



Zentrum für Entwicklungsforschung
Center for Development Research
University of Bonn

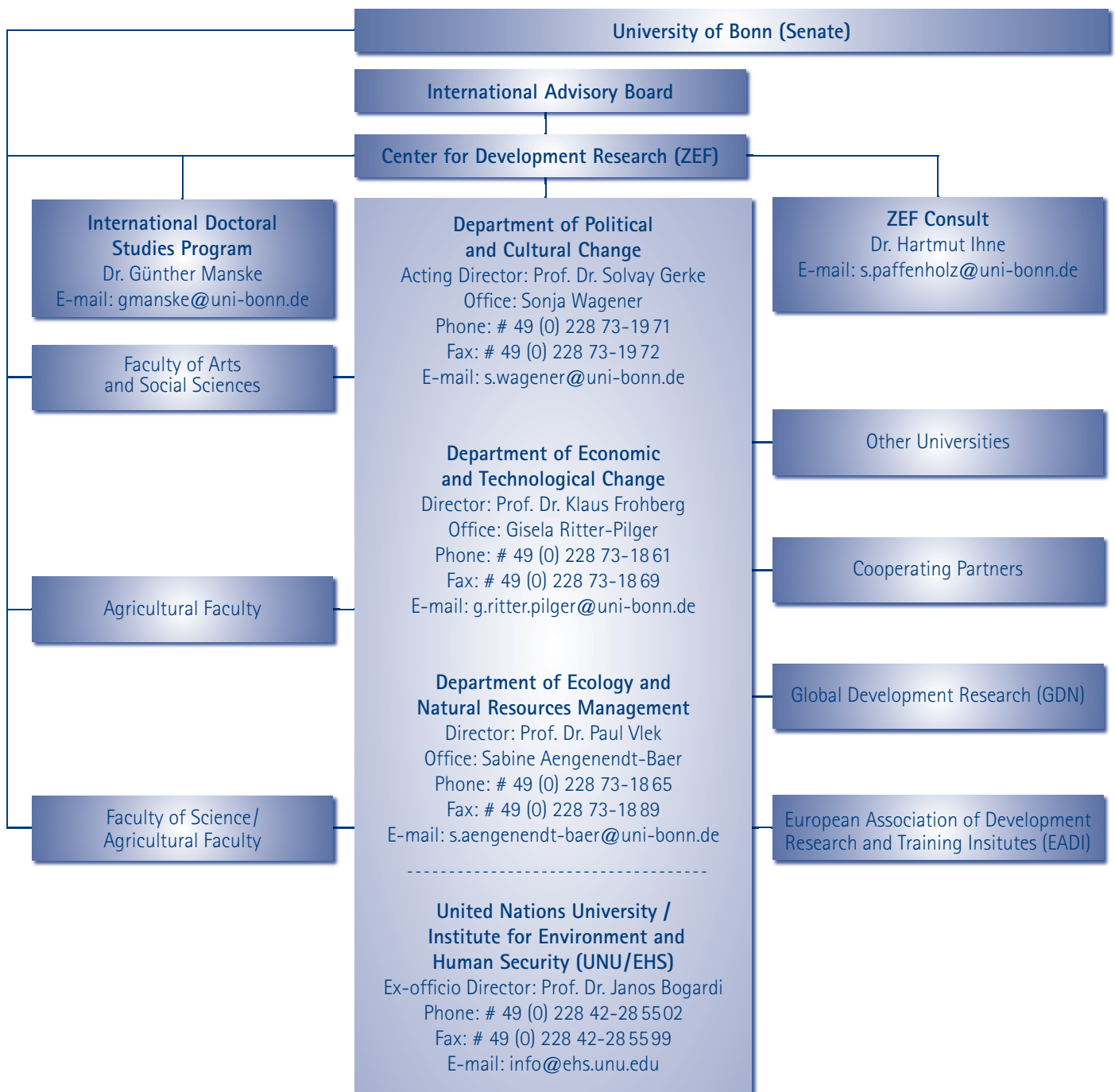
ZEF Bonn

Annual Report 2004 / 2005



Diversity

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ZEF Directors with members of ZEF's International Advisory Board in October 2005.



Preface: Development Research as a Pillar of Bonn University

Since its foundation in 1997, the Center for Development Research (ZEF) has gained a high reputation as an acknowledged think tank on issues concerning international development problems. But also for Bonn University ZEF has become an important pillar. In several ways it contributes to the academic profile of the Alma mater of Bonn.

ZEF generally strengthens the University's international profile. Especially through its International Doctoral Studies Programme on Development Research, it is contributing to an enrichment of the academic studies programme and culture. Since its inception in 1999, 245 PhD students from 55 countries have participated in the International Doctoral Programme at ZEF, and 82 of them have completed their studies so far. At the moment, 137 students are still enrolled in this programme.

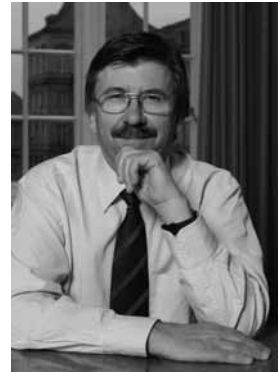
Furthermore, ZEF plays a major role for the research profile the University of Bonn has given itself. Development Research, the research area covered by ZEF, has been declared one of the research priorities of our University. In doing so, we appreciate the high level of the interdisciplinary and international research projects ZEF is involved in. A good example of this engagement is the project on conservation of wild coffee in Ethiopia (CoCE), which is being supported scientifically by several institutes of our University. Another example is the GLOWA Volta project, conducted by ZEF in cooperation with other research institutes in Germany as well as abroad. I had the pleasure to attend the GLOWA conference held in Cologne in May 2005 where the GLOWA Volta project was presented.

I am glad that in the past academic year and after many efforts, we finally succeeded in filling the professorship and head of the department of Political and Cultural Change. My colleague, Professor Dr. Solvay Gerke, was an excellent choice for this leading position, and I have no doubt that she will advance the department of Political and Cultural Change.

At the same time, there is a new challenge for ZEF: Since the beginning of 2005, funding of ZEF by money from the Bonn-Berlin compensation fund has come to an end. Basically, this means that ZEF has to think openly about new structures in order to be able to work under changed conditions as effectively as before. In particular, third-party funding will play an even bigger role in carrying out high-level scientific projects than in the past. I am aware that it will cost many efforts to give ZEF a new organisational structure, but this process can also be a great opportunity for all people involved. With the right attitude and the good will of everyone, ZEF can turn out even healthier and stronger than it is now.



Matthias Winiger



Matthias Winiger is a member of ZEF's International Advisory Board and Rector of the University of Bonn.



Introduction by ZEF's Directors

ZEF has been able to consolidate its position in the local, national, and international academic development community throughout 2004/2005. Not only ZEF's affiliation with the University of Bonn and its institutes has been intensified since funding from the Bonn-Berlin Compensation Fund ended in 2005, but cooperation with its partners like the United Nations University Program on Environment and Human Security (UNU/EHS) and the Global Water System Project (GWSP) has also been extended.

Fortunately, the Director's position of the Department of Political and Cultural Change has been filled permanently, and we are extremely pleased that Professor Solvay Gerke, former Director of Bonn University's Department of Southeast Asian Studies, succeeded interim Director Professor Hans-Dieter Evers in April 2005.

Among the highlights of past year's activities were the International Conference on Water Resources and Global Change in Bonn in February, which the ZEF- GLOWA Volta project co-organized with the GWSP, and a press conference on the ZEF-led BMBF funded Project on wild coffee in Ethiopia on the occasion of the BioTeam status conference, which attracted lots of media attention and coverage.

ZEF is also pleased that two of its major projects were successfully evaluated. The GLOWA Volta project has been granted permission to submit its third research phase following the BMBF Status Conference of all GLOWA projects in Cologne in May and a site tour through West Africa by some members of the evaluation team. The project on ecological and economic restructuring in the Khorezm Region in Uzbekistan also hosted a delegation of its evaluation team and received very positive feedback. The project aims at starting its next phase of research in 2007. Moreover, it matches well with a newly funded research project by the VW Foundation on "Local governance and fragile statehood in the Amu Darya Region", which broadens ZEF's research on governance and conflict.

By now, more than 283 doctoral students have been participating in ZEF's International Doctoral Studies Program on Development Research and 107 students have finished their studies. Together with former researchers and fellows, they constitute an enormous potential for setting up a professional ZEF Alumni Network, which enables us to generate their expertise and know-how in the long-term.

The report in front of you goes beyond the numbers and provides you an insight into the scientific progress being made in our various projects. ZEF is proud of what it has accomplished over the past seven-and-a-half years granted by the federal government to establish itself. Now that it has been accommodated within the budget of the University of Bonn, we trust that we can maintain our momentum. Of course, ZEF would never have been able to keep up a high level of research and research related activities without the support of its donors. Therefore, we would like to pronounce a special thanks to the German Federal Ministry of Education and Research (BMBF), the Federal Ministry for Economic Cooperation and Development (BMZ) the German Technical Cooperation (GTZ), the German Academic Exchange Service (DAAD) and the Robert Bosch Foundation and Volkswagen Foundation who enable us to keep looking forward optimistically to the future.



Paul Vlek



Solvay Gerke

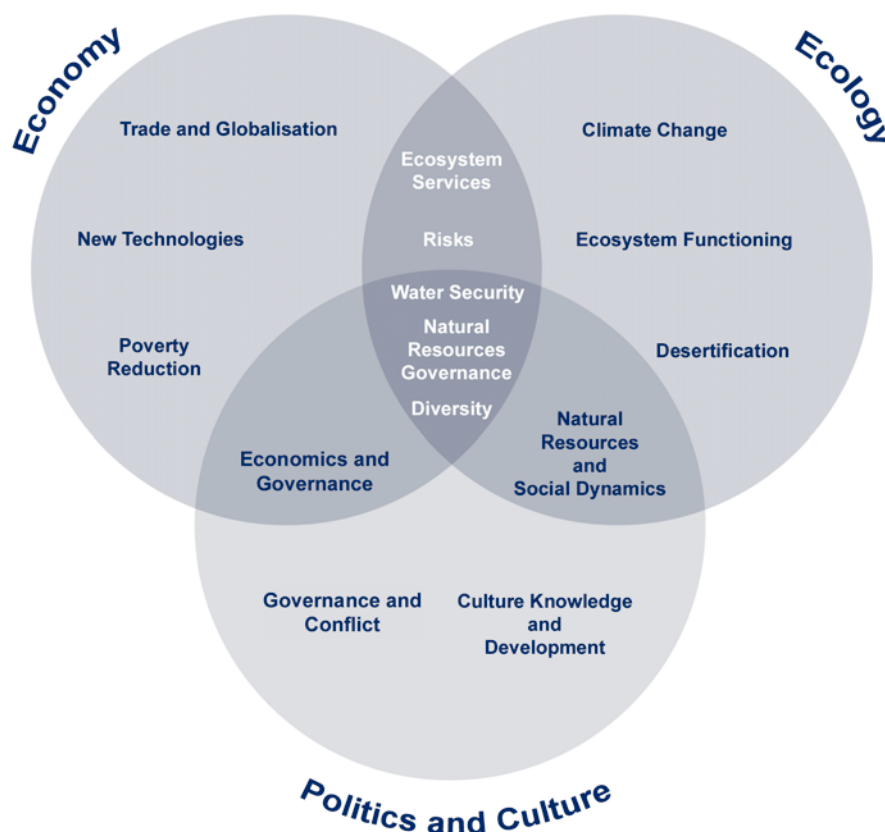


Klaus Froberg

ZEF's Research Approach

The Center for Development Research (ZEF) is an international and interdisciplinary scientific research institute of the "Rheinische-Friedrich-Wilhelms" University in Bonn. It was founded in 1995 and started its actual research activities in 1997. ZEF's research aims at contributing to solutions to global development issues. ZEF's approach is built on three pillars:

- **Research:** By covering three main research areas, which are interrelated through interdisciplinary research projects, ZEF offers a broad and integrated perspective on development. Since development is rarely constrained by a single problem within a single discipline, ZEF works on crosscutting themes of central importance for the developing world. The research programs build on the methods and analytical styles of the disciplinary research areas and link and integrate knowledge and capacities from different ZEF's departments. ZEF's major three research areas are: Political and Cultural Change; Economic and Technological Change; Ecology and Natural Resources Management. Results of ZEF's research are published in its own series, the ZEF Discussion Papers on Development Policy, in books, and renowned scientific journals.
- **Capacity Building:** Through its International Doctoral Studies Program for Development Research, ZEF intends to strengthen the international development research community in Germany, Europe and the developing world. The program aims at educating highly qualified scientific staff, advisers and managers for both the private and public sectors. In its size and concept, the program is unique, and ZEF has already become an institution of high and worldwide reputation.
- **Policy Dialogue & Public Awareness:** ZEF's research and other activities are carried out in close cooperation with national and international partners. In addition, ZEF maintains an active dialogue with representatives from governmental and non-governmental bodies, with national and international organizations for development cooperation as well as the private and business sector. To support its objectives and tasks, ZEF organizes international workshops and conferences, expert rounds and its Public Lectures on development issues.



Lead Article: Biodiversity - A Challenge for ZEF

by Manfred Denich, Franz Gatzweiler, Christopher Martius, John Mburu, Peter Mollinga. Box by Oliver Pye

Biodiversity conservation and use has to leave the traditional confines of biology if it is to be successfully implemented. As diverse the nature to be preserved as diverse are the social, economic, and political conditions in the regions where biodiversity conservation and use is an issue. In addition, regions with the highest biodiversity on earth are most affected by poverty and insufficient governance. Survival problems are on people's minds, often delegating secondary concerns such as conservation of nature to the background. Looking thoughtfully at ZEF's involvement in biodiversity research, an attempt is undertaken that makes the point for interdisciplinary approaches in biodiversity conservation and use.

"Biological diversity means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems". This is the definition of biological diversity as stipulated in Article 2 of the United Nations Convention on Biological Diversity, adopted by the 1992 Earth Summit in Rio de Janeiro (see Box). The term biological diversity - "biodiversity" - was coined in the 1980s and rapidly evolved into a keyword for biological research and the conservation of nature. Beyond its empirical use by biologists, the term biodiversity is also an idea about the protection of nature and sustainability and as such, it has entered the language of politicians, policy makers, advertising industry, and the media, and biodiversity-related issues have become increasingly important in national and international environmental discourses.

This article is not meant as an overview of all aspects of biodiversity. It rather discusses some aspects of biodiversity and the challenges facing its conservation and sustainable use in biodiversity-rich tropical and sub-tropical countries that arose or play a role in ZEF's research agenda. It particularly focuses on the economic valuation of biodiversity, conservation and use of biodiversity and the need of incentives for biodiversity conservation. Biodiversity in developing countries is threatened by environmental degradation, which in turn can be traced back to wrong policies, market failure, and widespread poverty. All this translates into limited capacities of governments and individuals to act environmentally sound.



Ethiopian coffee plants.

Importance and loss of biodiversity

The extent of the three levels of biodiversity, i.e. genetic, species and ecosystem diversity, on Earth today is the result of almost four billion years of evolutionary development of life. Today, there are approximately 1.75 million known species. But estimates of the global species numbers vary from 3 million to 110 million, with a best estimate close to 14 million. Out of this large pool, new species are discovered every day. Mostly, the newly discovered species are unspectacular organisms like the 200 new yeast species recently found in the guts of beetles. Sometimes new species like the dolphin in Australia or even those with "soft fur and big brown eyes" can still be discovered: biologists found a new species of an African monkey, which drew the public's attention in 2005.

Biodiversity, however, is not only the inventory of species, varieties, DNA patterns or ecosystem types. It also includes several quality criteria such as the relevance of species for ecosystem functioning, the importance of endemic species, i.e. species that occur only in the region under consideration, or the role of invasive alien species, i.e. species which are non-native to the respective ecosystem and whose introduction causes environmental or economic harm.

The scientific and public discussion is dominated by concerns regarding the real and potential changes of biodiversity. Much attention is drawn to the disappearance of species, particularly attractive ones such as the giant panda, Indian tiger or blue whale. Although extinction has been occurring throughout the course of Earth's history, in modern times species have been disappearing at 50 to 100 times the natural rate (even extinction rates of 1,000 to 10,000 times the natural rate are reported). Not only do plant and animal species become extinct, but biodiversity is also threatened at its other two levels - genetic and ecosystem diversity. Losses of genetic diversity are known from modern agriculture, which worldwide focuses on a few crop varieties only. Considerable numbers of old farm animal breeds and traditional crop varieties have already disappeared or are at high risk of extinction. Similarly, landscapes and their ecosystems such as forests, wetlands, lakes, rivers, coastal habitats, etc. are fragmented, degraded, polluted or destroyed as a consequence of human activities. These losses in biodiversity undermine the chances of future generations to adequately respond to potential environmental changes, diseases, increasing or changing consumer trends and other challenges, which we cannot yet foresee or predict.

With regard to developing countries, several underlying causes of biodiversity losses have been identified. They include human population growth, policy and market failures, underestimation of the value of biodiversity and, above all, poverty. As a result, biodiversity losses occur through human activities such as deforestation to expand agricultural areas, logging, illegal hunting or unregulated settlement and industrialization. These human impacts lead to considerable losses, particularly as a number of developing countries are centers of diversity of many world crops and represent regions also known for their high animal and plant diversity.

Examples of ZEF's research on biodiversity-related issues are the project on the genetic diversity of the coffee plant, *Coffea arabica*, in Ethiopia (see p. 15), and the project on ecological restructuring in Khorezm, Uzbekistan (see p. 41), which tackles the issue of land degradation caused by decades of cotton monocultures in irrigated agriculture.



Low crop variety leads to a loss of genetic diversity.

How much biodiversity do we need?

With the emerging changes in biodiversity due to human impacts, the question arises how much of it we need or how much of it should be conserved. One could argue that much of the existing biodiversity is not urgently needed: worldwide about 270,000 higher plants are currently known and 25% of these are used as food, fiber, medical and ornamental plants or for construction or fuel. A meager 10% of all the Earth's higher plants are cultivated for food production. Only 20 crop species meet 90% of the world's food requirement and just three crops - rice, maize, and wheat - provide 60% of the global demand for protein and nutritional energy. This may suggest that high levels of biodiversity are not a necessity for the survival of the human race. In recent years, however, the concept of "ecosystem services" has gained political momentum. It holds to the idea that we all depend on the functions that natural ecosystems provide "for free", such as clean water filtered in the thick soil layers of upstream watersheds, the atmospheric carbon dioxide accumulated in biomass through the photosynthesis of plants, or the pollination of crop plants through numerous insect species.

Much ecological insight has been gained into how the stability and resilience of such natural processes in ecosystems and the extent to which these are linked to the diverse web of seemingly "unnecessary" or redundant species. Ecosystems are sometimes compared to the wings of aeroplanes: safe flight (i.e. ecosystem functioning) depends on a critical number of rivets (species) being in place. This "rivet-popper" hypothesis suggests that high levels of biodiversity are required for robust and stable ecosystems.

So, answering the question of how much biodiversity we need is not possible yet. It depends very much on the perspective from which we look at it. If we keep the ecological functions in mind, this perspective may vary



between the precautionary approach, which considers the whole range of biodiversity, and the belief that we may effectively identify the necessary number of "rivets" to stay "airborne" with a minimum species set.

Biodiversity - a state of nature and a resource

The more biodiversity is looked at, the less clearly defined it appears to be. Viewing it from different angles leads to different perceptions of what is involved. Biodiversity can be seen as a "state" of nature or as a "resource". Biodiversity as a "state" refers to the existence of diversity *per se*. Individual species or varieties do not matter; what does matter is the entire extent of diversity in a given section of nature, which might be defined geographically, ecologically, or politically. It is generally not possible - and might never be - to fully describe quantitatively or functionally the state character of biodiversity. Yet, conservationists or decision makers need to be able to characterize the biodiversity of a system if policies and management concepts are to be implemented. Indicator species, keystone species or flagship species are used as a sort of surrogate for the biodiversity they belong to and are monitored to assess the biodiversity health of the system. In its healthy "state", biodiversity provides the basic conditions and drives the processes that ensure our very survival in a sustainable way. Ecosystem resilience and robustness are connected to the state nature of biodiversity and thereby to important foundations of life on Earth. Given the lack of knowledge of the degree of diversity necessary to sustain living systems, biodiversity should be conserved out of precaution.

Looking at biodiversity as a "resource" breaks the holistic aspect down to the function and use of its components

The biodiversity discourse

With the adoption of the Convention on Biological Diversity during the 1992 Earth Summit in Rio de Janeiro, the issue of biodiversity has become an archetypical global discourse. The Convention itself represents a compromise between conflicting discourses that developed prior to the summit, and that are crucial in understanding the policy debates surrounding biodiversity today. Three fundamental arguments that correspond to different interest groups and institutions can be identified, i.e. "environment", "resource" and "indigenous" related.

The environment discourse is connected to the green movements of the 1970s and to the growing awareness within institutions such as the UN and in the scientific community of the need to react to the looming ecological crisis of modernity. The UN Stockholm Conference already warned of the loss of genetic resources in 1972. By the time of the Rio Summit, international environmental NGOs had become key players in formulating an agenda based initially on the conservation of biodiversity through protected areas and international regulation. This environmental discourse is most closely related to the definition of biodiversity as species diversity.

The growth of environmentalism coincided with the growth of the life sciences industries. The developments in biotechnology, in connection with the general move towards an information and knowledge society, made the growth of a new corporate sector possible that had biodiversity itself as its key resource. The main issue for this sector was to secure access and property rights to biodiversity, i.e. genetic diversity, which, it was argued, would provide the incentives to protect the resource.

However, governments of the South had doubts both about the environmental argument itself, which they saw as limiting their ability to develop, and about the introduction of private property rights, which generated fears of information monopolization by the industrialized North. The Convention reflects this by affirming national sovereignty over natural resources, and by the call for technology transfer and benefit-sharing. The Convention resolved the perceived contradiction between environment and development with the slogan of "sustainable development". In fact, a new, hegemonic paradigm was created as a fusion of the environmental discourse and the life industries, one that called for the global integration of biodiversity into the market through a system of international environmental governance. Governance was seen as needed to internalize the real values of biodiversity, intellectual property to create incentives for investment and development.

The "indigenous" discourse rejects this new paradigm. Partly as a reaction to experiences with the industrial modernization of agriculture during the "green revolution" (and the related loss of biodiversity), small-scale farmer organizations, some green NGOs, and indigenous organizations emphasize the biodiversity conservation successes of subsistence agriculture and forest-based peoples. The patenting or private ownership of plants, indigenous knowledge, etc. is dismissed as biopiracy, the valuation of biodiversity as the commodification of nature. The subsistence perspective corresponds most to the ecosystem aspect of biodiversity.

These differing perspectives influence the various development perspectives open to us. Following the hegemonic argument, a market-oriented governance system seeks to integrate various stakeholders into a win-win regulatory arrangement, with different models of compensation for external effects, benefit-sharing, participation in management, etc. In contrast, the indigenous perspective starts from an antagonistic rather than stakeholder perspective, and seeks to strengthen subsistence-oriented access to and control over biodiversity.

as consumables *sensu lato* in ecological processes as well as for human welfare. Species diversity can supply a multitude of foods, including famine food in disaster areas, and raw materials, while ecosystem diversity provides habitat and recreational values. Biodiversity thus provides goods and services, both essential to the welfare of the people living with it, and the harvesting of the first can endanger the latter. Some advocate the harvesting of goods without regard to the on-site or off-site consequences of the loss in services under the assumption that the wealth generated from the goods will be put to find other ways to obtain the services. Without knowing if such technologies are available or at what cost, this view of biodiversity harbors great risks. For instance, genetic diversity enables organisms to evolve and adapt to changing ecological conditions and has, this way, an actual as well as potential value for breeding. It can help breeders and farmers to adapt crops and cropping systems to adversely changing conditions in order to enhance food security. Therefore, losses in genetic diversity might threaten the welfare and livelihood of future generations.

The valuation of biodiversity

One of the major concerns in the economics of biodiversity and development is how to place a monetary value on biodiversity and how this value can be applied to influence development policies.

It is assumed that the loss of species, genetic or ecosystem diversity caused by human activities may result in high costs to present and future generations. Moreover, usually only a limited number of individuals benefit from biodiversity loss and ecosystem change, and the costs borne by society of such changes are often higher than the benefits. Understanding the economic value of biodiversity would allow addressing its undervaluation as one of the key reasons for its degradation and for the low priority often given to conservation. By this approach, the extinction of species or the loss of genetic resources has to be considered a

resource consumption leading to economic costs, which have to be compared to the revenue from the use of the resource. To assess expenditures and revenues, monetary values have to be defined for the different levels of biodiversity and their ecological functions as well as for social, cultural, and aesthetic values. As long as there is no common ground for ethical considerations, such valuations are important for any kind of active biodiversity policy and political decision-making.

In valuing biodiversity, it is important to understand that economic value refers to the monetary value attached to a change in biodiversity or stock and not to the stock itself. The total economic value of biodiversity goods and services includes the entire spectrum of use and non-use values and is most frequently measured by the willingness to pay for its conservation.



Nowadays, species disappear up to 100 times the natural rate.

Given the vast amount of existing valuation studies, one could conclude that there is a great demand to determine the economic value of biodiversity in order to support political decisions on conservation. In reality, only a few of these valuation studies achieve real impact. The majority of resource allocation decisions in most countries have not been made on the basis of resource valuation. Therefore, we need to be skeptical of narrow valuation approaches and the assumption that when done properly they can provide an objective basis for decision-making. This does not imply the rejection of economic valuation. It rather emphasizes the need to use valuation as a tool in a negotiation process about trade-offs.

Access and benefit sharing

The 2005 Millennium Ecosystem Assessment indicates that the costs of biodiversity conservation borne by people in biodiversity-rich countries - predominantly developing countries - are rather high. Too often, these costs have to be borne by the poor in the form of opportunity costs of conservation. Industrialized countries, however, dominate in the use of and research on biodiversity due to their financial and technological potentials. Thus, one of the most challenging tasks for development research is the balancing of equitable sharing of benefits and costs related to the conservation and use of biodiversity. The two relevant questions are: "whose values count?" and "how can the benefits from biodiversity be shared equitably?" The related organizational problem of biodiversity conservation in developing countries (and not only there) is that the private delivery of public services is an entirely different matter from the private delivery of private goods and services. In many regions, poor farmers or forest dwellers are left with the costs of delivering public biodiversity goods or services to society. Governance systems need to assure people a fair share and rights to the benefits of biodiversity management. Currently, many governmental regulations for biodiversity conservation still lack adequate mechanisms to balance social and private costs and benefits. Thereby, they are widening the gap between the rich and the poor, forcing the poor to live from the stocks rather than from the flows of biodiversity management. A project at ZEF on "Determinants and effects of alternative institutions for natural resource management in developing countries" analyzes the impacts and performance of alternative governance systems (see p. 33: "Governance and natural resources").

Incentives for biodiversity conservation

Explicit and implicit in the goals of the United Nations Convention on Biological Diversity (Article 1) is the notion that biodiversity has a value. As such, economic valuation of biodiversity must be regarded an important tool in the development of relevant incentive measures for conservation at the global, national, and local level. If used more widely, valuation can help decide on an international level what financial resources a developed country should devote to biodiversity conservation in a biodiversity-rich developing country. It is increasingly difficult



Flood irrigation in the Volta Basin.

to commit resources to conservation initiatives without some idea of whether the value received in return for a unit of expenditure is worth it. Without an idea of what the donor countries can receive back from conservation investments, it is likely that the question of what extra resources to transfer to developing countries will continue to be settled on an *ad hoc* and probably unsatisfactory basis. This is a key question to be addressed by development research related to biodiversity.

People craft the institutions and governance structures that are incentives to enhance positive or to mitigate negative impacts on biodiversity. Incentive measures need to respond to the various values different people attach to biodiversity. Market-based incentives and regulatory interventions are the most widely applied incentive mecha-

nisms to conserve or use biodiversity in a sustainable way. Economic incentives are extremely relevant when biodiversity can be sustained at a local scale by improved resource management or by creating new markets for ecosystem services, such as emission trade or eco-tourism. Generally, economic incentives are called upon when market failure can be corrected or new markets can be developed.

Unfortunately, economic incentives have been far more pervasive in diminishing biodiversity resources than conserving them. To function properly, incentives require some degree of regulation, enforcement, and monitoring institutions that respond to the public and common pool resource features as well as the non-use values of biodiversity. This requires the involvement of stakeholders in decision-making, providing them with certainty over user rights and, ideally, facilitating self-governance and the building of social capital. Meanwhile, evidence is mounting that excluding people from high biodiversity areas or relying solely on the market to "work its wonders" frequently fails to achieve the desired conservation goals. Therefore, ZEF's project on "Determinants and effects of alternative institutions for natural resource management in developing countries" (see p. 33) analyzes the potential of participatory approaches for natural resource conservation.

Partnerships with the private sector and collaboration with local governments and resource managers are promising alternatives currently being investigated. In some ZEF projects, such partnerships are already being implemented. In the context of the project on wild coffee in Ethiopia (see p. 15), ZEF collaborates with Kraft Foods and the Amber Foundation.

Limitations of conservation and use of biodiversity

The people living in developing countries are economically the most disadvantaged. They not only suffer from the adverse environmental consequences of biodiversity loss but also from the — often internationally supported — efforts to establish new protected areas for biodiversity conservation with restricting rules and regulations. Developing economies often rely on the use of natural resources and the expansion of modern agriculture, key proximate factors for losses of forest diversity or of crop and animal genetic resources. To further complicate the situation, biodiversity-rich regions are often transboundary and governed under different policy and legal conditions, constraining the conservation of the biological resource base, and especially its sustainable use (a database developed at ZEF, www.groms.de, provides information on transboundary conservation issues for migratory species). Biodiversity thus constitutes a wide arena for conflict between conservation and use. To resolve the conflicting situation and to avoid erosion of biodiversity, conservation and management initiatives have to be based on carefully identified and clearly defined concepts that equally consider economic, social and ecological factors, as is for example stated in the framework of sustainable development adopted by the World Commission on Environment and Development in 1987. The current debate on biodiversity conservation, with support of the Convention on Biological Diversity, favors the notion of sustainable use of biodiversity, which has slowly been adopted in national policies and international agreements. This approach assumes a minimum or "sustainable" use of biological resources. Its extent depends not only on the maintenance of biologically relevant structures, but also on directing ecological processes in a way that assures productivity and biological reproduction of the involved organisms. Further, it allows societal institutions at the interface of social and biological systems to be involved in providing control mechanisms and management rules for biological resources that are accepted by all stakeholders at various levels (global, national and local).

From a strictly economic point of view, however, sustainable use of biodiversity can only be justified when the time horizon is sufficiently long and discount rates are low (discount rates are interest rates used in accounting



Biodiversity can trigger a conflict between conservation and use.



procedures to determine the present value of future cash flows, i.e. the discounted value of an amount of cash at some future date). Unfortunately, people in developing countries have few resources, are less likely to look far into the future, and their discount rates are many times higher than those of the developed world. Thus, persuading people on the margins of poverty to adopt strategies for sustainable use might need to involve compensating them for foregoing short-term gains, even if they themselves will also gain from this biodiversity in the longer run. As part of a comprehensive incentive system, such compensations could be solicited from international beneficiaries.

Therefore, in the project "Determinants and effects (...)" (see p. 33), the potential of so-called "payments for environmental services" schemes for translating biodiversity benefits into real financial incentives for local people is being analyzed. A target of the project is also to develop tools for achieving maximum environmental benefits with a given budget.

ZEF's perspective on biodiversity research

Driving forces and measures for the conservation and use of biodiversity vary within and between cultures and depend on a multitude of factors such as the extent of resource availability, skills for exploitation, education, availability of information or market conditions. Because of the different features and functions of biodiversity and their role in the efficient and equitable sharing of benefits derived from them, exploring and understanding biodiversity requires interdisciplinary scientific tools. This underlines the important role of interdisciplinarity in development research.

Due to the contrasting views on biodiversity, its conservation and sustainable use forces development research to deal with multi- and interdisciplinary approaches. Currently, ZEF is carrying out such research on biodiversity predominantly as an integral part of its ecological and economic research projects. It has recognized and accepted that biodiversity is being used by people to make a better living and that, particularly in rural environments of the tropics and subtropics, biological resources are very often the basis for developmental processes. At the same time, human impacts are recognized as the main cause of biodiversity loss. ZEF studies on biodiversity involve research on genetics, species, and ecosystems as well as on local cultures, socio-economic value systems and livelihoods (see for example the CoCE project on Wild Coffee in Ethiopia, see p. 15). Accordingly, mechanisms leading to biodiversity loss are thought to be understandable only through close collaboration between natural and social sciences. ZEF also recognizes that research on biodiversity is the first step in improving public environmental awareness, encouraging public participation, and stimulating the collaborative involvement of stakeholders in biodiversity conservation and use.

ZEF's activities follow the commitments to the United Nations Convention on Biological Diversity (CBD), the objectives of which are to promote (1) the conservation of biodiversity, (2) the sustainable use of its components and (3) the fair and equitable sharing of benefits arising out of the utilization of genetic resources. Accordingly, ZEF's work is in line with the aims stated in the Convention's Kuala Lumpur Declaration of the Seventh Session of the Conference of the Parties (COP 7) in early 2004. Priority issues include the integration of biodiversity conservation and use into socio-economic development recognizing in particular the role of local communities, the development of incentives to reduce biodiversity loss, the creation and the strengthening of public-private partnerships to promote protected areas, the development of concepts for an effective regime on access and benefit sharing and capacity building. At the interface of the CBD with the United Nations Convention on Combating Desertification, ZEF addresses biodiversity issues in drylands in the context of its research on land degradation.

Regarding research on loss of biodiversity, ZEF's activities are more indirect and focus on human impacts on landscapes and at watershed level analyzing land-use change, land degradation, and climate change. Many of these research activities implicitly deal with biodiversity. The results of these activities are reflected in policy advice in the form of land-use planning and development concepts that include biodiversity conservation or its sustain-

able use as a general feature. Examples of this approach are the GLOWA project in the Volta Basin (see p. 37) and the project in Uzbekistan (see p. 41).

While ZEF's research work is predominantly geared to the resource nature of biodiversity, it becomes increasingly obvious that this aspect supplies substantial arguments for the conservation of biodiversity to an only very limited extent. This is due to the fact that scientific as well as economic understanding of biodiversity *a priori* focuses on isolated sections of the entire ensemble and ignores the vast remainder. The only certain argument to preserve the hidden potential of biodiversity is expressed by the precautionary principle. With regard to biodiversity, the precautionary principle has to be understood as part of a comprehensive risk management and includes identifying and assessing adverse impacts on biodiversity as well as eliminating potential harms to it when a risk of losses becomes apparent even if cause and effect relationships are not fully scientifically established. One of the crucial questions in biodiversity policy ZEF is interested in refers to whether and under which framework conditions the precautionary principle can be applied to biodiversity conservation in developing countries. ZEF will continue working on the economic valuation of biodiversity. Special emphasis should be placed on the value of environmental

services, i.e. in the state view on biodiversity. Furthermore, the question has to be tackled which role flagship species (exceptionally attractive, well-known or economically valuable species of a habitat) can play in the valuation of biodiversity. Simultaneously, approaches have to be developed on how the mostly theoretical values of biodiversity can be transferred into real economic gains. Especially the latter is necessary for an active biodiversity policy and political decision-making.

In its projects, ZEF has experienced that implementing research-based concepts is not an easy task. This is also true for biodiversity conservation concepts. Therefore, implementation-oriented biodiversity research ("from knowledge to action") will be established focusing on the respective formal as well as informal

institutions and their interrelationships. To be successful, public-private partnerships and collaborations with local governments and resource managers are of fundamental importance, since implementation-oriented research can only succeed if it is participatory in nature.

Conclusions

- Threats to species, genetic or ecosystem diversity caused by human activities may result in high costs to present and future generations. The underestimation of the economic value of biodiversity seems to be one of the main reasons for the low priority often given to its conservation.
- Losses in biodiversity undermine the chances of future generations to adequately respond to potential environmental changes, diseases, and other challenges that we cannot yet completely foresee. In such a situation of uncertainty, the precautionary principle should be adopted as a safeguarding measure.
- Biodiversity in developing countries is particularly threatened by environmental degradation, which is often caused by a combination of wrong policies, market failure, and widespread poverty. A way to persuade poor people to turn to sustainable use is to compensate them via a comprehensive international incentive system in which the richer countries contribute to paying for the conservation and value of the world's biodiversity resources.
- ZEF's research in the area of biodiversity covers mainly the context of resolving the conflict between conservation and use of biodiversity in the developing world. Thus, it contributes to the answer of the overarching question which role biodiversity can play in food security and poverty alleviation.



Harvesting cotton in Khorezm, Uzbekistan.

Chapter 1. ZEF Projects with a Focus on Diversity

1.1. ZEF Research on Biodiversity

Introduction: Biodiversity in West and East Africa

Africa is one of the richest areas in the world in terms of species numbers and ecosystems. It harbors unique and outstanding hotspots of biodiversity, such as the endemism-rich "Upper Guinean" region. However, this diversity is increasingly threatened because of the ongoing surges in population densities. Although Africa has been populated and cultivated by mankind for millennia, the high population densities in modern times lead to large-scale changes in land use and massive deforestation at an unprecedented rate. These transformations, combined with ongoing global climate change, negatively impact the diverse and unique ecosystems and seriously threaten human well-being and survival. Driving forces of biodiversity loss include:

- overexploitation of natural resources resulting in uncontrolled deforestation and loss of game through intense hunting and poaching. This is especially the case in West Africa);
- large-scale conversion of natural habitats into impoverished pastoral and agricultural systems where overgrazing due to oversized herds of life-stock and monocultures of crop plants (e.g. cotton) lead to soil erosion as well as depletion and pollution of water;
- increasing poverty of a highly diverse, multi-ethnic population leading to massive socio-economic problems, migration and the breakdown of traditional systems of sustainable land use as well as long-standing forms of conservation which were mostly based on religion.

Erosion and loss of biodiversity is particularly severe in West Africa because in rural areas more than 60-80% of the population rely on natural resources for living. Agriculture strongly depends on rainfall, sufficient (ground) water and fertile soils because most people cannot afford or handle sophisticated irrigation systems and commercial fertilizers. Furthermore, productivity of savannas, forests and river systems is crucial to providing bush meat and fish, which constitute the most important sources of animal protein in Africa. Plant diversity is essential for human health because traditional medicine plays a major role for local communities, as western medicine is often unaffordable or faked. Use of local plants contributes substantially to commercial gains for local communities, including timber products and vegetable oils.

Overexploitation of resources has already led to a loss of more than 90 % of rainforests in West Africa and to serious water problems in the fragile ecosystems of the Sudanese and the Sahel zones. The biodiversity crisis is further aggravated by the economic and/or political instability of most West and East African countries, a situation that promotes uncontrolled and thus unsustainable exploitation of natural resources. Furthermore, large areas of biodiversity



Africa harbours unique and outstanding hotspots of biodiversity.



Oversized herds lead to soil erosion and pollution of water.

are as yet not well-documented scientifically because of understaffed research institutions and universities lacking adequate training and resources. But well-trained local personnel is the only way to implement and continuously adjust meaningful management plans for conservation and sustainable use of biodiversity in the long run. ■

The CoCE Project on *Coffea arabica* in Ethiopia

Introduction

Arabica coffee (*Coffea arabica*, Rubiaceae) originates from the Ethiopian highlands where it also has its centers of diversity. Wild populations of *C. arabica* grow naturally in the undergrowth of montane rainforests and, currently, the most important occurrences of wild coffee are known from eight forest regions in Ethiopia (see Fig. 1). The existence of the gene pool of *C. arabica* is highly endangered by settlement and land-use pressure on the montane rainforests. This development is alarming as coffee production and consumption is of considerable economic and social importance to Ethiopia. The genetic erosion of the gene pool of *C. arabica* is irreversible, and can also lead to high consequential costs for the international coffee breeding and production industry. The importance of rainforest conservation can be viewed against this background of man-made destruction or degradation of about 60 % of the Ethiopian forests during the last thirty years. Currently, only 2,000 km² of forests remain. Moreover these areas are extremely fragmented. Twenty-five percent of the Ethiopian coffee is produced in coffee forests systems.

Vegetation surveys

Floristic studies in the rainforests of Bonga, Berhane-Kontir, Yayu, Maji and Harena region (see Fig. 1) revealed a total of 651 plant species (32 endemic to Ethiopia) belonging to 120 families. Only 10 % of the species have been found in all of the five regions. By means of a multivariate analysis, it could be shown that the forests of the five regions differ in terms of their flora, whereas the forests are largely similar within each region. However, forest areas in which wild coffee is abundant represent an exception. The species composition of these stands is relatively similar across the regions and, therefore, they are tentatively classified as a separate forest formation ("coffee forest"). A comparison of the forest fragments shows that they differ less in plant species composition than in the abundance of single species. This is due to differences in the microclimate according to altitude and exposition. Wild coffee has a patchy distribution and is most frequently found in those parts of the forest where competing undergrowth, shrubs, and small trees have been removed by the local forest users.

Project title:

"Conservation and use of the wild populations of *Coffea arabica* in the montane rainforests of Ethiopia".

Keywords:

Biodiversity, conservation and use, coffee, economic valuation of diversity, rainforest

Country of research: Ethiopia

Research objectives:

The aim of the research project is to assess the diversity and the economic value of the Ethiopian coffee gene pool and to develop concepts of model character for conservation and use of the genetic resources of *Coffea arabica* in its center of diversity in Ethiopia. The concepts are to be based on the conservation of the montane rainforests as the natural habitat of the wild coffee populations and the forest coffee systems as the traditional use of the wild coffee populations.

ZEF staff involved:

Paul Vlek, Manfred Denich (project leaders), Franz Gatzweiler, Tadesse Woldemariam (project coordinators), Alice Beining, Taye Kufa, Georg Lieth, John Mburu, Peter Mollinga, Anke Rojahn, Christine Schmitt, Feyera Senbeta, Admasu Shibru, Till Stellmacher, Kassahun Tesfaye, Teklu Tesfaye (Gole team members)

Timetable: August 2002 - June 2006

Main cooperation partners

Ethiopian Agricultural Research Organization (EARO)
 Addis Ababa University (AAU)
 Ethiopian Economic Association (EEA)
 Institute of Biodiversity Conservation (IBC)
 Nees Institute for the Biodiversity of Plants (University of Bonn)
 Institute of Plant Nutrition (University of Bonn)
 Institute of Phytopathology (University of Bonn)
 Foundation of Sustainable Development (University of Wageningen)
 Amber Foundation, Freiburg
 GEO schützt den Regenwald e.V.
 Kraft Foods Deutschland
 German Technical Cooperation, GTZ

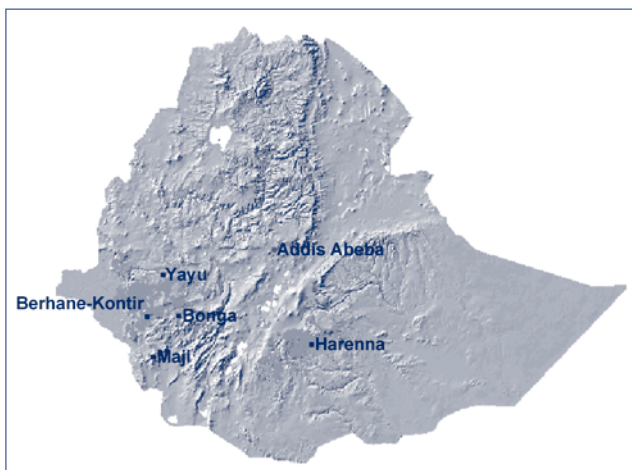
Main funding partners:

This project is being carried out in the framework of the BioTEAM Biosphärenforschung - InTEgrative und Anwendungsorientierte Modellprojekte) - Program of the Federal Ministry of Education and Research (BMBF), Germany

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Figure 1:
Location of study regions of the CoCE project



Molecular genetics

The research on molecular systematics is being carried out (1) to determine the extent and distribution of genetic diversity in wild populations of *C. arabica* and its patterns of distribution, (2) to clarify the origin of *C. arabica*, and (3) to identify what "wild" populations of *C. arabica* there are at the molecular level. Based on chloroplast (cp) genome sequence data *C. arabica* appears as a species that arose in recent time through a single allopolyploidization event, involving *C. eugenioides* as a mother. Rapid subsequent spreading then generated today's geographical range. An interregional analysis using ISSR (Inter Simple Sequence Repeat) data shows strong differences in genotype distances among different regions. Some regions show closely related genotypes. However, high levels of genetic diversity were also found within regions. To explain these patterns, the reproduction system (high rate of out-crossing; *C. arabica* is mainly self-pollinating) and dispersal mechanism of *C. arabica* (through monkeys and baboons) seem relevant. In some cases, historical human influence is also likely.

Ecophysiological studies

The recent findings from eco-physiological studies indicate that there are considerable differences in water use efficiency (WUE) between different wild coffee populations. Particularly during the dry season, populations from Bale Mountains (Harenna) showed higher WUE, both instantaneous ("short-term") and intrinsic ("long-term"), when compared with three different populations studied in southwest Ethiopia. During the wet season, coffee plants from Bale Mountains also showed higher instantaneous WUE compared to plants in the southwest, whereas no significant difference could be found for intrinsic WUE.

Phytopathological studies

The research on fungal pathogens showed that in all investigated areas, coffee leaf rust (CLR, *Hemileia vastatrix*), occurred relatively frequently, attacking up to 80% of the trees during the warmer and drier season. Comparing morphological characteristics, all spore samples could be related to *H. vastatrix*. Most study areas remained free of coffee berry disease (CBD). In seedling tests with an aggressive strain, all selections were highly affected by CBD. In contrast to that result, in an artificial inoculation with attached green berries in the field, only few cherries showed symptoms. Cherries of seven trees remained completely free of disease. These observations allow first remarks on possible CBD tolerant or resistant selections in the wild coffee populations of Ethiopia. The coffee wilt disease (CWD), *Gibberella xylarioides*, was present to a very low extent in all areas.

Economic analyses

Direct payments were analyzed as a potential incentive to stop the conversion of coffee forests by conducting economic experiments with farmers in Bonga. In a framed field experiment with farmers, the effectiveness of collective punishment as an enforcement mechanism (collective tax and a tax/subsidy) was tested. The results suggest that an incentive compatible tax or tax/subsidy mechanism leads to the desired outcome in the majority of cases. Competition among farmers, however, may lead them to behave in a retaliatory way, so that even a high collective punishment is not effective. In general, one can conclude that direct payments with collective punishment are risky undertakings with regard to the compliance rate of farmers, even in a safe environment.

The global value of coffee genetic resources was assessed on the basis of three main aspects: (1) the potential to use them for the breeding of disease-tolerant varieties, (2) their potential to increase yields of coffee, and (3) the potential for breeding a caffeine free coffee cultivar. These aspects were analyzed on the basis of past experiences (e.g. with overcoming diseases using wild varieties) as well as potential future prospects. The economic value of the coffee genetic resources is estimated between US\$ 0.5 billion and US\$ 1.5 billion.

Institutional research

As part of the research on institutions, information on the institutional background of the different forest resource utilization schemes was collected. It became clear that the coffee forests are traditionally divided into plots of customary use rights and that plot "ownership" can be inherited or even sold. It was possible to reveal customary use and maps were drawn that illustrate which forest plot of which size and with which resources belongs to which forest user in the village. Local government bodies tolerate this forest partition to a certain degree, while upper governmental levels follow official "all land belongs to the state" government policy and are either not aware of it or declare it to be illegal activities.

Ethiopian Coffee Forest Forum

CoCE project staff initiated a forum that assembles key stakeholders in order to discuss and elaborate conservation strategies. The initiative led to the constitution of the Ethiopian Coffee Forest Forum (ECFF). ECFF is a platform to establish an agenda for an institutionalized collaborative action among stakeholders in the frontier of the conservation and use of *Coffea arabica* and its habitats. During the last meeting of the ECFF, a vision for the conservation and use of coffee forests was formulated and major challenges in achieving that mission were identified. ■



Wild coffee is more resistant to diseases than improved varieties.



Interviews were conducted with the inhabitants of Bonga.



BIOTA West Africa

Introduction

Project title

"BIOTA West Africa subproject W02: Assessment of Africa's biodiversity and development of sustainable conservation strategies considering climate and land cover changes" (new title). "Biophysical and hydrometeorological parameters within the framework of Terrestrial Biodiversity Research" (former title).

Keywords:

Biodiversity, climate change, vegetation dynamics, land surface - atmosphere interactions

Countries of research:

Burkina Faso, Benin, Côte d'Ivoire

Research objectives:

The BIOTA subproject W02 focuses on hydrometeorological and biophysical parameters that affect the local biocoenoses, to analyze how land cover changes affect regional patterns of climate and biodiversity, and vice versa. Our prime objective is therefore to generate a multi-scaled scientifically sound climatological framework derived by reliable experimental field measurements and a profound analysis of regional climate variability including vegetation dynamics and land cover / land use changes.

ZEF staff involved:

Paul Vlek (project leader), Jörg Szarzynski (project coordinator), Lazare Tia

Timetable:

BIOTA 1st phase:
January 2001 - March 2004
BIOTA 2nd phase:
March 2004 - March 2007

The implementation of the BIOLOG program by the Ministry of Education and Research (BMBF), in particular BIOTA, complies with the obligations for industrialized nations, as stipulated in the Convention on Biological Diversity (CBD) of 1992, which requires the support of developing nations via transfer of knowledge, capacity building as well as logistic and financial support. In BIOTA-West, the main foci of research and capacity building are concentrated on Burkina Faso, Benin and Cote d'Ivoire. These countries have also ratified the CBD and thus need substantial support to fulfill its requirements.

In the pilot phase of BIOTA West, most research was centered on establishing local collaborations in order to assess diversity patterns of selected taxa in undisturbed habitats and to initiate long-term monitoring programs in standardized biodiversity observatories. For the main phase of BIOTA-West, the emphasis has been shifted to the applied aspects of the project. These include the investigation of the consequences of human impact on biodiversity and its relation to (socio-) economic needs of the local population, predictive modeling to evaluate the impact of global change on biodiversity patterns, priority setting for conservation areas and the intensification of capacity building to guarantee local application and further development of strategies for conservation and sustainable use of biodiversity in the long run.

Main results of BIOTA-West since July 2004

Regional / mesoscale climate analysis and modeling

The climate data set of W02 comprises time series from several hundred weather stations in Africa on a monthly and/or daily basis. Based on geostatistical procedures, these data were used to interpolate surface precipitation climatologies. A full sequence of maps was established illustrating decadal means of rainfall for the entire region of West Africa. (<http://www.bondy.ird.fr/carto/pluvio.html>).

Compared to the single map of the authors mentioned above, this sequence shows the spatiotemporal variations of rainfall during the last five decades. General spatial features such as the latitudinal progression of isohyets in Sahel, the rainfall maxima along the coasts of Guinea, Sierra Leone, Liberia and Cameroon, and the Dahomey Gap are visible as is the temporal forward and backward shift of isolines in the course of the years. In part, some of these regions correspond to areas with the highest species numbers in Africa. As a striking point, the topographically-induced wetter region of the Jos plateau in Nigeria casually emerges as an isolated refugial spot. According to findings from other BIOTA projects, this highland is one of the centers of bat diversity in West Africa. But also with regard to the climate dynamic of West Africa, the Jos plateau is a meaningful topographic unit. Next to the highlands of Ethiopia and the southern Chad (Darfur), the Jos plateau is one area with a high impact on

the origin and appearance of squall-line activities in West Africa. Squall lines are well-organized mesoscale convective systems which contribute to more than 80% of the annual rainfall in the Sahelian region. According to results from the HAPEX-Sahel experiment, the inter-annual variability and the observed decline in Sahelian rainfall over recent decades is mainly linked to the numbers of convective complexes recorded during the rainy season, rather than to a reduction in the size of the rainstorms.

Local bioclimatic monitoring: vegetation-atmosphere interactions and land surface parameterization (LSP)

The research infrastructure for bioclimatic monitoring tasks was expanded significantly through the integration of project activities and research sites into regional research networks. Important among these are the formation of an integrative multi-scale monitoring concept in Burkina Faso linking BIOTA West Africa with the GLOWA project in the Volta basin (see p. 37) and the Burkinabé counterpart INERA. The GLOWA program is a research initiative of the BMBF on "Global Change in the Hydrological Cycle". The "Biophysical Observation Network" (BON) combines important features of biophysical ground measurement and remote sensing techniques in order to enable the monitoring of large scale vegetation, hydrologic and bio-geophysical dynamics and an accurate evaluation of climate dynamics based on observations of biosphere - atmosphere interactions.

The newly established Observation Network in Burkina Faso is a favorable complement to the already existing stations in Ghana installed by GVP. In general, the experimental sites serve three distinct purposes: Firstly, they provide the instrumental basis for data assimilation. Secondly, measurements in the surface-atmosphere-interface provide the boundary conditions for climate modeling. Thus, capturing the dynamics of the exchange processes in parameterizations and algorithms is a major component of atmospheric modeling across all scales from local to regional measurements, via the scale of the Planetary-Boundary-Layer to the scale of continents and hemispheres finally leading to global weather systems. The third aspect is the possibility to validate the output from the models and to test and verify hypotheses.

Phyto-structure and light environments: derivation of biophysical parameters in different West African vegetation units

Our investigations on vegetation structure (canopy cover, gap fraction, LAI, faPAR) and light environments are based on rapid-assessment methodology (hemispherical photography, LAI-2000) that will provide essential information on habitat diversity and its influence on flora and fauna. Results can be used in both BIOTA and GLOWA-Volta research projects. It is a focal point to mention that our approach combines ground measurements and remote sensing products that will be applied by BIOTA and GLOWA subprojects. Satellite-derived vegetation indices based on NOAA-AVHRR as well as TERRA-MODIS images will be calibrated by ground validation to fit local conditions. Once the pilot studies

Main cooperation partners:

Burkina Faso:
Université Ouagadougou;
Institut de l'Environnement et de
Recherches Agricoles (INERA);
Benin:
Université Abomey-Calavi CI;
Université d'Abobo-Adjamé;
Université de Cocody;
Station d'Ecologie Tropicale de Lamto;
Institut de Géographie Tropicale (IGT)

Main funding partners:

German Federal Ministry of Education and
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Environmental awareness in Fada N'Gourma, Burkina Faso.

Project title:

"Socio-economic analysis of maintaining and utilizing biodiversity in East African rainforest systems (Biota East 13)".

Keywords:

Biodiversity conservation, economic valuation, degradation factors, cost-benefit analysis, incentive mechanisms

Countries of research:

Kenya, Uganda

ZEF Staff involved:

John Mburu, Degnet Abebaw Ejigie, Iason Diafas, Paul M. Guthiga

Timetable: January 2005 - May 2007

Main cooperation partners:

IUCN- Eastern African Regional Office, Nairobi
Zoologisches Forschungsmuseum Alexander Koenig (ZFMK), Bonn
University of Nairobi, Kenya
Kenyatta University, Kenya
Makerere University, Uganda

Main funding partners:

German Federal Ministry of Education and Research (BMBF)

Project Coordinator/Contact:

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and regressions are established and validated, the transferability to larger grid solutions will be examined.

The project started with the selection of sites for LAI measurements in Burkina Faso (Bontoli Park). The sampling design follows the conceptual framework of VALERI (Validation of Land European Remote Sensing Instruments); Institut de la Recherche Agronomique, Centre d'Avignon (<http://www.avignon.inra.fr/valeri/>) in accordance with Dr. Frédéric Baret (Directeur de Recherche, INRA CSE, Avignon). ■

BIOTA East Africa

During the short project period, theoretical and analytical frameworks have been developed for the objectives stated below. Furthermore, empirical data for the spatial analysis of land use/land cover changes has been collected using a semi-structured questionnaire in Kenya. A random sample of 120 villages was selected and groups of village elders were interviewed. It is expected that this data will indicate the forces that have been driving the degradation of Kakamega Forest and the increasing losses of biodiversity. Eventually, we will be able to quantify the different threats to the unique biodiversity found in this forest and predict the future land cover changes for the research areas. Recommendations emanating from these results will enable policy makers to initiate measures that can mitigate further biodiversity losses.

The research objectives are:

(1) To conduct a spatial analysis of forest fragments in Kakamega, Kenya, and develop spatial models to assess the driving forces of land use/cover change

(2) To evaluate the economic value of the various use and non-use values of rainforest systems in Kenya and Uganda, along the gradient of degradation, and to assess whether the forest, with all its unique and endemic biodiversity, is able to compete with alternative forms of land use, e.g. farming.

(3) To assess the magnitudes of different categories of costs and benefits of utilization and maintenance of forest resources from the perspective of different management approaches and along the gradient of degradation, and develop models providing an understanding of efficient and sustainable approaches to conserving biological resources.

(4) To enhance human capacity regarding the application of economic tools for decision-making in environmental and natural resource conservation issues.



In the project, land use change is being analyzed.

Data collection for the other objectives of this project is currently being conducted in Kenya and Uganda. ■

Genetic Resources Policy Initiative (GRPI)

ZEF has been participating in GRPI stakeholder meetings and workshops in Kenya and Ethiopia. In Ethiopia, ZEF assisted the Ethiopian Task Force on GRPI in understanding the role of economics in the process of policy-making. This has enabled the Task Force to understand how to evaluate obstacles to a sustainable conservation of genetic resources in the country. In Kenya, ZEF was involved in a brainstorming meeting and has been assisting in an analysis of the shortcomings in the Seed and Plant Varieties Act, which is currently undergoing revision.

For the research outputs, several policies, legislative, and institutional measures related to genetic resources have been analyzed in Ethiopia. These policies include the Environment Policy (1997), Biodiversity Policy (1998), Biodiversity Strategies and Action Plan (2004), Agricultural Research Policy (1997), Plant Quarantine Regulation (1992), Wildlife Proclamation (2005), and Forestry proclamation (2005). It has emerged that these policies are not properly integrated into the various relevant sectoral and cross-sectoral development policies and strategies. Among other things, this is because of the inadequate technical capacity and lack of awareness on the meaning and importance of biological resources among the relevant stakeholders and the public.

Other important results suggest that most of the organizations involved in the conservation and sustainable use of genetic resources (Institute of Biodiversity Conservation, Environmental Protection Authority, Ethiopian Science and Technology Commission, and Ethiopian Intellectual Property Office) have no regional structures to implement their activities. This has consequently resulted in a delay of policy implementation. The various biodiversity activities undertaken by different institutions in the country are not coordinated and harmonized. There are prevailing conflicts and overlapping mandates. Moreover, the mandates of the federal and regional institutions involved in biodiversity have not been clearly defined and established. Consequently, there are activities that remain undone while others are duplicated. Some essential biodiversity-related policies and laws are still not in place, for instance, policies providing for the conservation and management of wetlands. Most importantly, the country does not have a land use policy. ■

Participants of a ZEF workshop held in Kenya.



Project title:

"Genetic resources policy initiative (GRPI)".

Keywords:

Agro-biodiversity conservation, economic analysis, legal and policy analysis, capacity building

Countries of research:

Ethiopia, Kenya

Research objectives:

(1) To identify and advise task forces and stakeholder groups in Ethiopia and Kenya on ways how economics can play a role in national genetic resources policy-making. (2) To conduct economic analyses of legal and policy options concerning conservation, sustainable use and control of genetic resources for food and agriculture in Ethiopia and Kenya.

ZEF staff involved:

Edilegnaw Wale, John Mburu

Timetable: February 2005 - January 2008

Main cooperation partners:

GTZ, Germany
International Plant Genetic Resources Institute - Sub-Saharan Africa, Nairobi, Kenya
Institute for Biodiversity Conservation (IBC),
Ethiopia Institute for Development Studies, Nairobi

Main funding partners:

BMZ/GTZ through International Plant Genetic Resources Institute - Sub-Saharan Africa (IPGRI)

Project Coordinator/Contact:

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Economic Valuation of Indigenous Breeds in East Africa

Project title:

"Economic valuation of indigenous breeds in East Africa".

Keywords:

Animal genetic resources, economic valuation, Borana cattle, choice experiment

Countries of research:

Kenya, Ethiopia

Research objectives:

- (1) To value important characteristics of tropical breeds of cattle by using choice experiment methods (i.e. choice ranking).
- (2) To determine costs of conserving Borana cattle in Kenya and Ethiopia by applying a direct cost analysis and a contingent valuation method.
- (3) To derive the best conservation strategies from the two objectives mentioned above and to analyze the impact of these strategies on less favored households (analysis of "pro poor conservation strategies").

ZEF staff involved:

John Mburu, Kerstin Zander

Timetable:

October 2002 - September 2005

Main cooperation partners:

International Livestock Research Institute (ILRI), Ethiopia, GTZ Negelle (Ethiopia); Kenyan Agricultural Research Institute (KARI) in Marsabit, Kenya, and CARE Ethiopia

Main funding partners:

Robert Bosch Stiftung

Project Coordinator/Contact:

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In this study, the relevance of Borana cattle as a means of food security, a source of income and of cultural identity was investigated by conducting a choice experiment. This valuation method investigated livestock-keepers' preferences regarding different cattle attributes and the magnitude of their willingness to pay (WTP) for them. The choice experiment was performed across a sample of 368 livestock-keepers on the Borana plateau in Ethiopia and northern Kenya. The results show that livestock-keepers allocate a positive WTP value to attributes such as watering requirement, tick tolerance, animal body size, good fertility, and suitability for traction. However, there are also cattle attributes that livestock-keepers attach a negative WTP value to, i.e., they would have a negative utility for animals with such attributes. One of these attributes is the milk quantity, a production factor that is very important in the developed world as well as in high potential areas in Ethiopia and Kenya. Neither a lower nor a higher milk yield than the status quo of 2-4 litres per day seems to add benefit to the livestock-keepers.

Interesting differences have been found between two important groups of livestock-keepers: those whose livelihood almost fully depends on livestock production (i.e., pastoralists) and those who, in addition to livestock production, do crop cultivation to increase their income (i.e. agro-pastoralists). Pastoralists prefer cattle that are not necessarily suitable for traction. Further, pastoralists derive higher benefits from larger-framed animals (for both cows and bulls) than agro-pastoralists. Thus, for the latter, animal body size is not an important purchasing factor.

These findings have important policy implications. One is that the pastoralists may be better "targets" for participating in conservation programmes because they place a higher value on attributes that are possessed by the pure Borana breed than agro-pastoralists. Targeting the pastoralists would thus imply that there is no need for compensation payments for keeping Borana cattle. Without external incentives, this group of livestock-keepers will most likely continue to maintain the pure Borana cattle. Essentially, they would be the least costly to incorporate into a conservation programme.

Based on the results of the choice experiment and the initial WTP indicators for cows and bulls, various scenarios have been modeled, with each scenario forming a set of attributes that represents different cattle breeds and types of Borana. Compensating surplus for the pure Borana, its subtypes and crosses were then estimated, again revealing heterogeneity among livestock-keepers with different socio-economic characteristics. ■



Firewood harvesting.

Payments for Environmental Services

Local land use decisions often result in environmental damages that impact on people other than those taking the decision. Payments for environmental services (PES) are increasingly being discussed as a mechanism to translate external, non-market values of the environment (e.g. the value of forests for biodiversity, climate, and water) into real financial incentives for local actors. Under PES, local actors are given a periodic payment conditional on the adoption of more sustainable land use practices. While the number of PES initiatives in developing countries has increased significantly over the past decade, the existing discussion on PES systems in the development field has largely not taken into account the significant experiences with PES-type initiatives in developed countries (e.g. in the form of agri-environmental payments to landowners, conservation easements, etc.).



Doctoral student on field research in Costa Rica.

In June 2004, ZEF, in cooperation with the Center for International Forestry Research (CIFOR), organized an expert workshop in Titisee (Germany) in order to facilitate a global exchange of experiences between scientists working on PES issues. A broad range of case studies were presented on PES initiatives in developing countries (spanning from Latin America over Africa to Asia) as well as developed countries (particularly the EU, US, and Australia).

The results indicate that PES is indeed a promising approach to translating the demand for environmental services into real environmental improvements. Existing PES schemes, however, frequently do not achieve their full potential due to weaknesses in scheme design. First, the link between the activity paid for and the actual environmental service provided is often still poorly understood. Second, it is not always clear whether the practices paid for would not have been adopted anyhow. This is particularly a problem for activity-avoiding schemes, such as those paying for forest conservation. Third, environmentally damaging activities may partially shift elsewhere (leakage). Fourth, monitoring and enforcing actual land use practices often remains problematic. Targeting tools, auctions, and mechanisms for monitoring, enforcement and leakage prevention developed in some countries to overcome these weaknesses may provide useful lessons for other countries, at least for middle-income countries where the transaction costs of implementing such solutions are not too high.

Current PES design can, however, not be understood without an analysis of underlying political processes. Complex path dependencies often hamper

Project title:

"Alternative institutions for natural resource management in developing countries (Part I)".

Keywords:

Institutions, payments for environmental services, market-based instruments, conservation concessions

Countries of research:

Costa Rica, Tanzania, Indonesia

Research objectives:

This research focuses on the potential of payments for environmental services (PES) for achieving improvements in the sustainability of natural resource management in developing countries. Specific objectives are to analyze (1) how a PES scheme should be designed to achieve maximum environmental services with a given budget, and (2) whether poor forest-dependent households are likely to benefit from a PES scheme.

ZEF staff involved:

Stefanie Engel, Ramón López, Charles Palmer, Tobias Wünscher, Sebastian Scholz, Melanie Zimmermann, Astrid Zabel

Timetable: April 2004 - March 2006

Main cooperation partners:

Center for International Forestry Research (CIFOR), CATIE (Costa Rica); Sokoine University of Agriculture, Morogoro, and TIST - The International Small Group & Tree Planting Program (Tanzania); The World Bank
See also project webpage (below)

Main funding partners:

Robert Bosch Foundation, IIED, CIFOR

Project Coordinator/Contact:

Stefanie Engel, st.kirchhoff@uni-bonn.de
<http://131.220.109.9/index.php?id=devcom>



Participants of an expert workshop in Tübingen, Germany, June 2005.

scheme improvements at a later stage. There is also a potential for PES to be abused as a disguised subsidy for protectionist reasons and a need to further analyze its advantages over alternative policy measures. It appears that PES is best suited for situations of transnational externalities or where governments lack the institutional capacity to implement first-best solutions.

Furthermore, results clearly suggest that PES schemes do not automatically provide both high environmental benefits and significant reductions in poverty. Rather, there is often a tradeoff in scheme design in terms of these two objectives, and in some circumstances PES may not only not help the poor but even actually harm them. This is a risk particularly in activity-avoiding schemes. Further analysis of the impacts of PES on the poor is required to avoid undesirable side effects. On the other hand, it should be clear that PES itself is not the best tool to achieve poverty alleviation; rather, its strength lies in its potential to achieve environmental improvements.

ZEF is conducting empirical research in Costa Rica and Tanzania to further look into the issues raised above. Theoretical modeling motivated by ZEF research on community-firm interactions in Indonesia (see p. 33) was used to analyze the potential of PES to induce communities to opt for forest conservation instead of logging. The results indicate that if PES is not designed carefully it may simply induce local communities to negotiate better logging deals with timber companies, and that to be effective, payments made under PES may have to be much larger than the currently observed timber fees paid by logging companies. ■

A broad range of case studies have been conducted for analyzing the effectiveness of payments for environmental services (PES).



1.2. ZEF Research on Cultural Diversity

Introduction to socio-cultural diversity

The issue of diversity is widely discussed in both the natural and social sciences, albeit within different methodological and theoretical frameworks. Biological diversity is a pre-condition, but also a result of evolution, and is thought to be essential to the long-term survival of life on earth. Reduction of the number of species reduces the potential for evolution. In analogy to biological diversity, cultural diversity may be of crucial importance to the long-term survival of humanity and a pre-condition for development. UNESCO, in its Universal Declaration of Cultural Diversity states, "...that cultural diversity is our collective strength... and ...should be used to ensure sustainable development" (2001, par 16).

Differentiation and segmentation

In the social sciences, the discussion on social and cultural diversity is closely linked to concepts of social and cultural differentiation and segmentation. Division of labor and functional differentiation of social systems have been familiar ideas in sociology since Durkheim (1947). It is common among sociologists to refer to cultural differentiation due to modernization, urbanization or the expansion of markets. Georg Simmel (1903), in his reflection on urban society, suggests that diversity is one of its essential characteristics. Social elements from many different communities such as values, languages and customs circulate in the urban environment, which creates the fertile ground to stimulate encounter for interaction, hybridization and differentiation. Although the matter of social differentiation has been studied systematically in the social sciences since the end of the eighteenth century, it was Simmel (1900) who uncovered most clearly the complexity of social differentiation in modern societies. He considered the variety of influences like the rapid development of a money economy, the growth of cities, the mobility of individuals and the emergence of new diverse cultural and social interests that had contributed to growing individualism and the diversification of social groups in Western Europe during the nineteenth century.

In the twentieth century these processes continued, but two other forms of social differentiation acquired much greater attention in social thought: gender and ethnicity. Current debates on multiculturalism refer to an emerging global culture and global homogenization versus resistance in local cultural traditions. Today, one can see that the circulation of social diversity is taking place globally. Ethnic food, dress, music, architecture, etc. are now available in metropolitan areas worldwide, but at the same time, a process of homogenization is taking place. The cultural landscapes resulting from local diversity are in fact quite standardized, because complexity has to be reduced in order to enable effective governance. Also, universal acceptance in a global market necessitates a reduction of cultural complexity to guarantee the distribution of standardized products.



Cultural diversity is our collective strength.

Reduction of complexity and governance

According to Luhmann (1973), trust is a pre-condition for social interaction and complexity has to be reduced in order to create trust in governance. The complex reality has to be modeled and thus made more manageable and transparent. Models reduce reality to transparent systems that create trust. Model-building is thus one extreme form of reduction of complexity. If we look into the colonial past of Southeast Asia, the colonial governments had to reduce the cultural complexity of the populations in their colonies to enable selective responses to culturally complex problems. The British in Malaya, for example, classified the "natives", putting them into categories like Malay, Chinese, Indians and Others, although the ethnic diversity was and is much more complex. This was done in order to handle the cultural diversity and to establish an effective government administration to deal with this ethnically complex situation. In this tradition, today's Singapore took over the system of categorizing ethnicity from the British to standardize its complex ethnic and religious diversity. This policy of creating a simplified virtual world has had its effects. Singaporeans increasingly think and act in terms of the four standardized ethnic categories. For example, the use of local Chinese dialects was suppressed in favor of speaking Mandarin and various Indian ethnic groups were enticed to use Tamil, a language alien to many of them. The Singaporean government has means of modeling ethnicity by bringing people to act, dress and speak in the same way for the sake of a functioning government system.

Indonesia provides another example of how to govern cultural diversity in a unitarian national state. In Indonesia, diversity cannot be talked away with its more than 100 ethnic groups living in the archipelago, but the state managed to create a unifying model under the national Logo "Unity in Diversity". Each province can express its cultural complexity in identifying five cultural items to symbolize diversity and traditional ethnic origin: a dance, a costume, a song, a typical traditional house and a distinct cultural symbol. Thus, each province has a different set of items to symbolize diversity, but the set itself is standardized and a way of modeling diversity.

Markets and diversity

The growing world market makes mass products available around the globe and increases consumer choices of the upper and middle classes. However, the vast majority of the developing world cannot make use of these choices as they lack the appropriate purchasing power. They, in turn, face a reduction in the diversity of local products, which Boeke (1953) already described in his well-known book on dual economies, as culturally specific local products are replaced by standardized world market commodities. On the other hand, products with an ethnic label are available worldwide for middle and upper class consumption. These goods are often consumed as symbolic signs (Baudrillard 1988) which no longer express an already existing and culturally-based meaning. But cultural elements have to be recognized immediately by the consumer and categorized as a specific expression of an identifiable cultural/ethnic group. Thus, cultural



Citizens in the developing world face a reduction in the diversity of local products.



Reducing complexity enables effective governance.

diversity has to be incorporated into a standardized product and cultural elements are changed into a commodity, which can be marketed on a worldwide scale.

Such modeling socio-cultural diversity by concentrating on interrelated cultural elements is a useful way of increasing transparency. Circulating all elements of diversity without standardizing selections of that diversity is difficult to govern, but on the other hand it also limits the landscape of possible local cultural specializations. Furthermore, such an inevitable decrease in cultural diversity raises the question of who has the power to do so and what the long-term consequences are.

Diversity and power

Of course, current reflections on the strength or weakness of cultural diversity often bear a vision of culture as a closed entity. This application refers to authentic expressions of homogenous ethnic or national communities, to (ethnic) groups or individuals as passive carriers of their respective culture. This ethnicization of culture usually does not take into account the economic and political structures and the relationships of power in which cultures are embedded.

In many cases, the debate on cultural diversity is reduced to the question of tolerance and respect towards other cultures, whereas the discussion of cultural diversity as an asset for socio-economic development is only rarely posed. It is time to look at cultural and bio-diversity as two sides of the same coin: there is no development without diversity. ■

Introduction written by Prof. Dr. Solvay Gerke (Director of ZEF's Department of Political and Cultural Change)

Cultural Diversity in Central Asia

The research project "Local Governance and Fragile Statehood in the Amu Darya Borderlands", which is funded by the Volkswagen Foundation, applies a regional perspective by focusing on the borderland region of Afghanistan, Tajikistan, and Uzbekistan. Starting off from a historical view, the project takes into account that cultural and social practices of local governance were equally diverse on both sides of the border river Amu Darya - at least before the foundation of the Soviet Union. While the small kingdoms (khanates) dominated by Uzbek Khans used their strategic location between the power centers of Kabul and Bukhara to maintain a certain political independency, the whole region was characterized by a high ethnic diversity and a high variety of socioeconomic ways to earn a living (e.g. pastoral nomadism, crop cultivation, trade).

However, during the 20th century, the Amu Darya region underwent major changes. The region north of the Amu Darya was incorporated into the Soviet Union in 1924. Consequently, the river became the state boundary between Afghanistan and the Soviet Union. In the aftermath of Soviet incorporation, the population of the northern banks were Sovietized: Not only did ethnic categories (such as Uzbek and Tajik) become streamlined to handle the high cultur-

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The presence of the central state remains weak in many regions of Afghanistan.



Project title:

“Local governance and fragile statehood in the Amu Darya Borderlands”.

Keywords:

Local governance, transboundary resource management, cross-border interaction, regional conflict complexes

Countries of research:

Afghanistan, Tajikistan, Uzbekistan

Research objectives:

Analyzing the interrelationship of local governance, cross-border activities and state influence in a context of fragile statehood

ZEF staff involved:

Conrad Schetter, Bernd Kuzmits, Tommaso Trevisani, Max Schlüter, Katja Mielke (as of September 2005), Firdavz Fayzulloev (as of September 2005)

Timetable: April 2005 - August 2008

Main cooperation partners:

National Center for Policy Research, University of Kabul
German Agro Action (Kunduz)
Konrad Adenauer Foundation

Main funding partners:

Volkswagen Foundation

Project coordinator/Contact:

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Afghan society is fragmented by local, religious, and ethnic communities.

al diversity in the region, but the Soviet economic culture (e.g. Kolkhoz, planned economy) was also implemented and replaced the manifold traditional ways of livelihood strategies.

While the northern side of the Amu Darya witnessed a rapid modernization, the southern banks of the river only experienced a tardy process in this respect: The development of an

Afghan national consciousness did not start before the early 20th century. Likewise, the presence of state institutions remained weak in Northern Afghanistan. Drastic attempts to change the socioeconomic situation failed, although the Afghan state initiated a command economy in the 1950s. All endeavors to bring modernity to Northern Afghanistan came to an end with the outbreak of the Afghan War (1979-2001). State structures eroded at all levels, while at the same time, local, religious, and ethnic differences fragmented Afghan society into myriads of communities defined by cultural boundaries, thus underlining the high cultural diversity of the country.

It can be subsumed that - at least at first glance - the northern banks of the Amu Darya are culturally homogeneous, contrary to the Afghan side on the southern banks. However, by focusing particularly on local governance structures, we assume that the great transformations that affected Uzbekistan and Tajikistan in the period of Sovietization were not anchored deeply in society. Hence, the project aims to detect similarities of institutional arrangements at the level of local politics, which can be observed on both sides of the river. For example, the mahallas (assembly of neighboring communities) in Uzbekistan and Tajikistan might play a similar role as jirgas and shuras (assemblies on different levels) in Afghanistan. In addition, forms of legal pluralism - state law, Islamic law and customary law - which are characteristic of Afghanistan became increasingly popular and widespread in Uzbekistan and Tajikistan after both countries achieved independence in 1991.

Eventually, we intend to draw exemplary conclusions from this research project to answer the question to what extent cultural idiosyncracies and institutions are responsive to externally initiated transformations of society. In times in which development aid as such is coming increasingly under pressure of justification, this question is more exigent than ever. ■



Diversity and Governance within the GLOWA Volta Project

Introduction

The GLOWA-Volta Project has the objective of supporting sustainable water use under changing climatic conditions and altering land and water use patterns in West Africa's Volta Basin. The project is part of the BMBF-funded GLOWA program (Global Change in the Hydrological Cycle).

In the context of overall diminishing water resources and rising water demand, a national and regional coordination of the water sector and institution-building for transboundary co-operation are important in West Africa. The GLOWA Volta project, with its close partnership with national water administrations and water research institutes in the Volta Basin, is well positioned to support decision-making at these levels.

Therefore, a scientifically sound decision support system (DSS) is currently being created within the project. The DSS, on demand by the stakeholders involved, will enable informed decision-making, based on predictive climatological, hydrological and economic computer models.

Water reform processes and institutional diversity

In Burkina Faso as well as in Ghana, reform processes in the water sector have been instigated since the early 1990s. These reforms follow the prescriptions of the water policies of the main international donor agencies and focus on the community-based management of rural drinking and irrigation water supplies, private sector participation in urban and small-town water drinking provision and the establishment of central water administrations, which shall operate according to the principles of "Integrated Water Resources Management" (IWRM).

While the main legal reforms have been enacted, the implementation of the new legislation proves to be rather slow. This is partly the result of the lack of financial resources, technical equipment and human resources on the side of the newly created regulatory bodies. Partly, it is also due to a lack of political will to enforce legal regimes that contradict local institutional regimes as well as the vested interest of political and economic elites.

Especially in the large areas of countryside, water resource management is still largely reined by local customs. As Ghana and Burkina Faso are characterised by a high degree of ethnic and cultural diversity, local perceptions, values and norms regarding the natural resource vary considerably. A wide range of local institutions, spiritual beliefs and traditional rules regulate the use of water resources and protect them from pollution at local level. Water access and rights are administered by (neo)-traditional authorities such as clan-heads, chiefs and spiritual leaders in the various communities. The power of local authorities as well as the legitimacy of local custom creates an institutional diversity that often renders the enforcement of official legislation ineffective.



Implementing new legislations is a slow process in Ghana and Burkina Faso.

Project title:

"GLOWA Volta: Sustainable water use under changing land use, rainfall reliability and water demands in the Volta Basin".

Keywords:

Climate change, hydrological cycle, institutional analysis, governance

Countries of research:

Burkina Faso and Ghana

Research objectives:

Water governance, institutional analysis, political economy of water resource management, knowledge exchange

ZEF staff involved:

Solvay Gerke, Hans-Dieter Evers, Wolfram Laube, Eva Youkhana, Charlotte van der Schaaf, Irit Engavoen, Marlis Gensler, Alexandre Sessouma, Stefan Haffner

Timetable:

1st Phase: 2000 - 2003
2nd Phase: 2003 - 2006
3rd Phase: 2006 - 2009 (to be approved)

Main cooperation partners:

IMK/IFU, WRC, WRI SARI, BIOTA, INERA, IFPRI, IMWI (see homepage below)

Main funding partners:

BMBF, Ministry for Schools Science and Research of North Rhine-Westphalia

Project Leader/Contact:

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Diversity of mandates and interests

Centrally coordinated approaches towards IWRM clash with the far-reaching mandate of decentralized government bodies, which have gained increasing importance in the Volta Basin. The linkage between the water administration and the bodies of decentralized governance is envisioned to take the form of River Basin Management Boards (RBMB) in which the representatives of the local governments, among other stakeholders, participate in planning and decision-making regarding the water resources of river (sub-) basins. Decisions taken are nevertheless subject to central approval. Although some pilot projects have been instigated, such RBMB's are not working yet, and it remains to be seen how far local politicians and administrators are willing to cede power to these forums and will start to act as local implementers of IWRM.

Political as well as administrative decision-making processes at various societal levels are frequently characterized by favoritism, political patronage and/or outright corruption, especially if valuable resources are involved or substantial funds for infrastructure development become available. Economically well-endowed and powerful interest groups are often able to influence decision-making processes at various societal levels and capture resources in ways that contradict the principles of IWRM and run counter to the interests of the larger public and particularly poor and less powerful stakeholders.

Socio-scientific research and decision support in the Volta Basin

Insights about resource governance in the Volta basin are currently used to shape modeling approaches and to evaluate modeling outcome with regard to their cultural acceptability and socio-political applicability. Furthermore, innovative ideas for knowledge exchange are being developed that cater for the institutional diversity and complexity of resource governance in the Basin and enable the inclusion of different players and interest groups into the process of knowledge generation and decision support.

In the context of overall diminishing water resources and rising water demand a national coordination of the water sector and institution-building for trans-boundary cooperation are important issues that GLOWA Volta is well-suited to address. But as socio-scientific research has shown, fundamental water use decisions are taken at levels below and involve a diversity of authorities, institutions and interest groups. How to support decentralized decision making and how to create patterns of knowledge exchange that include those interest groups that are frequently excluded from decision-making processes are subjects of further research, which will focus on negotiation processes that surround concrete water resource decisions and will try to determine decentralized information needs, adequate techniques and possible intermediaries for local knowledge exchange. ■



Corruption often occurs if valuable resources are involved.



Local stakeholders give insights about resource governance to a researcher.

Chapter 2. Interdisciplinary Research

2.1. Governance

Governance and Conflict

Conflict-prone countries or countries ridden by protracted civil wars, state collapse and political disintegration have gained increasing significance for development research and policy in recent years. While the importance of (re-)establishing governance in such countries is widely recognized, most research focuses on governance at national level, with less attention being paid to the functioning of governance at local level. Instead, the research group "Governance and Conflict" concentrates on how state and communal institutions compete, coexist or form hybrid structures of governance at local level.

One project of the research group, founded by the German Foundation for Peace Research, compares the emergence of local governance structures in two countries, Afghanistan and Somaliland, which suffered enormously from protracted warfare and state collapse, but recently entered a phase of political reconstruction. Research in Afghanistan concentrates on the multi-ethnic province of Kunduz, which is shaped by strong warlordism and absent landowners. In contrast, the province of Paktia is characterized by homogeneous tribal structures and government paid militias. In Somaliland, governance has been established as part of a struggle for independence from the defunct Somali state. The three local case studies, Borama, Erigavo and Burao, vary in the degree to which state government structures have been established, in the role of the traditional authorities, in the fragmentation of the respective clan segments, and in effectiveness of maintaining peace at local level.

By investigating such different cases, the research group hopes to gain significant insights into the functioning of local governance in deviating socioeconomic environments. Furthermore, the project will produce policy-relevant findings by advancing the development of an applicable analysis framework for governance structures, which could prove useful in the identification of potential project partners and entry points for external interventions.



ZEF research in Afghanistan focuses on local governance.

Project title:

"State failure and local governance in Somalia and Afghanistan".

Keywords:

Human security, structural stability, good governance, state failure

Countries of research:

Afghanistan, Somalia, Somaliland

Research Objectives:

The comparative research project aims at contributing to the understanding of the local, regional and national formation of governance structures after state collapse. Furthermore, the project will produce policy-relevant findings helping to understand the functional logic of governance structures, including the differences between their localized realities.

ZEF staff involved:

Conrad Schetter, Ulf Terlinden, Max Schlüter

Timetable: July 2004 - December 2005

Main cooperation partners:

Institut für Entwicklung und Frieden (INEF),
University of Duisburg-Essen
Somaliland Academy for Peace and
Development, Hargeisa
GTZ, Kunduz
Tribal Liaison Office, Kabul
Swiss Peace, Kabul

Project Coordinator/Contact:

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Project title:

"Knowledge governance".

Keywords:

Knowledge gap, digital divide, development strategies

Countries of research:

Singapore, Malaysia, Indonesia, Thailand, Egypt, Jordan, Tunisia, Morocco

Research objectives:

Strategies to close the digital divide and develop a knowledge society

ZEF Staff involved:

Hans-Dieter Evers, Solvay Gerke, Thomas Menkhoff (SMU), Chay Yue Wah (Nanyang Technological University), Hari Paudel

Timetable:

1st project 2000 - 2002, funded by DFG
2nd project 2003 - 2005, funded by Singapore Management University

Main cooperation partners:

Singapore Management University

Main funding partners:

DFG, Singapore Management University

Project Leader/Contact:

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<http://www.zef.de/264.0.html>

The World Summit on the Information Society in 2004 and 2005 has increased the awareness of the digital divide and the knowledge gap. ZEF provided a background paper for UNESCO on these topics and continued its cooperation with the Singapore Management University. A joint research project was focused on knowledge governance on the macro-level and knowledge management on the corporate level. Sharing of knowledge is increasingly recognised as an enabler of corporate profitability and government efficiency. Studies on large corporations, like Deutsche Telekom and Singtel, and on SMEs (small and medium enterprises in Asia) depicted different corporate strategies to break down barriers and reduce knowledge gaps. Governments in Asia have implemented strategies to develop knowledge-based economies. Singapore, a small country devoid of natural resources, has been particularly successful in implementing appropriate measures from building cutting-edge research institutions in biotechnology to science parks and e-government. The extensive use of foreign talents was identified as an important factor in Singapore's success. A balance of local and imported global knowledge guarantees sustainable development of knowledge production. Social science knowledge is of great importance in the modernization and democratisation of developing nations. A study of ZEF's Research Group on "Culture, Knowledge, and Development" used biometrical indicators to show the extent to which local knowledge is used to reflect on social issues. Asian nations differ greatly in their success in closing the gap between local and global knowledge. The ZEF research group has completed field studies in ASEAN and North Africa and is proposing development strategies for educational reform and knowledge governance.



Sharing knowledge is important for the modernization of the developing world.

Governance of Natural Resources

In Indonesia, decentralization has resulted in forest-dependent communities negotiating with companies over logging on land to which communities have uncertain property rights. The contractual terms and outcomes of such negotiations vary significantly. Using survey data collected in over 60 communities in East Kalimantan, the study identified and compared the impacts of mechanized logging on communities from concessions given out before and after decentralization and analyzed the causes of the observed variation. It was found that significantly more households received financial and non-monetary benefits after decentralization than before. Moreover, in a situation where community rights remain weak and poorly enforced, the community's ability to self-enforce its rights over the forest is crucial to claiming a significant share of logging rent. Ethnic homogeneity, low opportunity costs of time, and a higher level of social capital enhance a community's ability for self-enforcement and thereby its payoffs in a logging agreement. Moreover, communities deriving a large proportion of incomes from the forest and wealthier communities are more likely to obtain higher payoffs.

While conflicts with logging companies increased only slightly after decentralization, a majority of households in over half of the communities surveyed reported problems in the distribution of logging rents within the community. Anecdotal evidence collected in the course of the surveys suggested that distributional problems may have affected cohesion and trust among community members, and hence, the community's capacity for collective action. A majority of communities also reported inter-community conflicts over forest borders and contradictory land claims as a result of post-decentralization concessions.

Communities perceived no significant differences in negative impacts of logging on water quality, flooding or hunting, before and after decentralization. Perceived negative impacts on the collection of forest products and farming declined with decentralization as a consequence of improved community access to the forest. Those communities that obtain higher financial payoffs from logging were also more likely to obtain environmental provisions in the logging contracts.

In Ghana, the research focused on the effectiveness of Water Users' Associations in managing small-scale irrigation schemes. Based on data collected in 52 communities and 821 households in the three northern districts, it was found that membership size, the profitability of irrigated agriculture, training of



Small-scale fishery in Ghana.

Project title:

"Alternative institutions for natural resource management in developing countries (Part II)".

Keywords:

Institutions, decentralization, participatory resource management

Countries of research:

Ghana, India, Indonesia

Research objectives:

The objectives of this research are to analyze the impacts of decentralization in natural resource management on local communities and the environment in developing countries. Specific issues addressed include: Why are some communities more successful than others in implementing institutions for sustainable resource management? Who really participates in 'participatory' resource management, and why?

ZEF staff involved:

Stefanie Engel, Ramón López, Osman Gyasi, Charles Palmer, Bhagirath Behera, Melanie Zimmermann, Astrid Zabel

Timetable: April 2001 - March 2006

Main cooperation partners:

Center for International Forestry Research (CIFOR), International Water Management Institute (IMWI), Ministry of Agriculture/Regional Office, Bolgatanga (Ghana), Centre for Economic and Social Studies, Hyderabad (India), University of Maryland
Also see project webpage below

Main funding partners:

Robert Bosch Foundation, International Water Management Institute (IMWI), DAAD

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leaders, sanctions for deviant behavior, resistance of landlords to land redistribution as well as ethnic homogeneity across villages sharing the use of the schemes impact on community performance. Simple, flexible rules established by members, extension education and training programs on group dynamics and cooperative management as well as better legal backing for local institutions could improve upon the performance of the community-based irrigation management institutions. Success of the devolution program obviously depends on the ability and willingness of local users to organize successful collective action. Study results indicate that participation rules and bylaws, social norms typified in intense social interactions, accountability of leadership, as well as community involvement in the planning and construction (or rehabilitation) of the schemes increase household participation in collective maintenance.

Integrating Governance and Modeling

Project title:

"Integrating governance and modeling".

Keywords:

Sustainable use of land and water resources; collective action; multi-stakeholder governance structures; planning/decision support based on multi-agent systems

Staff involved:

Thomas Berger

Timetable: June 2004 - April 2008

Scientific Partners:

Winston Andah (WRI), Felix Asante (ISSER), Regina Birner (University of Göttingen), José Díaz (Uni Talca), Harald Kunstmann (IMK-IFU), Nancy McCarthy (IFPRI), Ruth Meinzen-Dick (IFPRI), Carlos Mena (University of Talca), Roberto Pizarro (University of Talca), Heidi Wittmer (UFZ-Leipzig)

Funding Partners:

CGIAR Challenge Program on Water and Food

Project Coordinator/Contact:

Thomas Berger

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<http://www.zef.de/mas.htm>

This recent project is part of the CGIAR Challenge Program on Water and Food. Its objective is to research the use of integrated simulation models as decision-tools in multi-stakeholder negotiation processes at the sub-basin level. The project sites are the White Volta (Ghana) and the Maule basin (Chile), where construction of agent-based simulation models that combine economic and hydrological sub-models is already underway. The project will focus on (1) the analysis and strengthening of multi-stakeholder governance structures in the two project sites, (2) the identification of problems, policy options to address the problems, and criteria for evaluation policy options by stakeholders, (3) the extension of simulation models to incorporate the impact of climate change on land and water use decisions of risk-averse producers, (4) the evaluation of alternative policy options, as identified by stakeholders, (5) the development of decision-support tools that present and visualize the outputs of the simulation models in a form that is useful for the stakeholders, and (6) the actual use of the decision-support tools in negotiation and planning processes in the multi-stakeholder governance structures.

Dissemination strategies will be based on the development of different formats and media targeted to different audiences, and will include: materials prepared for stakeholder workshops, a film that can be used for extension purposes, training materials for using and managing the computer simulation model, participation in regional and virtual networks (i.e. e-groups of Water for Food Challenge Program projects), policy briefs, research reports and journal articles.



Water and health are strongly interlinked issues in West Africa.

Economic Reform and Good Governance: A challenge for Arab Countries

According to UN Secretary-General Kofi Annan, good governance is one of the main factors in combating poverty and attaining sustainable human development.

However, the components of good governance, such as state accountability, institutions based on the rule of law, the scope for participation, and an efficient public administration are poorly developed in many countries. Arab countries in particular show enormous deficits. The political, economic, and social power structures in this region also pose a problem in the field of development cooperation. At ZEF, a comparative study has been conducted exploring the opportunities to participate in legislative procedures concerning the issue of economic reform in Morocco, Jordan, and Egypt. With the support of three interdisciplinary research teams in the three countries, the roles of the executive, the parliaments, and civil society were analyzed.

Herewith a summary of the major trouble zones:

Political-economic impediments

- The three countries suffer from a lack of economic competitiveness, also owing to weakly developed human capital.
- Despite the introduction of neo-liberal reform policies, economic structures have been only partly liberalized. State and private monopolies blurring the economic politics of the countries represent a particular problem.
- The private sector consists mainly of a multitude of informal micro- and small enterprises and suffers from a lack of productivity and political-organizational weakness.
- The reform process has certainly accelerated by the heads of state interfering directly with economic politics, but the sustainability of such reforms remains doubtful. A coalition of bureaucrats and economic actors has grown that stubbornly opposes reforms while benefiting from too little regulation in some areas and too much in others.
- Austerity measures, misguided employment, and investment expenditure have resulted in an unequal distribution of social benefits, causing social polarization.

Weaknesses in participation

- The reforms are pushing the executive beyond its capacities. Informal or short-term solutions such as special industrial zones and consultancy offices set up at ministry level to boost the reform are in fact obscuring institutions.
- The heads of state in the three countries have rendered the opposition powerless with their electoral systems, restrictive regulations or by integrating the opposition in a manner that undermines its credibility.
- The poor technical, administrative, and political competences of the different actors are usually not sufficient for them to participate in the complex political-economic reform processes in an adequate manner.

Project title:

"Good governance and the law-making process for economic reform of selected Arab countries".

Research fields/Issues:

Inclusiveness of the law-making process, information content of economic regulatory reform, interaction between parliaments, executive branch and civil society

ZEF staff involved:

Noha El-Mikawy
Christian von Drachenfels

Timetable:

December 2001 – December 2004

Research Partners:

Economic Research Forum for the Middle East, North Africa, Iran and Turkey (Cairo, Egypt)

Funding Partners:

The German Federal Ministry for Economic Cooperation and Development (BMZ)



The private sector consists of many informal small enterprises.



An unequal distribution of social benefits has caused social polarisation in the Arab region.

- There are increasing numbers of civil society organizations in the Arab countries that appear to make the landscape of semi-state associations and unions more pluralistic. In reality, they are usually poorly organized and politically reticent.

A poor information and knowledge basis

- Active participation in legislative procedures requires a broad information and knowledge base. The ability to collect data and develop indicators, scenarios, and options for action is a further important prerequisite. These competencies can only develop in a well-functioning network of policy-making and market and research institutions. But this is precisely what is missing in the three countries, despite recent and encouraging developments in the field of information and knowledge building structures.
- The media play a very important role as providers of information and knowledge. However, in the absence of transparent management structures, they are an easy target for corruption by the economic and political elites.

Conclusions and recommendations

- Enacting economic laws and signing trade agreements is no reliable indication of the level of economic liberalization in the Arab countries. A lot remains to be done before there are free, fair, and competitive domestic markets in this region.
- The lack of adequate laws for the freedom of opinion and information still represents a major political impediment in the three countries. Liberal laws in this field should therefore not only be enacted, but also implemented.
- It is necessary to promote mechanisms that build consensus and mitigate conflicts. Various institutions already in existence should be strengthened.
- Opportunities for cooperation with civil society (such as employers' associations and research institutes) offered by the EU-MEDA partnership program should be improved by means of the corresponding committees.
- A European-Arab committee of journalists could be founded to address the issue of information and knowledge based societies and work out solutions for the three countries. It would make sense for it to cooperate with the recently founded Euro-Arab Chamber of Commerce.

A lot remains to be done before there are free and competitive markets.



2.2. Land and Water Use

Climate Change in the Volta Basin (GLOWA Volta)

The GLOWA Volta Project (GVP) is a nine-year scientific study of the physical and socio-economic determinants of the hydrological cycle within the Volta Basin, a major transnational river basin encompassing over 400,000 km² within the sub-humid to semi-arid West African savanna zone. The Basin is shared by six riparian nations, among which Ghana and Burkina Faso are most significant in terms of population, water use and economic activity. The GVP, initiated in 2000, is one of five major river basin studies funded by the German Federal Ministry of Education and Research (BMBF) that focus on global change and the hydrologic cycle. The ultimate objective of GVP is to develop a scientifically sound Decision Support System (DSS) for the assessment, sustainable use and development of the Basin's water resources. The DSS will provide a comprehensive monitoring and simulation framework, enabling decision makers to evaluate the impacts of climatic and land use trends overlaid on the consequences of deliberate policies, investments and other interventions in the social, economic, and biological productivity of water resources. Integral to this effort is the development of scientific capacity and infrastructure within the Basin to ensure the self-sustainability of the DSS through the completion of formal GVP activities.

Project highlights since July 2004

The structure of GVP research consists of three distinct phases. In Phase I (2000 - 2003), efforts focused on establishing research infrastructure and institutional collaboration within the Basin, and collecting essential physical and socio-economic data. During Phase II (2003 - 2006), emphasis has shifted to developing disciplinary modeling and analysis tools. Phase III activities will focus on the conceptual and technical integration of data, models and methods developed during Phases I and II; and on transferring products and activities to stakeholders within the Basin.

We are now roughly midway through Phase II. Ongoing activities initiated under Phase I, consisting primarily of academic field research within the Volta Basin, are now largely complete, with ten PhD dissertations defended in 2004. Ten additional PhD candidates have defended or will defend in 2005. Project activities have expanded significantly within Burkina Faso, primarily through collaborative research with the "Institut de l'Environnement et de Recherche Agricoles" (INERA) and through the establishment of research networks linking GVP with BIOTA-West Africa and partners (see p.19).

The Volta remains one of the few major trans-national basins lacking an Inter-state Basin Commission or comparable legal framework for regulating and allocating flows across international borders and for enabling coordinated development of the Basin's water resources. Encouraging progress is currently

Project title:

"GLOWA Volta: Sustainable water use under changing land use, rainfall reliability and water demands in the Volta Basin", a project in the framework of the GLOWA (Global Change in the Hydrological Cycle) Program of the German Federal Ministry of Education and Research (BMBF).

Keywords:

Global climate change, water and land use, decision support, hydrological cycle

Countries of research:

Burkina Faso and Ghana

Research objectives:

The impact of climatic and land use change on the Volta basin

ZEF staff involved:

Paul Vlek, Charles Rodgers (project leaders), Luna Bharati, Jörg Szarzynski, Barnabas Amisigo, Halidou Compaore, Eva Youkhana, Wolfram Laube, Maria Plotnikova

Timetable:

1st Phase: 2000 - 2003
2nd Phase: 2003 - 2006
3rd Phase: 2006 - 2009



Transferring activities to local stakeholders is a target of the GLOWA Volta project.

**Main cooperation partners:**

IMK/IFU, BIOTA, DLR, IWMI

Linked Projects:

BIOTA West Africa, CGIAR challenge program on water and food (small reservoirs project; governance and modeling project); others

Main funding partners:

BMBF, Ministry for Schools, Science and Research of North Rhine-Westphalia

Project Coordinator/Contact:Charles Rodgers: crodgers@uni-bonn.de
Luna Bharati: lbharati@uni-bonn.de
www.glowa-volta.de

underway toward such a governing structure through the joint IUCN - Global Water Partnership project "Improving Water Governance in the Volta River Basin", commencing in 2004. To support these objectives, the GVP formally initiated the White Volta Pilot Project in early 2005, in collaboration with the Ghanaian Water Resources Commission (WRC) and joined by the International Food Policy Research Institution (IFPRI) via the Challenge Program on Food & Water, Governance and Modeling Project.

Over the last year, GVP research infrastructure was expanded significantly through the integration of project activities and research sites into regional research networks. Important among these are the formation of an integrative multiscale monitoring concept in Burkina Faso linking GVP with BIOTA West Africa (BMBF) and Burkinabé counterpart INERA. The Biophysical Observation Network (BON) combines important features of biophysical ground measurement and remote sensing techniques in order to enable (1) monitoring of large scale vegetation, hydrological and bio-geophysical dynamics and (2) evaluation of climate dynamics based on observations of biosphere - atmosphere interactions. December 2004 also saw the inauguration of the "Centre de Recherches et de Formation Scientifique" (CRFS), an international research facility constructed by the Dreyer Foundation and shared by ZEF/GVP, BIOTA West Africa, the Helmholtz Institute and INERA. This innovative research site in western Burkina Faso provides residence and research facilities for scholars conducting extended agricultural, environmental and hydrologic studies. Finally, GVP is currently establishing a working relationship with the Kofi Annan Center of Excellence (KACE), a joint India - Ghana facility for Information and Communication Technology training, research and development. KACE hosts a high performance computing center with broadband satellite links to the Internet. Our objective is to transfer computationally intensive aspects of the Volta Basin DSS, including climate forecasting, to the KACE during GVP Phase III.

Research highlights on atmosphere

The primary objectives of the research on atmosphere are to estimate the impacts of climatic and land use changes on the quantity and timing of precipitation; to quantify feedback mechanisms between land processes and climate and to contribute important components of the Volta Basin DSS. Significant accomplishments during the last year include the successful generation of regional climate scenarios, calibration of distributed physical hydrological models at three nested scales, coupling of hydrologic and mesoscale climate models, preliminary analysis of factors influencing the onset of the rainy season and initiation of web-based short-term forecasts for West Africa.

The hydrologic response of the Volta Basin is known to be extremely sensitive to alterations in climate, with small changes in precipitation leading to proportionally larger changes in runoff. The runoff/rainfall sensitivity embodies mechanisms such as change in land use and land cover that partition rainfall between evapotranspiration and runoff. Rainfed agriculture is the primary source of food security and livelihood in the basin. Therefore, small changes in



the water balance can have a profound influence on living conditions. Unreliable rainfall also makes rain fed agriculture risky, contributing to low income levels of the Basin residents. Analysis of historical records from the northern Volta Basin suggests that increasing temperature and decreasing rainfall trends are already discernable.

In order to obtain meteorological and hydrological data needed, the network of bioclimatological measuring stations has been expanded over the last year to improve spatial coverage, particularly in Burkina Faso (in conjunction with BIOTA West Africa), and in Ghana's Upper East Region in collaboration with Ghanaian Hydrological Services. Detailed synoptic data are collected, including precipitation, temperature, wind speed, evaporation and runoff. Terrestrial data are also being collected using advanced, high-precision instruments which include eddy covariance systems and scintillometers. Combined with data obtained with remote sensing applications and models like SEBAL (Surface Energy Balance Algorithm for Land) the data is used to satisfactorily calculate and assess the energy exchange processes that take place between land and the atmosphere.

Climate model simulations predict increasing annual precipitation for the Volta region exhibiting strong spatial (-20% to +50%) and temporal (-20% to +20%) heterogeneity. A delay in the onset and a general shortening of the rainy season are also being predicted. Model runs predict increasing temperatures ranging from 1° in the maritime South of Ghana to 1.6° in the Sahelian North of Burkina Faso. Both physical hydrological models such as WaSim-ETH and the simple models using historical data show a significant climate change signal in catchment hydrology. Measured and modeled results are a critical component of the decision support system (DSS) which is being developed for the management of the Volta Basin water resources.

Research highlights on land use

The research on land use aims to understand the changes in land cover and land use due to socio-economic development and natural impacts and to model and to predict the effect of land conversion on biophysical land surface parameters which influence the atmospheric and land surface water cycle. The tasks within the cluster are (1) to retrieve the basic biophysical parameters to analyze the spatial and temporal dynamics and changes of vegetation; (2) to investigate the response of socio-economic development on biophysical land surface properties. Data of various sensors representing different temporal and spatial resolution are used to provide a substantial data basis, namely LANDSAT TM/ETM+ (30m spatial resolution) for specific local areas of interest and medium resolution data with MODIS/TERRA (250m-1km spatial resolution) for West Africa. A GIS-based model structure is being developed to identify the interactions and feedbacks between socio-economic development and vegetation.



Changing gender roles will be analyzed in the framework of the GLOWA Volta research.



Rainfed agriculture is the primary source of food security in the basin.

Research highlights on water use

The studies on water use focus on sectoral demands and use of water and its institutional management framework. Important Subproject W1 outputs include establishment of physically based hydrological modeling capacity, and framework and database for evaluation of groundwater supply and demand. Subproject W2 outputs include contributions on water and health, the role of rural credit and changing gender roles. Subproject W3 research documents a range of institutional weakness that adversely affect water sector performance. Formal integration of institutional analysis into DSS will be both politically and technically challenging.

Socio-scientific research agenda within the project

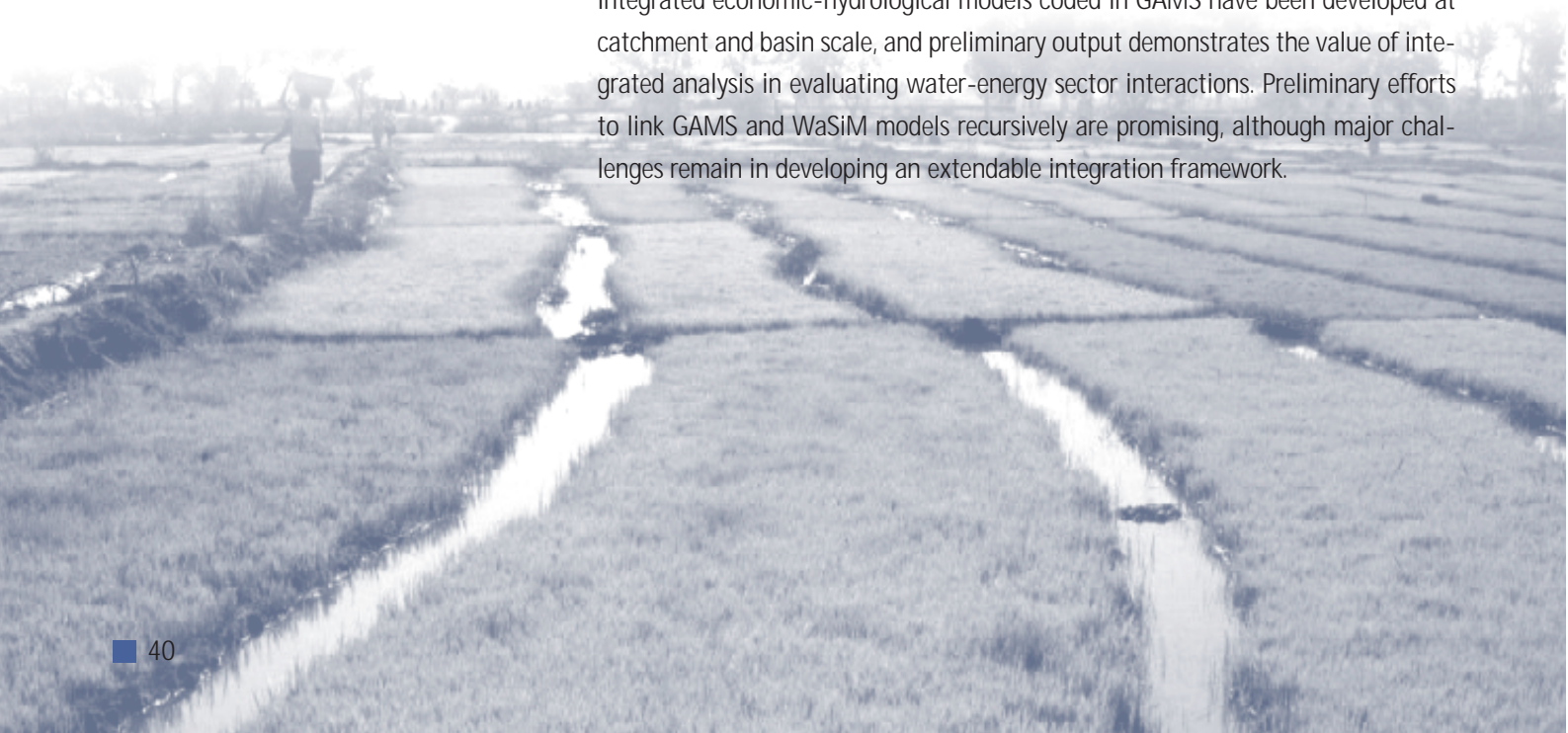
The way societies use, manage, and govern water resources does not solely depend on considerations of future physical availability and large-scale economic efficiency. It is also strongly influenced by historically contingent and culturally enshrined values, norms and interests regarding water resources and the established management patterns of the water sector. Furthermore, the water sector policies and performance are largely determined by the wider social, economic, and political context of the respective countries. Socio-scientific research within the GLOWA Volta project has been geared to an institutional analysis of the water sector in the major riparian countries, Ghana and Burkina Faso, and has brought about a thorough understanding of the embedded nature of water use, water management and governance in these countries. See more on this subject in the Chapter on "Diversity and governance in the GLOWA project" (p. 29).

Research highlights technical integration and decision support

The ultimate objective of the GVP is to develop a Decision Support System (DSS) for the management of Volta Basin water resources that is at once scientifically sound and relevant to the needs and interests of diverse water sector stakeholders. Integrated economic-hydrological models coded in GAMS have been developed at catchment and basin scale, and preliminary output demonstrates the value of integrated analysis in evaluating water-energy sector interactions. Preliminary efforts to link GAMS and WaSiM models recursively are promising, although major challenges remain in developing an extendable integration framework.



Collecting data on local water use is essential for the project.



Desertification: Economic and Ecological Restructuring in Khorezm, Uzbekistan

The Aral Sea problem has been widely acknowledged as one of the major ecological disasters of the world. This "creeping environmental problem" (Glantz) only began to be noticed in the 1960ies, and has gained worldwide notoriety since. The German Council on Environmental Policy (WBGU) coined the "Aral Sea Syndrome" to refer to the problems "associated with centrally planned, large-scale projects involving water resource development". The WBGU (1997) furthermore rated the desiccation of the Aral Sea as "the greatest environmental catastrophe ever caused to regional water resources by mankind". Such catastrophes arise from attempts to provide for urgently required additional resources, like irrigation water for food production, which, however, have a severe and often far-reaching impact on environment and society.

Chain of causes

Looking at the reasons that have led to the desiccation of the Aral Sea, a long causal chain can be drawn that takes us back to the "Soviet style" of central

management of land and water resource use. This management style has put a whole region "under siege" for the production of a then strategic good, cotton.

This same agricultural system, characterized by a centrally commanded management style, still prevails in Uzbekistan. Today, the region is characterized by water wastage, soil salinization, poverty, the malfunctioning of institu-

tions, and economic inefficiency. However, providing solutions for the "Aral Sea Syndrome" is not easy, since quick assessments are likely to get it wrong.

To improve the efficiency and sustainability of water and land use as well as the living conditions of the population in the region, an integrated approach is needed which simultaneously addresses the ecological sustainability of the agricultural production system, its economic efficiency, and the political and institutional arrangements required to make improved systems work. Furthermore, such an approach should be truly user-driven, which means that viable solutions have to be developed in close cooperation with the farmers and decision-makers in the region.

ZEF's research approach and results

ZEF has, in close consultation with its national and international partners, designed such an interdisciplinary, application-oriented research program for the region. The aim of this program is to provide appropriate regional develop-

Project title:

"Economic and Ecological Restructuring of Land and Water Use in the Region Khorezm (Uzbekistan)",
2nd Phase: Field trials to understand processes and links; development of an integrative modeling tool for simulation of restructuring options in various scenarios.

Keywords:

Sustainable land use, efficient water use, legal-administrative studies, Aral Sea Basin

Countries of research:

Uzbekistan

Research objectives:

to provide options for sustainable land and water use in the Aral Sea Basin through integrated, interdisciplinary research, to contribute to combating desertification and to improve the livelihood of the local population

Research approach:

Sound interdisciplinary research, long-term cooperation for human capacity building, participatory approach, science-based concept for restructuring land and water use

ZEF Staff involved:

Christopher Martius, John Lamers, Peter Mollinga, Rolf Sommer, Resul Yalcin, Gerd Rucker (Oberpfaffenhofen), Akmal Akramkhanov, Hayot Ibrakhimov, Alwin Becker, Ihtiyor Bobojonov, Christopher Conrad, Colin Davenport, Nodir Djanibekov, Irina Forkutsa, Gulbahkor Ruzieva, Daniel Hawes, Susanne Herbst, Asia Khamzina, Kirsten Kienzler, Marc Müller, Inna Rudenko, Clemens Scheer, Tina Schieder, Sandra Staudenrausch, Tommaso Trevisani, Alexander Tupitsa, Mehriddin Tursunov, Geert Jan Veldwisch, Caleb Wall, Darya Zavgorodnyaya

Timetable:

1st Phase: 2001-2004

2nd Phase: 2004 (funded until 2006, expected project duration until 2012)



Irrigation system in Khorezm.



Main cooperation partners:

United Nations Educational, Scientific and Cultural Organization (UNESCO)
 German Remote Sensing Data Center (DFD) of DLR, Oberpfaffenhofen
 Institute for Research on the Atmosphere (IMK-IFU), Forschungszentrum Karlsruhe, Garmisch-Partenkirchen
 International Maize and Wheat Improvement Center (CIMMYT), Mexico
 Tashkent Institute for Irrigation and Mechanization (TIIM), Uzbekistan SANIIRI (Irrigation Institute Tashkent), Uzbekistan: Uzbek Cotton Research Institute, Tashkent, Uzbekistan(see project-website)

Main funding partners

German Federal Ministry for Education and Research, BMBF

Additional Funding

Ministry for Science and Research of the Land of North Rhine-Westphalia (until end of 2004)
 German Academic Exchange Service (DAAD)

Project coordinator/Contact

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Addressing rural poverty is crucial to development activity in the region.



ment concepts for a sustainable and efficient use of resources in the region. The 10-year program started in 2001 with a philosophy of a long-term participatory commitment and a strong human capacity building component. The training of young Uzbek academics in their role of future decision-makers in the region has a particularly high priority. The research program is being carried out in the district of Khorezm in Uzbekistan, a model region where solutions for the Aral Sea Basin are being tested.

In 2005, the first phase of the project was completed, and the first "generation" of PhD students are now writing up their theses and publications. Their research has been focusing on the many different aspects of science that contribute to a better understanding of the system of land and water use in this region. Thus, a new picture of the intricacies and interdependencies of the availability and quality of natural resources, of the various human actors and their interests as well as their driving forces is now emerging.

Complex problems

Irrigation systems in the Aral Sea Basin require vast amounts of water. But abandoning them in order to restore the Aral Sea to its former size would be unfeasible, take too many decades, and throw 40 million people into disaster, since 90% of the crops are grown in irrigated agriculture. Moreover, agriculture is producing 33% of Uzbekistan's GDP and the majority of the population depend on farming for their livelihood. Besides, rural areas are also the poorest. Therefore, addressing rural poverty should be a crucial part of any attempt to improve the use of natural resources and should be the ultimate goal - along with improving ecological sustainability - of any development activity in the region.

As a strongly hierarchical command economy prevails in Uzbekistan, privatization is often hailed as the answer, in order to achieve prosperity by giving farmers more freedom of choice. But when not only the prices of agricultural commodities but also the true costs of inputs at world-market level are factored into economic calculations of farm business enterprises, a different picture emerges. This research was done by one of ZEF's Uzbek junior scientists, Inna Rudenko, and had the following outcome: The Uzbek "state order" system for important crops also works as an effective subsidization mechanism from which the farmers benefit. Thus, changing the state order would require careful considerations and model simulations before an apparent simple mainstreaming process towards a market economy - including the privatization of farming cotton and wheat - could lead to improving wealth and income in the rural areas. Furthermore, the farm economic model reveals that farmers would get more "soums" (the Uzbek currency) when growing rice - a bad strategy considering that rice uses up five times more water than the already highly water-consuming cotton.

Local solutions

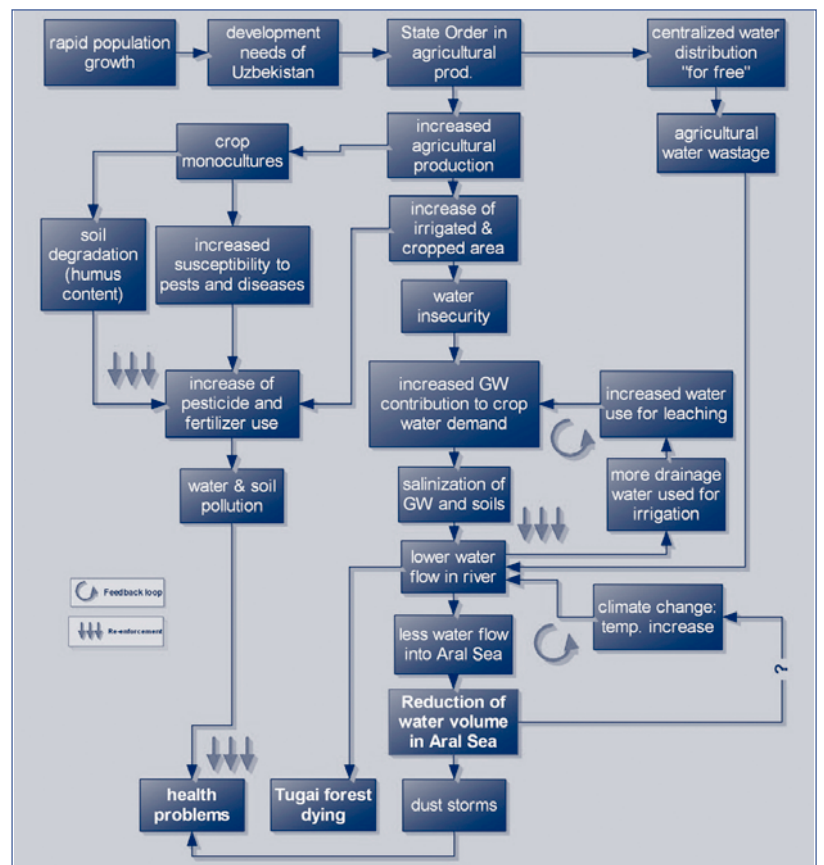
Similarly, the textbook recommendations regarding the use of natural resources are likely to fail if the local problem-solving strategies are not adequately taken into account. For example, there is a vicious cycle in which, through many years of irrigation with surface water, soil salinity is built up to levels that are toxic if not lethal to the crops unless more water is applied each year for leaching the salts out of the soils before crops are sown. In Uzbekistan, the leaching requirements may amount to 25-30% of total annual water use in agriculture. Leaching also fills up the groundwater to levels at which more salts are transported to the soil surface when the shallow ground water is evaporated through capillary forces. It is therefore a standard recommendation to lower the ground water tables. However, farmers in the region often do the opposite: they sometimes block the already malfunctioning agricultural drainage system in order to keep the groundwater in the fields. The reason was revealed by one of the project's field studies, done by a young Uzbek scientist, Irina Forkutsa: A low but reasonable cotton harvest of 1.6 tons per hectare was achieved in one experimental field that had not been irrigated by a single drop of water. The plants were watered from below - the groundwater was at a level of 80 cm below surface, near enough for the plant roots to obtain water from it. The strategy of the farmers makes sense, because another study - by Marc Müller, an economist at ZEF - revealed that the risk of water shortage has continuously increased over the last 20 years, from 10 to about 40%. Farmers not trusting the water distribution of government agencies prefer to rely on supply from high groundwater tables - even under a risk of soil salinization.

These are only two examples, but they illustrate the ZEF approach - to obtain a better informed evaluation of the problem situation in the region through the thorough integration of sound scientific data. The complex situation is easily judged wrongly - and wrong problem statements add up to bad solutions. Therefore, the project has started developing computer-aided tools that will help understanding the complexities better - and identifying problems that arise from attempts at local problem-solving without taking the whole picture into account. A fully integrated concept called KEOM - Khorezm Economic-Ecological Optimization Model - will be developed by Rolf Sommer and his modeling team as a long-term strategy of the project to assist decision-makers in distributing resources on a regional scale and assess the associated long-term and often complex effects of "turning a little screw". Whereas developing this tool will take a couple of years, a much simpler



Local problem-solving strategies have to be taken into account.

Figure 1:
Causal chains in the Aral Sea Basin that lead to the Aral Sea Dilemma





tool will be made available at an earlier stage that will allow farmers and farm managers to allocate land to crops in an optimized manner and consider soil quality, water availability, and economic performance of crops. In this way, the project will allow to perform at a lower level - that of the farm - when the more complex solutions are still being developed.

2.3. Trade and Globalization

Trade, Environmental and Social Standards, Labeling

Project title:

"Trade, environmental and social standards, and labeling".

Keywords:

Eco-labeling, child labor, trade liberalization

Countries of research:

Egypt, Bangladesh, India, Nepal, Philippines, Thailand and general

Research objectives:

This research program aims mainly at contributing to a better understanding of the economics of labeling, its determinants, and the impacts of labeling and standards on international trade, with a particular emphasis on developing countries.

ZEF staff involved:

Ulrike Grote, Arnab Basu, Nancy Chau, Ahmed Ghoneim, Cristina Carambas, Sayan Chakrabarty, Dina Mandour

Timetable:

Started in 1998
Completion of several articles in 2004/2005
Completion of one Ph.D. thesis in 2005 and two theses in 2006
Conference proceedings in 2005/06

Main funding partners:

GTZ, DAAD

Project Coordinator/Contact:

Ulrike Grote
u.grote@uni-bonn.de
<http://131.220.109.9/?id=274>

Increased liberalization of international trade has resulted in growing concerns about labor conditions and production methods that adversely affect the environment. Consequently, the search for an optimal instrument to ensure fair trade has led to the study of the effectiveness of product labels. Results of a case study on child labor in textile and garment enterprises in Egypt show that firms with child labor are mainly small-scale firms. Even companies with export shares of more than 50% employ child laborers. However, these exporting firms target their exports mainly to Arab countries, not to the EU or the US. It has also been found that awareness about the prohibition of employing child laborers is generally relatively low. On the contrary, children are often employed for social reasons like helping the family, or the child him-/herself. This result was supported by a small additional survey of diverse enterprises in the informal sector.

An economic analysis of eco-labeling in the agricultural sector in Thailand and the Philippines has found that positive financial, environmental and health benefits accrue to producers of certified organic products. The empirical study also shows that although profits at farm level are far greater for farmers producing eco-labeled products than for the conventional counterparts, the latter get a higher share of the total profit shared in the marketing chain than the former. While this does not alter the fact that the farmers are better off in participating in eco-labeling, the assessment of profit distribution is relevant as it provides an indication of how the eco-labeled product market currently operates. It also raises the issue of whether measures can be taken to ensure that farmers get optimal economic benefits without prejudicing the share of the other market participants.

The proceedings of an international conference on "The Role of Labeling in the Governance of Global Trade: The developing economy", which took place at ZEF in Bonn in March 2005, are currently being prepared. They identify and highlight the constraints as well as the policy requirements for the efficient and equitable use of labeling in international trade as well as research gaps in the labeling literature.

Trade and Agricultural Policy Distortions in Developing Countries

With the aim of entering the World Trade Organization (WTO), many developing countries have actively participated in bilateral and multilateral trade negotiations since 1995. However, knowledge on protection in the agricultural sector is generally still rather low. To fill this gap in research, a project was initiated by the International Food Policy Research Institute (IFPRI) in cooperation with ZEF to understand and assess agricultural policies and to measure protection for agricultural products in selected Asian countries.

ZEF research focused on Vietnam which has moved from a centrally planned towards a market-oriented system through several major economic and trade reforms since 1986. First positive results of the reform process became visible in the early 1990s when poverty declined and the agricultural sector started to grow, achieving impressive export growth rates. The question arises to what extent support policies contributed to this growth. The finding is that most agricultural products were taxed from the 1980s to the mid-1990s. This was mainly due to major inefficiencies in the production and processing of agricultural commodities, the dominance and monopoly position of the state-owned sector, restrictive trade policies like import and export quotas and licenses, and distorted markets and prices in the country.

The domestic reform process, and the opening of the economy since the early 1990s, have impacted on the gaps between the domestic and international prices. During the last decade, agricultural support seems to have emerged and slightly increased in Vietnam. However, in general it is at a low level compared with many other countries. The detailed results for key commodities and for the agricultural sector overall are especially important for Vietnam as it moves forward plans to negotiate WTO membership.



Since the 1990s, Vietnam achieved impressive export growth rates for its agricultural products.

Project title:

"Trade and agricultural policy distortions in developing countries".

Keywords:

Agricultural policies, protection rates

Country of research:

Vietnam

Research objectives:

To find out how much support the Vietnamese government provided for its agricultural sector from 1986 to 2002

ZEF staff involved:

Ulrike Grote, Hoa Ngyuen

Timetable: 2003 - December 2004

Main cooperation partners:

David Orden, IFPRI

Main funding partners:

GTZ

Project Coordinator/Contact:

Ulrike Grote

u.grote@uni-bonn.de



2.4. Agricultural Technologies and Modeling

Policy Analysis for Sustainable Agricultural Development (PASAD)

Project Title:

"Policy analysis for sustainable agricultural development (PASAD)".

Keywords:

Sustainable agriculture, technology adoption, rural labor markets and bio-economic modeling

Countries of the Research:

Tanzania, Malawi, Romania, Kenya and Ethiopia

Research Objectives:

The PASAD project aims at contributing to a deeper understanding of sustainable rural development. The project focuses on three crucial aspects, namely (1) institutional factors that influence the degree of commercialization of small-scale farmers, (2) alternative occupational choices in rural labor markets with respect to agricultural and non-agricultural employment, and (3) biophysical aspects concerning soil fertility management technologies.

ZEF staff involved:

Peter Wobst, Borbala Barlint, John Mduma, Hardwick Tchale and Holger Seebens

Timetable: July 2002 - June 2005

The Romania study finds that good land management practices have common determinants with commercial orientation, namely the factors of production. Moreover, market participation, sales and commercial orientation is negatively influenced by high transportation and transaction costs. In order to promote commercial orientation and ecological sustainability, agricultural education, land transactions, investment in infrastructure, efficiency of processing factories as well as the establishment of new processing factories and collection points should be encouraged. Moreover, cooperation among producers will lead to lower transaction and transportation costs and thus to higher commercial orientation.

The Tanzania study shows that household and community characteristics affect the decision to participate in off-farm employment and that supplying labor off-farm negatively affects adoption and intensity of soil conservation. Moreover, spatial analysis reveals substantial



The PASAD research team.

variation in model parameters across regions that significantly correlate with the spatial patterns of poverty. For example, the study finds that interventions such as rural credit schemes have greater impacts in the western than the eastern part of the country.

Results from the Malawi study indicate that in order to enhance sustainable productivity of smallholder farmers there is a need to promote the adoption and scaling-up of integrated soil fertility management, i.e. chemical fertilizer and grain legumes. Integrated soil fertility management options enhance productivity, profitability and food security. As evidence from this study indicates, adoption and intensity of integrated soil fertility management options requires institutional and policy support in terms of credit provision, extension services and improvement of market access. Furthermore, a favorable institutional and policy environment tends to be more important in enhancing adoption while household specific socio-economic factors tend to influence the intensity of use of integrated options. Policy simulation results indicate that when farmers face cash constraints, they resort to the use of grain legume options only. However, alleviation of the cash constraints results in a shift to chemical fertilizer only as it becomes affordable for smallholder farmers. But such policies cause an increase in the nitrogen balance (an indicator of soil fertility mining) as farmers

substitute chemical fertilizers for grain legume options. Complimentary policy strategies such as the distribution of improved crop technologies, chemical fertilizer and grain legume seed would therefore promote integrated soil fertility management options and provide for current food security as well as sustained productivity of the soil through the stabilization of the nitrogen balances.

The emergence of female-headed households has changed traditional structures of the rural East African economy, as women are often deprived in terms of access to productive resources. However, a study on female-headed households in Kenya demonstrates that it is important to acknowledge their heterogeneity. After basically distinguishing between basically married, divorced, and widowed female headed-households, it has been shown that widows are facing many more difficulties in obtaining labor from the spot market, being visited by extension agents, or adopting soil conservation practices as compared to the other categories. The development of rural labor markets may thus increase the independence of women from agriculture and contribute to female empowerment by giving women the chance to generate cash income.

Main cooperation partners:

Economics Department, University of Dar es Salaam, Tanzania
 Sokoine University of Agriculture, Morogoro, Tanzania
 Agricultural and Applied Economics Department, Bunda College of Agriculture, Lilongwe, Malawi
 Institute of Agricultural Economics, Bucharest, Romania
 International Food Policy Research Institute, Washington, D.C., U.S.A.

Main funding partners:

Robert Bosch Foundation

Project Coordinator/Contact:

Peter Wobst
 p.wobst@cgiar.org
 www.pasad.uni-bonn-de

Modeling and Empirical Studies



Future stakeholders eager to play a role.

Long-term economic development crucially depends on an efficient and most productive use of scarce resources at micro level. With respect to low-income countries, agricultural production processes are still at the center of all development efforts. However, since rural livelihoods in such countries are mainly based on these scarce

natural resources, the linkages between agricultural or other rurally located production and the quality and quantity of natural resources have to be considered in the assessment of the relative performance of such rural production activities.

The "Efficiency of Micro-Development" (EMD) project focuses on the relative economic performance of micro-level development. It consists of two components: (1) the quantification of the relative productivity and efficiency of production units, households, and economic sectors chiefly by regressing on primary and secondary data by other ongoing projects; and (2) the theoretically consistent modeling of different efficiency measurement approaches. EMD can therefore be regarded as a research endeavor cutting across different projects in ZEF.

Empirical studies to quantify the relative performance of micro-development processes and structures have been conducted in the following case studies:

Project Title:

"The efficiency of micro-development (EMD) - theoretical modeling and empirical studies".

Keywords:

Efficiency and productivity, quantitative measurement of micro-performance, theoretical modeling

Countries of Research:

Ethiopia, Malawi, Tanzania, Brazil

Research Objectives:

- (1) the economic assessment of development processes at micro level
- (2) the quantification of the relative performance of production units, households and sectors
- (3) the formulation of adequate policy measures to address inefficient resource use
- (4) to make a contribution to consistent modeling

ZEF staff involved:

Johannes Sauer, Holger Seebens, Tsegaye Yilma, Jumanne Abdallah, Hardwick Tchale, Arisbe Mendoza

Timetable:

June 2004 - June 2007 (proposed end)

Main Cooperation Partners:

Different projects within ZEF: e.g. PASAD, Eastern Amazon, GLOWA

Main Funding Partners:

Staff funded by ZEF, doctoral students funded by respective projects

Project Coordinator/Contact:

Johannes Sauer
jsauer@uni-bonn.de



There is a need for technological improvement of smallholders' agricultural production in Ethiopia.

■ **Ethiopia:** The technical efficiency of smallholder maize production in Ethiopia was investigated by determining the policy factors most crucial to enhancing production performance. It could be shown that there is a high variance in technical efficiency at farm level. A general need for technological improvement and change could be stated, and several starting points for policy measures aiming at enhancing farm efficiency in the short run were discussed. The main conclusion was that measures should basically be focused on improving the managerial skills of the farmers and fostering agricultural extension programs aimed at improving resource allocation. In contrast to most applications we adequately test whether the estimated maize production frontiers have the required regularities of monotonicity and quasi-concavity, and hence run the risk of making improper policy recommendations. Thus, only consistent relative scores of technical efficiency are used as an empirical basis for discussion and policy inferences.

■ **Malawi:** The level and determinants of relative technical efficiency of smallholder farmers in Malawi were assessed using the method of stochastic frontier analysis tested for economic regularity conditions. The results indicate medium to high levels of technical efficiency, consistent with a-priori expectations with the relatively higher yielding hybrid maize. Higher levels of relative technical efficiency are obtained when farmers use integrated soil fertility options compared to the use of inorganic fertilizers only. Of the policy variables included in the analysis, agricultural input and output markets, credit facilities and the extension of access to the markets strongly influence smallholder technical efficiency. The study recommends that the Malawian government resuscitate these public policy issues in order to address the sustainability of its agriculture and its impact on poverty in an effective way.

■ **Tanzania:** Empirical evidence on the links between production efficiency, biodiversity, and resource management was delivered by analyzing a case study on small-scale tobacco production in the Miombo woodlands in Tanzania. The subsistence nature of tobacco production in Tanzania suggests that most power-driven equipment, fertilizers, and sustainable crop processing technologies are beyond the reach of the majority of small-scale tobacco growers. The consequence is that in order to expand their production, tobacco farmers heavily substitute such inputs by increasingly using wood. Hence, a growing amount of forest land is cleared by the farmers, resulting in forest degradation and a loss of biodiversity. In a first step, this study determines the efficiency of tobacco production bordering the Miombo woodlands in Tanzania as well as investigating factors for the relative inefficiency at farm level. In a

second step the relation between forest species diversity in the surrounding woodlands and tobacco production efficiency as well as between diversity and the type of institutional arrangement with respect to forest management are empirically analyzed. The results indicate that the different efficiency measures vary widely over the sample, showing a significant positive effect of the curing technology - i.e. the design of the barn - and the source of the firewood. The majority of farmers are producing with increasing returns to scale. A strong positive correlation between tobacco production efficiency and forest diversity as well as between community-based arrangements and forest diversity is revealed. Ultimately, this suggests that agricultural production efficiency is conducive to environmental sustainability with respect to tobacco in Tanzania as well as supporting property rights based on institutional arrangements for forest resource management.

The more theoretical and modeling component of EMD focuses on the micro-economic and mathematical underpinnings of the quantitative models used in applied development and agricultural economics. Therefore, the establishment of an "Efficient Development Network (EDN)" is planned, which will be an international network of researchers and academics involved in quantitative productivity and efficiency analysis that are based in developing as well as developed countries.





2.5. Risks

United Nations University Institute for Environment and Human Security (UNU-EHS)

Project Title:

"Hazards, risks, vulnerabilities, and sustainable development", Joint PhD Programme.

EHS staff involved:

Janos J. Bogardi, Joern Birkmann, Fabrice Renaud, Katharina Thywissen, Juan Calos Villagrán de León, Dusan Sakulski

PhD candidates:

Bastien Affeltranger (BA)
Adelina Mensah (AM)
Marcus Kaplan (MK)
Xiaomeng Shen (XS)

Countries of PhD research:

Mekong countries (BA), Ghana (AM), Sri Lanka & India (MK), China & Germany (XS)

PhD research titles:

- The Politics of Hydrological Data. Flood Management and Transboundary Cooperation on the Mekong (BA)
- The Influence of Land Use Activities on Nutrient and Sediment Loading into Upland Catchment Streams of Ghana (AM)
- The Impact of Mangrove Destruction on Human Security in Sri Lanka and South East India (MK)
- Flood Risk Perception and Communication in Different Cultural Contexts (XS)

Timetable:

BA: October 2004 - April 2006
AM: October 2004 - December 2005
MK: February 2005 - February 2007
XS: February 2004 - December 2006

Contact:

Fabrice Renaud (Academic Officer)
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The ever increasing threats to individuals and societies arising from extreme environmental events like floods, landslides and drought have broadened the concept of human security to account for environment-related challenges. The mission of UNU-EHS is to advance human security through knowledge-based approaches to reduce vulnerability and environmental risks. To explore the practical ramifications of this new concept for activities, the United Nations University created the Institute for Environment and Human Security (UNU-EHS), which started its scientific work in Bonn in September 2004. With its team of six scientists from different disciplinary backgrounds, UNU-EHS aims to assess the vulnerability and coping capacity of communities facing natural and human-induced hazards in a changing environment. By improving the understanding of cause and effect relationships UNU-EHS offers options to help reduce the risks faced by societies as well as their vulnerabilities to risks.

UNU-EHS' research and training activities in its initial 2004-2005 biennium focus on flood plains, deltas and coastal zones, with emphasis on urban agglomerations. Drought and its impact on rural communities will be an added priority from 2006 onwards.

Within its activity framework, UNU-EHS is concentrating on identifying, defining, and highlighting human insecurity; developing methods for measuring, analyzing and monitoring vulnerability to different hazards and at different social and geographical scales; exploring the linkages between environmental change, hazards, risks and vulnerability, and developing prevention and response strategies within the context of sustainable development; educating a new generation of scientists (PhD program); improving the knowledge and skills of practicing professionals through capacity-building activities in cooperation with partner institutions; strengthening the capacity of the UN System to provide science-based advice to its Member States and its peoples concerning environmental threats to human security; developing networks with universities, research institutes, scientific associations and affected communities to ensure dissemination of new knowledge and information; participating in institutional capacity development; raising public and political awareness of "living with nature, living with risks" within the context of sustainable development.

The projects and activities of UNU-EHS developed in a very positive and dynamic way in its first biennium. The research work is already ongoing in a wide range of countries throughout the world: Sri Lanka, China, Vietnam, Guatemala, Ghana, Russia and Hungary. New projects shall follow in India, South Africa and Uzbekistan/Kazakhstan.

Following the Indian Ocean Tsunami in December 2004, UNU-EHS has strengthened its activities in South-East Asia. Especially in Sri Lanka, together with Sri Lankan partners, UNU-EHS scientists are analysing the vulnerability of coastal zones in an event of natural disasters. Together with leading German

scientific institutions (GeoForschungsZentrum Potsdam, German Aerospace Center and others) UNU-EHS is involved in the German-supported "Tsunami Early Warning Program" for South-East Asia.

Capacity building as described above is one of the main goals of UNU-EHS. Sharing knowledge is most effective through joint development and dissemination of knowledge. The formal Cooperation Agreement between UNU and the University of Bonn signed in the early days (October 2003) of the Institute strongly affirms this goal. However, UNU-EHS is involved in a wide range of activities in this area. The IHDP 6th Open Meeting "Global Environmental Change, Globalization and International Security: New Challenges for the 21st Century" took place in Bonn in October 2005, whereby UNU-EHS was strongly involved in organizing courses and sessions. Furthermore UNU-EHS is preparing a workshop on urban catastrophe management for November/December 2005 as well as lectures as part of the Training Course on Regional Ocean Governance for Mediterranean and Eastern European Countries organized by the International Ocean Institute based in Malta.

Within the capacity-building scope, the Center for Development Research (ZEF) of the University of Bonn has been recognized as a long-term partner, especially as ZEF's profile is highly complementary with that of UNU-EHS. In the years 2004/2005 there has been an active staff exchange program between both institutes sharing advice on activity planning and research as well as offering education via lectures at ZEF by EHS scientists.

In its attempt to maintain and to develop synergy between research and education, UNU-EHS has jointly launched a PhD program with ZEF at the University of Bonn. In addition to the immediate aim of human capacity-building, UNU-EHS is responsible for the newly emerging thematic profile of the joint PhD program - Hazards, risks, vulnerabilities, and sustainable development - including the development of a cross-cutting educational module on risks and vulnerabilities. The paramount objective of the PhD program is to build up human capacity and academic expertise in the area of environment and human security. In the biennium 2004/2005, four PhD candidates are already working on interdisciplinary, case-study oriented themes. It is expected that this number will be doubled by the end of 2005.



UNU-EHS aims to assess the vulnerability of communities.



UNU-EHS' research focuses on flood plains, deltas and coastal zones.



Chapter 3. Capacity Building

The International Doctoral Studies Program for Development Research (IDSP)

The two main goals of the IDSP are to support academic and scientific capacity building in developing countries and to educate academics from European countries in the field of development research and policy. An evaluation among its Alumni showed that the majority of IDSP participants reach the goal of working in international development-related organizations and institutions.

Scientific standard and concept

The academic goal of the educational program is to offer the students a combination of knowledge, methods and tools to strengthen their specializations as well as to give them an overview and insight of development-related issues and methods in general. This innovative approach enables our graduates to perform as specialists in their own academic fields and to tackle development-related issues with a broader view and on a multi-disciplinary scientific basis.

The IDSP has a tight schedule for its students. After six to twelve months of study and courses at ZEF they conduct their empirical research, most of them abroad, either in their home countries or, in some cases, at an international institution or organization in the field of development policy or co-operation. After one or two years in the field, they return to ZEF to assess their collected data and knowledge and to complete their thesis. The whole program has to be finished within a time frame of three years.

Since a large number of the students are involved in ZEF's major interdisciplinary projects, one of the criteria for selecting the students is that their research proposals fit in with ZEF's existing research agenda.

During their stay at ZEF, students are specially encouraged and supported by ZEF to publish their work and participate in international conferences, workshops and congresses in order to train their rhetorical skills, gather experience and establish contacts with international colleagues in their fields.

Courses, teachers, and tutors

Courses are held in all of ZEF's research fields. Besides the involvement of ZEF senior staff members, some of the lecturers are professors or teachers from other, often international, universities, so that a high academic standard and a broad perspective on development-related issues is ensured. Co-operation with several institutes of the Universities of Bonn, Cologne and Aachen is especially intensive.



Presentation of PhD research in a seminar.



Participants in the ZEF intercultural weekend seminar.

The Doctoral Course Program is organized in:

- Module I, a four-week interdisciplinary course, addresses the complex and inter-linked problems of global change in development and research. It intends to open the minds of the doctoral students to other disciplines and to change their working mentality for their future doctoral research. The course embraces the classical fields of environmental disciplines within natural sciences and the economic, political, and social-cultural dimensions of development. Part of the course is seminars on boundary concepts, which are concepts that are used in different disciplinary domains but have different meanings in these domains, such as "value and valuation", "risk and vulnerability" or "What is a model?".

Three additional weeks are dedicated to reflective activities (writing, literature research) and writing of a term paper. This will be done in team-work and is required for the successful completion of the course and the Certificate of "Doctoral Courses in Development Research at ZEF".

- Module II comprises three disciplinary courses (Development Economics and Politics, Development Sociology and Policy, Natural Resource Management and Ecology) that provide specific knowledge separately for each program area about theory and methodology that is essential for the empirical studies of the students
- Module III consists of up to three sets of lectures a year on "Contemporary Development Issues and Methods". Invited prominent guest scientists deliver lectures on selected frontier-level topics. Each set comprises two to three days of lectures and individual discussions on specific PhD research topics. Module III can also be conducted in the form of specific training for individual students provided in laboratories at the University of Bonn or other co-operating institutes in Germany or abroad.



Arisbe Mendoza-Escalante (Mexico), Kavita Rai (Nepal) and Lucy Dennis Aviles (Bolivia) celebrating their doctoral graduation.

Origin of IDSP students 2004/2005



Regions of origin	Number	in %
Africa	53	32 %
South and East Asia	28	17 %
Former Soviet Union states	15	9 %
Arab countries	6	4 %
Europe, Industrial states	50	30 %
Latin America	13	8 %
Total:	165	100%

Countries of origin	Number	in %
High income states	50	30 %
Developing countries	100	58 %
Transition states	15	12 %

The tight time schedule in combination with the high academic standard of the graduates can only be achieved by the intensive tutoring and supervision system that ZEF offers. This is unique in the German academic landscape, where the average duration of a PhD is about five years and most of the PhD students work without any intensive feedback on their work.

Selection procedure

Owing to the high academic standard of the IDSP, less than ten percent of the roughly 300 applicants a year can be accepted. University marks so far and the quality of the research proposal are the decisive criteria for selecting students for attendance of the IDSP. Representatives of ZEF and the main funding partners take part in the selection procedure.

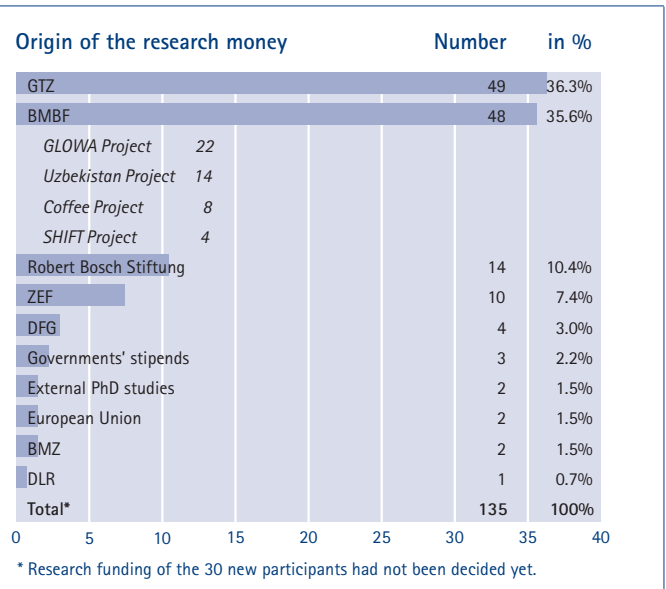
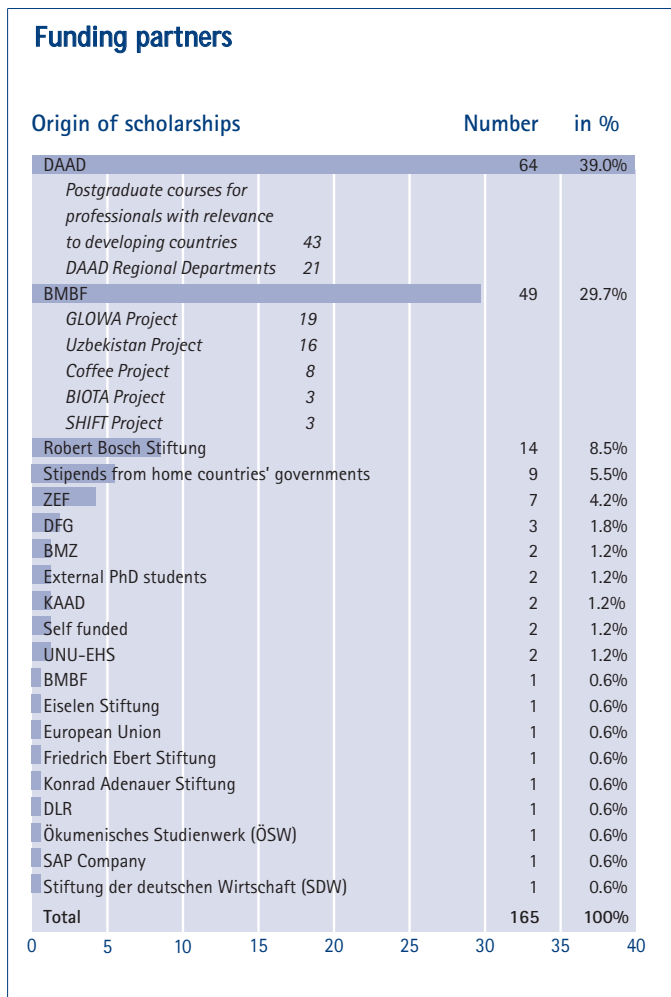
Alumni and career perspectives

Since the inception of the IDSP in 1999, 283 students from 55 countries have participated in the program. A total of 107 students have graduated from ZEF with a PhD degree so far. Our contact with former PhD students, especially via our Alumni Program, proves that the vast majority of former students find suitable positions in a development-related academic, NGO, governmental or inter-governmental context, some of them in their home countries.

Application

New applicants for the International Doctoral Program for Development Studies should have the following profile:

A successful application requires an excellent master or diploma degree in Economics, Political Science, Agricultural and Resource Economics, Engineering Degrees, Geography, Mathematics, Natural Science or Agriculture, and excellent proficiency in English. The applicant should be younger than 32. First, you have to enter your data in an online registration form at <http://www.zef.de> before you send your appli-





PhD students of the 2004/2005 batch.

cation written in English: a letter of application, application forms from ZEF, an abstract of the master or diploma thesis, the plan of proposed research, two letters of recommendation, the curriculum vitae and certified copies of all relevant certificates. The application forms can be downloaded from ZEF's website or are mailed on request to interested persons.

The deadlines for applications for the doctoral program and scholarships are: August 31, yearly, for non-EU citizens and DAAD scholarships (available only for applicants from developing countries), and May 31, yearly, for EU citizens and scholarship holders of the Robert Bosch Foundation.

Highlights 2004/2005

Global Development Medal for Adama Konseiga

Adama Konseiga, Doctoral Student at ZEF, was awarded the "Global Development Medal for Outstanding Research on Development" of the Global Development Network (GDN) in Dakar, Senegal in the category "Mutual Impact, the Global Economic Architecture and the UN Millennium Goals". He received USD 10,000 for his thesis on "Regional integrity beyond the benefit of traditional trade: the role of labor mobility in the cases of Burkina Faso and Côte d'Ivoire". He wrote his PhD at ZEF, and he was awarded a prize for his Doctoral Degree by the French University of Clermont Ferrand. His research was funded by the German Federal Ministry for Economic Cooperation and Development (BMZ), the German Academic Exchange Service (DAAD), and German Technical Cooperation (GTZ).

The Global Development Awards is the largest international contest for researchers on development, offering prizes totaling USD 400,000 to scholars and practitioners based in developing countries.

After the floods: Support for Universities in Banda Aceh

ZEF and the DAAD are sponsoring three PhD students from afflicted areas as of August 2005. Three PhD students from universities in these areas are participating in ZEF's three-year International Doctoral Studies Program for Development Research. They have been chosen by ZEF and the DAAD using the usual selection criteria.



Günther Manske and his team.



Not only did the tsunami disaster in December 2004 cause massive and widespread human suffering, but it also represented a major setback for human and academic capital in the countries concerned. The wave left behind a trail of destruction in Indonesia. For example, the tsunami killed 103 staff at the University of Syiah Kuala in Unsyiah and 25 staff at the neighboring Islamic institute IAIN Ar-Raniry. The latter institute's buildings also suffered considerable damage.

The initiative to sponsor the PhD students was prompted by the proposal of a personally affected student from the region, Mr. Ashabul Anhar. He is a PhD student at ZEF and a DAAD stipend-holder.

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Budget

The IDSP has an annual budget of 1.8 million euros including scholarships that is mainly financed by donors. Only 15% of the budget (office space, program coordinator's position and some of the lecturers) are financed by the Land of North Rhine-Westphalia.

Akmal Akramkhanov, Uzbekistan
 Faculty of Agriculture, University of Bonn



Outstanding Doctoral Theses

The spatial distribution of soil salinity: Detection and prediction

Imperfect irrigation and the excessive use of water in agricultural land in the Aral Sea Basin has been going on for several decades. The environmental consequences of such developments are soils plagued by salinity. However, salinity appraisal in the Aral Sea Basin is still dependent on traditional soil surveys with subsequent laboratory analyses for the total dissolved solids (TDS). This PhD thesis had three specific objectives, namely, to identify techniques that enable rapid estimation of salinity, to characterize the spatial distribution of soil salinity and to estimate the spatial distribution of soil salinity based on readily or cheaply obtainable environmental parameters.

Soil salinity was measured by four electrical conductivity (EC) devices on a regular grid covering an area of approximately 3 km by 4 km. Standard statistical procedures were applied for data description, correlation between variables, analysis of variance, and regression. Characterization of the spatial distribution of soil salinity and interpolation of point data were carried out using geostatistics. Soil salinity estimation based on environmental attributes was carried out using a neural network model as this offers enhanced generalization compared to other models. Analyses were integrated into a GIS for visualization and presentation of the results.

An environmental correlation model that was built for the farm scale estimated soil salinity using a neural network and obtained a correlation coefficient between estimated and measured soil salinity of 0.83. Explicit prediction of salinity was satisfactory taking into account contrasting scales of soil salinity variation and environmental data derived from varying scales with unknown accuracy.

The use of environmental attributes and soil salinity relationships to upscale spatial distribution of soil salinity from farm to district scale essentially estimated similar mean soil salinity value. However, visual comparison of the maps suggests that the estimated map had soil salinity that was overly uniform in distribution, which is thought to be caused by inaccuracy of environmental data (including scale problems), or overgeneralization by the neural network model.

Upscaling proved to be satisfactory, but further research is needed before an unrestrained application of the model is undertaken. Considering that the neural network model is an empirical model, its further training is required for locations whose conditions are different from the farm the model was generated from. Furthermore, the model depends on how strong the relationship between environmental variables and soil salinity is. Therefore, ideally, environmental variables must be available for the study area in high spatial resolution or must be easily measurable.

Land degradation in Ethiopia

A study of re-settled versus traditional farmers shows that the latter do a better job in conserving soils. This result was the outcome of this PhD thesis carried out in the Ethiopian highlands.

Agriculture, a key sector of Ethiopia's economy, supports over 85% of the estimated 70 million inhabitants. The population will double in 25 years. Therefore, agriculture faces an ever-greater challenge to ensure food security.

The rising population density associated with land clearing for agriculture has reduced the estimated original 40% forest cover to a mere leftover of 2.7% cover. It has also caused severe soil degradation - in some areas is beyond reversibility - that has destabilized the agro-ecosystems, especially in the central and northern highlands.

In an effort to relax the pressure on the soil in the degraded highlands, relocation of several thousand households and resettling them in the low-populated southwestern highlands has been adopted as a policy by the government in the last few decades. This study was conducted in one of the resettlement areas in the southwest of Ethiopia to assess the impact of re-settlement on the natural resource base of the settlement areas. The study examined the biophysical processes of resource degradation and the farmers' awareness of, and their response to, degradation as well as the coping mechanisms they developed. The study was based on comparative surveys and analyses of two farming systems, extensive cereal crop-based farming introduced by the settlers, and intensive traditional perennial crop-based farming. The ultimate aim of the study was to provide guidance in sustainable land use for planning policy decisions in the region.

An important conclusion was that the farmers' awareness of soil erosion and soil fertility problems is not only dependent on the farming system in place, but also on the farm slope conditions, literacy, access to information, tenure security and training or participation in soil and water conservation activities. Even if they are properly informed, the responses to their difficulties with soil degrada-

Merkuria Argaw, Ethiopia

The study was conducted in collaboration with EARO (Ethiopian Agricultural Research Organization) and with financial support from DAAD (German Academic Exchange Service).
University of Bonn, Faculty of Mathematics and Natural Sciences



Adama Konseiga, Burkina Faso

Faculty of Agriculture, University of Bonn

The PhD thesis was awarded by the Global Development Network Medal (see p. 55) in December 2004.



tion are seriously constrained by a lack of appropriate technologies, a lack of experience and a shortage of labor.

Given these results one should question the wisdom of the resettlement program. It may become a threat rather than a solution to land degradation in the areas of destination, particularly if no better know-how and technologies are offered to the settler communities to exploit their new environment in sustainable ways.

Labor mobility in Burkina Faso and Côte D'Ivoire

The West African Economic and Monetary Union (WAEMU) seeks to change the weak intra-regional trade and the strong disparities between countries. Intra-African migration flows are one of the best arguments for regional integration. While exports of goods from Burkina Faso to Côte d'Ivoire represented only 0.07 percentage points of the total exports in 1996, migrants from Burkina Faso account for the majority of foreigners living in Côte d'Ivoire. The outputs of the PhD study constitute a very comprehensive and detailed empirical analysis of changes in labour mobility inside WAEMU. Also, a new database on skilled migration and brain drain in the union countries is being constructed for the study of macroeconomic convergence.

At micro level, results show that special attention should be placed on seasonal migration. Seasonal migrants do not cause labor shortage. Under the conditions of free movement of rural labor, an increased expected income of a magnitude of 10% of the Sahelian average income would induce an increase of 6.3 percentage points in seasonal migration. However, an increase in the level of mistrust by 10 percentage points among households in delegating the security of their livestock while being absent would decrease the probability of migration by 3.2 percentage points. At the same time, migrant households are able to meet their basic needs, which in the local context is subject to high uncertainty. The latter is shown in the results in the following way: Important income instability in the preceding period enhances seasonal migration. The capacity of migration to generate and efficiently allocate remittances toward technological adoption for food security is also interesting. However, the study warns about the huge return migration flows that are following the current Ivorian political crisis and the potential losses coming from brain drain at macroeconomic level. In particular, Burkina Faso showed a severe "brain drain" to Côte d'Ivoire compared to other similar Sahelian countries. However, the effect of "brain gain" holds only for countries with well-controlled migration outside the WAEMU and to an industrialised country. Once the migration effects are included, the regional annual convergence speed is enhanced by 0.85 percentage points.

It becomes evident that the migration phenomenon is complex but represents a desirable activity in the context of missing credit and insurance markets, high agroclimatic risks and a low level of human capital. The study recommended promoting the free movement of people while identifying alternative destinations for future migrations. Policy-makers should develop a local labor market

that allows households to hire shepherd services under secured conditions, the latter being a condition for the participation of pastoralists groups in the income diversification strategy of migration. To make "brain circulation" a beneficial activity, more effort should also be made in co-ordinating sending and receiving country policies to reach an optimal skilled migration level that is favorable to human capital formation in the poorer sending zones.

The economics of migration in the Volta Basin of Ghana: Household and district level analysis

This study addresses migration determinants and effects in the Volta Basin of Ghana. The study is carried out at household and district levels, in which the two major data sources are the household survey and the Ghana Census 2000 data (a complete matrix of inter-district migration flows) respectively. Based on the household survey data, this study investigated the determinants of the decision to migrate within the Volta Basin of Ghana with a special emphasis on the role of migration income affecting household migration decisions. To do this, it built upon the New Economics of Labor Migration (NELM), a theory which considers the role of intra-household exchange of information for the migration decision of household members. As migrants are a non-random part of the population, the migration equation was corrected for selectivity bias using the Heckman procedure. The direct and indirect effects of rural out-migration in the source community are also examined using the survey data. The iterated Three Stages Least Squares (3 SLS) method was employed to determine and measure the net effect of migration on the income sources of households. This study, using the Ghana Census 2000 data, also attempted to explain gross inter-district migration flows by readily relating migration to certain aggregate proxy district-level variables. The gravity model is employed and modified to include basic district characteristics.

Estimation results showed statistically significant effects of income differential on the households' decision to participate in migration. This result lends credence to the importance of economic incentives in the intra-household migration decision making process. Results of the 3 SLS model also showed that the loss of labor to migration has a negative effect on household farm income in source areas. However, there is evidence as well that remittances sent home fully compensate for this lost-labor effect, contributing to household incomes directly and also indirectly by stimulating farm and non-farm self-employed production. Consequently, these findings present evidence in support of the NELM hypothesis that remittances loosen constraints on production and the imperfect market environments characterizing rural areas in developing countries.

In the district level analysis, important district attributes explaining the "in" and "out" flows are illuminated. Based on the findings of the preliminary analysis and pertinent theoretical reasons, the "gross" migration, instead of the 'net' migration flow approach is chosen. Results demonstrate that there is much

Daniel Tsegai

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overlap between places of moderately high in- and out-migration rates. Overall, migration in the Volta Basin of Ghana is predominantly over short distances and economic factors and health facilities play a significant role in directing migration flows in the Volta Basin of Ghana.

Ecotourism in Yucatán, Mexico

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In Mexico, as in many less developed countries and countries of transition, tourism is one of the most dynamic economic sectors. But, despite its economic importance, mass tourism has been criticized because of its negative social and environmental impact. Therefore in Mexico, a country with a rich cultural heritage and high ecological diversity, new travel designs have been developed. The Mexican government and various regional NGOs have instigated a variety of ecotourism projects with the aim of benefiting the local communities and to protect the environment, since ecotourism is said to promote integrated and sustainable strategies that enhance the social acceptance and ecological compatibility of tourism.

The aim of this PhD study was to understand how new tourism concepts are implemented. To this end, an analysis of an ecotourism project realized by a regional NGO in a small Mayan village in Yucatán was conducted. Research focused especially on two phases: on that of planning and installing the ecotourism project in 1998 and on the phase when the funding of the project ended in 2002. A combination of qualitative and quantitative data collections in a long-term study and an actor-oriented approach turned out to be the right methodology to measure the social and cultural effects of such interventions in development projects at different stages.

The focus of the study was put on the social dynamics arising at the interface between the project and the local community. The study emphasizes the important role of development brokers and "change agents". Moreover, it revealed that power relations, kinship, and religious affiliations are important factors determining the acceptance as well as the benefits that the "Ecotourism" project poses to the local actors. The study documents a complex network of patron-client relationships that influenced the strategies, methods, and direction of the participatory development project. Strategic relations between powerful interest groups and project leaders determined the development of the project and the allocation of project resources. While rich and powerful actors were able to influence project policies and participated in decision-making processes, village members with less political influence and economic means were widely excluded from the information and communication structures established by the project. Local as well as expert knowledge were exchanged selectively, largely to the disadvantage of those who were politically and economically less endowed.

The study also points to the importance of historically contingent inequalities between indigenous minorities and Hispanic members of the Mexican society. Furthermore, the considerable impact that sweeping protestant evangelization

had on project participation could be shown. Fundamentalist Protestantism that has been increasingly adopted by the local Mayan population has a convincing influence on project acceptance and participation as the Protestants promote "modernized" values, norms, and beliefs.

The findings of this study clearly show that local communities cannot be conceived as homogeneous entities. This is especially important for a successful implementation of pro-poor projects. In order to be able to promote disadvantaged members of the local society effectively, it is necessary to gain a deeper insight into socio-cultural structures and village dynamics and into the interests and rationalities of different local actors.

Benefits of Social Capital - Urban solid waste management in Bangladesh

In urban Bangladesh, the conservancy department (CD) of the city corporation/municipality is formally responsible for solid waste management (SWM). It is evident that since the period of British Bengal, local institutions are performing the responsibility of conservancy services. The politico-administrative structure as well as the characteristics of the political culture of Bangladesh society such as corruption, nepotism, and favoritism, abuse of rules and regulations, bureaucratic loyalty to the political parties, as well as conflicts between the party in power and the opposition affect the performance of city corporations and the CD in particular.

Studies show that nearly 50% of the daily generated solid waste remains uncollected in Bangladesh. It is assumed that inappropriate and unsatisfactory conservancy services have propelled the growth of civil society to handle SWM-related issues, such as the collection and disposal of garbage and the composting of solid waste in the urban areas, by organizing community-based initiatives in Bangladesh.

This PhD study deals with the question of community development and community action in the two cities of Chittagong and Dhaka in Bangladesh. It is based on extensive field research in the government administration in four selected areas of both cities.

The focus of the research is on urban solid waste disposal as a crucial topic of urban development. In addition to describing the organisation of the city government and the formation of various non-governmental organisations in this field, the study is focused on the question why some of the poor areas or "localities" manage to form their own specific organisations whereas others do not.

To explain this question, the author uses the concept of "social capital", which he regards as a property of a social system and as such as an enabler of social action. He shows that communities with a high level of social capital accumulation are strong enough to organise their own system of garbage disposal, whereas those that do not have social capital cannot engage in social action that will improve their environment.

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Development Studies 1 (2005)





Chapter 4. Public Awareness

Press Review

Afghanistan

Deutsche Welle Radio (international radio). Weltspiegel Asien. May 11 2004. Interview with Conrad Schetter on "Economic Conference in Bishek".

Süddeutsche Zeitung (national daily newspaper). August 24 2004. Aussenansicht, p. 2. Conrad Schetter: "Wahlen in Afghanistan sind nicht frei".

WOZ - Die Wochenzeitung (swiss weekly newspaper). August 26 2004, p. 9-10. Conrad Schetter: "Weder fair noch frei. Afghanistan".

Financial Times Deutschland. September 18 2004. Conrad Schetter "Ausweitung der Kampfzone; Hamid Karsais Vorgehen gegen die Warlords in Afghanistan ist gefährlich".

Deutsche Welle (international radio). Funk Journal. September 13 2004. Live interview with Conrad Schetter on 'Elections in Afghanistan'.

Deutschland Funk (national radio). Information am Mittag. September 14 2004. Live interview with Conrad Schetter on "Political situation and elections in Afghanistan".

HR Info Radio (regional radio). December 7 2004. Live interview with Conrad Schetter on "The inauguration of Hamid Karzai".

Development and Cooperation (D+C). February 2005. Conrad Schetter: "Dilemmas of fighting drugs".

e.velop (online magazine of the German government). April 20 2005. Conrad Schetter: "Afghanistan: Dilemma Drogenbekämpfung".

Introduction

ZEF is a scientific institution with a strong emphasis on informing a broader public of its work and its impact. The interdisciplinary approach to and the international set-up of its research work enable a wide network of scientific and non-scientific partner institutions and organizations all over the world. Individual staff members of ZEF contribute as experts or as representatives of their projects to evaluating development projects, to writing reports on projects relating to development that are run by German Federal Ministries or to informing the media. It is this continuous contact and interaction with political and ministerial actors, with colleagues in the academic world, and with representatives of NGO circles as well as of the media that not only enriches ZEF's work but also gives the Center a pivotal role in the development community.

Publishing

ZEF has three book series in which mainly its doctoral theses are published:

ZEF Development Studies at LIT Verlag, Muenster/Hamburg/London; Development Economics and Policy at Peter Lang Verlag, Frankfurt a.M.; and Ecology and Development Series at Cuvillier Verlag in Göttingen. For more information please have a look at our website:

www.zef.de/publications/Books/Series.

Publishing scientific articles in the relevant academic journals (see a selection at the back of the Report) on a regular basis is a must for ZEF's researchers. Besides, senior staff members publish their own books (see list at the back of the Report).

The ZEF Discussion Papers on Development Policy inform an academic audience as well as policy-makers and a more general public.

For reaching out specifically to the non-academic public, ZEF publishes ZEF News twice a year as well as its Annual Report. ZEF Policy Briefs focus on issues of public debate or on scientific outcome with a high policy implication.

Also, the regular contributions of ZEF staff to popular journals in the development sector like "Development and Cooperation" (D+C) make the Center an important player in this field.

Networking

Cooperation with the United Nations University Institute for Environment and Human Security (UNU-EHS) has been intensified (see Chapter 2.5.), especially in the framework of the Doctoral Program.

ZEF is also involved in preparing the EADI General Conference, which will take place in Bonn in September, as well as in the Open Science Meeting, organized by its partner organization IHDP (International Human Dimensions Programme on Global Environmental Change).

Workshops

This year's highlights definitely include the international conference on "The Role of Labeling in the Governance of Global Trade" (March 2005), which was co-organized with Cornell University and the College of William and Mary and took place at ZEF, and the workshop on "Payments for Environmental Services (PES) - Methods and design in developing and developed countries", which was held in cooperation with the Center for International Forestry Research (CIFOR) in Bogor in Titisee (Germany) in June 2005.

Also, ZEF was involved in writing a policy paper and organizing an expert workshop in cooperation with the Friedrich Ebert Foundation and the Deutsche Welle Academy on "Media Development Cooperation - a central function of cooperation" in September 2004.

The Annual Meeting of "DesertNet", an association of German experts on the issue of desertification, was co-organized by ZEF in Bonn in December 2004. The meeting, the issue, and the experts were successfully highlighted at a Press Conference and in media coverage afterwards.

Public Relations Highlights 2004/2005

Public Lectures

ZEF organized a Public Lecture series on Diversity, in which economic and socio-logical issues as well as biodiversity topics were presented by and discussed with international experts.

In the winter term, ZEF also organized a lecture series called "Silk Road Lectures" with high-ranking experts from politics, the academic and the NGO field on the political, economic, and social background of developments in Central Asia, Iran, and Afghanistan. A special panel discussion was organized on the occasion of the Afghan elections in October 2004.

Also, ZEF staff members have given lectures or have been contributing to other lecture series, e.g. of the University of Bonn on political, social, and economic development in Africa.

Delegations and visitors

On a regular basis, ZEF receives foreign delegations to inform potential future partners about its work. Among the special guests in the past year are an Afghan Ministerial Delegation led by the Afghan Minister of Higher Education, Dr. Ameer Shah Hasanyaar, the Secretary General of the Association of African Universities (AAU), Akilagpa Sawyer, and a Thai Delegation from the Thai Ministry of Social Development and the National Institute of Development Administration (NIDA) who had a briefing on Briefing on Knowledge Management and Knowledge Governance.

Deutsche Welle Radio (international radio).
June 1 2005. Interview with Conrad Schetter on "Bomb attack in Qandahar".

Deutsche Welle Radio (international radio).
Funk Journal. May 24 2005. Interview with Conrad Schetter on "Karzai's meeting with Bush in Washington".

Africa

Development and Cooperation (D+C).
November 2004. Interview with Ulf Terlinden "Somalia between hope and scepticism".

Aus Politik und Zeitgeschichte (APuZ)
4/2005, January 24 2005 (monthly magazine). Khalid Y. Khalafalla "Der Konflikt in Darfur".

Deutsche Welle Radio (international radio).
June 2005. Interview with Hartmut Ihne on global development politics, the role of the World Bank and development in Africa (debt relief).

Deutschlandradio (national radio).
Hintergrund Politik. April 27, 2005.
Interview with Ulf Terlinden "Es gilt das Gesetz des Dschungels. Somalia als Beispiel für den Staatszerfall in Afrika".

Project on Wild Coffee in Ethiopia

General Anzeiger (local daily newspaper).
March 15 2005. "Eine Kostbarkeit, die an Sträuchern wächst".

dpa (german press agency). March 18 2005. "Wissenschaftler fordern Erhalt von Wildkaffee in Äthiopien".
Taz (local daily newspaper). March 18 2005. "Wilder Kaffee in Gefahr".
WDR (regional TV). Lokalzeit. July 15 2005. Report on the festive celebration on the occasion of 100 years of German-Ethiopian diplomatic relations.

Deutschlandfunk (national radio). Umwelt und Landwirtschaft. April 13 2005. "Artenschutz durch Vermarktung".

Water

Deutschlandfunk (national radio). February 25, 2005. "Virtuelles Wasser: Globaler Import und Export in Agrarprodukten".

Deutsche Welle Radio (international radio). March 2005. Two contributions on the International Water Conference in Bonn, February 23-25 2005.

3sat (Swiss-Austrian-German TV channel). nano. March 22 2005. Feature on the GLOWA Volta project and the newly opened research center in Dano, Burkina Faso, on the occasion of World Water Day and interview with Paul Vlek.

Development research in general

Kölner Stadtanzeiger (local daily newspaper). June 5, 2004 "In Bonn soll sich die Welt treffen".

Das Parlament (national two-weekly newspaper). No. 35/36. August 23/30 2004. "Es ist ein Geheimtipp für die Entwicklungsforschung: Ein noch kleines Institut in Bonn mit großer Wirkung".

Das Parlament (national two-weekly newspaper). No. 35/36, August 23/30 2004. Interview: "Kritischer Begleiter von Entwicklungsprozessen. Im Gespräch: Paul Vlek".

General Anzeiger (local daily newspaper). November 1-2 2004. "NORD SÜD. Vernachlässigtes Arbeitsfeld Entwicklungshilfe. Experten kritisieren mangelhafte Förderung der Medien".

General Anzeiger (local daily newspaper). December 28 2004. Interview with Hans-Dieter Evers: "Wir werden von den Ostasiaten abgehängt".

General Anzeiger (local daily newspaper). January 11 2005. Interview with Paul Vlek: "Eliteschule für Entwicklungsforscher".

Media Coverage

Media coverage (radio, websites and tv) on the basis of interviews, press releases and press conferences was given on Afghanistan, Somalia, Ethiopia (Coffee project), on World Water Day, on the GLOWA project, on the Uzbekistan project (desertification), on ZEF in general as a development related research institute, on EU agricultural politics, and on the aftermath of the Tsunami disaster.

Opening of Dano Station in Burkina Faso

About 250 people attended the opening of the new "Center for Research and Scientific Education (CRFS)" in Dano, the province of Ioba in Burkina Faso, in December 2004. Among the visitors was the German Ambassador to Burkina Faso, Mr. Schweinitz. Opening speeches and welcome addresses at the inauguration ceremony were held by, among others, the Minister of Education and Scientific Research of Burkina Faso, Mr.



Inauguration of Dano Station in Burkina Faso, December 2004.

Laya Sawadogo, Mr. Gisbert Dreyer, Director and Founder of the Dreyer Foundation in Germany, as well as by Paul Vlek of ZEF. The Dreyer Foundation is the new Center's main source of funding.

Cooperation between ZEF and the Burkinabé Institute for Environment and Agricultural Research (INERA) has herewith entered a new phase of intensive collaboration and exchange in the field of scientific activities and personnel. The Center offers excellent accommodation, technical equipment and modern working facilities for up to 20 researchers. It has been an essential home for researchers from the GLOWA Volta project and the BIOTA West Africa network, who have already been conducting their field work in this area for some years. Both projects are being funded by the German Federal Ministry of Education and Research (BMBF).

The German TV channel "3sat" broadcast a feature on the GLOWA Volta project in Burkina Faso and an interview with Paul Vlek on the project on the occasion of World Water Day 2005 (March 22).

International Conference on "Integrated Assessment of Water Resources and Global Change: A North-South Analysis"

About 130 experts from all over the world met in Bonn from February 23-25 2005 to discuss issues of water resources and global change from a North-South perspective. The Global Water System Project (GWSP) and the GLOWA-Volta project, both ZEF-based, played key organizational roles.

The Conference was supported by UNESCO, BMBF, by INWENT (Capacity Building International) and by the government of the Land of North Rhine-

Westphalia. The Conference and especially the GLOWA Volta project got good press coverage, among others by the "Deutsche Welle" and the "Deutschlandfunk".

Successful media coverage on the project on Wild Coffee in Ethiopia at the BioTeam Conference

ZEF successfully presented the results of its research on the "Conservation and use of the wild populations of Coffea Arabica in the montane rainforests in Ethiopia" at a Press Conference held on the occasion of the BioTeam Status Conference in Bonn on March 14 2005. Representatives of the local print and national radio and electronic media showed considerable interest in the issue of wild coffee, biodiversity and their economic value.

A hundred years of German Ethiopian diplomatic relations

The celebration of 100 years of German-Ethiopian diplomatic relations in Bonn on July 15, which was organized in cooperation with Bonn University's Faculty of Agriculture, attracted lots of public attention. This was also due to the presence of Karlheinz Böhm, the Ethiopian Prince Asfa Wossen-Asserate, and the Ethiopian Ambassador in Germany, Mr. Hiruy Amanuel. The regional TV channel "WDR" as well as the local print media reported on the event.

Selection of Events 2004/2005

September 2004	Expert workshop on Media Development Cooperation with the Deutsche Welle Academy and the Friedrich Ebert Foundation
October 11 2004	Panel Discussion on the elections in Afghanistan
October 23 2004	UN Day in Bonn on "Responsible Consumption". ZEF stand on the Wild Coffee project in Ethiopia
November-December 2004	Silk Road Lectures Series on Development, Security, and State Formation in the Heart of Asia
December 2-3 2004	Annual Meeting of DesertNet in Bonn
December 2004-March 2005	ZEF Public Lectures Series on Diversity
December 7 2004	Information Visit by East African University Directors
December 13 2004	Inauguration of the new Dano Research Station in Burkina Faso (GLOWA Volta project)
February 23-25 2005	International Conference on the "Integrated Assessment of Water Resources and Global Change" in Bonn

Various

Development and Cooperation (D+C). August 2004. Anja Schoeller-Schletter "preliminary results on the development of constitutional control in Latin America".

Development and Cooperation (D+C). January 2005. Alma van der Veen "Desertification: Caused by ill-conceived political decisions".

Deutschlandfunk (national radio). January 10, 2005. Interview with Hans-Dieter Evers on the effects of the Tsunami.

RTL-TV. Nachtjournal (national TV channel). January 10, 2005. Interview with Hans-Dieter Evers on the effects of the Tsunami.

Der Spiegel (national weekly magazine). No. 3. January 17, 2005. Hans-Dieter Evers quoted in an article on "Flutkatastrophe: Joschka hat zugepackt".

Development and Cooperation (D+C). April 2005. Gabi Waibel. "Protecting women and children".

forsch (magazine of Bonn University). April 2005. 3 articles about ZEF: "Forschung am Amu Darya Fluß" (p. 11) "Akademische Hilfe nach dem Sturm" (p. 31) "Ausgezeichnet" (on Adama Konseiga, p. 43).

ARD (national TV channel). Morgenmagazin. June 30 2005. Interview with Klaus Froberg on the pros and cons concerning EU agricultural subsidies.

Sat1 (national TV channel). Spiegel-TV. August 1 2005. "Heuschrecken - die Zähne des Windes".

- March 14-15 2005 BMBF BioTeam Status Conference (presentation of the project on Wild Coffee in Ethiopia)
- March 18-19 2005 International conference on "The Role of Labeling in the Governance of Global Trade" at ZEF
- April 20 2005 DFG Round Table Talks on Water, Politics, and Development at ZEF
- May 18-19 2005 BMBF GLOWA Status Conference in Cologne (presentation of GLOWA Volta)
- June 15-18 2005 Workshop on "Payments for Environmental Services (PES) - Methods and design in developing and developed countries" in Titisee, Germany
- June 27 2005 Secretary General of the Association of African Universities (AAU), Prof. Akilagpa Sawyer, visits ZEF
- July 7 2005 High-ranking delegation of the Thai Government visits ZEF for a briefing on Knowledge Management



Karl-Heinz Böhm and Ethiopian guests celebrating with ZEF 100 years of German-Ethiopian diplomatic relations in Bonn in July 2005.



Chapter 5. Academic Output

Selected Publications 2004/2005

Books of ZEF Staff and Fellows

Evers, H.-D. and R. Korff (2004): Southeast Asian Urbanism: The Meaning and Power of Social Space. Hamburg: LIT; New York: St. Martin's Press; Singapore: ISEAS, 2nd edition.

Gatzweiler, F.W. (2004): The Changing Nature of Economic Value. Indigenous Forest Garden Values in Kalimantan, Indonesia. Aachen: Shaker.

Menkhoff, T., Evers, H.-D. and Y.W. Chay (eds.) (2005): Governing and Managing Knowledge in Asia. Singapore, London, New Jersey: World Scientific.

Stein, A.J., Meenakshi, J.V., Qaim, M. et al. (2005): Analysing Health Benefits of Biofortified Staple Crops by Means of the Disability-Adjusted Life Years Approach - A Handbook Focusing on Iron, Zinc and Vitamin A. Technical Monograph 4, Washington, DC: HarvestPlus.

Wimmer, A., Goldstone, R., Horowitz, D., Joras, U. and C. Schetter (eds.) (2004): Facing Ethnic Conflicts, Towards a New Realism. Lanham: Rowman and Littlefield.

Reviewed Articles of ZEF Staff and Fellows

Abdeldayem, S., Hoevenaars, J., Mollinga, P.P., Scheumann, W., Slootweg, R. and F.v. Steenbergen (2005): Agricultural Drainage: Towards an integrated approach. *Irrigation and Drainage Systems* 19: 71-87.

Balint, B. (2005): Market Channels and Commercial Orientation in Romania, in: Brosig, S. and H. Hockmann (eds.): How Effective is the Invisible Hand? Agricultural and Food Markets in Central and Eastern Europe 31, IAMO: Halle (Saale): 249-268.

Balint, B. (2004): Institutional Factors Influencing Agricultural Sales of the Individual Farmers in Romania, in: Petrick, M. and P. Weingarten (eds.): The

Role of Agriculture in Central and Eastern European Rural Development: Engine of Change or Social Buffer?. *Studies on the Agricultural and Food Sector in Central and Eastern Europe* 25, IAMO: Halle (Saale): 238-257.

Basu, A.K., Chau, N.H. and U. Grote (2004): On Export Rivalry and the Greening of Agriculture: The Role of Eco-labels. *Agricultural Economics* 31 (2-3): 135-147.

Begdullayeva, T.K., Oryol, M.M. and J.P.A. Lamers (2004): Salts Accumulation in Plant Parts of Sorghum technicum by Vegetation Phases. *Vestnik (Scientific Journal of Karakalpakstan Branch of Uzbek Academy of Sciences)*, Nukus: 22-24.

Braimoh, A.K., Stein, A. and P.L.G. Vlek (2005): Identification and Mapping of Associations among Soil Variables. *Soil Science* 170 (2): 137-148.

Braimoh, A.K. and P.L.G. Vlek (2004): Land-Cover Change Analyses in the Volta Basin of Ghana. *Earth Interactions* 8 (21): 1-17.

Braimoh, A.K., Vlek, P.L.G. and A. Stein (2004): Land Evaluation for Maize Based on Fuzzy Set and Interpolation. *Environment-Management* 33: 226-238.

Brunner, A.C., Park, S.J., Ruecker, G.R., Dikau, R. and P.L.G. Vlek (2004): Catenary Soil Development Influencing Erosion Susceptibility along a Hillslope in Uganda. *CATENA* 58: 1-22.

Codjoe, S.N.A., Ehlers, E. and P.L.G. Vlek (2005): Effects of Change in Population, Household Conditions and Farming Practices on Agricultural Land Use in the Volta River Basin of Ghana. *Erdkunde* 59: 126-135.

De Macale, M.A.R. and P.L.G. Vlek (2004): The Role of Azolla Cover in Improving the Nitrogen Use Efficiency of Lowland Rice. *Plant Soil* 263: 307-317.

- Denich, M., Vielhauer, K., A. Kato, M.S. de, Block, A., Kato, Q.R., de Abreu SÃ, T.D., Lücke, W. and P.L.G. Vlek (2004): Mechanized Land Preparation in Forest-Based Fallow Systems: The experience from Eastern Amazonia. *Agroforestry Systems* 61: 91-106.
- Egamberdiyev, R., Jumayeva, D. and G. Yakubov (2004): Resources and Environment in Khorezm Oasis. *Vestnik (Scientific Journal of Karakalpakstan Branch of Uzbek Academy of Sciences)*, Nukus.
- Egamberdiyev, R., Yakubov, G. and D. Jumayeva (2004): Life Style of Decorative Trees Grown in Khorezm. *Vestnik, (Scientific Journal of Karakalpakstan Branch of Uzbek Academy of Sciences)*, Nukus.
- Engel, S. (2005): Endogenitäten im partizipativen Ressourcenmanagement: Politökonomische Aspekte des Bewässerungsmanagements in Ghana. *Schriften des Vereins für Socialpolitik* 303, Zur Bewertung der Entwicklungszusammenarbeit. Duncker und Humblot GmbH, Berlin: 99-126.
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- Evers, H.-D. (2004): Knowledge Society and the Knowledge Gap, in: A. R. Embong (ed.): *Globalisation, Culture and Inequalities*, Bangi, Penerbit Universiti Kebangsaan Malaysia: 301-316.
- Evers, H.-D. (2004): The Global Context of Development Anthropology: Social and Cultural Dimensions of Market Expansion, in: Kikuchi, Y. (ed.): *Development Anthropology-Beyond Economics*. Quezon City: New Day Publishers: 204-218.
- Evers, H.-D. (2004): The Path Towards a Malaysian Knowledge Society", in: Shah, M.H. and K. L. Phua (eds.): *Public Policy, Culture and the Impact of Globalisation in Malaysia*. Kuala Lumpur: Malaysian Social Science Association: 21-39.
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- Fosu, M., Kühne, R.F. and P.L.G. Vlek (2004): Improving Maize Yield in the Guinea Savannah Zone of Ghana with Leguminous Cover Crops and PK Fertilization. *Journal of Agronomy* 3 (2): 115-121.
- Frohberg, K., Tillack, P. and U. Fiege (2004): Recent Developments and Current Situation with Regard to Property Rights on Land and Land Markets. *Quarterly Journal of International Agriculture* 43 (4) - Special issue on Land issues in Central Europe and the Commonwealth of Independent States: 337-360.
- Frohberg, K. and E. Winter (2004): Impacts of Croatia's Bi- and Multilateral Trade Agreements: Experiments with trade model specifications, in: Dabbert, S., Grosskopf, W., Heidhues, F. and J. Zeddies (eds.): *Perspektiven in der Landnutzung - Regionen, Landschaften, Betriebe - Entscheidungsträger und Instrumente*, *Schriften der Gesellschaft für*

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- Ibrakhimov, M., Mirhodjiev, M., Shirokova, Yu. and J.P.A. Lamers (2005): Modern Technologies-GIS. *Agriculture of Uzbekistan* 3: 30-31.
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Münster/Hamburg/London

Bhuiyan, S.H. (2005): Benefits of Social Capital. *Urban Solid Waste Management in Bangladesh*.

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No. 49 Gyasi, K.O. (2005): Determinants of Success of Collective Action on Local Commons.

No. 48 Daude, S. (2005): Agricultural Trade Liberalization in the WTO and its Poverty Implications.

No. 47 Ferenji, B.T. (2005): The Impact of Policy Reform and Institutional Transformation on Agricultural Performance.

No. 46 Konseiga, A. (2005): Regional Integration

Beyond the Traditional Trade Benefits: Labor Mobility Contribution.

Ecology and Development Series at Cuvillier Verlag,
Göttingen

No. 28 Syadhrinudin (2005): The Potential of Oil Palm and Forest Plantations for Carbon Sequestration on Degraded Land in Indonesia.

No. 27 Anhar, A. (2005): The Role of Biological Nitrogen Fixation in the Cacao Agroforestry System in Central Sulawesi Indonesia.

No. 26 Argaw, M.D. (2005): Forest Conversion-Soil Degradation-Farmers' Perception Nexus: Implications for Sustainable Land Use in the Southwest of Ethiopia.

No. 25 Bagamsah, T.T. (2005): The Impact of Bushfire on Carbon and Nutrient Stocks as well as Albedo in the Savanna of Northern Ghana.

No. 24 Rucker, G. (2005): Spatial Variability of Soils on National and Hillslope Scale in Uganda.

No. 23 Ibrakhimov, M. (2005): Spatial and Temporal Dynamics of Groundwater Table and Salinity in Khorezm (Aral Sea Basin), Uzbekistan.

ZEF Discussion Papers on Development Policy

No. 86:

Qiuxia Zhu: The Impact of Rural Enterprises on Household Savings in China, Bonn, May 2004.

No. 87:

Abay Asfaw, Klaus Froberg, K.S. James and Johannes Jütting: Modeling the Impact of Fiscal Decentralization on Health Outcomes: Empirical Evidence from India, Bonn, June 2004.

No. 88:

Maja B. Micevska, Arnab K. Hazra: The Problem of Court Congestion: Evidence from Indian Lower Courts, Bonn, July 2004.



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Donald Cox, Oded Stark: On the Demand for Grandchildren: Tied Transfers and the Demonstration Effect, Bonn, September 2004.

No. 90:

Stefanie Engel, Ramón López: Exploiting Common Resources with Capital-Intensive Technologies: The Role of External Forces, Bonn, November 2004.

No. 91:

Hartmut Ihne: Heuristic Considerations on the Typology of Groups and Minorities, Bonn, December 2004.

No. 92:

Johannes Sauer, Klaus Froberg and Heinrich Hockmann: Black-Box Frontiers and Implications for Development Policy - Theoretical Considerations, Bonn, December 2004.

No. 93:

Hoa Nguyen, Ulrike Grote: Agricultural Policies in Vietnam: Producer Support Estimates, 1986-2002, Bonn, December 2004.

No. 94:

Oded Stark, You Qiang Wang: Towards a Theory of Self-Segregation as a Response to Relative Deprivation: Steady-State Outcomes and Social Welfare, Bonn, December 2004.

No. 95:

Oded Stark: Status Aspirations, Wealth Inequality, and Economic Growth, Bonn, February 2005.

No. 96:

John K. Mduma, Peter Wobst: Village Level Labor Market Development in Tanzania: Evidence from Spatial Econometrics, Bonn, January 2005.

No. 97:

Ramón López, Edward B. Barbier: Debt and Growth, Bonn, March 2005.

No. 98:

Hardwick Tchale, Johannes Sauer, Peter Wobst: Impact of Alternative Soil Fertility Management Options on Maize Productivity in Malawi's Smallholder Farming System, Bonn, August 2005.

Working Papers

ZEF Working Paper Series

No. 1:

Evers, Hans-Dieter and Solvay Gerke: Closing the Digital Divide: Southeast Asia's Path: Towards a Knowledge Society, Bonn, 2005.

No. 2:

Bhuiyan, Shahjahan and Hans-Dieter Evers: Social Capital and Sustainable Development: Theories and Concepts, Bonn, 2005.

No. 3:

Schetter, Conrad: Ethnicity and the Political Reconstruction of Afghanistan, Bonn, 2005.

No. 4:

Kassahun, Samson: Social Capital and Community Efficacy: In Poor Localities of Addis Ababa Ethiopia, Bonn, 2005.

No. 5:

Fuest, Veronika: Policies, Practices and Outcomes of Demand oriented Community Water Supply in Ghana: The National Community Water and Sanitation Programme 1994-2004, Bonn, 2005.

No. 6:

Fuest, Veronika: Partnerschaft, Patronage oder Paternalismus? Eine empirische Analyse der Praxis universitärer Forschungskooperation mit Entwicklungsländern, Bonn, 2005.

No. 7:

Menkhoff, Thomas and Hans-Dieter Evers: Strategic Groups in a Knowledge Society: Knowledge Elites as Drivers of Biotechnology Development in Singapore, Bonn, 2005.

No. 8:
Evers, Hans-Dieter: Wissen ist Macht: Experten als Strategische Gruppe, Bonn, 2005.

No. 9:
Mollinga, Peter P.: The Water Resources Policy Process in India: Centralisation, Polarisation and New Demands on Governance, Bonn, 2005.

No. 10:
Laube, Wolfram: Promise and Perils of Water Reform: Perspectives from Northern Ghana, Bonn, 2005.

No. 11:
Mollinga, Peter P.: Sleeping with the Enemy: Dichotomies and Polarisation in Indian Policy Debates on the Environmental and Social Effects of Irrigation, Bonn, 2004.

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Terlinden, U. (2004): African Regional Parliaments - Engines of Integration and Democratisation? Background Paper on International Development Cooperation, Africa Desk of the Friedrich-Ebert-Foundation, Bonn.

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List of PhD Theses in 2005 (until August 2005)

Abebaw Ejigie, Degnet (Ethiopia):
The Politics of the Indonesian Rainforest: A Rise of Forest Conflicts in East Kalimantan during Indonesia's Early Stage Democratisation.
University of Bonn, financed by DAAD.

Akramkhanov, Akmal (Uzbekistan):
The Spatial Distribution of Soil Salinity: Detection and Prediction.
University of Bonn, financed by BMBF.

Algieri, Bernardina (Italy):
Impact of the Dutch Disease on the Russian Economy: An Econometric Investigation.
University of Neapel, financed by a scholarship from the University of Neapel, and by ZEF.

Anhar, Ashabul (Indonesia):
The Role of Biological Nitrogen Fixation in the Cacao Agroforestry System in Central Sulawesi Indonesia.
University of Bonn, financed by GTZ, DAAD.

Aviles, Dennis Lucy (Bolivia):
Popular Participation, Decentralisation and Local Power in Bolivia.
University of Bonn, financed by GTZ, DAAD.

Bagamsah, Thomas T. (Ghana):
The impact of Bushfire on Carbon and Nutrient Stocks as well as Albedo in the Savanna of Northern Ghana.
University of Bonn, financed by GTZ, DAAD.

Carambas, Cristina (Philippines):
Economic Analysis of Eco-Labeling in the Agricultural Sector of Thailand and the Philippines.
University of Bonn, financed by GTZ, DAAD.

Denboba, Mercuria Argaw (Ethiopia):
Forest Conversion-Soil Degradation-Farmers' Perception Nexus: Implications for Sustainable Land



Use in the Southwest of Ethiopia.
University of Bonn, financed by GTZ, DAAD.

Desta, Lulseged Tamane (Ethiopia):
Reservoir Siltation in Ethiopia: Causes, Sources Areas
and Management Options.
University of Bonn, financed by DAAD.

Gyasi, Kadir Osman (Ghana):
Determinants of Success of Collective Action on Local
Commons: An Empirical Analysis of Community-based
Irrigation Management in Northern Ghana.
University of Bonn, financed by Robert Bosch Stiftung.

Mfundisi, Kelebogile B. (Botswana):
Analysis of Carbon Pools and Human Impacts in the
Yala Swamp (Western Kenya): A Landscape Approach.
University of Bonn, financed by GTZ, DAAD.

Rai, Kavita (Nepal):
Dam Development: The Dynamics of Social Inequality
in a hydropower project in Nepal. University of Bonn,
financed by GTZ, DAAD.

Saxena, Shilpi (The Netherlands):
Sustainable Development in Darjeeling Hills, India:
Ecological and Socio-Economic Sustainability for
Small-Scale Farmers with Supportive Observations
from Kanagawa, Japan.
University of Mainz, financed by DAAD.

Syahrinudin (Indonesia):
Oil Palm and Forest Plantation for Green House Gases
Mitigation.
University of Bonn, financed by GTZ, DAAD.

Tchale, Hardwick (Malawi):
Agricultural Policy, Soil Fertility Management and
Productivity in the Maize-based Smallholder Farming
System in Malawi.
University of Bonn, financed by DAAD.

Tipraqsa, Prasnee (Thailand):
Opportunities and Constraints of Integrated Farming
System in Northeast Thailand.

A Case Study of the Huai Nong lan Catchment, Khon
Kaen Province.
University of Heidelberg, financed by DAAD.

Tsegai, Daniel (Eritrea):
The Economics of Migration in the Volta basin of
Ghana: Household and District-Level Analysis.
University of Bonn, financed by BMBF (GLOWA), GTZ.

Yilma Dessalegn, Tsegaye (Ethiopia):
Modeling Farm Household Land and Water Use
Decisions in the White Volta Basin of Ghana: Agent
Based Bio-economic Model Approach.
University of Bonn, financed by BMBF (GLOWA).

Selection of Workshops and Conferences

June 1-4 2004:

ZEF organized a "Higher Education Forum" in the con-
text of the "International Conference for Renewable
Energies" held at the Gustav Stresemann Institut (GSI) in
Bonn. The theme of the Higher Education Forum was
"Capacity Building in Developing Countries: Bringing
Renewable Energies to the People". The event was co-
organized by the DAAD and ZEF, with the support of
the Universities of Flensburg, Oldenburg and Göttingen.
Around 120 former students from Flensburg, Oldenburg
and Göttingen, coming from 38 different countries -
most of them from developing countries - presented
their work. Additionally, representatives from the fields
of science, industry, and development cooperation pro-
vided information about latest developments in the
field of renewable energies.

Noha El-Mikawy participated in the preparatory mee-
ting for the setting-up of the "Forum for the Future",
initiated by the G-8 governments for the greater
Middle East, and met with G-8 government officials
and the media in New York in September 23-24 2004.
ZEF (Hartmut Ihne) co-organized a workshop on
"Media and Development" with the Center for
European Integration (ZEI) and the Friedrich Ebert
Foundation in Bonn on October 7 2004.

October 27-29 2004:

The ZEF Uzbekistan Project organized an internal Unified Modeling Language (UML) Seminar.

November 6-7 2004:

Tommaso Trevisani was the co-organizer of the Central Asian Research Network annual meeting, held in Rome at the Dipartimento di Studi Storici, Geografici e Antropologici, Università Roma III.

Maria Kern, Christopher Martius and Paul Vlek attended the ASA-CSSA-SSSA International Annual Meeting and gave presentations. The meeting took place in Seattle, USA, in November 2004.

Ulf Terlinden gave a presentation on "Governance and State Failure" at a GTZ conference on "Options of Technical Assistance in Eroding States" held in Eschborn in November 2004.

December 2-4 2004:

The International Conference of the DesertNet, "Desertifikationsforschung und Entwicklung in Deutschland - Soll und Haben", took place at the Gustav Stresemann Institut in Bonn and was organized by the DesertNet, an organization of German research institutions working on topics related to desert and desertification. Mariam Akhtar-Schuster (University of Hamburg) and Christopher Martius (ZEF) were in charge on behalf of the DesertNet Board.

January 11 2005:

The members of the Uzbekistan project participated in a videoconference on "Water and Soil saving Technologies and their Suitability for Smallholder, Private Farmers of Khorezm within the Aral Sea Basin". This conference was organized by the State University of Urgench (UrSU), Khorezm, in collaboration with the ZEF/UNESCO project in Urgench and was attended by the following institutions: Soil Science Institute of Uzbekistan, Uzbek Cotton Research Institute, TIAMEE University Tashkent, UrSU, ZEF Bonn, and Wageningen University and Research Center, The Netherlands.

Hans-Dieter Evers gave a presentation on "Knowledge and Development - Strategies for the construction of a

knowledge society" at a roundtable of experts for the GTZ in Eschborn, Germany, in February 2005.

February 14-16 2005:

Initiated by the CoCE project, the Ethiopian Coffee Forest Forum (ECFF) met in Addis Ababa for a workshop on "Development of Coffee Forest Conservation Strategies". Multiple stakeholders defined a common vision and discussed different views on conservation strategies for Ethiopian wild coffee. By means of a computerized system-tool for the description of complex systems, the participants defined potential strategies for conservation and use. The participants of the ECFF agreed that this approach was useful and innovative and was going to be used in conservation planning as a policy decision support tool.

February 23-25 2005:

Around 130 international experts from over 30 countries, representing academic institutes and NGOs, exchanged results and views on water research during the international conference on "Integrated Assessment of Water Resources and Global Change: a North South Analysis" in Bonn. The German Federal Ministry of Education and Research (BMBF) financed the conference, which was jointly organized by the Center for Development Research (ZEF), the Global Water System Project (GWSP) and the UNESCO-IHP-HELP (Hydrology for Environment, Life and Policy) Program.

March 14-16 2005:

Manfred Denich, Franz Gatzweiler, Peter Mollinga, Paul Vlek, and several doctoral students and researchers participated in the "Statusseminar" of the BioTeam Research Program of the German Federal Ministry of Education and Research (BMBF) in Bonn, (re) presenting the Coffea Arabica project in Ethiopia. Manfred Denich and Paul Vlek also spoke at the Press Conference highlighting the Coffee project.

March 15-16 2005:

ZEF (Manfred Denich) co-organized with InWEnt a workshop on "Biodiversity Conservation and Use - The Implementation of Sustainable Management Concepts" at the Wissenschaftszentrum in Bonn.



March 18-19 2005:

A conference on "The Role of Labeling in the Governance of Global Trade: The Developing Economy Perspective" was organized by Ulrike Grote (ZEF) in cooperation with Arnab Basu (College of William and Mary) and Nancy Chau (Cornell University) at ZEF.

Jörg Szarzynski presented a paper on "Networking in West Africa: The Volta Basin Biophysical Observation Network (BON)" at the VALERI (Validation of Land European Remote Sensing Instruments) workshop in Avignon, France, in March 2005.

Peter Wobst, together with John Mduma, Holger Seebens, Hardwick Tchale, and Borbala Balint organized three PASAD workshops. The main objective of the final workshops was to engage stakeholders, especially policy makers and academics, to discuss the research results and their relevance to contemporary national policy issues. As such, the feedback obtained from the workshops guided the review process, so that the final research output reflects the current economic and political environment in the respective countries as much as possible. The workshops took place on April 25, 2005 at the Department of Economics, University of Dar es Salaam, Tanzania, on April 28, 2005 at the Faculty of Development Studies, Bunda College of Agriculture, University of Malawi in Lilongwe, Malawi and on June 20, 2005 at the Rural Economy and Sociology Department, Institute of Agricultural Economics, University of Bucharest in Dambovicioara, Romania.

April 20-22 2005:

"Water, Politics and Development" was the theme of a one-day seminar at ZEF on April 20, preceding the "DFG Rundgespräch" on the same issue on April 21-22 at ZEF. Both events were organized and facilitated by Peter Mollinga (ZEF).

May 18-19 2005:

GLOWA Status Seminar: The GLOWA Volta Team participated successfully in the second Status Conference in Cologne. On the basis of these presentations, the project was invited to submit its research proposal for the third research phase.

Paul Vlek and Christopher Martius participated in the International Conference "Land and Water Use in Khorezm, Uzbekistan", organized by the State University of Urgench, Uzbekistan, in June 2005 and gave presentations on "The UN Millennium Development Goals and Their Relevance for Development" (Paul Vlek) and "Modeling and Decision Support" (Christopher Martius).

June 15-18 2005:

ZEF organized an expert workshop on "Payments for Environmental Services (PES) - Methods and Design in Developing and Developed Countries" in Titisee, Germany. The workshop was organized by the research group "Alternative Institutions for Natural Resource Management in Developing Countries", in cooperation with the Center for International Forestry Research (CIFOR), and was co-financed by IIED and Forest Trends.

June 20-21 2005:

Peter Mollinga gave the keynote speech at the conference "Irrigation Management: Policies and Practices" in Bhubaneswar, Orissa, India, "Towards Domestically Generated Irrigation Reform: Canal and Tank Irrigation in South India", organized by the European Commission-sponsored project "Minor Irrigation in Orissa".

August 15-26 2005:

ZEF's Department of Economic and Technological Change organized in collaboration with the Eastern Africa Regional Office of the World Conservation Union (IUCN), a two-week training on "Economic Valuation and Environmental Assessment". The course was funded by BMBF via the Biota-East Africa project and attended by 28 Kenyan mid-level and senior staff of conservation state agencies, NGO's, CBO's, and private companies.

August 24-27 2005:

Klaus Froberg participated in the EAAE Congress on "The Future of Rural Europe in the Global Agri-Food System" in Copenhagen, Denmark, as Chair of the Programme Committee.

Habilitations

Engel, Stefanie (2004): Designing Institutions for Sustainable Resource Management and Environmental Protection. Habilitationsschrift, Bonn.

Academic Awards / Careers

Nick van de Giesen, former Senior Researcher, was appointed Professor at the University of Delft, the Netherlands, as of July 2004.

Tobias Debiel, former Interim Director at ZEF, was appointed Executive Director of the Institute for Development and Peace (INEF) in Duisburg as of August 2004.

Paul Vlek, Director at ZEF, was made Fellow of the American Society of Agronomy at the ASA-CSSA-SSSA Annual Meeting in Seattle, USA, in November 2004.

Asay Asfaw, former Junior and Senior Researcher, joined IFPRI in Washington DC as a post-doctoral fellow in November 2004.

Khalid Khalafalla, former Junior and Senior Researcher, was appointed Professor with tenure and Dean at the University of Khartoum, Sudan, as of December 2004.

Veronika Fuest, former Senior Researcher, was appointed Senior Researcher at the Max Planck Institute in Halle, Germany, as of December 2004.

Noha El-Mikawy, former Senior Researcher, assumed a position as a Governance Policy Advisor for the UNDP in Beirut, Libanon, as of March 2005.

Stefanie Engel, Senior Researcher, was offered a position ('Ruf') as Professor of International Forest Economics, University of Göttingen, in March 2005.

Solvay Gerke, former Director of the Institute of Oriental Languages and Cultures of the University of Bonn was appointed Director of the Department of Political and Cultural Change as of April 1 2005. She

succeeded Hans-Dieter Evers, who will remain at ZEF as a Senior Fellow.

Thomas Berger, former Senior Researcher, obtained the Josef G. Knoll Visiting Professorship for Development Research at the University of Hohenheim in spring 2005.

Shahjahan Bhuiyan, former Junior Researcher, was appointed Associate Professor at the Islamic University in Bangladesh in spring 2005.

Paul Vlek, Director at ZEF, was awarded the distinction of Honorable Professor of Urgench State University in Uzbekistan in June 2005.

Networking and Facilities

European Development Research Network (EUDN)

The primary role of the European Development Research Network EUDN, with its secretariat located at ZEF, is to promote cooperation between researchers from Europe and developing countries. The major activity of EUDN included the organization of the second annual EUDN conference in cooperation with the French development agency AfD Paris in November 2004.

Details can be found at www.eudnet.net.

ZEF's video conference facilities have been used increasingly by development institutions in the Cologne-Bonn-Aachen region. For example, the Capacity Building International Group of InWent in Cologne used ZEF's facilities for a videoconference on the promotion of small and medium enterprises (SME) in West China, connecting 22 locations in China with more than one thousand mayors, county executives, and SME representatives.

Appendix: Budget / Funding Partners

Indirect Support (Scholarships)		in Euro	
Deutscher Akademischer Austauschdienst (DAAD)/ Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung (BMZ)/ Auswärtiges Amt (AA)		663.675,00	75,3%
Own funds		46.800,00	5,3%
Scholarships from Lybia		31.200,00	3,5%
United Nations University/Institute for Environment and Human Security (UNU-EHS)		22.675,00	2,6%
Deutsche Forschungsgemeinschaft (DFG)		19.500,00	2,2%
Centre d'Etudes et de Recherches sur le Développement International (CERDI), France		15.600,00	1,8%
Higher Education Commission/Deutscher Akademischer Austauschdienst (HEC/DAAD)		13.375,00	1,5%
SAP (Software Provider)		13.000,00	1,5%
Friedrich-Ebert-Stiftung (FES)		12.675,00	1,4%
Konrad-Adenauer-Stiftung eV (KAS)		12.675,00	1,4%
International Maize and Wheat Improvement Center (CIMMYT)-ZEF-Hohenheim		12.200,00	1,4%
Scholarship from Italy		11.700,00	1,3%
Evangelischer Entwicklungsdienst (EED)		6.100,00	0,7%
Total		881.175,00	100%
External Funds			
Bundesministerium für Bildung und Forschung (BMBF)/ Deutsches Zentrum für Luft- und Raumfahrt (DLR)	<i>Largest Projects:</i>	3.617.876,57	59,0%
BMBF/Forschungszentrum Juelich	Biota East		
	Biota West		
	Coffee in Ethiopia		
	Glowa Volta		
	Integrated Water Resource Management		
	International Project Office/Global Water System Project		
	Uzbekistan		
	Water Resources and Global Change Conference		
BMZ/ Gesellschaft für Technische Zusammenarbeit (GTZ)	<i>Largest Projects:</i>	709.967,78	11,6%
	Development Research and Teaching		
	Doctoral Program		
	Economic Consultation in Arabic Countries		
Robert Bosch Stiftung	<i>Largest Projects:</i>	550.734,40	9,0%
	Agriculture in Europa and Africa		
	Doctoral Scholarships		
	Natural Resource Management		
Forschungszentrum Karlsruhe	<i>Single Project: Virtual Institute</i>	276.447,12	4,5%
State of North-Rhine Westphalia (NRW)		170.900,00	2,8%
Deutscher Akademischer Austauschdienst (DAAD)		143.104,02	2,3%

Volkswagen Stiftung (VW)		142.049,51	2,3%
Europäische Union (EU)		75.877,32	1,2%
Kraft Foods Deutschland GmbH		64.970,00	1,1%
Syngenta - World-Leading Agribusiness		63.940,00	1,0%
Deutsche Forschungsgemeinschaft (DFG)		56.600,00	0,9%
Deutsche Stiftung Friedensforschung (DSF)		48.430,00	0,8%
International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)		42.900,00	0,7%
International Food Policy Research Institute (IFPRI)		41.600,00	0,7%
Agence française de Développement (Afd)		20.000,00	0,3%
International Plant Genetic Resources Institute (IPGRI)		19.500,00	0,3%
Internationale Weiterbildung und Entwicklung gGmbH (INWENT)		15.000,00	0,2%
International Institute for Environment and Development (IIED)		14.550,00	0,2%
Institute for Environmental Studies (IVM)		13.775,42	0,2%
United Nations Educational, Scientific and Cultural Organization (UNESCO)		9.990,00	0,2%
Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung (BMZ)		8.577,33	0,1%
International Human Dimension Program (IHDP)		7.000,00	0,1%
World Climate Research Programme (WCRP)		5.402,50	0,1%
Diversitas - International Programme of Biodiversity Science		5.181,28	0,1%
Istedod Foundation Uzbekistan		3.250,00	0,1%
International Geosphere-Biosphere Programme (IGBP)		767,85	0,0%
Total		6.128.391,10	100%
Core Funds: University of Bonn/State Funds (NRW)			
Personnel Costs		1.165.500,00	80,1%
Administrative Costs		290.000,00	19,9%
Total		1.455.500,00	100%
Indirect Support & External Funds & Core Funds		8.465.066,10	



The Society of the Friends of the Center for Development Research

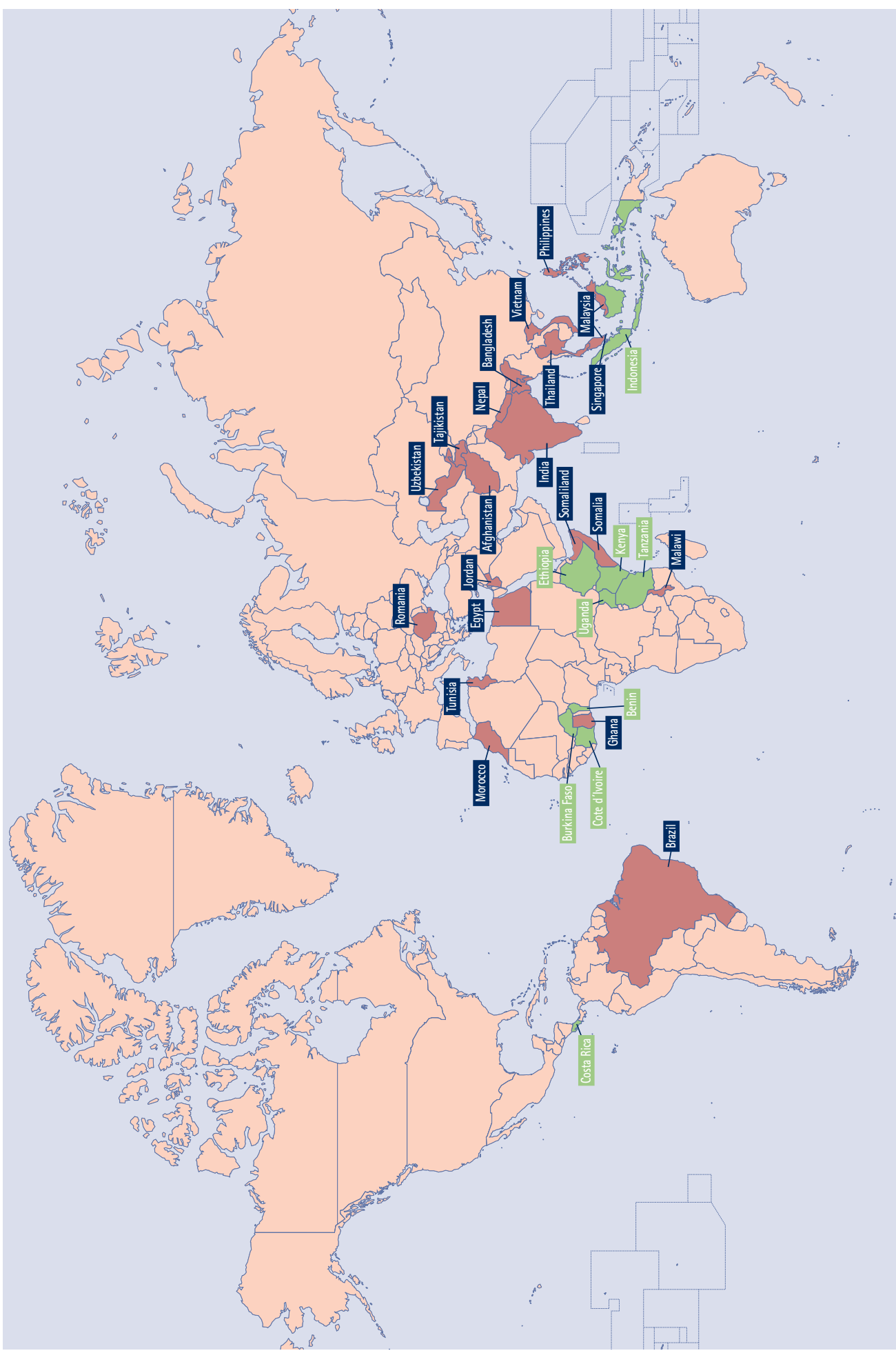
The Society of the Friends of the Center for Development Research is a network of experts founded with the overall objective to promote the exchange of academic knowledge and practical experience in development research and development policy. The Society's members are former academics, politicians, entrepreneurs, and development experts with international experience, most of them from Germany, who have committed themselves to share their knowledge and experiences with the senior staff as well as with the up-and-coming generation at ZEF.

Further Information about ZEF

Please have a look at our homepage for more and up-to-date information on our staff, students, publications, events, and research areas and activities: <http://www.zef.de>.



A global view on ZEF research projects



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