramm et al 2011)

Figure 5: Three different zones to promote scaling up of sustainable land management at the village level.



Photo by Hanspeter Linger

Land management for climate change adaptation

How can land management support management of climate change vulnerability? The project has helped to identify four guiding principles in response to this question. These principles are:

1. Diversify land use practices and farm incomes
2. Intensify the use of natural resources in a sustainable way
3. Scale up land use practices that achieve high productivity to larger areas
4. Protect land and livelihoods

In order to achieve tangible effects in adaptation to climate change, however, sustainable land management practices must be scaled up from individual households and isolated model plots – which occur frequently throughout Tajikistan – to entire zones, landscapes, and communities. The project has taken a village-based approach to promoting the expansion of successful practices to larger units of land, and proposes to distinguish three specific zones at this level known as the in-village, near-village, and off-village zones (Figure 5).

Each zone requires different and specific land management technologies and approaches as well as specific supporting policies. The three zones are closely interlinked; changes in one zone may

affect the other zones through off-site effects. Thus integrated planning is required. To add to this challenge, the physical features of each zone differ from village to village – and so do the communities.

Knowledge management and decision support

Land users, advisors, decision-makers, and policy-makers thus face the task of finding management practices that are best suited to site-specific conditions. This task is most efficiently addressed in collaborative efforts, and an appropriate knowledge platform can greatly facilitate it. Such a platform is now available as one of the results of the PPCR project and needs to be maintained and developed further. It contains the following five elements:

- Training and support for continued standardised documentation of land management practices, and dissemination of these practices by means of a manual which documents the 70 technologies and approaches in Russian and English;
- Monitoring and evaluation of the performance and impacts of land management practices using modern methods such as soil spectral libraries for rapid and inexpensive assessment of soil properties and engaging students at the Master's and PhD levels to support local capacity development;

- Collaboration with innovative land users to disseminate and scale up proven practices, spreading their experience through video documentaries;
- Preparation of an online knowledge platform that makes relevant material – data, tools, and scientific publications – publicly available through an appropriate regional institution, in this case the University of Central Asia;
- Knowledge sharing at the global level; opportunities for exchange during the reporting period included the 2011 WOCAT annual conference in Central Asia; the Climate Smart Agriculture Publication currently being prepared by FAO (2011–2012); and various publications in peer-reviewed journals.

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A comparative case study: The impact of mulching in vineyards

In a terraced vineyard at the Karsang field station of the Soil Institute of the Academy of Agricultural Research in Tajikistan, experiments in conservation farming showed that mulching increased soil moisture by 10–20% due to reduced evaporation in the short term. This effect is substantial and has immediate benefits for plant growth and crop yield. In the longer term (8 years), mulching significantly increased soil organic carbon (SOC) content, indicating overall improved soil health. On average, plots with mulch showed an SOC content of 1.3%, as against an SOC content of 0.4% on control plots in the top 15 cm of the soil profile (see photo and Figure 6 below).



Mulching with vine branches.

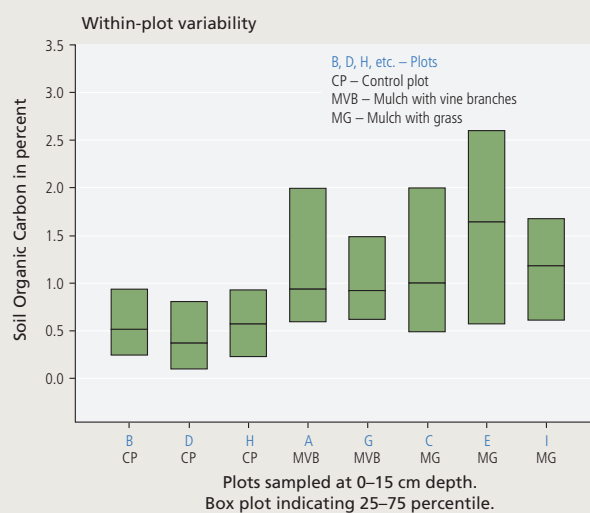


Figure 6: Soil organic carbon (SOC) content on plots with mulching using grass or branches, and without mulching. (Source: Shokirov 2011)

Spotlight: Global change and its impacts on sustainable development

Global change and regional resource claims in Laos

The Lao People's Democratic Republic (Lao PDR, or Laos) is situated in the heart of the economically highly dynamic region of mainland Southeast Asia. Based on the country's wealth in natural resources and a change in the ruling Communist Party's policy towards economic opening, Laos has become a supplier of raw agricultural commodities, tree crops, minerals, and hydropower for its neighbours. The large and dominant economies of China, Thailand, and Vietnam are thus the main drivers of a drastic increase in the demand for land and of rapidly growing pressure on natural resources in Laos. Until recently, there was no comprehensive spatial overview of these developments in Laos. But understanding the spatial distribution of the various land-based economic sectors is essential for informed decision-making with regard to potential related trade-offs. CDE – in collaboration with the NCCR North-South and national and international development partners – has helped to close this information and knowledge gap.

*Andreas Heinemann, Michael Epprecht, Senior Research Scientists
Kaspar Hurni, Cornelia Hett, Oliver Schönweger, PhD Candidates*

Laos: Southeast Asia's power station

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The mountainous topography of Laos holds significant potential for hydropower generation. Over the last decade, hydropower projects have mushroomed. Most of them are designed to produce power for export, to feed the energy hunger of neighbouring Thailand, China, and Vietnam.

A recent study by the World Bank and CDE addressed this issue by compiling available hydropower data and representing them visually on maps, thereby enabling easy access to this information. The study identified over 100 hydropower projects at various stages of construction or planning. According to the

information available, these projects would flood at least 290 villages, directly affecting around 100,000 people or about 2.5% of Laos's rural population (see table on next page). Interestingly, hydropower projects will increasingly move into more marginal and poorer areas in the future: the estimated poverty rate was significantly higher in areas of hydropower projects in their early planning stage (49%) than in areas of more advanced projects (41%), while both were above the national poverty rate (35%). The study results found a wide echo in policy and development arenas and dialogues, and were published in the high-profile *Lao PDR Development Report 2010* of the World Bank, CDE, EU, and the Australian Government (Vostroknutova et al 2011).

Nam Ngum dam and power station, Lao PDR.



Barbara Vollenwyder

Commercial pressures on land

In an initiative involving the Lao DECIDE Info programme – funded by the Swiss Agency for Development and Cooperation (SDC) – as well as the Swiss National Centre of Competence in Research (NCCR) North-South and GIZ (Gesellschaft für Internationale Zusammenarbeit, Germany), CDE is currently working to compile and analyse a comprehensive land concession inventory of Laos. First results indicate that during the last decade, the number of land concessions has increased by a stunning average of over 100% annually; currently, there are over 2,200 land concessions in Laos, which is over 100 times more than in early 2000. Mining is the largest sector in terms of land surfaces, followed by the agriculture and forestry sectors; the three sectors together make up over 75% of the total concession area, which is largely based on foreign direct investment (Figure 7). The inventory also shows that foreign concessions exceed domestic investments by a factor of 10 – which is not surprising, but nonetheless crucial when considering the local population's weak or in-existent negotiation power with regard to these land deals. Most concessions were granted in relatively easily accessible areas with relatively low poverty rates, but almost 30% of the villages in which a concession was granted have poverty rates above 50%. Spatial analysis offers an exceptional opportunity to gain insight into the larger pattern of land investment in the country, and provides transparency and guidance to related policy debates. The results of the inventory will soon be published in the official first national report on land concessions in Lao PDR.

Payment for carbon sequestration: an opportunity for poverty alleviation?

Besides the economically driven pressure on land and resources, a certain claim to land is also made by the international community in relation to global climate change and emerging mitigation approaches. The global mechanism for reducing emissions from deforestation and forest degradation and enhancing forest carbon stocks in developing countries (REDD+) is being heavily promoted in Laos and has become an important component of the forestry

Status of hydropower project	Villages affected	Population affected	Poverty rate (%)
Under construction	31	12,583	41
In planning	86	27,438	45
Feasibility study	176	64,941	49
Total	293	104,962	47
National level			35

More recent hydropower projects affect more villages, a larger population, and poorer people. (Source: Vostroknutova et al 2011)

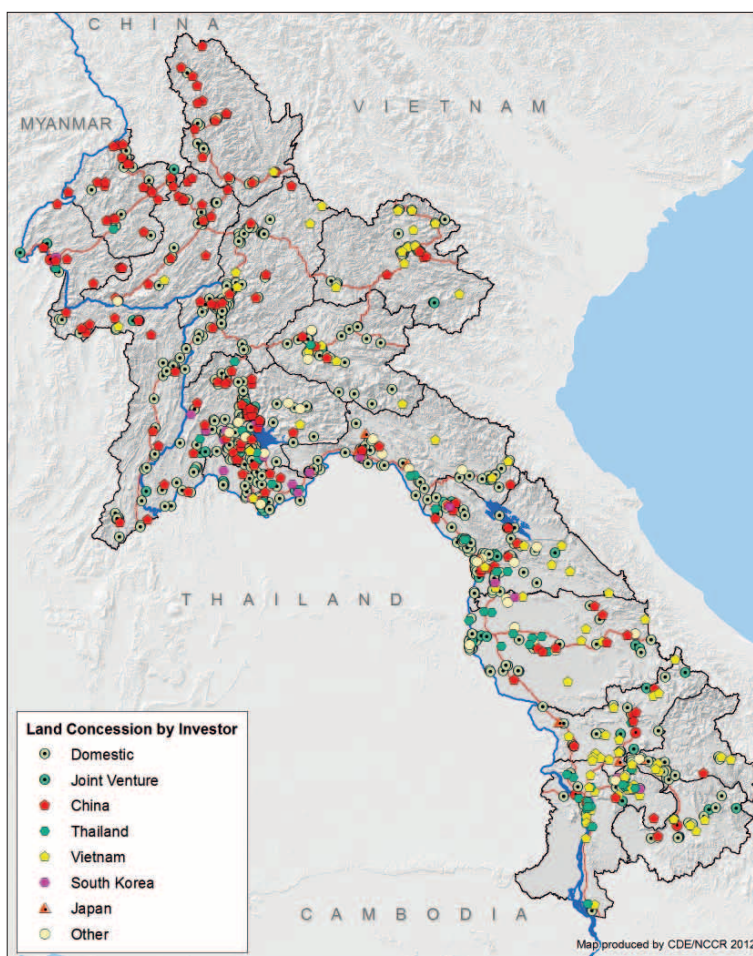


Figure 7: Land concessions in Laos, by investor. (Source: Schönweger et al, in press)

*Small-scale rice farming
in the mountains
of Lao PDR.*



Peter Messerli

sector. REDD+ appears to be a promising opportunity to address climate change and poverty simultaneously. To date, it remains unknown how REDD+ relates to poverty in Laos. Despite selected insights from local case studies, a systematic analysis of the linkages between poverty and carbon at the national level has been missing. To provide first insights, we carried out a study within the NCCR North-South research project on landscape transformation, combining spatial information on carbon stored in vegetation and on poverty, thereby creating carbon–poverty typologies for the whole country. We found that Laos has considerable potential for “pro-poor” REDD+ schemes for poor and remote regions. At the same time, a look at the spatial distribution of population density showed that 58% of poor people live in areas with a low carbon mitigation potential (Figure 8). This calls for a spatially differentiated evaluation of potential REDD+ schemes: while REDD+ may have considerable potential for contributing to poverty alleviation in some poorer regions, it can hardly be considered as a key instrument for poverty alleviation at the country level.

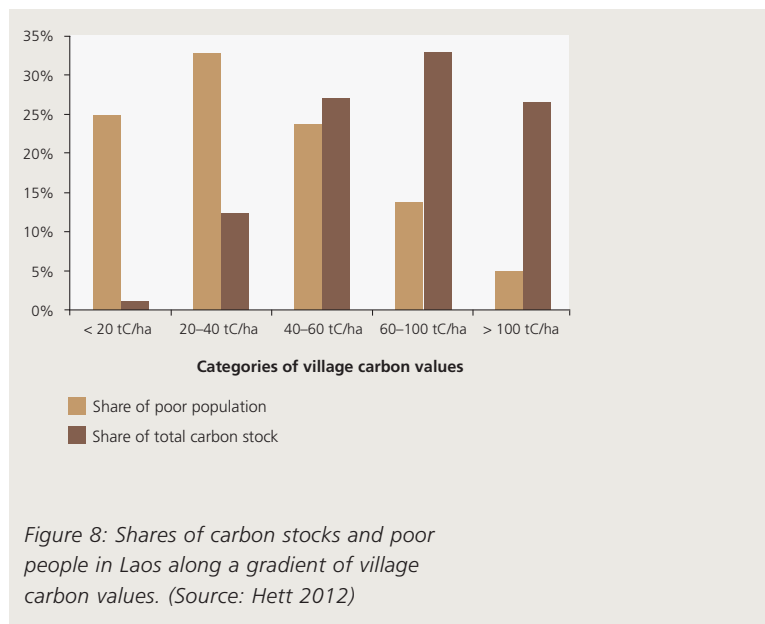


Figure 8: Shares of carbon stocks and poor people in Laos along a gradient of village carbon values. (Source: Hett 2012)

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Spotlight: Global change and its impacts on sustainable development

Universities in times of global change

Global change and the need for sustainable development affect universities as well. Students today are generally sensitised to issues relating to global change, be it climate change, ecosystem degradation, economic instability, social disparities, demographic pressure, or gender inequality. The recent Rio+20 United Nations Conference on Sustainable Development (UNCSD) has reaffirmed that sustainable development cannot be achieved exclusively by technical, regulatory, or financial means: research and education are required to change the way we think and act. Although many universities throughout the world increasingly acknowledge the relevance of embedding sustainable development in their teaching, research, and management, they struggle to position it in their mandates. Against this background, the University of Bern has markedly increased its efforts to be a front runner in translating sustainable development into its overall mission, by promoting it at all levels of education and research.

Hans Hurni, Urs Wiesmann, Heinzpeter Znoj, Members of the CDE Board

In the cantonal mandate detailing the university's tasks for 2010–2013, the Bernese government included a statement on sustainable development, requesting the university to “work towards achieving sustainable development and clarify, by the end of 2011, its interpretation of the term and the tasks involved”. CDE had been founded in August 2009 with this mission. Accordingly, the university mandated the CDE Board to help translate the task and clarify the university's role in promoting sustainable development in research, education, and on campus. In the case of Bern, the campus is not a single location, but spreads across a multitude of buildings in one part of the city.

We immediately began implementing this new assignment and organised a series of discussions with representatives of each of the university's

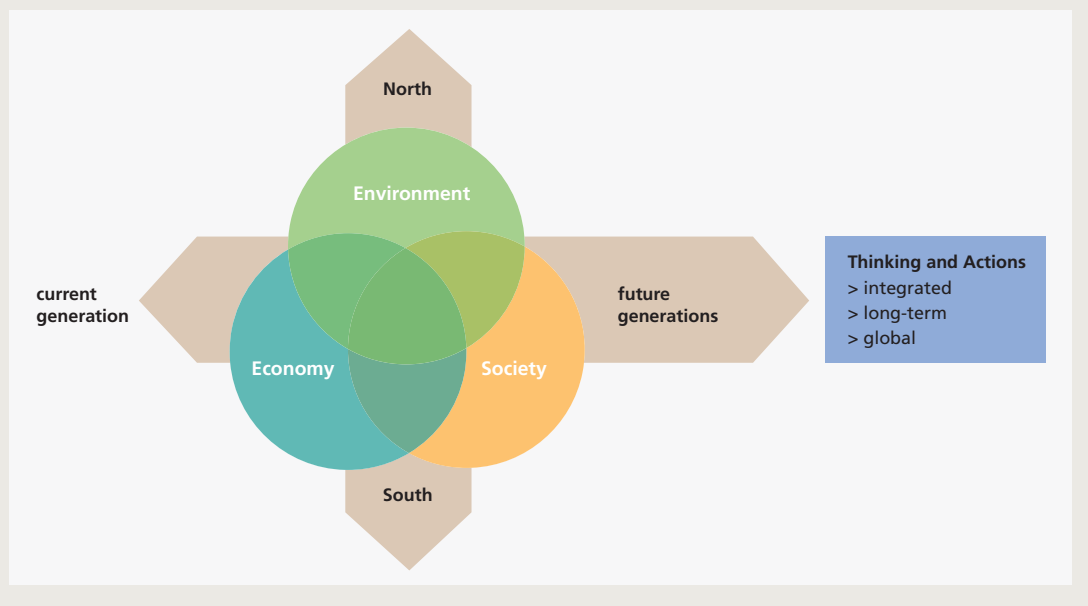
eight faculties and the then six research centres, as well as with representatives of the students, assistants, lecturers, and the various departments of the university administration. This series of meetings in early 2010 led to a baseline report containing highly stimulating input ideas and workshop outcomes (Hurni et al 2010). We used the definition of sustainable development established by the Brundtland Commission in 1987, as promoted by the cantonal government in 2006 (Figure 9).

We concluded in the 2010 baseline report that sustainable development can be used as a guiding principle in further developing the university. Two main fields of action were identified: (a) Internally, the university should optimise all three dimensions of sustainable development and become a workplace and a space for living and learning that is



Presentations at a training course of the Swiss National Centre of Competence in Research (NCCR) North-South.

Figure 9: Visualisation of sustainable development as promoted by the Canton of Bern in 2006. (Source: Staatskanzlei des Kantons Bern 2006, translation by CDE)



exemplary in this regard and thus takes a leading role in society. (b) Towards the outside, sustainable development should be introduced in the university's vision, strategy, and mission statements, where it has been missing so far. In research the topic of sustainable development has had a fairly solid base for many years, particularly in integrated research programmes and in some of the new university centres such as CDE. In the field of education, however, sustainable development should be introduced in all curricula of the university, although in varying detail and according to the specific needs of each curriculum. The option of specialising in sustainable development should be offered to students at all levels of education and in lifelong learning.

A number of steps were taken in 2011 towards implementing the measures proposed above. The most important was to strengthen the university's capacity in the field of sustainable development by creating two new specialised professorships, one in sociology and one in biology, in addition to the existing ones in geography and further disciplines. At the rector's office, the university specifically assigned a vice rector for quality assurance and sustainable development in 2011, and at the level of the senate, a specific commission for sustainable development was established in 2012.

Compared with other universities in Switzerland, the University of Bern is now well underway towards becoming a model institution in terms of sustainable development, with its new institutional arrangements, its willingness to introduce sustainable de-

velopment in education, and its integrative research programmes operating in Switzerland, Europe, and overseas, including in developing and transition countries. We consider this an opportunity for the University of Bern as a medium-size "full university" that is located in the capital of Switzerland and has close links to both the federal and the cantonal administrations as well as to the national political arena.

At the international level, the University of Bern is also on its way to the forefront of universities pushing sustainable development. Given that all heads of state fully subscribed to sustainable development at Rio+20, the UN Conference on Sustainable Development held in Rio de Janeiro on 20–22 June 2012, it can be anticipated that more and more organisations and institutions will call for support in developing their strategies, needing more competence in the field of sustainable development. Universities will be asked to share this competence in their curricula and training courses, in creating innovation, and in generating knowledge.

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Partners and networks

Centre for Agroecology (AGRUCO), University of Cochabamba, Bolivia

CDE's programmes and mandates all critically depend on strong partnerships with organisations in the places we work in, be it at the global, regional, national, or local levels. Many of these partnerships have led to close ties with personalities at our partner institutions in academia, the public administration, international organisations, and civil society. It is impossible to present and appreciate these partners' work in a summary annual report such as this one. For this reason, we have invited one specific partner – the Centre for Agroecology (AGRUCO) at the University of Cochabamba, Bolivia – to provide an account of how the long-term links between our two institutions evolved and what the future holds with regard to continued collaboration.

Freddy Delgado, Director General, AGRUCO, Cochabamba
Stephan Rist, Head of Land Governance Cluster, CDE

AGRUCO has been a key partner of CDE and the Swiss National Centre of Competence in Research North-South (NCCR North-South) in South America for more than a decade now. Formally, AGRUCO is a centre of excellence of the University of Cochabamba. It was initiated by the university's Faculty of Agronomic Sciences in 1986, with support from the Swiss Research Institute of Organic Agriculture (FiBL), Intercooperation – a Swiss NGO – and the Swiss Agency for Development and Cooperation (SDC). Today, AGRUCO is fully financed by the University of Cochabamba and has a portfolio of programmes funded by third parties. Its multidisciplinary team of 35 experts is concerned with the development, dissemination, and institutionalisation of a novel approach to sustainability which puts the potentials and limitations of so-called "traditional", "local", or "indigenous" forms of natural resource governance and management centre stage.

Following this approach, AGRUCO's research has revealed a surprisingly high congruence of traditional agriculture – including the related knowledge, institutions, and technologies – with the principles of sustainability. But precisely these local forms of knowledge and resource management are increasingly threatened by fragmentation and disappearance. AGRUCO understands sustainable development as the systematic enhancement of endogenous forms of knowing, organising, managing, and governing land and natural resources. The classical understanding of development as a unilateral North-to-South transfer was thus replaced by an approach that strengthens, or creates, platforms, networks, and movements for exchange, includes marginalised people, and has the aim of jointly identifying those parts of endogenous knowledge that should be revalued and could be enhanced with relevant exogenous expertise. The result is



Participants of a course on land management and indigenous sustainable development organised by AGRUCO.

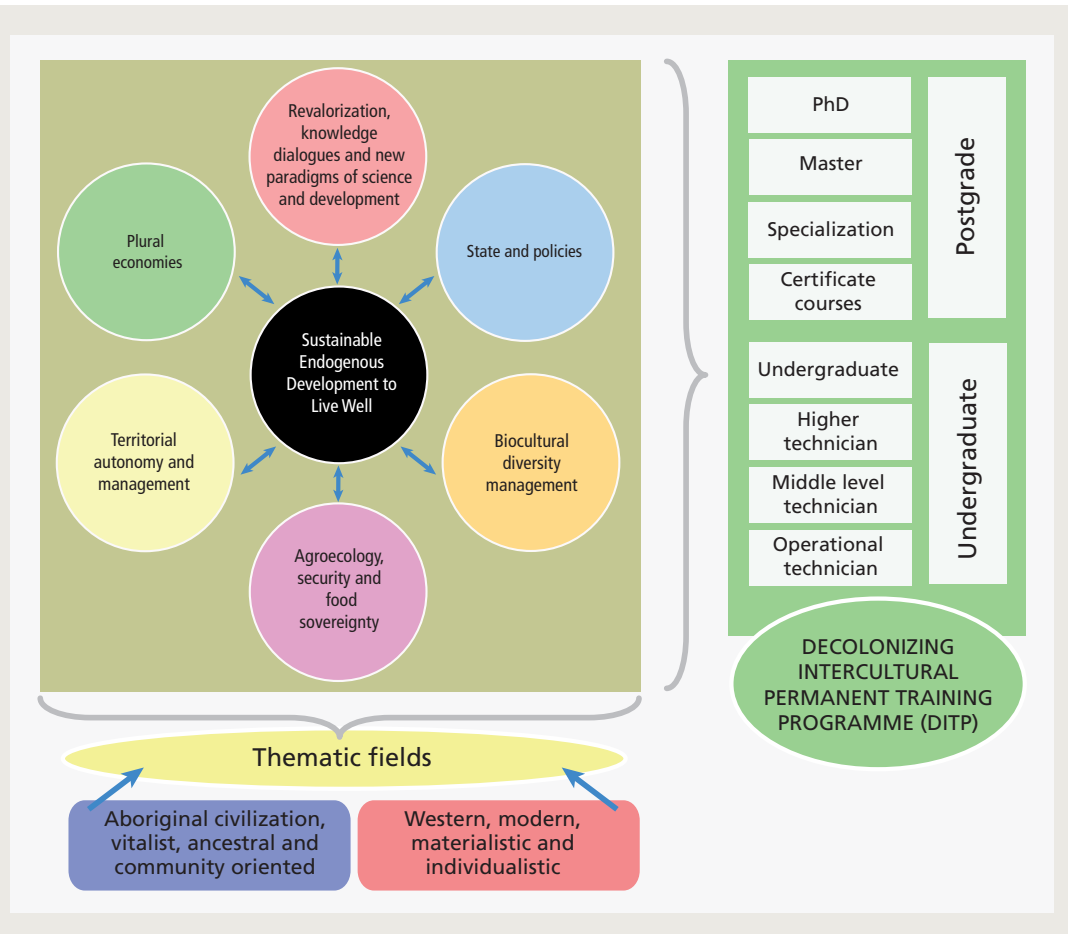


Figure 10: Conceptual framework of AGRUCO's Decolonizing Intercultural Permanent Training Programme. (Source: AGRUCO)

a process of open-ended social learning which is based on transdisciplinarity and co-produces knowledge among those involved: members of the rural communities, scientists, policymakers, NGOs, and owners of small businesses (Figure 10).

AGRUCO's collaboration with CDE started in 1999 in the context of a research project on Social Learning for Sustainability (SOLES) financed jointly by the Swiss Agency for Development and Cooperation (SDC) and the Swiss National Science Foundation (SNSF). Using and adapting the Autodidactic Learning for Sustainability (ALS) framework that had been developed by CDE, the project brought together university students, teachers, NGO workers, and indigenous communities to establish dialogues between different forms of knowledge. Evaluation of the project's processes and outcomes led to numerous publications in international peer-reviewed journals. The insights gained into the nature and dynamics of social learning processes, including their potentials and limitations, helped to refine the approach and its instruments as a vehicle for advancing sustainable development.

In 2001, thanks to the NCCR North-South, collaboration between AGRUCO and CDE took on a new dimension, in terms of both research and exchange. A project on conflicts in Tunari National Park that was carried out under the NCCR North-South, for example, provided room for 7 PhD candidates and more than 20 MSc students from Bolivia and Switzerland, and enabled researchers of CDE and other members of the NCCR North-South to participate in seven Master's courses at AGRUCO. The project's transdisciplinary approach implied intense cooperation between scientists, peasant movements, NGOs, and government organisations. Insights from this transdisciplinary collaboration regarding the need to enhance biological and cultural diversity alike motivated mainly peasant representatives of the constitutional assembly to establish that the Bolivian society addresses biocultural diversity in an integrative way and that this diversity has to be considered as a cornerstone of sustainable development in the country. Since 2009, AGRUCO has participated in a research initiative on the transformation of agrarian systems, again under the umbrella of the NCCR North-South, with a focus on the principles of



Social learning for sustainable land management includes learning from indigenous societies and especially women.

sustainability and the new notion of development known as “vivir bien” (living well) that has emerged in the Andean countries and especially in Bolivia. The research partnership between AGRUCO and CDE has further been deepened by a joint project on Governance of Forest Multiple Outcomes in the Bolivian Lowlands (GOFORBO) that studies trade-offs between livelihoods, biodiversity conservation, and carbon sequestration.

Cooperation between Switzerland and Bolivia enhanced and consolidated AGRUCO’s position at its home university in Cochabamba and on the national and international academic scenes. AGRUCO has benefited in various ways: for example, it has been entrusted with heading a South–South collaborative project for Capacity and Theory Building for Universities and Research Centres in Endogenous Development (CAPTURED), which is active in Africa, Latin America, and Asia.

The most recent development has seen AGRUCO, CDE, and the NCCR North-South join forces to establish a programme for continued education

oriented towards interculturality and decolonisation. This programme offers certificate courses at the University of Cochabamba for young members of rural communities engaged in the big social movements that have emerged in the Bolivian highlands and lowlands in recent years. The contents and methodology of the courses were defined in a transdisciplinary process between AGRUCO and these movements. Courses are taught almost entirely in the communities where the participants come from. Preparations also took place for a PhD course to be launched as part of the programme in the spring of 2012. It will be a joint venture between Bolivian and Swiss faculty members.

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Vostroknutova E, Nehru V, Dixon A, van Gelder L, Verghis M, Miwa K, Jagannathan V, Perumalpillai-Essex J, Illangovan P, Rex W, Barma N, Gibson D, Carlsson Rex H, Fenton N, Lindelow M, Stenhouse R, Bojo J, Davading S, Record R, Nghardsaysone K, Larsen M, Ruta G, Brahmhatt M, Fritz V, Fraser J, Li Y, Suri V, Andam K, McLinden G, Callander T, Wallace K, MacGeorge R, Stewart J, van den Toorn W, Krahn J, Larsen B, Heinemann A, Thomas I. 2011. Lao PDR Development Report 2010: Natural Resource Management for Sustainable Development – Hydropower and Mining. The World Bank, Washington, DC. 80 pp.

Wolfgramm B, Stevenson S, Lerman Z, Zähringer J, Liniger HP. 2011. Final report for Tajikistan pilot programme for climate resilience, component A5. Phase 1 On Agriculture & Sustainable Land Management. 54 pp.

CDE's PhD students at the International Graduate School (IGS) North-South in 2011*

Name	Working title of thesis	Funded by	Start of PhD	End of PhD
Anarbekov, Oytur	Irrigation management transfer: Questions of sustainability of Water Users Associations (WUAs) in Ferghana Valley	International Water Management Institute (IWMI); CDE; United Nations Economic Commission for Europe (UNECE)	2012	2015
Asnake, Mekuriaw	Assessment of the dynamics of soil and water conservation measures and land use change in the highlands of Ethiopia using remote sensing and GIS	National Centre of Competence in Research (NCCR) North-South	2010	2013
Bikketi, Edward	The role of social capital in social learning processes for soil and water management innovations: The case of Western and Eastern Kenya	Volkswagen Foundation; Swiss Government Scholarship for Foreign Students (FCS)	2010	2013
Brunswig-Sikaneta, Megan	Household welfare and accessing health care services in Tanzania: A spatial perspective	NCCR North-South	2010	2013–2014
Conradin, Katharina	World heritage sites and sustainable regional development	Self-funding; with support from World Heritage Site Swiss Alps Jungfrau-Aletsch and NCCR North-South	2011	2014
Faye, Papa	Managing the forest by the people: Constitutionality, citizenship and representation in two decentralisation initiatives in Senegal's forestry sector	CDE; Institute of Social Anthropology, University of Bern	2011	2014
Gambon, Helen	Constitutionality processes and social-ecological outcomes in an indigenous territory in the Bolivian lowlands	Swiss National Science Foundation (SNSF) Doctoral Programme (ProDoc)	2012	2015
Garrard, Rodney	Landscape dynamics in Sagarmatha (Mount Everest) National Park, Nepal: Impacts on selected environmental services and adaptive capacities	Commission for Research Partnerships with Developing Countries (KFPE); CDE; European Outdoor Conservation Association	2009	2013
Hergarten, Christian	Integrated assessment of ecosystem services of land use systems at regional scale	NCCR North-South	2009	2012–2013
Hett, Cornelia	Assessing vegetation-based ecosystem services and the relationship to land use and land cover change on a regional scale	NCCR North-South	2007	2012
Hurni, Kaspar	Spatial characterisation of land use patterns and land transformation processes in Lao PDR	NCCR North-South	2009	2013

Jacobi, Johanna	The contribution of organic farming to farmers' and ecosystem resilience in a changing climate: A comparison of different cacao cultivation systems in Alto Beni, Bolivia	Avina Stiftung; KFPE; NCCR North-South	2010	2013
Lemann, Tatenda	The dynamics of "blue" and "green" water uses in the upper Blue Nile Basin in Ethiopia: Towards improved decision-making and transboundary negotiations	Water and Land Resource Centre, SDC; NCCR North-South; CDE	2012	2015
Nazarmavloev, Farrukh	A soil spectroscopy library and its application for assessing soil fertility in agricultural lands of Tajikistan	FCS; University of Central Asia (UCA)	2012	2015
Portner, Brigitte	Spatial impacts of biofuel crop production	SNSF ProDoc	2009	2012–2013
Primasari, Nova	Dynamics of land use and stakes in Indonesia's peat lands and their impact on environmental services and local livelihoods: The case of Riau Province, Indonesia	Self-funding	2011	2014
Roth, Vincent	Discharge and erosion modelling in the upper Blue Nile Basin: Towards improved decision-making and transboundary negotiations	Water and Land Resource Centre, SDC; NCCR North-South; CDE	2012	2015
Schönweger, Oliver	Key factors and processes shaping the implementation of large-scale land acquisitions	Swiss Network for International Studies (SNIS)	2012	2015
Shabdolov, Alisher	Improved governance of rangeland in the Western Pamirs: Implications for common property management of scarce pasture resources in mountain regions	FCS; UCA	2012	2015
Tadele, Amare	Assessing the long-term impact of soil terracing on carbon sequestration in the highlands of Ethiopia	NCCR North-South	2010	2013
Thanichanon, Puwadej	Effects of market integration on land use and welfare in Xayaburi Province, Lao PDR	NCCR North-South	2009	2012–2013
Vergara, Cristian	Implementation of the REDD+ scheme in the Pilon Lajas Biosphere Reserve, Bolivia: An evaluation based on a social multi-criteria framework	SNSF ProDoc; self-funding	2012	2015

*Includes IGS North-South students enrolled at the University of Bern and/or engaged in preparatory work for their PhDs at CDE in 2011.

Personnel*

Board Members, CDE	
Name	Professional background
Hurni, Hans (President)	Prof., physical geographer
Wiesmann, Urs	Prof., human geographer
Znoj, Heinzpeter	Prof., social anthropologist
Directors, CDE	
Name	Professional background
Messerli, Peter (Director)	PhD, human geographer (100%)
Breu, Thomas (Deputy Director)	PhD, human geographer (100%)
Executive Committee	
Name	Professional background
Balsiger, Urs	MBA, economist (80%)
Kohler, Thomas	PhD, geographer (80%)
plus CDE Directors (see above)	
Heads of Cluster	
Name	Professional background
Bieri, Sabin	PhD, human geographer (40%)
Ehrensperger, Albrecht	PhD, human geographer (90%)
Giger, Markus	MSc, agro-economist (90%)
Herweg, Karl	PhD, physical geographer (100%)
Rist, Stephan	PhD, agronomist (95%)
Schwilch, Gudrun	MSc, physical geographer and PhD candidate (100%)
Programme Staff	
Name	Professional background
Bachmann, Felicitas	MA, anthropologist (70%)
Bottazzi, Patrick	PhD, international development studies (75%)
Eckert, Sandra	PhD, GIS/RS specialist (80%)
Engesser, Matthias	MSc, physical geographer (80%)
Epprecht, Michael	PhD, geographer (100%)
Fries, Matthias	MSc, physical geographer (80%)
Gabathuler, Ernst	MA, social education worker and agronomist (100%)
Gämperli Krauer, Ulla	MSc, human geographer (25%)
Gasser, Judith	MSc, geographer (50%)
Gerber, Kurt	MSc, GIS/IT specialist (80%)
Heim, Eva	PhD, psychologist (100%)
Heinimann, Andreas	PhD, environmental scientist (100%)
Hergarten, Christian	MSc, GIS/IT specialist and PhD candidate (100%)
Hett, Cornelia	MSc, physical geographer and PhD candidate (100%)
Hirschbühl, Tina	BA (Hons), international relations (60%)
Hoeggel, Udo	MSc, eco-agronomist (100%)
Hösli, Christoph	MSc, physical geographer (80%)
Ifejika Speranza, Chinwe	PhD, human geographer (35%)
Kläy, Andreas	MSc, forest engineer (80%)
Krauer, Jürg	MSc, GIS/IT specialist (100%)
Landolt, Andrea	MA, language scientist (50%)
Liechti, Karina	PhD, human geographer (50%)
Liniger, Hanspeter	PhD, physical geographer (100%)

Lörcher, Sylvia	MSc, human geographer (25%)
Mathez-Stiefel, Sarah-Lan	PhD, ethnobotanist (40%)
Meessen, Heino	PhD, landscape ecologist (60%)
Mekdaschi Studer, Rima	PhD, agronomist (40%)
Michel, Claudia	PhD, human geographer (50%)
Ott, Cordula	MA, anthropologist and PhD candidate (100%)
Portner, Brigitte	MSc, human geographer and PhD candidate (100%)
Providoli, Isabelle	PhD, physical geographer (80%)
Roth, Vincent	MSc, physical geographer (25%)
Rueff, Henri	PhD, economist (35%)
Salmi, Annika	MA, sociologist and PhD candidate (100%)
Schäfer, Natalie	MSc, human geographer (80%)
Schneider, Flurina	PhD, geographer (80%)
Schönweger, Oliver	MSc, sustainable development, PhD candidate (100%)
Weber, Adrian	MSc, physical geographer (80%)
Wolfgramm, Bettina	PhD, environmental scientist (100%)
Wymann von Dach, Susanne	MSc, physical geographer (50%)
Zähringer, Julie	MSc, environmental scientist (50%)
Zimmermann, Anne	PhD, language scientist and editor (100%)
Services Unit Staff	
Name	Professional background
Achermann, Sarah	Assistant (25%)
Balsiger, Nicole	Financial administrator (30%)
De Maddalena, Cinzia	Assistant (25%)
Fedail, Ahmed	Web project manager (50%)
Gehrig, Roger	Assistant (25%)
Hauser, Cyprien	Assistant (25%)
Heierle, Emmanuel	IT coordinator (80%)
Hodel, Elias	Assistant (25%)
Jöhr, Franziska	Secretary (80%)
Kummer, Simone	Desktop publishing specialist (70%)
Lannen, Anu	Language editor and translator (50%)
Lazzini, Mirjam	Assistant (25%)
Paulsson, Maria	Assistant (25%)
Schönbächler, Moritz	Assistant (25%)
Sommer, Laura	Assistant (25%)
Thibault, Marlène	Language editor and translator (100%)
Trechsel, Lilian	Assistant (25%)
Tresch, Jeannine	Secretary and IT specialist (60%)
Vollenwyder, Barbara	Managerial assistant (80%)
Willi, Barbara	Administrative assistant (35%)
Willi, Yasmine	Assistant (25%)

*Status on 31 December 2011

Finances

Financial account for 2011 (in CHF / rounded)

INCOME		
External funds		
Programme income	3,664,800	
Other income (services)	31,900	
<i>Total external funds</i>	<i>3,696,700</i>	
University funds		
Contribution to office rent	200,000	
Contribution to personnel expenditure	2,188,800	
Contribution to operating expenses	475,000	
<i>Total university funds</i>	<i>2,863,800</i>	
Total income	6,560,500	
EXPENDITURES		
Personnel		
Salaries		4,463,800
Social benefits		1,052,700
<i>Total personnel</i>		<i>5,516,500</i>
Other expenditures		
Office rent		220,000
Office operating expenses		311,600
Travel		50,400
Miscellaneous		216,500
IT (CDE share)		172,000
<i>Total other expenditures</i>		<i>970,500</i>
Accruals		73,500
Total expenditures		6,560,500

Balance sheets as at 31 December 2011 (in CHF / rounded)

ASSETS		
Current assets		
Liquid funds, CDE		649,100
Liquid funds, programmes		0
Accounts University		1,406,200
Accounts receivable		1,233,800
<i>Total current assets</i>		<i>3,289,100</i>
Fixed assets		
EDP equipment		82,100
Furniture		9,100
<i>Total fixed assets</i>		<i>91,200</i>
Total assets		3,380,300
LIABILITIES		
Current liabilities		
Accounts payable		225,800
<i>Total current liabilities</i>		<i>225,800</i>
Equity capital		
Capital		699,300
General reserves		866,800
Tied reserves		1,048,400
Accounts received in advance		540,000
<i>Total equity capital</i>		<i>3,154,500</i>
TOTAL LIABILITIES		3,380,300

All accounts were audited externally and internally and were unconditionally approved.



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