

Annual Report 2011/2012

Focus: Uncertainty - a challenge for science



Zentrum für Entwicklungsforschung
Center for Development Research
University of Bonn

Cover: Kore women in Nech Sar National Park, southern Ethiopia. Photo by Till Stellmacher.

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For an overview of ZEF's staff and its departments please have a look at www.zef.de/staff1.html.



1 Introduction

by ZEF-directors

Major development concerns in 2011/12 were the slowing down of economic growth and employment in parts of the developing world and financial crises in the industrialized economies. The Rio+20 conference left much to be desired in terms of concrete strategy for addressing the global development and environmental agenda around climate, water, and soils. A new development agenda with re-focused development goals has to emerge in the coming years. It is promising that attention to “green growth” in international forums and the advantages of a nexus perspective around energy, water and food and land is increasing. The Center’s research agenda is not driven by short-term issues. Rather we at ZEF feel challenged and accordingly have addressed some of the structural and strategic issues in development in the context of our long term research, partnerships, and capacity building.

ZEF has initiated significant new research initiatives such as on food security, health and sanitation, landscape planning as well as on bio-economy and forestry in the Amazon. We expanded our research programs on volatility of markets and poverty. The competence network on conflict, migration and mobility Crossroads

Asia and the West African Science Service Center on Climate Change and Adapted Land Use (WASCAL) have progressed and operate at scale. Research on the economics of land degradation has been added. All these research initiatives entail partnerships in the developing world and often also with strong partners in Germany and elsewhere in Europe. At the local level, the Center has intensified cooperation with Bonn-based international and UN organizations such as the UNCCD and the United Nations University (UNU). This cooperation gets an international dimension when research findings are shared at international meetings, or joint lecture series organized, e.g. the UNU on Risk and Uncertainty for Sustainable Development with internationally renowned experts presenting their latest work.

ZEF researchers have published a considerable number of peer-reviewed articles as well as ZEF working and discussion papers (see www.zef.de/publications). ZEF is especially proud of its support for research capacity development: the ZEF doctoral students from around the world are a central element of that effort. Most of our students move into important positions in their home countries or end up in development or-

ganizations and research institutes all over the world, thereby forming an alumni-network of scientists, decision-makers and future leaders in their countries and in international organizations. And increasingly ZEF engages with partners at universities in developing countries to cooperate in building their doctoral studies and research programs.

ZEF operated with an annual budget of about 11 million Euros in 2011 and 2012, of which about 80% result from project funds raised in the competitive markets for research grants. We would like to express our gratitude to all our donors who have made these achievements possible, including the German Federal Ministry of Education and Research (BMBF), the German Federal Ministry for Economic Cooperation and Development (BMZ), the German Academic Exchange Service (DAAD), the Robert Bosch Foundation as well as the Volkswagen Foundation, and to the Bill and Melinda Gates Foundation, the Foundation fiat panis, Thyssen Foundation, Bayer, the Dreyer Foundation as well as the many organizations and governments which support our doctoral students financially.



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Lead article Uncertainty, a challenge for development research

by Conrad Schetter and Manfred Denich

'Development' is a contested notion. Ideas about how to approach this notion are contradictory and range from modernism to neo-liberalism and post-development. The question of how to define development is also an ongoing debate at ZEF. The different strands of thought on development have one thing in common, however: the term as such focuses on the scale of time, in particular on the outline of the future. While one camp of researchers, practitioners and policy-makers understands development in a narrow sense by relating it to a clear normative vision of what the world should ideally look like in the future, others tend to follow rather open-ended or analytical concepts that link the term development with change.

Nevertheless, these different approaches to development are facing one joint challenge: The uncertainty of how to describe the future and make prognoses. While all academic disciplines – be they the natural sciences or the humanities – are facing the problem of uncertainty, this is particularly true of Development Research as its very title implies a future orientation. The general public and decision-makers expect Development Research to come up with clear prognoses on the direction in which the world will or should move. There are major and long-term changes – such as the demographic trend towards declining birth rates and higher life expectancy, growing urbanization, the penetration of information and communication technologies, the expansion of global market forces that de-

termine the allocation of resources in the developing world, and global climate change. Development Research, of course, makes use of such historical changes as well as lessons learnt and draws on different forms of information – from mega datasets to individual life stories. But at a micro and local level too, Development Research has been having a hard time in making solid statements about the future. This essay discusses the challenges Development Studies face with regard to formulating prognoses for the future and coping with uncertainty.

Different dimensions of uncertainty

To begin with, we must distinguish between uncertainties and risks, i.e. unknown probabilities of changes in the former case and known probabilities in the latter, which can be addressed by insurance mechanisms. Uncertainties must be tackled by much broader sets of policies that build capabilities and opportunities to respond to changes and shocks. Development policies and science play a key role in this area. According to Brugnach et al. (2008) "uncertainty refers to the situation in which there is not a unique and complete understanding of the system to be managed". Following Klinke & Renn (2002) and Brugnach et al. (2008) three dimensions of uncertainty can be identified.

First, researchers have to admit that knowledge about a research subject will always be incomplete. Uncertainty is usually associated with a gap in knowledge



Research on price volatility in food markets has to deal with uncertainty.

including limitations of measurements, a lack of data availability, and the variability of a system over time or space (epistemological uncertainty). On the other hand, uncertainty might also arise as a consequence of an information-overkill. Unclear definitions and imprecise expressions make complex information even more confusing (linguistic uncertainty). Although sound science is narrowing the uncertainties in the ongoing debate on climate change, many issues remain open when future scenarios are designed. Short-term changes in weather conditions are more or less predictable, but long-term prognoses are raising more questions about future developments than providing actual answers. The reason for this is that recently published models of climate change contain an unexpectedly wider range of uncertainty than earlier models. The attempt to adjust climate models to the actual performance of natural systems and include local or regional land-use changes has caused an accumulation of uncertainties at different levels and produced even more complex and vague projections. The average global surface temperature, for example, is expected

to rise between 1.8 and 4.0°C by the end of the 21st century – depending on the different underlying scenarios (IPCC 2007). Moreover, these different scenarios generate different ranges of projected temperature



Insufficient water supply has multiple causes, leading to different research questions and frames.

increases with a minimum of 0.6 and a maximum of 6.4°C – showing the high degree of uncertainty. One may argue that this epistemic aspect of uncertainty is perhaps the one which research might be able to influence most by improving the data base and making available data more valid.

Second and even more problematic is the ontological dimension of uncertainty. Generally, it is extremely difficult to predict how a subject under research might change in time and space. It is not only the social sciences that are facing this problem when they have to deal with the complexity of societies; the natural sciences too are hardly able to encompass a phenomenon such as the complexity of ecological systems. This becomes even clearer when we look at mega themes such as climate change, flows of migrants or the devel-

opment of agricultural and financial markets. The dilemma of handling mega themes is that they emerge as the aggregated labels for many observations of change at the micro, meso and macro-levels. This means that they can only describe major trends – whilst ignoring several contradicting minor trends. Yet, it would be deceptive to think that minor themes are per se easier to understand. Even individual decisions depend on a myriad of factors – from personal emotions to environmental constraints. This makes it difficult for a researcher to come up with any prognosis. This complexity is a core reason why social, economic as well as ecological systems usually demonstrate a non-linear or even chaotic behavior. Moreover, one also has to bear in mind that systems are constantly adapting to new conditions. Both behavior and changing properties increase the uncertainty of research findings and of the prognoses based on these findings.

Price volatility – an example of ontological uncertainty

An example of research that has to deal with ontological uncertainty is price volatility in the food markets, which is the topic of a current ZEF project. As long as harvest shocks and economic fluctuations follow known probabilities, insurances can be provided making it possible to reduce or eliminate harvest or price risks for the buyer of the insurance. However, if probabilities are not known, insurances are not available because their provision becomes too risky. This is the case with natural catastrophes beyond frequent historical experiences but also with the non-linear economic and political dynamics of positive feedback cycles (i.e. price increases that drive trade bans that drive further price increases). But insurances are also not provided when the impact of uncertainty strongly interferes with (difficult to observe) human behavior: for example, the care the farmers give to soil and crops influenc-

es the impact of weather shocks. The lack of insurance due to problems of monitoring historic events as well as human behavior is particularly an issue in countries where low institutional quality and high political instability prevail.

Many ways to frame research

Finally, the ambiguity of research adds to the complexity of uncertainty. Ambiguity is rooted in the plurality of perspectives, since any observed phenomenon allows a multitude of possible interpretations. This means that ambiguity already starts with framing a problem or research question. The way in which a research question is posed leads to the eclipsing of alternative ways of how to frame the research. Brugnach et al. (2008) give the example that research on insufficient water supply might deal with uncertainties deriving from the amount of available water. Framing the problem this way, solutions for overcoming water shortage will be sought in the technical realm. However, the same issue can also be framed as an issue of excessive water consumption. In this case, researchers would tend to look for solutions by investigating questions such as how the population uses and consumes water and how water policies interfere. Although ZEF with its trans-disciplinary research approach (such as in major projects in Uzbekistan, Vietnam and West Africa) aims to take several frames of research into account simultaneously ('boundary concept'), the given example underlines that the options of how to frame a research question are virtually innumerable. Considering a certain direction of the research, including or excluding certain variables, etc. can lead to completely different results. This is why framing a research approach inherently entails uncertainties.

This brief overview underlines why research has to tolerate various dimensions of uncertainty which prevent unambiguous prognoses for the future. This, however,

clashes with the high public expectations on research. One of the core challenges of human nature is that, in general, human beings need certainties. This is a significant reason why the sciences gained such a high reputation and legitimacy in society. Since the Enlightenment in the late 18th century, the public believed that the rationality of science should be able to explain the world and that research should provide a sound outline of the future – or at least several strands of scenarios. Since people consider science as the ‘production of certainty’ they support its maintenance as a public good and its financing from public funds.

Between uncertainty and expectations: The researchers’ dilemma

This diagnosis means that scientists are often trapped between the frequently inconclusive results of their own research and high public expectations regarding their capabilities to solve problems and make clear prognoses about the future. This tricky situation has had a strong impact on research methods and the communication of results in recent years. Scientists working in the field of natural resource management in particular tend to point out the uncertainties of their research results (with the assistance of statistical tools) instead of hiding contradictions or touching up certain research results. As a consequence, uncertainty has become more and more a serious variable of modeling (e.g. probabilistic method) and prognoses, allowing a greater flexibility of scenarios and solutions (Pahl-Wostl 2007). However, underlining the uncertainty of research results also has a strong political impact: If researchers are not able to provide bold arguments in favor of a certain decision, policy-makers often enough take this as an excuse to shy away from formulating concrete policies; if researchers give too much attention to the imponderability of their datasets, they will hardly raise public awareness or achieve a change of behavior.

Researchers at ZEF are aware of all these dimensions of uncertainty. Natural scientists, for example, may have to deal with uncertainty on clearly defined levels such as the physiological characterization of a plant species regarding tolerance of soil salinity. In this case, the relatively low range of uncertainty can be described using statistical methods. In other cases, uncertainty is an even more difficult issue to tackle. As the lead institute for the establishment of the West African Science Service Center on Climate Change and Adapted Land Use (WASCAL), ZEF is investigating a multitude of research topics related to climatic and environmental as well as economic and political changes. Integrated approaches, such as climate models combined with hydrological and economic models, with social aspects and with risk assessments, will help to understand the complex social-ecological systems of the West African study region. Field studies, modeling and scenario development are being applied to derive adaptation measures to climatic changes for land and water use and to cope with the vulnerability and resilience of natural and human ecosystems. The attempt and the need to integrate as many of these findings as possible at a scientific level unavoidably leads to a level of uncertainty that is difficult for decision and policy-makers to handle.

To conclude: Scientific findings are associated with a wide range of uncertainties, which cause barriers for decision and policy-making on coping strategies, adaptation measures and future investments. In order to support informed decisions, the scientific outcome and its associated uncertainties have to be communicated to scientists in other disciplines, to stakeholders and to target groups in a comprehensible and assessable way. This is a challenge for both scientists and users of scientific information. Both groups are required to make a joint effort and work on approaches that focus on “how to deal with uncertainty”.

Literature

Brugnach, M. et al. (2008): Towards a relational concept of uncertainty: about knowing too little, knowing too differently, and accepting not to know. In: *Ecology and Society* 13 (2).

IPCC (2007) *Climate Change 2007: The physical science basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.* Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.); Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 996 p.

Klinke, A. & Renn, O. (2002): A new approach to risk evaluation and management: Risk-based, precaution-based, and discourse-based strategies. *Risk Analysis* 22 (6): 1071-1094.

Pahl-Wostl, C. (2007): The implications of complexity for integrated research management. *Environmental modeling and software* 22: 561-569.



Researchers often face the dilemma of how to communicate uncertainty in scientific outcome to their audiences.

3 ZEF's research agenda

ZEF aims at producing **development research** that contributes to reducing poverty, enhancing sustainable development and improving development-oriented policy making.

For achieving this, ZEF conducts research on a set of **themes relevant to development**, collaborates with scientists, in particular from Africa, Latin America and Asia, and educates young scientists from across the world through its **Doctoral Studies Program**.

ZEF's research concept and set-up are **trans-disciplinary**, implying the research bridges the gap(s) between scientific disciplines, between research and policy and between research and practice.

ZEF's core research themes are supported by ZEF's "disciplinary capabilities", contributing to the core research areas. ZEF's research projects and doctoral studies fit into this overall research framework.

This Annual Report covers a selection of themes.

For a complete overview of ZEF's research areas and themes please have a look at: www.zef.de/researchareas.html



ZEF's core research themes – a selection

3.1 Science policy

Introduction

Science policy and innovation are central to development. ZEF research focuses on science policy in an interdisciplinary approach, bringing together economics, political, social and natural sciences.

The main questions that science policy research at ZEF aims to answer are: What science policy enhances sustainable development, including its socio-political, economic and environmental dimensions, and how can science investors enhance their impact?

Research

ZEF is a member of the Cooperation on Doctoral Education between Africa, Asia, Latin America and Europe (CODOC)

CODOC looks at how doctoral education contributes to the development of institutions, higher education sys-

ZEF conducts research on knowledge systems in Central Asia and the Caucasus.



tems and national research capacity. ZEF conducted a survey of doctoral education trends at universities in Africa, Asia and Latin America, to gain a better overview of doctoral education in these regions and to compare trends with those in Europe. A final conference was held in Stockholm, Sweden, in September 2012. Full report downloadable at www.codoc-project.eu

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Local knowledge strategies for coping with regional transition in Central Asia and the Caucasus

In its countries of research, ZEF is also looking at the effects of existing and missing science policy instruments and therewith systems of knowledge production and sharing. For example in Central Asia and the Caucasus, where ZEF has been conducting interdisciplinary research for many years on the economic, social and ecological challenges these countries are facing. Based on this experience, ZEF has now started two new research initiatives in Central Asia and the Caucasus: one deals with agricultural knowledge systems (in Georgia and Tajikistan) and the second with the conversion of knowledge in post-Soviet agriculture (in Tajikistan). Local cooperation partner is the Institute of Philosophical, Political and Legal Sciences of the Academy of Sciences of Tajikistan.

Projects:

Epistemic cultures and innovation diffusion in post-Soviet southern Caucasus and Central Asia. Pilot study: agricultural knowledge systems in Georgia and Tajikistan.

Conversion of knowledge in post-Soviet agriculture: the impact of local governance on the knowledge management of agricultural actors in Tajikistan.

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Funder: German Federal Ministry of Education and Research (BMBF), Volkswagen Foundation, Germany

Education in post-conflict societies

ZEF started exploring a new area of research: the politics and social dynamics of rebuilding systems of higher education to support peace-building after armed conflicts and crises. The pilot project entitled "Contested knowledge" started in June 2012. While the UN Millennium Development Goals contain the right to universal primary education, tertiary and vocational education are often given less emphasis. As a center of excellence for training academics and future policymakers from developing countries, ZEF knows well how higher education can contribute to education, economic growth, and good governance. For supporting peace-building, universities and vocational schools can be indispensable in providing meaningful training and job prospects for vulnerable youth as well as providing an arena for scientific and political growth. This pilot project will select three comparative country case studies.

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Funder: Fritz Thyssen Foundation

Doctoral research on science policy

Brazil, Germany, Peru (see feature below). **Colombia:** Economic analysis of institutional arrangements for rural innovation. **Indonesia:** Knowledge governance in an industrial cluster: Collaboration of academia-indus-

try-government in Indonesia. **Malaysia:** A global value chain and science policy analysis for sustainable palm oil industry in Malaysia. **Vietnam:** Transforming the epistemic culture of development: The case of Vietnam's Mekong Delta.

Scientific cooperation for development. An analysis of BMBF policy within the 'Research for Sustainability Program'.

This PhD thesis reflects on the idea of „science for development“, which means the potential influence of science on development in its social, economic and ecological dimensions. The research analyzes the German science policy implementation in an international context by focusing on the research and funding policy of the German Federal Ministry of Education and Research (BMBF) in the field of sustainability research. These programs aim at supporting research cooperation between Germany and emerging economies or developing countries. The research outcome is to be put into recommendations for the policy level, as well as into a set of „cooperation success criteria“. The latter are meant to be guidelines for future projects and aim at maximizing the benefits of research cooperation related to development.

Doctoral researcher: Anna Schwachula, Germany.

For **contact** and **more information** on (doctoral) research in this area please look at www.zef.de/1877.0.html

Selected output on science policy

Hornidge, A., L. Oberkircher, A. Kudryavtseva (2012): “Boundary Management and the Discursive Sphere – Negotiating ‘Realities’ in Khorezm, Uzbekistan”, *Geoforum*, DOI 10.1016/j.geoforum.2012.11.014.

Djanibekov, N. , A. Hornidge, M. Ul Hassan (2012): “From Joint Experimentation to Laissez-faire: Transdisciplinary Innovation Research for the Institutional Strengthening of a Water User Association in Khorezm, Uzbekistan”, *Journal of Agricultural Education and Extension*, 18: 4, pp. 409-423.

Hornidge, A. and S. Kurfürst (2011): “Conceptualizing Public Space in Hanoi and Singapore: The Power of State Visions”, *Internationales Asienforum*, 42: 3-4, pp. 345-369.

Hornidge, A. (2011): “‘Creative Industries’ – Economic Program and Boundary Concept.” 2011. *Journal of Southeast Asian Studies*, 42: 2, pp. 253-279.

3.2 Water resources

Introduction

Access to water which is sufficient in quantity and quality for domestic, agricultural, economic and cultural requirements is a sine qua non for development. Therefore, trans-disciplinary research on water in its physical, ecological, socio-economic, political, and legal contexts is integral to ZEF's research agenda. The broad objective of ZEF's water management research agenda is to arrive at integrated approaches - in partnership and close collaboration with local actors in the research countries.

Research

Water value chains in South Africa

This research initiative on the ‘Economics of water value chains in South Africa’ is a three-year follow-up program of an interdisciplinary project in which integrated water resources management concepts are studied and developed in and for the basin of the river Olifants in South Africa.

In this follow-up project, ZEF researchers and their partners investigate the economics of water value chains for improving water resources management in general and the water foot print, water value flow, and water treatment options in particular. Moreover, capacity building activities are undertaken. The project's output is expected to contribute to identifying the virtual water trade and the associated economic values within and outside South Africa.

The research is conducted by a large consortium in Germany and South Africa. Main partners in Germany are the University of Witten/Herdecke, Ruhr University of Bochum and seven industrial partners. In South Africa, partners include the University of Pretoria, Water Research Commission and Department of Water Affairs.

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WISDOM - Water Information System for the Sustainable Development of the Mekong, Vietnam

ZEF has been part of this interdisciplinary research endeavor with 24 German and Vietnamese partners since 2007 by contributing to social science research on water resources management. Current PhD research deals with the management of water quality

[ZEF alumna Nadine Reis, right, receiving the KfW Prize 2012 for development research.](#)



in aquaculture, water quality and health, knowledge diffusion of water-related knowledge, industrialization and water, water management at the local level as well as the formation of strategic groups in the water sector. Furthermore, smaller research components focus on the development of small-scale enterprises as well as water management and gender in the Mekong Delta.

Read more in: ZEF news No. 25 2012, page 4 and in "D & C" No. 5 2012, page 203-205.

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Funder: German Federal Ministry of Education and Research (BMBF)

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Highlights

ZEF alumna awarded highest KfW Prize for practice-relevant development research 2012

On June 23 2012, the KfW Prize for promoting practice-relevant development research was awarded to Nadine Reis, a ZEF alumna. Nadine Reis received the prize for her doctoral thesis on "Tracing and making the state. Policy practice and domestic water supply in the Mekong Delta, Vietnam". [Watch the interview with Ms. Reis on \[www.youtube.com/user/zefbonn\]\(http://www.youtube.com/user/zefbonn\) and find pictures of the award event on ZEF's facebook site. You can also order Nadine Reis' doctoral thesis at: \[www.lit-verlag.de/isbn/3-643-90196-5\]\(http://www.lit-verlag.de/isbn/3-643-90196-5\).](#)

Selected output on water resources

Akpabio, E. M. 2012. Water beliefs and the changing times in Nigeria. In: Hans P. Hahn, K. Cless and J. Soentgen (eds.): People at the Well: Kinds, Usages and Meanings of Water in a Global Perspective. Campus Verlag, Frankfurt, 266-280.

Bekchanov, M., Bhaduri, A. and Lenzen, M. and J.

P.A. Lamers. 2012. The role of virtual water for sustainable economic restructuring: evidence from Uzbekistan, Central Asia. ZEF Discussion Paper on Development Policy No. 167.

Djanibekov, N., Hornidge, A.-K. and M. Ul-Hassan. 2012. From joint experimentation to laissez-faire: transdisciplinary innovation research for the institutional strengthening of a water users association in Khorezm, Uzbekistan. The Journal of Agricultural Education and Extension, 18 (4): 409-423.

Eguavo, I. and W. Tesfai. 2012. Social impact and impoverishment risks of the Koga irrigation scheme, Blue Nile basin, Ethiopia. Afrika Focus 25(1), 39-60.

Eguavo, I., Sisay Demeku Derib, Tilaye Teklewold Deneke, M. McCartney, B. A. Otto and S.S. Billa. 2012. Digging, damming or diverting? Small-scale irrigation in the Blue Nile Basin, Ethiopia. Water Alternatives, 5 (3): 678-699.

Doctoral research on water resources

Chile: Vulnerability to climate change and water scarcity: community adaptation strategies and coping capacity in semiarid Chile. Ethiopia: Spatial and temporal evaluation of water budget at Gumara watershed.

Ghana: Spatio-temporal dynamics of bush-fire nutrient losses and atmospheric depositional gains across the Northern Savanna region of Ghana. **India:** Organization, natural resources management and rural development in an irrigated area in Andhra Pradesh. **Indonesia:** The impact of decentralization reforms upon water sector reforms in Indonesia: A comparative analysis of policy implementation in two river basins. **Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan:** Efficient water allocation and water conservation policy modeling in the Aral Sea Basin. **Mexico:** Impact of bio-fuel production on freshwater resources and greenhouse gas emissions – LCA case studies on selected farming systems. **South Africa:** Boundary work for

sustainable water resources management - a study of boundary dynamics at the Wilderness Catchment (Garden Route, Western Cape Province) and the Incomati Catchment (Mpumalanga Province). **India:** Sustainable management of ground-water resources considering the impacts of climate change and land use change in the Kharun sub basin. **Uzbekistan:** Hydrological dimensions of dryland afforestation in Central Asia. **Uzbekistan:** MSc: Assessing soil-borne CO₂ exchange in irrigated cropland of the Aral Sea Basin as affected by soil types and agricultural management; Modeling of soil C and N dynamics of rice-wheat cropping systems under conservation agriculture in Khorezm. **Uzbekistan:** Water governance under state control in the irrigation water management organizations of Khorezm Region. **Vietnam:** Strategic groups in the water sector of Vietnam. **Vietnam:** Diffusion of water-related knowledge. **Vietnam:** Water quality management in aquaculture. **Vietnam:** Local industrialization and water. **Vietnam:** Still living with the floods: exploring ways of adaptation to floods in central Vietnam. **Vietnam:** Water management at the local level. Vietnam: The political ecology of waterborne disease in Can Tho City.

For contact and more information on (doctoral) research in this area please look at



3.3 Land use and food security

Introduction

From a long-term perspective food security depends on natural resources and sustainable innovations. A natural resource base that has been particularly neglected by policy makers over the years is sustainable land and soil management. ZEF has long-standing research experience in this field, particularly in Central Asia and Africa, and has recently added a strong emphasis on the economics of land degradation. Land prices are rapidly increasing world-wide due to increased land scarcity and raising output prices that stimulate demand for the land resources. These changes have far reaching impacts on land rights and institutions. Poor land users tend to lose out in the competition.

Research

Food and Nutrition Security

ZEF is one of the leading research partners in a research consortium carrying out a project funded by the European Commission under its Seventh Framework Programme (FP7). The project 'Exploring the future of global food and nutrition security' (FoodSecure) aims at improving the resilience of the global food system. This is mainly done by developing tools for policy makers to mitigate risks and uncertainties in the world food system, which are caused by economic and climatic shocks, while providing for sustainable economic growth. The food system is analyzed in relationship to the ecosystem, energy, and financial markets, all of



ZEF doctoral research investigates, among other topics, different aspects of rural livelihoods in Uzbekistan.

which are potential sources of shocks that can disrupt the food system. In addition, it is examined in light of fundamental societal trends and changing attitudes towards food consumption and production.

ZEF researchers will lead the consortium's work in the short-term forecasting of price volatility and its impacts on food and nutrition security. A toolbox for the short term forecasting of food and nutrition security (FNS) is to be developed. The toolbox, in conjunction with more general agricultural and trade models used and developed in the project, will finally be used to identify appropriate responses to food price spikes and their impacts on FNS, including institutional and policy responses and the use of emergency food stocks.

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Main cooperation partners: LEI-WUR, IFPRI, INRA, KU Leuven, CCAP, IAE, IHEID, IIASA, EC JRC, PBL, Prospec, SAU, URoma3, IDDRI, EEPRI, EMBRAPA, CIRAD.

Volatility of prices, markets and food security policy

The food price hikes in 2007/8 have dramatically increased the number of poor people in developing countries. ZEF has launched a new research project to theoretically and empirically analyze the impacts and causes of food price volatility, the transmission mechanisms between world and national markets, the effects of public policy interventions, as well as the impact of macro policies on these prices. Special attention is paid to the influence of speculation in international commodities markets and the G8/G20 efforts to combat food price volatility. The objectives of this research are to help improve the risk management and food security policies at the international level and in developing countries, to support donors such as the German Federal Ministry for Economic Cooperation and Development (BMZ) in their efforts to strengthen food security, in particular for the poor, and to in-

form private players in international commodities markets about the impact of their activities.

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Marginality reduction for enhanced investments for and with the poorest

ZEF strives to engage the marginalized poor in the rural areas of sub-Saharan Africa and South Asia. Its researchers seek to support agricultural productivity and rural growth by extending the reach of agricultural innovations to the poor among small farming communities. Such innovations can consist of bundles of new measures, practices or technology products, including both crop

technology innovations and non-crop technology and institutional innovations which can play an important role in fostering secondary growth and multiplier effects created by agricultural development.

A prerequisite for engaging the marginalized poor is making them visible. ZEF has been mapping areas in Asia and Africa where many poor people live under difficult socio-economic and biophysical conditions. The next step will be to better understand the needs, strategic options and constraints of the different strata of the marginalized poor. This assessment – to be piloted in Bangladesh, India, Ethiopia and Ghana – will then serve to identify innovation bundles that are adjusted to the respective potentials of the poor in each stratum.

For further reading: Graw, V. and C. Ladenburger. *Mapping Marginality Hotspots. Geographical Targeting for Poverty Reduction. ZEF Working Paper No. 88, January 2012.* Downloadable at www.zef.de/workingpapers.html

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Funder: Bill and Melinda Gates Foundation.

Website: www.zef.de/margip.html

Highlights

New Robert Bosch Junior Professor at ZEF

Jan Börner was inaugurated as a Robert Bosch Junior Professor for „Sustainable Use of Natural Resources“ at the University of Bonn on March 22, 2012. He started his five-year research on the sustainable use of tropical rain forests in Brazil at ZEF in August 2012. Jan Börner has studied environmental and resources economics in Berlin and Minnesota. He was a doctoral student at ZEF and received his doctoral degree from the Faculty of Agriculture of Bonn University in 2006. As a Postdoc he



has worked in Munich and Brazil.

For photos and video clip of the event see www.zef.de

Selected output on land use and food security

Algieri, B. 2012. Price Volatility, Speculation and Excessive Speculation in Commodity Markets: sheep or shepherd behavior? ZEF Discussion Paper on Development Policy No. 166.

Baumüller, H. 2012. Facilitating agricultural technology adoption among the poor: The role of service delivery through mobile phones. ZEF Working Paper No. 93.

Djanibekov, N., van Assche, K., Bobojonov, I. and J.P.A. Lamers. 2012. Farm restructuring and land consolidation in Uzbekistan: New Farms with Old Barriers. *Europe-Asia Studies*, 64 (6): 1101-1126.

Hiemenz, U. 2012. The politics of the fight against food

price volatility - where do we stand and where are we heading? ZEF Working Paper No. 92.

Pangaribowo, E.H. and D. Tsegai. 2011. Food Demand Analysis of Indonesian Households with Particular Attention to the Poorest. ZEF Discussion Paper on Development Policy No. 151.

Von Braun, J. and G. Tadesse. 2012. Global Food Price Volatility and Spikes: An Overview of Costs, Causes, and Solutions. ZEF Discussion Paper on Development Policy No. 161.

Doctoral research on land use and food security

Bangladesh: Impact of technological innovations on the poor: integrating agriculture with aquaculture.

Benin, Burkina Faso, Ghana: Farmer innovation in rural West Africa: determinants and implications for climate change and food security.

Burkina Faso: *Jatropha curcas*: Sustainable bio-fuel production in Burkina Faso? - Carbon balance and economic costs and benefits as sustainability indicators.

Burkina Faso: Perceptions of food security in West-Africa: livelihoods of farmers in the Ioba Province of south-western Burkina Faso. **China:** Land rental market and agricultural technological progress in China: a restricted profit function approach. **Ethiopia:** Organic carbon dynamics under different land use systems in Tigray,

Northern Ethiopia. **Ethiopia:** The volatility of international food prices: impacts on resource allocation and on farmers' supply responsiveness. **Ghana, Malawi:** Land conflicts, accountability and chieftaincy institution. **Ghana:** Large-scale investment in agriculture in West Africa - implications for land markets and smallholder farmers. **Ghana:** Spatio-temporal dynamics of bush-fire nutrient losses and atmospheric depositional gains across the northern Savanna region of Ghana.

Indonesia: A short-term food price alert system and potential responses for responsible investment in agricultural commodity futures. **Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan:** Climate volatility and change in Central Asia. Economic impacts and adaptation. **Kenya:** Assessment of land degradation patterns in western Kenya: implications for restoration and rehabilitation. Modeling land degradation and LUCC. The case of maize production in the Rift Valley.

India: Sustainable management of ground-water resources considering the impacts of climate change and land use change in the Kharun sub basin. **Bhutan:** The prospects of organic farming. **Uzbekistan:** Economic efficiency analysis of crop producing farms. **Uzbekistan:** Remote sensing based assessment of land suitability for afforestation of the degraded land in the downstream of the Amu Darya River. **Uzbekistan:** The effect of phosphorus amendments on nitrogen fixation and growth of trees on salt-affected croplands in the lower reaches of Amu Darya. **Uzbekistan:** Trees, crops and rural livelihood: afforestation on marginal croplands. **Vietnam:** Multi-level assessment of land degradation in Vietnam and implications for mitigating policy.

For contact and more information on (doctoral) research in this area please look at www.zef.de/1567.0.html

Slums in Surat, India, where public policies have failed to improve human health so far.



3.4 Renewable energy

Introduction

Sustainable energy is a key element of any strategy for sustainable development and therefore part of ZEF's research agenda. ZEF's research focuses on sustainable energy options for and in developing countries is planned to be scaled up especially in the area of biomass based energy. ZEF has taken this focus because in many low-income countries biomass still covers up to 60 or 70% of primary energy.

Highlights

The bi-annual Prize of the "Friends of ZEF" - an association supporting ZEF - for the best doctoral thesis written at ZEF in 2010-2011 was awarded to ZEF-alumnus Alam Hossain Mondal from Bangladesh on September

ZEF alumnus Alam Mondal receiving the ZEF Friends' Prize for the best doctoral thesis written at ZEF 2010-2011.



Farmers in Mexico. Here, ZEF studies the impact of biofuels production on freshwater resources and greenhouse gas emissions.

10, 2012. He wrote his doctoral thesis on "Implications of renewable energy technologies in the power sector of Bangladesh: Long-term planning strategies". Mr. Mondal is now working with the Masdar Institute of Science and Technology in Abu Dhabi. Mr. Mondal's doctoral research was funded by the German Academic Exchange Service (DAAD).

Selected output on renewable energy

Guta, D. 2012. Assessment of biomass fuel resource potential and utilization in Ethiopia: Sourcing strategies for renewable energies. *International Journal of Renewable Energy Resources*, 2 (1): 132-139. Further Information: [ijrer.com/index.php/ijrer/article/view-File/141/pdf](http://ijrer.com/index.php/ijrer/article/view/File/141/pdf)

Mondal, M.A.H., Denich M. and J. Mathur. 2011. Impacts of CO2 emission constraints on technology selection and energy resources for power generation in Bangladesh. *Energy Policy*, 39: 2043-2050.

Doctoral research on renewable energy

Brazil: Electrification of isolated communities in the Brazilian Amazon with renewable energy: social, economical, and environmental factors in the performance of installed systems. **Burkina Faso:** *Jatropha curcas*: Sustainable biofuel production in Burkina Faso? Carbon balance and economic costs and benefits as sustainability indicators. **Ecuador:** GIS-based sustainability assessment planning of rural electrification in the Amazon Basin. **Ethiopia:** Biomass based energy, rural livelihood and energy security. **Mexico:** Impact of biofuels production on freshwater resources and greenhouse gas emissions – LCA case studies on selected farming systems.

For contact and more information on (doctoral) research in this area please look at www.zef.de/1570.0.html

3.5 Environmental and climate change

Introduction

Natural resources form the basis for human livelihoods and development. The depletion of natural resources, loss of biodiversity, landscape changes and shifts in material and energy flows are putting critical stress on the global environment. Understanding these changes is a prerequisite for designing policies and actions to alter the course of events or temper their effects. Science plays a key role in delivering this information for adequate and timely policies and action. ZEF tackles these issues from an ecological, economic, and social perspective.

ZEF conducts research on landscape changes such as here in Uzbekistan.



Research

Climate change and adapted land use in West Africa (WASCAL)

The West African Science Service Center on Climate Change and Adapted Land Use (WASCAL) is a regional research-focused program set up to help tackle climate change in West Africa and enhance the resilience of human and environmental systems to climate change and variability. It does so by strengthening the research infrastructure in West Africa related to climate change and by pooling the expertise of ten West African countries and Germany. Funded by the German Federal Ministry of Education and Research (BMBF), WASCAL is coordinated at ZEF and implemented in a collaborative effort by West African and German partners. WASCAL includes a Competence Center, a Core Research Program and a Graduate Research Program – all based in West Africa.

Political agreement between African WASCAL partner countries and Germany signed in Lomé

The WASCAL project partners from 10 West African states and Germany signed a political agreement on the WASCAL initiative in Lomé, Togo, on February 12, 2012. The ceremony was attended by high-ranking West African ministers, further government representatives, the German BMBF state secretary Georg Schütte as well as ZEF-Director Paul Vlek.

For more information in German have a look at www.bmbf.de/media/press/pm_0209-018.pdf

Contact: Manfred Denich,
m.denich@uni-bonn.de

Funder: German Federal Ministry
for Education and Research (BMBF)

Website: www.wascal.org



The Advisory Board for the international doctoral program on 'Climate change economics' met in Dakar, Sénégal, in September 2012.

The WASCAL Graduate Research Programs welcome their first doctoral students

Four West African universities started their doctoral training programs within the WASCAL initiative in January 2012. These programs focus on: the West African climate system (Akure, Nigeria), Climate change and water resources (Cotonou, Benin), Climate change and land use (Kumasi, Ghana) and Economics of climate change (Dakar, Sénégal). WASCAL will run eight graduate research programs in West Africa on selected priority areas of the climate change - land use nexus.

In July 2012, the first batch of students in the graduate research program on 'The economics of climate change' (University Cheikh Anta Diop de Dakar, Senegal) finished their course program.

Selected output WASCAL

Callo-Concha, D., Gaiser, T. and F. Ewert. 2012. Farming and cropping systems in the West African Sudanian Savanna WASCAL research area: northern Ghana, southwest Burkina Faso and northern Benin. ZEF Working Paper No. 100.

Eguavoen, I. 2012. Climate change and trajectories of blame in Northern Ghana. Blessing and destruction. ZEF Working Paper No. 99.

Sanfo, S. and F. Gérard. 2012. Public policies for rural poverty alleviation: The case of agricultural households in the plateau central area of Burkina Faso. *Agricultural Systems* 110, 1-9.

Sow, P. 2012. Uncertainties and conflicting environmental adaptation in the Region of Pink Lake, Senegal. ZEF Working Paper No. 101

Tambo, J. A. and T. Abdoulaye. 2012. Climate change and agricultural technology adoption. The case of drought tolerant maize in rural Nigeria. *Mitig Adapt Strateg Global Change* 17, 277-292.

Climate change mitigation and adaptation in Central Asia

The project "Opportunities for climate change mitigation and adaptation through afforestation of degraded lands in Central Asia" explores the role of small-scale plantation forestry for ecological restorations and rural livelihoods in response to growing water scarcity and

ZEF investigates opportunities for climate change mitigation and adaptation in Central Asia.



cropland degradation. Research results so far indicate that afforestation is financially attractive to farmers, since it has a high productive value i.e fruit, fuel-wood, fodder production, and carbon sequestration while requiring low agricultural inputs. The research team also found out, that the current carbon price per se would be insufficient to trigger the adoption of agroforestry by local farmers. Thus, relevant local incentives are studied to motivate farmers and decision-makers to convert degraded cropland to tree plantation for the triple purpose of carbon sequestration, provisioning of non-timber products, and soil rehabilitation.

Contact: Asia Khamzina (Robert Bosch Junior Professor), asia.khamzina@uni-bonn.de

Funder: Robert Bosch Foundation

Website: www.zef.de/1631.html

More than carbon price: Interview in Nature

Utkur Djanibekov, a doctoral student at ZEF and an agricultural economist by training, was interviewed by Nature Climate Change. He is conducting his doctoral research within the project "Opportunities for climate change mitigation and adaptation through afforestation of degraded lands in Central Asia". He was interviewed on the interdisciplinary findings which were reported about in the "Forest Policy and Economics" journal (*Djanibekov U., Khamzina A., Djanibekov N., Lamers J.P.A. 2012. How attractive are short-term CDM forestations in arid regions? The case of irrigated croplands in Uzbekistan. DOI:10.1016/j.forpol.2012.01.006).

Women and climate change in rural Kenya and Bangladesh

A new research program was initiated in cooperation with the International Food Policy Research Institute (IFPRI) on climate change impacts on rural women. The

focus is on adaptation and resilience and the potentials of group-based approaches for effective adaptation. With partners in the respective countries panel data sets are being established through primary data collection as a basis for micro household modeling that emphasizes initiatives for enhancing women's asset protection.

Contact: Joachim von Braun, vonbraun@uni-bonn.de

Selected output on environmental and climate change

Djanibekov, U., Khamzina, A., Djanibekov, N. and J.P.A. Lamers. 2012. How attractive are short-term CDM forestations in arid regions? The case of irrigated croplands in Uzbekistan. *Journal of Forest Policy and Economics*, 21: 108-117. Further Information: doi: 10.1016/j.forpol.2012.01.006

Khamzina, A., Lamers, J.P.A. and P.L.G. Vlek. 2012. Conversion of degraded cropland to tree plantations for ecosystem and livelihood benefits. In: Martius C., I. Rudenko, J.P.A. Lamers, P.L.G. Vlek (eds.): Cotton, Water, Salts and Soums - Economic and Ecological Restructuring in Khorezm, Uzbekistan. Springer Science+Business Media, B.V., 235-248.

Laube W., Schraven, B. and M. Awo. 2012. Smallholder adaptation to climate change: dynamics and limits in Northern Ghana. *Climate Change*, 111 (3-4): 753-777. Further Information: www.springerlink.com/content/fk5q027h22258272/

Doctoral research on environmental and climate change

Benin, Burkina Faso, Ghana: Farmer innovation in rural West Africa: determinants and implications for climate change and food security. **Chile:** Vulnerability to climate change and water scarcity: community adaptation strategies and coping capacity in semiarid Chile. **China:** Nitrogen leaching and water pollution

from agricultural activities and mitigation strategies in Central China. **Ethiopia:** Effectiveness of soil and water conservation measures for land restoration in the Wello area, northern Ethiopian highland. **Iran:** Evaluating genotypic traits and management practices for improving water productivity of wheat (*triticum aestivum* L.) in Golestan province. Experimental and modeling approaches. **Ghana:** Adapting to global markets and a changing environment in northern Ghana: Dynamics and their Implications for the sustainability of small-holder livelihoods. **Ghana:** Migration, development and population dynamics in rural northern Ghana: the case of the Upper and East region. **Ghana:** Spatio-temporal dynamics of bush-fire nutrient losses and atmospheric depositional gains across the northern Savanna Region of Ghana. **Ghana:** The role of local institutions for climate change adaptation and disaster risk management in Northern Ghana. **Indonesia:** Climate-adaptation planning: the perception, meaning, and institutionalization of locally embedded adaptation planning along the example of Kampung Penjaringan Jakarta. **Indonesia:** The optimal carbon tax scheme under the influence of corruption: theory and experiments to learn for Indonesia. **Kazakhstan, Kyrgyzstan, Tajiki-**

stan, Turkmenistan, Uzbekistan: Climate volatility and change in Central Asia: economic impacts and adaptation. **Kenya:** Modeling land degradation and LUCC – the case of maize production in the Rift Valley. **Uzbekistan:** Carbon sequestration through afforestation of degraded croplands in northwest Uzbekistan. **Uzbekistan:** Economic efficiency analysis of crop producing farms. **Uzbekistan:** Exploring policies and institutions on supporting adoption of afforestation on degraded land in Uzbekistan: multi-agent system modeling approach. **Uzbekistan:** Remote sensing based assessment of land suitability for afforestation of the degraded land in the downstream of the Amu Darya River. **Vietnam:** Regulation of water quality: identification of factors shaping the habitus of water utilization within the aquaculture sector in Can Tho City.

For contact and more information on (doctoral) research in this area please look at www.zef.de/1879.0.html

3.6 Mobility and migration

Introduction

Migration and mobility play a crucial role in development research, since both phenomena deal with dynamic changes. Migration can be understood as a particular form of spatial mobility and includes all kinds of population movements. Beside migration forced by natural disasters or wars there are networks of labor migration, as well as networks enabling the flow of commodities (trade) or ideas (knowledge). Mobility refers to a society's potential to change. Social mobility is pivotal with regard to development processes and policy, since it relates to how mobile people are, and how much space governments provide for citizen for changing their social positions. Spatial and social mobility indicate the extent to which people are able to cope with the challenges of daily life and to develop themselves. Moreover, we understand social inequalities, knowledge gaps and political marginalization as barriers to mobility. These issues are on ZEF's research agenda and covered in many ZEF projects such as Crossroads Asia, WASCAL and MARGIP.

Research

Crossroads Asia: Conflict, Migration, Development

The competence network Crossroads Asia is coordinated at ZEF. It represents a novel, post area studies approach and is carried out by scholars from the humanities and social sciences. The geographical space extends from eastern Iran to western China and from





Pastoral nomads in Iran.

the Aral Sea to northern India. The competence network is organized in three working groups which conduct research in three closely interlinked thematic areas: Conflict, Migration and Development.

Contact: Anna-Katharina Hornidge, hornidge@uni-bonn.de

Funder: German Federal Ministry for Education and Research (BMBF)

Website: www.crossroads-asia.de

Selected output Crossroads Asia: Crossroads Asia Working Paper Series

Ismailbekova, A. No. 4, 2012. Coping strategies: public avoidance, migration and marriage in the aftermath of the Osh Conflict, Fergana Valley .

Hill, J. No. 3, 2012. A post-area studies approach to the study of hill irrigation across the Alai - Pamir - Karakoram - Himalaya.

Schetter, C. No. 2 , 2012. Trans-local lives. Patterns of migration in Afghanistan

Selected Crossroads Asia public lectures

Ports, pipelines, and pipedreams of modernity: Ethnic identity and the politics of place in Gwadar, Pakistan. Lecture by **Hafeez Jamali** on July 26, 5-6 pm, at ZEF. July 7, 2012.

Turning translocal? Social networks and migration of the Wakhi of Gojal, Northern Pakistan. Lecture by **Andreas Benz**, at ZEF. July 3, 2012.

Figurations of Natural Disasters in Pakistan. Public Lecture by **Martin Soekefeld** at ZEF. April 26, 2012.

The **nexus of conflict and migration in Afghanistan**. Crossroads Asia Workshop. May 24, 2012. See: <http://www.dw.de/dw/article/0,,16035556,00.html?maca=en-rss-en-all-1573-rdf>

Doctoral research on mobility and migration

Tajikistan, Kyrgyzstan: Conflicts in Fergana Valley: Identity and social dynamics along Kyrgyzstan and Tajikistan borders. **Sri Lanka:** Quiet cooperation? The mediation of everyday fisher livelihood and coastal resource struggles in postwar Sri Lanka .

For more information on (doctoral) research in this area please look at www.zef.de/1879.0.html

Selected output on mobility and migration

Scheffran, J., E. Marmer and P. Sow. 2012. Migration as a contribution to resilience and innovation in climate adaptation: Social networks and co-development in Northwest Africa, in *Journal of Applied Geography*, 33, Special Issue, p. 119-127

Schetter, C. & Prinz, J. 2012: Counterinsurgency, Anthropology, Retreat – the US Military’s COIN ‘Strategy’ in Afghanistan. In: *Orient*, H II 2012, 24-34

Schetter, C. 2011: Flüchtling, Arbeitsmigrant, Dschi-

hadist. Zur Rolle von Translokalität in Afghanistan.

In: *Geographische Rundschau* 63 (11), 18-24.

Stark, O. and L. Byra. 2012. A back-door brain drain. ZEF Discussion Paper on Development Policy No. 164.

Stark, O. 2012. Integration, social distress, and policy formation. ZEF Discussion Paper on Development Policy No. 162.

Stark, O. Casarico, A., Devillanova, C. and S. Uebelmesser. 2011. On the formation of international migration policies when no country has an exclusive policy-setting say. ZEF Discussion Paper on Development Policy No. 157.

Suburb in China.



3.7 Health and sanitation

Introduction

Health, water supply, and sanitation are (a prominent) part of the UN Millennium Development Goals. With many infectious diseases (tuberculosis, malaria, HIV/Aids) spreading rapidly across developing countries, ZEF research focuses on the intricate linkage between environment and human health. To unravel the linkage, ZEF applies innovative theoretical perspectives combining diverse methods to assess health risk. The final aim is to develop governance instruments to target vulnerable segments of the population and to formulate policies to ameliorate the situation.

Research

Research on water, sanitation and health

In this new research initiative ZEF will explore tradeoffs and synergies between water quality and quantity, sanitation and hygiene, and related links with agriculture. The aim is to guide pro-poor investments for improved community and domestic capacities to enhance services for drinking water, sanitation and hygiene among agricultural communities with multi-purpose water systems. The project takes an interdisciplinary and systems approach. This three-year project started in May 2012 and will be carried out at sites in Ethiopia, Ghana, India and Bangladesh with strong local partners that have considerable experience in field-based research.

Contact: Joachim von Braun, jvonbraun@uni-bonn.de

Funder: Bill and Melinda Gates Foundation

Health impact of water access in urban Tibet

This research project in Tibet has been integrated in 2012 into the larger International Center for Integrated Mountain Development Kailash Sacred Landscape Initiative, encompassing the Himalayan mountain region of China, India and Nepal. ZEF contributes with socio-economic research on water and health to the initiative which has focused mainly on biodiversity so far. ZEF conducted an interview survey among local governments in Yunnan, China. Further, Leh Town in Ladakh in India is a case study now for developing a methodology for comparative research will be developed. Also, an MoU with the Ladakh Ecological Development Group has been signed.

Contact: Daphne Gondhalekar,
daphneg@uni-bonn.de

Funder: European Commission (Marie Curie Programme), German Research Foundation (DFG)

Water resources institutions and human health in Ahmedabad City, India.

The researchers in this project investigate health risk from an integrated perspective. So far, the following research activities have been undertaken (i) analyzing the distribution of water and vector-borne diseases in the city, (ii) assessing the socio-economic, institutional and ecological factors influencing water- and vector-diseases at household level and (iii) analyzing the spatial and temporal factors influencing water and vector-borne diseases in two settlements.

At the city level, the research explored the influence

Ahmedabad City in India. Here, ZEF investigates how the (mis-) management of water impacts human health.



of water management and town institutions on the spatial distribution of water and vector-borne diseases. On this basis, two case study areas were selected with different forms of socio-economic status but equally high incidence rates of water and vector-borne diseases. Spatial mapping of water infrastructure disclosed the different levels and conditions of water infrastructure and an additional household survey revealed socio-economic conditions such as hygiene, access to drinking water and sanitation, land tenure and health status of family members.

The research conducted so far questions the widely held view that 'on-site solutions' to water supply and sanitation could be a preventive medicine to the growing infectious diseases. Secondly, it questions the 'one-death, one-disease' approach dominant among international discourses to address human health.

Contact: Saravanan Subramanian,
s.saravan@uni-bonn.de

Funder: German Research Foundation (DFG)

Selected output on health and sanitation

Abbas, F. and U. Hiemenz. 2011. Determinants of public health expenditures in Pakistan. ZEF Discussion Paper on Development Policy No. 158.

Liu, D. and D. Tsegai. 2011. The new cooperative medical scheme (NCMS) and its implications for access to health care and medical expenditure: Evidence from rural China. ZEF Discussion Paper on Development Policy No. 155.

Doctoral research on health and sanitation

China: Sustainability of community health insurance scheme under asymmetric information: the case of China (see feature below). **Tanzania:** Optimal resource allocation for health: determinants and policy implications. **Vietnam:** Local industrialization and water.

Vietnam: The political ecology of waterborne disease in Can Tho City.

China's new rural cooperative medical scheme: evolution, design and impacts

The New Cooperative Medical Scheme (NCMS) program was implemented after 2002 in response to the poor state of health care in rural China. Supported by government subsidy, the scheme was rapidly scaled up reaching an enrollment rate of 94% in 2009. This doctoral research investigates the impact of the NCMS program on improving health care utilization and relieving the burden of high medical expenditure among citizens - with a focus on the varying effects for different regions and income groups. Furthermore, the study simulates and discusses policy designs for improving reimbursement packages. The research draws on data from the China Health and Nutrition Survey data (CHNS), which provides prolific cross section and longitudinal information. A major finding is that household income appears not to play a significant role for enrollment in the NCMS program. But regional circumstances do matter: In the gen-

erally poorer western regions, households with a high ratio of migrant workers are less attracted to the NCMS program. Also, regional variables such as infrastructure and environment (e.g. travel time) play a significant role. So far, the NCMS has definitely improved medical care utilization of poor income groups. Concerning the health care consumption of rural households in China, it was found that non-monetary factors (such as waiting and travel time) and the severity of an illness play a vital role in choosing treatment. Adjustment of the reimbursement level alone wouldn't bring change in health care adaption, but if coverage of inpatient treatment and reimbursement levels were increased this would help to reduce the catastrophic health expenditures for poor people.

Doctoral researcher: Liu Dan, China.

For **contact** and **more information** on (doctoral) research in this area please look at www.zef.de/1571.0.html

Household income appears not to be the decisive factor for people in rural China to enroll in the Cooperative Medical Scheme.



4 Capacity development

4.1 ZEF's Doctoral Studies Program

ZEF's Doctoral Studies Program offers an interdisciplinary and international three-year doctoral education. Since its inception in 1999 more than 500 students from 85 countries have participated in the program. For general information on the ZEF doctoral program and the application and registration procedure please look at www.zef.de/doctoralprogram.html

Welcome to new doctoral students at ZEF

In autumn 2012, ZEF welcomed its latest batch of doctoral students. Thirty-one students from 16 countries have started into the three-year doctoral program at ZEF, where they will strengthen their interdisciplinary and disciplinary skills. Moreover, they are to conduct one year of practical field research in a developing country.

ZEF junior researcher Liu Dan wins prize for best paper in Australia

Liu Dan, a ZEF junior researcher from China, won the first prize for the best paper submitted by a junior researcher to the 33rd Australian Conference of Health Economists in Melbourne, Australia (September 29-30, 2011).

First doctoral students at Right Livelihood Campus Bonn

Ms. **Lai Wan Teng** from Malaysia received the first RLC Bonn PhD Scholarship in October 2011. Her doctoral research, to be funded by the DAAD for three years, deals with patterns of migrant integration in Penang, Malaysia.

Ms. Wan Teng will conduct her research in cooperation with the two "Alternative Nobel Prize" laureates Irene Fernandez and Anwar Fazal. Also, Ms. **Divya Swaminathan** started her doctoral research within the RLC program. Her research is about the role of traditional knowledge in multi-stakeholder agricultural innovation processes. www.rlc-bonn.de

Batch 2012 of the ZEF Doctoral Studies Program.



Doctoral degrees at ZEF finished mid 2011- mid 2012

Title	First name	Family name	Date PhD Exam	Country of Origin	Title of doctoral thesis	Faculty	
Ms.	Naheed	Akhter	31-Aug-11	Pakistan	Comparison of DRIS and critical level approaches for evaluating nutrition status of wheat in District Hyderabad, Pakistan	Faculty of Agriculture, University of Bonn	Asian Development Bank
Mr.	Gebreyesus Brhane	Tesfahunegn	05-Oct-11	Ethiopia	Soil erosion modeling and soil quality evaluation for catchment management strategies in northern Ethiopia	Faculty of Agriculture, University of Bonn	BMZ (DAAD)
Mr.	Hafiz	Boboyorov	06-Dec-11	Tajikistan	Kinship and Islam: The role of collective identities in shaping institutional order of patronage in southern Tajikistan	Faculty of Arts, University of Bonn	BMZ (DAAD)
Mr.	Tilaye Teklewold	Deneke	15-Dec-11	Ethiopia	Water governance in Amhara Region of Ethiopia: an institutional analysis	Faculty of Agriculture, Humboldt Universität in Berlin	BMZ (CGIAR)
Ms.	Sewmehon Demissie	Tegegne	23-Dec-11	Ethiopia	Livestock Water Productivity (LWP) Improvement in the mixed crop-livestock system of Ethiopian highlands, Amhara region: a gendered sustainable livelihood approach to target LWP interventions for rural poverty reduction	Faculty of Mathematics and Natural Sciences, University of Bonn	BMZ (CGIAR)
Mr.	Andreas	Wilde	11-Jan-12	Germany	What is beyond the river? Power, authority and social order on 18th and 19th century Transoxania	Faculty of Arts, University of Bonn	Volkswagen Foundation
Mr.	Stephen Mutie	Wambua	30-Jan-12	Kenya	Household energy consumption and dependency on common pool forest resources: the case of Kakamega Forest, western Kenya	University of Göttingen	KAAD
Ms.	Juliet	Akello	08-Feb-12	Uganda	Biodiversity of fungal endophytes associated with maize, sorghum and Napier grass and the influence of biopriming on resistance to leaf mining, stem boring and sap sucking insect pests	Faculty of Agriculture, University of Bonn	BMZ (DAAD)
Ms.	Grace	Villamor	26-March-12	Philippines	Flexibility of multi-agent system models for rubber agroforest landscapes and social response to emerging reward mechanisms for ecosystem services in Sumatra, Indonesia	Faculty of Mathematics and Natural Sciences, University Bonn	BMZ (DAAD)
Mr.	Samir	Maskur	05-Apr-12	Indonesia	The sustainability of the Acehese Jama'at Tabligh movement through the formation of social network	Universiti Kebangsaan Malaysia, Bangi.	
Ms.	Evita Hanie	Pangaribowo	04-Jun-12	Indonesia	Household food consumption, women's asset and food policy in Indonesia	Faculty of Agriculture, University of Bonn	BMZ (DAAD)
Ms.	Nina	Langen	08-Jun-12	Germany	Ethics in consumer choice - An empirical analysis based on the example of coffee	Faculty of Agriculture, University of Bonn	Robert Bosch
Mr.	Asghar	Tahmasebi	25-Jun-12	Iran	Pastoralism under pressure: vulnerability of pastoral nomads to multiple socio-political and climate stresses - the Shahsevan of northwest Iran	Faculty of Mathematics and Natural Sciences, University of Bonn	BMZ (DAAD)
Mr.	S. Nana Ato	Arthur	28-Jun-12	Ghana	The unfinished business of decentralisation: political accountability of local government in Ghana	Faculty of Arts, University of Bonn	KAAD
Ms.	Tapiwa Uchizi	Nyasulu	06-Jul-12	Malawi	Governance and customary land tenure in peri-urban Kasoa in Ghana	Faculty of Arts, University of Cologne	BMZ (DAAD)
Mr.	Ramli	Nordin	27-Aug-12	Malaysia	Creating knowledge-based clusters through urban development: a study of Cyberjaya, MSC Malaysia	Faculty of Arts, University of Bonn	Government of Malaysia

4.2 Capacity development in Africa

Ghana

The Center of African Excellence in Accra, Ghana, belongs to the five “Centres of Excellence” on the African continent which were initiated by the German Academic Exchange Service (DAAD) in 2008. ZEF and the Institute of Statistical Social and Economic Research (ISSER) run the Centre of Excellence in Accra, the Ghanaian-German Division for Development Studies (GGDS) at the University of Ghana. GGDS is built on five pillars: a PhD program, staff development and enhanced research infrastructure at ISSER, development of joint research projects and academic exchange and networking.

Since 2009, the first year of enrolment, 14 students have been participating in the GGDS. The first student, Michael Ayamga, graduated in May 2012.



Excerpt from an interview with Michael Ayamga about his doctoral studies at GGDS.

“The doctoral program offers a great opportunity to get in touch with other researchers from Ghana

and Germany. During the initial workshop in Ghana we learnt a lot from the German researchers who held the workshop. These lecturers were also the first contact persons at ZEF – these contacts turned out to be very useful in the process of conducting my research and writing my thesis. Moreover, the institutional framing at the University of Ghana was much better than at other universities. Our supervisors were very engaged and there were no delays in the marking of our work. The fact that I was able to complete my PhD within three years shows that this is an extraordinary course. Important was the scholarship from DAAD that enabled me to focus 100% on my doctoral course. We also have a very good access to resources like books and other scientific literature”.

Contact: Wolfram Laube, wlaube@uni-bonn.de

Funder: German Academic Exchange Service (DAAD)

Website: www.zef.de/1629.html

Ethiopia

ZEF has been cooperating with the University of Addis Ababa, Ethiopia, since 2010 on developing and running a new Doctoral Program on Environmental Planning and Biodiversity Conservation. The program is the first PhD program in this field in Ethiopia. It is funded by the German Academic Exchange Service (DAAD) and cooperates with the Institute for Environmental Planning (IUP), University of Hanover, Germany. Currently, 15 doctoral students are enrolled in the program.

In November 2011, a one-week field excursion was organized to two National Parks in Southern Ethiopia: Nech Sar and Mago. The aims of the excursion were to i) analyze the difficulties that arise from the local governance of protected areas and conservation in an applied and interdisciplinary way and to ii) discuss



ZEF and the University of Addis Ababa have set up the first Doctoral Program on Environmental Planning in Ethiopia. In this picture: PhD students.

approaches towards more sustainable and integrated protected area management with the students. Both parks are highly degraded, mainly caused by overgrazing. Conflicts prevail between local agro-pastoralists and smallholders who live inside and around the parks on the one hand and the park authorities on the other.

All PhD students and senior researchers of the Program joined the excursion, including staff from ZEF and IUP as well as experts from the German Federal Agency for Nature Conservation (BfN) and the Geographic Institute of the University of Hamburg, Germany. **Girma Kelboro**, an Ethiopian doctoral student at ZEF, presented his work on Nech Sar National Park during the excursion.

Contact: Till Stellmacher, t.stellmacher@uni-bonn.de

Funder: German Academic Exchange Service (DAAD)

Website: www.zef.de/1629.html

4.3 Capacity development in Asia

German-Pakistani Research Collaboration Program

Pakistani collaboration partners of two projects within the “German-Pakistani Research Collaboration Program”, initiated and funded by the German Academic Exchange Service (DAAD), have been visiting ZEF in the beginning of 2012. The ZEF-led projects are: “Improving irrigation water use in the Punjab province of Pakistan by raising flexibility and integrating surface and groundwater resources” and “After the Flood is before the Flood”.

Contact: Conrad Schetter, c.schetter@uni-bonn.de and Bernhard Tischbein, email: tischbein@uni-bonn.de

ZEF conducted interviews with its Pakistani partners. See the full interviews at www.zef.de/news of the doctoral program (archive).

You can also read interviews with ZEF senior researchers Joe Hill and Conrad Schetter about the German-Pakistani collaboration in ZEF news No. 25, page 6-7.

4.4 Right Livelihood College

Introduction

The RLC Campus Bonn was inaugurated on May 30, 2011. It is hosted by ZEF and financed by the German Academic Exchange Service (DAAD). The aim of the RLC Campus Bonn is to promote exchange between the Right Livelihood Award laureates and researchers as well as synergies between the work of the laureates and interdisciplinary research and education, particularly in the fields of poverty alleviation, environmental sustainability, and social justice. The main activities of the RLC Campus Bonn are: providing PhD scholarships for research projects relevant to the laureates’ work and to ZEF’s research agenda, organizing international workshops and providing training facilities for PhD students from developing and transition countries.

Right Livelihood Laureates together with students at ZEF during the workshop on “Mobilization for Change: Social Movements in a Developing World” in June, 2012.



Workshop on “Mobilization for Change: Social Movements in a Developing World”, June 2012

Three “Alternative Nobel Prize” laureates participated in the international workshop on “Mobilization for Change: Social Movements in a Developing World” taking place at ZEF in Bonn from June 2-10, 2012. Nnimmo Bassey (Nigeria), Anwar Fazal (Malaysia) and Zafrullah Chowdhury (Bangladesh) worked together with senior experts and 21 PhD students from Africa, Asia and Latin America. The workshop was accompanied by various public events such as a photo exhibition in the Landesmuseum in Bonn.

Contact: Till Stellmacher, t.stellmacher@uni-bonn.de

Funder: German Academic Exchange Service (DAAD)

Website: www.rlc-bonn.de

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Selected output and outreach

Lectures

Public Lectures

Ports, pipelines, and pipedreams of modernity: Ethnic identity and the politics of place in Gwadar, Pakistan. Lecture by Hafeez Jamali, Department of Anthropology at the University of Texas at Austin. July 26, 2012.

Figurations of natural disasters in Pakistan. Lecture by Martin Sokefeld from the Ludwig Maximilian University Munich. June 27, 2012.

Land reform in Ghana: Is there conflict between efficiency and equity? Lecture by Michael Ayamga, University of Ghana. May 23, 2012.

The future of **development theory.** Panel discussion at ZEF. May 3, 2012.

Civil society in Vietnam and Cambodia. Lectures by Prof. Adam Fforde (Asia Institute, University of Melbourne) and Dr. Kim Sedara, Cambodian Development Resource Institute, Phnom Penh. January 18, 2012.

Risk and Uncertainty lecture series

Vulnerable people, vulnerable states: redefining the development challenge. Lecture by **Daniel W. Bromley**, Professor (Em.) of applied economics at the University of Wisconsin-Madison. July 5, 2012.

Arab Development Challenges Report 2011 - Towards the Developmental State in the Arab Region. Lecture by **Mohammad Pournik**, UNDP, Cairo. June 12, 2012.

Governance challenges as a risk for agricultural development. Lecture by **Regina Birner**, Chair of Social and Institutional Change in Agricultural Development at the University of Hohenheim, Germany. February 29, 2012.

Infrastructure - relations to risks and uncertainties in development. Lecture by **Jean-Jacques Dethier**, Research Manager Development Economics (DEC) at the World Bank. January 4, 2012.

Water lectures

The role of hydrological process research for sustainable development of water resources in the global south. By Stefan Uhlenbrook, Professor of Hydrology with UNESCO-IHE (Institute for Water Education) in Delft, The Netherlands. May 2, 2012.

The crucial role of water in disaster risk reduction and climate change adaptation: Experiences from development projects in the Philippines, Bangladesh and Saint Lucia. By Claudia Hiepe, FAO, Rome. January 30, 2012.

Comparative analyses of water governance systems: Concepts, methods, applications. By Claudia Pahl-Wostl from University of Osnabrück, Institute for Environmental Systems Research. January 20, 2012.

Implications of localism for comparative water studies. By Wendy Olsen from the University of Manchester, School of Social Sciences. January 21, 2012.



Water Energy Food Security Nexus and the Green Economy Conference: What next? Panel discussion with Thomas Stratenwerth (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU), Franz Marré (Federal Ministry for Economic Cooperation and Development (BMZ), Reza Ardakanian (Director of UN-Water Decade Programme on Capacity Development, UNW-DPC) and Janos Bogardi (Executive Officer of Global Water System Project (GWSP). December 12, 2011.

Awards and events

World Food Prize 2012

The 2012 World Food Prize has been awarded to **Dr. Daniel Hillel** for his role in conceiving and implementing a radically new mode of bringing water to crops in arid and dry land regions - known as “micro-irrigation”. Professor Hillel has been a lecturer for several years in the ZEF doctoral studies program and a Senior Fellow of the Center. See: http://www.worldfoodprize.org/en/laureates/2012_laureate

ZEF at Euroscience Open Forum 2012

ZEF chaired a high-ranking panel at the Euroscience Open Forum 2012 in Dublin, Ireland, on July 13. More than 200 people participated in the panel “Soil, land, and food security: the challenges for science, economics and policy” where the role of soils in the human-climate nexus was discussed.

ZEF-director held key note at Deutsche Welle Global Media Forum in Bonn 2012

At the plenary session on “**The fight for knowledge: Opportunities and risks of educational work in conflict and crisis zones**” ZEF-director Conrad Schetter held the key note address. June 27, 2012.

The ‘Farmers’ Innovation Contest’ in Ghana

This contest was carried out in the framework of the WASCAL initiative in West Africa during summer 2012. Its objective was to identify locally developed innovations by farmers which can complement existing extension packages after further scientific evaluation. The winners were awarded in November 2012. See www.zef.de/news/archive

ZEF-director at expert hearing of parliamentary committee for Economic Cooperation

ZEF-director Joachim von Braun was **invited as an expert to a hearing** of the German federal parliamentary committee for Economic Cooperation. The topic of discussion was “The impact of speculations in the finance and capital markets on food prices, suggestions for containment in consideration of current EU proposals”. June 27, 2012. Bonn.

UNFCCC side event at ZEF

ZEF organized a side event on ‘**Rainbow water: rainfall, the water cycle, forests and trees**’ to the United Nations Framework Convention on Climate Change (UNFCCC)’s 36th session of the Subsidiary Body for Scientific and Technological Advice (SBSTA). May 23, 2012.

DVPW meets at ZEF

The annual conference of the development policy section of the **German Association of Political Scientists (DVPW)** was held at ZEF from May 3-5, 2012. It was funded by the Fritz Thyssen Foundation. The contributions will be published as a special issue of Politische Vierteljahresschrift (PVS) in 2013.

The international workshop on “Civil society in Vietnam and Cambodia: Concepts and discourses - diversity in practice” was held at ZEF in January 2012. It was funded by the Fritz Thyssen Foundation.

Media coverage: see <http://www.zef.de/index.php?id=1422>



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Budget 2012/ Funding Partners of ZEF

Indirect Support*)		in Euro	in %
German Academic Exchange Service (DAAD) / German Federal Ministry of Economic Cooperation and Development (BMZ)		397.077	53,2
Own funds of students		68.450	9,2
Jack Kent Cooke Foundation		38.250	5,1
Ministry of Higher Education, Malaysia		37.100	5,0
China Scholarship Council		36.600	4,9
German Academic Exchange Service (DAAD) Regional Program / German Foreign Office (AA)		35.485	4,8
Evangelisches Studienwerk e.V. Villigst		24.600	3,3
IFEU/GTZ, DAAD		21.600	2,9
Katholischer Akademischer Ausländer-Dienst (KAAD)		19.200	2,6
Evangelischer Entwicklungsdienst (EED)		12.645	1,7
Stiftung der Deutschen Wirtschaft (SDW)		12.300	1,6
Ministry of Agriculture and Rural Development of Vietnam		11.080	1,5
Higher Education Commission Pakistan (HEC)		10.800	1,4
Ministry of Education, Indonesia		10.800	1,4
Government of Iran		10.250	1,4
Total		746.237	100

External Funds**)	Projects	in Euro	in %
German Federal Ministry of Education and Research (BMBF) via		5.579.655	61,9

<ul style="list-style-type: none"> German Aerospace Center (DLR), or 	Advancing Health Research Networks in Sub-Saharan Africa project Crossroads Asia project European Land-Use Institute project Forest Landscapes Institutions & Development project International Advanced Study Courses (IPSWaT) International Project Office (IPO), Global Water Systems Project (GWSP) WASCAL project, West Africa		
<ul style="list-style-type: none"> Forschungszentrum Jülich (FZJ) 	BiomassWeb project Olifant project, South Africa Wisdom project, Vietnam		
Bill and Melinda Gates Foundation	AG-WATSAN-Nexus project Marginality project TIGA project	739.008	8,2
German Federal Ministry of Economic Cooperation and Development (BMZ)		703.143	7,8
directly	Excessive Price Volatility project		
BMZ via			
<ul style="list-style-type: none"> German Academic Exchange Service (DAAD) 	PhD Course at the University of Addis Ababa, Ethiopia		
<ul style="list-style-type: none"> International Water Management Institute (IWMI) 	Improving Water productivity in Crop Livestock Systems project		
<ul style="list-style-type: none"> International Center for Agricultural Research in the Dry Areas (ICARDA) 	Wheat for Asia project		
German Academic Exchange Service (DAAD) / German Foreign Office (AA)	Before the Flood is after the Flood DAAD/ZEF Centre of Excellence, Ghana Improving irrigation Water use in the Punjab Province of Pakistan RLC Campus Summer University Central Asia 2012	473.116	5,2
Robert Bosch Foundation (RBS)	Junior Professorship – Prof. Börner Junior Professorship – Prof. Khamzina	374.763	4,2
European Commission (EU)	CODOC project FoodSecure project URBEN project	231.611	2,6
Fiat Panis Foundation	Dr. Hermann Eiselen Doctoral Program	122.076	1,4
German Academic Exchange Service (DAAD)	International Doctoral Studies Intercultural Weekend Seminar	118.749	1,3
International Food Policy Research Institute (IFPRI)	Agriculture-environment-health Economics of Desertification, Land Degradation and Drought Enhancing Women's Assets to Manage Risk & Climate Change	117.320	1,3

German Research Foundation (DFG)	Health Impact of Water Access project Water Resources Institutions & Human Health in India project International cooperation project	106.653	1,2
Volkswagen Foundation (VW)	Forest Resource & Livelihood Management project, East Africa Conversion of Scientific Relations, Tadjikistan Local Governance & fragile Staatlichkeit Workshop Junior Fellowship: Research Funds Laube	83.149	0,9
Third-Party Project Funds available after project end		78.237	0,9
German Federal Ministry of Food, Agriculture and Consumer Protection (BMELV)	Regiopower – Part 1	75.436	0,8
Fritz Thyssen Foundation	Competitive Knowledge project Workshops	60.753	0,7
Union Investment	Price Development for Food Products	53.765	0,6
German Technical Cooperation (GIZ)	Cooperation Bonn Summer School International Agricultural Research	46.672	0,5
Bayer CropScience	International Price Effects on Land Use & Production	36.624	0,4
Dreyer Foundation	Doctoral Scholarship	19.019	0,2
Deutsche Welthungerhilfe (DWHH)	Contextual Analysis, South Punjab	817	0,0
Total		9.020.566	100

Core funds***)	in Euro	in %
Personnel Costs	1.200.583	70,4
Administrative Costs	283.530	16,6
University Bonus System including BMBF & DFG Overhead Shares****)	221.265	13,0
Total	1.705.378	100

Indirect Support & External Funds & Core Funds	11.472.181	Euro
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ZEF's International Advisory Board

Prof. Dr. Hans van Ginkel (Chairman of the Board)

Former Under-Secretary General of the UN and Rector of the United Nations University in Tokyo, Japan.

Prof. Dr. Bina Agarwal

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Prof. Dr. Carolina Vera

Director of the Center for Atmospheric and Ocean Research, University of Buenos Aires, Argentina.



ZEF Board meeting in October 2012.

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