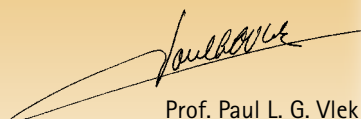




Editorial

A Culture of Change

ZEF makes it its business to study "change" with a clear focus on sustainability and growth. To what extent these goals are reconcilable in today's world remains to be seen. But, as they are both on the agendas of most development agencies, research on squaring this circle is on the top of ours. The desire to accommodate the aspirations of developing countries while pursuing the goals of full employment and growth in the West is increasingly being questioned, as reflected in flexible commitments such as those made in Rome and Johannesburg. As a centre with a strong interest in sustainable management of natural resources, we are particularly concerned that meeting everybody's goals might be at the expense of the natural resource base, and thus at the expense of coming generations. Change is a common feature at ZEF. With Prof. von Braun having been appointed Director of the International Food Policy Research Institute (IFPRI) in Washington, D.C., and Prof. Wimmer joining the Faculty of the University of California, Los Angeles (UCLA), the next generation of Directors will be joining ZEF. But ZEF was conceived and built with a culture of change embedded in its philosophy. Having a sound strategy formulated and approved by the advisory board, ZEF expects new research impulses from the new Directors in implementing the strategy. It is the new ZEF that will address the issues of reconciling development and growth, equity and sustainability. We are well aware that if we are to be successful, attitudes among country and international leaders may have to change. ZEF will continue to do research to encourage this process. In this issue, the focus is on management of soils, based on recent research in Uganda.


Prof. Paul L. G. Vlek

Institutional Market Reform and Nutrient Depletion

A Model for Soil Degradation in Uganda

Johannes Woelcke, Thomas Berger and Soojin Park

The amount of nutrients that farmers extract from their soils through unsustainable land management practices is reaching alarming levels in sub-Saharan Africa. Policy-makers and researchers have raised concerns that this process of nutrient depletion contributes to declining crop yields, with serious consequences for

Saharan Africa, and is therefore an appropriate location to explore these issues. The research project "Policies for Improved Land Management in Uganda" was initiated in April 1999 with funding from the German Federal Ministry for Economic Cooperation and Development (BMZ). Its immediate objective is to assist policy-

makers in identifying and assessing policy and institutional and technological strategies to improve land management in Uganda. An interdisciplinary team of researchers from ZEF, the International Food Policy Research Institute (IFPRI), and the Ugandan organisations National Agricultural Research Organization (NARO), Makerere University, Kampala (MUK) and the Agricultural Policy Secretariat

(APSEC) has been jointly working on this project.



Household Survey in Uganda

food security and household welfare. Nutrient depletion could be halted and reversed through the application of inorganic or organic fertilisers, but such land management practices are not very common. This raises two important questions: Why do farmers mine their soils? Why do they not invest in more sustainable practices, which could guarantee both present and future generations enough food and income?

Uganda is among the countries with the highest levels of nutrient depletion in sub-

Livelihood Strategies

During the first project phase, scientists from ZEF and IFPRI identified a wide range of livelihood strategies that farm households adopt at particular locations in Uganda. Based on statistical information on agricultural potential, market access and population density, they classified these



local livelihood strategies and searched for appropriate policy strategies that may be suited to develop each of these locations. Alternative policy strategies are, for example, provision of credit for the intensification of livestock production, plant breeding programs for the expansion of subsistence perennial food production, or public investment in the rural non-farm economy to pull farm labour out of unsustainable land management practices.

A Bio-Economic Model

A PhD project at ZEF focused on Iganga District in Eastern Uganda, and, using a mathematical model, analysed why farm households in Iganga deplete their soils and how they might respond to these different policy interventions. The model is an integrated “bio-economic model” that combines both biophysical and socio-economic data and processes. It measures the impacts of different policy interventions on the livelihood strategies of farm households and predicts how these households adjust their land management practices, which in turn affect the soil nutrient stocks. The model developed at ZEF contains an innovative crop yield estimator that calculates crop yields in response to changes in land management practices. The crop yield estimator uses Artificial Neural Networks, a computer algorithm that resembles the human brain’s learning process, to make these crop yield estimations.

With the bio-economic model, ZEF tested whether under current market conditions the adoption of ecologically sustainable farming practices is financially and

technically feasible. For several representative farm households, the model calculated different policy scenarios and searched for profitable land management practices leading to non-negative nutrient balances. The results of the scenarios revealed difficulties in achieving the goal of non-negative nutrient balances. Because of higher yields and consequent higher nutrient losses from fields due to produce and stover removal, the nutrient balances for commercial farm households are lower than those for other farm household types. In most cases, neither the adoption of new farming practices nor the provision of credit contributes to reaching the goal of ecological sustainability. The main reason for this model result is the non-profitability of most farming practices under current market conditions. Additional market studies in Eastern Uganda showed highly distorted markets for agricultural inputs and outputs, due to inefficiency in procurement, high transportation costs and the absence of competitive pressure. Since the initiation of market liberalisation in Uganda, it has been government policy to leave the import of fertilisers entirely to the private sector. The fertiliser market, however, is still in a very early stage of development. Only very drastic changes in input and output prices would induce the farm households to conserve their soil nutrient stocks while simultaneously satisfying their consumption needs.

Policy Conclusions

Several policy conclusions can be derived from this bio-economic model. First,

the model results strongly encourage the completion of market reforms in Uganda. The process of market liberalisation has removed some major distortions, but has not been sufficient to create a business environment which enables private trade, nor has it succeeded in linking small farms to high value markets. More public investment in market institutions, e.g. market information systems, and in finance and contract enforcement should be undertaken. Second, the model results emphasise that the provision of credit alone does not necessarily lead to the adoption of sustainable farming practices. Policy programs that combine the access to new technologies, credit and training/education need to be designed. One starting point for such combined policy programs could be the recent microfinance program “Entandikwa” that has been successfully implemented in Uganda.

However, one question of scientific and policy relevance could not be answered by the current model version, but will be addressed with a dynamic multi-agent model version. High negative nutrient balances will definitely reduce crop yields in the long run, but when exactly will they translate to irreversible losses of soil fertility? As an example, in the current situation, commercial farm households produce a nitrogen loss of 77 kg per hectare, i.e. the soil nitrogen content will be halved in 31 years. In an optimistic policy scenario with completed market reforms, this highly negative balance can be lowered to 14 kg N per hectare, i.e. it will take about 175 years to halve nitrogen content in the soil. In both cases, the commercial farm households deplete their natural resource stock, but without a doubt the second alternative is preferable, provided that both alternatives involve the same costs. The question still remains at which critical rate of nutrient depletion the process of soil deterioration becomes irreversible. Below this critical rate, soil nutrient stocks could be restored through fertiliser application. If the farm households operate with modest levels of nutrient extraction below this threshold, they may be able to invest returns from agricultural production in physical, human or social capital and increase yield levels in the long run. By the same token, a very high critical rate of nutrient depletion would suggest the need for direct fertiliser subsidies to prevent irreversible losses in soil fertility for future generations in Uganda.



Johannes Woelcke carried out the study; Thomas Berger and Soojin Park are research fellows at ZEF.

Protecting Coffee Diversity in Ethiopia

Manfred Denich, Detlef Virchow and Sina Bremer

Arabica coffee, which is popular worldwide, has its origin in the mountainous rain forests of Ethiopia. This is where the highest genetic diversity of *Coffea arabica* can still be found. But these wild populations are seriously threatened by an increasing deforestation of the mountainous rain forests. To conserve these genetic resources is of particular importance regarding the future of coffee breeding and coffee production in developing countries, as coffee is one of the most important sources of income for many of them.

A new project at ZEF, whose objective is to prove the diversity and the economic value of the wild coffee populations and to develop concepts for their protection and

utilisation, started in August this year with support from the German Federal Ministry of Education and Research (BMBF). Investigations on the flora, ecophysiology, phytopatology and genetics in the coffee forests are to visualise the three levels of diversity: ecosystems, species and coffee-genetic diversity. In addition, an economic valuation of the diversity and of the different forms of coffee utilisation will be carried out as an institutional analysis of the land-use conflicts.



M. Denich and D. Virchow are the managers and co-ordinators of the project; S. Bremer is research assistant at ZEF.



Green Manures or Fertilisers: The Farmer's Dilemma in Eastern Uganda

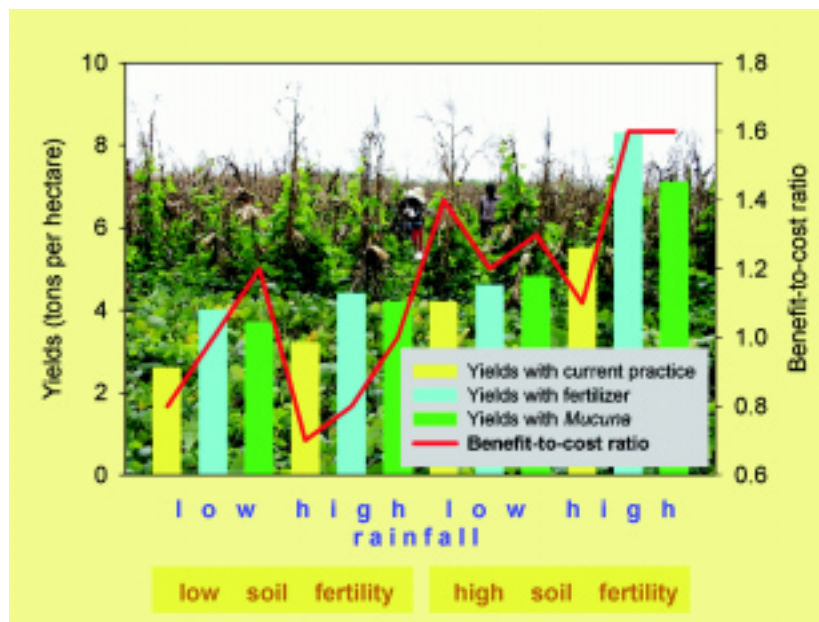
Crammer K. Kaizzi and Paul L. G. Vlek

Cereals are important food and cash crops for smallholder farmers in eastern Uganda. However, crop yields are declining, due to low soil fertility, nitrogen (N) and phosphorous (P) deficiencies, exacerbated by nutrient depletion through crop harvests, runoff and soil erosion. This has resulted in negative nutrient balances in most of the farming systems.

For annual crops, nitrogen is the most limiting nutrient. This limitation can be remedied either traditionally, with inorganic fertilisers, or by exploiting the natural process of biological nitrogen fixation (BNF). The latter can be achieved if the smallholder farmers in eastern Uganda plant green manures – plants that are able to fix atmospheric nitrogen with the help of symbiotic bacteria living in their roots. What are the options for resource-poor farmers cultivating maize and rice for obtaining a nitrogen supply for their fields? In a recent ZEF study, two possible N sources were investigated: mineral fertilisers (urea) and green manure (*Mucuna pruriens*, velvet bean). The study was made on contrasting soils in different agro-ecological zones of eastern Uganda (the Mt. Elgon highlands; the mid-altitude region around Jinja and Mbale; and the lower-altitude Lake Kyoga basin). The high- and mid-altitude zones are agricultural areas of high potential, and are characterised by more reliable rainfall. The opposite is true for the low-altitude region. Although soils are better at the higher elevations, fields with relatively poor and

relatively rich soils were selected in each zone to test the alternative technologies, thus creating a matrix of testing conditions of poor/rich soils and high/low rainfall.

The farmers' current practice of two maize crops per year was compared with the best performing green manure and fertiliser technologies. As for green manure, mucuna was used as a relay crop with maize in alternate seasons, because part of the benefits of green-manure application is only felt in the subsequent season. Alternatively, urea was applied in the subsequent season. The yields of the three systems (two maize crops, *mucuna*, and urea) were determined over a two-season cycle, and the agronomic and economic benefits of these different systems were assessed in the matrix of the production environment (Tab. 1).



Maize Crops and Benefit-to-cost ratio

During the first season, *mucuna* produced a relatively good yield of 3 – 8 t ha⁻¹ dry matter. It is important to note that this was achieved without diminishing the standing maize crop, as long as farmers kept the *mucuna* from smothering the maize. The farmers in the lowlands did not manage to prevent this and lost around 25% in yield. As much as 80 – 200 kg N ha⁻¹ was found in the green manure, with about

half of it coming directly from the atmosphere through BNF. The N accumulated by *mucuna* is released during the rapid decomposition of the residues, and some of the N is taken up by the subsequent crop, resulting in increased yields.

The yield response of the maize in the second season to the *mucuna* in the previous season ranged from 0.8 to 1.8 t ha⁻¹ in the high-rainfall area and from 0.3 to 1.2 t ha⁻¹ in the drier zones. The response to mineral N from urea was even higher in all locations except on the good soils in the dry zone (see Figure). However, the systems should be evaluated over the two seasons. Farmers clearly stand to gain in terms of maize production from fertilisers as well as from the use of *mucuna*. Only in the better soils in the drier zones are these increases below 1 t ha⁻¹. By and large, the differences between urea use and *mucuna* intercropping are of no significance.

We then assessed the economic benefits of the three approaches, expressed as benefit to cost ratio. A benefit-to-cost ratio of 1 implies that the farmers are just recovering their costs. In economic terms, farmers working on low-fertility soils are not even getting local market returns on their labour and other costs with their current practice. The use of fertilisers only pays for itself easily on the high-fertility soils, particularly when rainfall is secure. The level of economic returns of a *mucuna* relay crop is an improvement for all farmers. None will lose money by adopting this practice. The greater benefits are derived by those farming under the most favourable conditions, but principally for those farmers working on poor soils with low rainfall only the use of *mucuna* might make small gains possible.

Clearly, if fertilisers are to find greater adoption in Eastern Uganda with the current input and produce prices, their marketing should first target the better-off farmers. Such investments will not easily be adopted by those farmers who would seem to need them most. Farmers appear to be well aware of this fact.

C. Kaizzi carried out the study; Prof. Vlek is director at ZEF.

Not Enough Globalisation?

Private Investment Promotion

Indra de Soysa

The effects of globalisation on the economy and society are hotly contested subjects in academic and political arenas. Some see globalisation as detrimental to economic growth and democracy within poor countries. A research project of ZEF situates the globalisation discussion within the older academic theories based on modernisation and dependency/world systems traditions which dominated development studies in the past four decades. There is very little in terms of content that distinguishes pessimistic arguments about the structural effects of globalisation from the older theories of imperialism and dependency that viewed foreign direct investment (FDI) and trade as an exploitative mechanism of a capitalist world system.

Using hard quantitative data, the research assesses the shape and the degree to which globalisation has progressed in the past three decades. Furthermore it examines the impact of FDI and democracy on economic development and the effects of eco-

nomical internationalisation on democracy. The results suggest that the pessimists are wrong in overemphasising a contradiction between economic internationalisation and democratisation. FDI creates higher growth rates than does domestic capital. Moreover the study shows that the general consensus that democracy has no effect on economic growth rates is based on improper conceptualisation and measurement of what is valuable and harmful about democracy for growth. The study conceptualises democracy as polyarchy, whereby democracy is measured along the two dimensions of the degree of competitiveness and inclusiveness. The results show that what matters positively for growth is clearly the competitive aspects of democracy rather than other dimensions. FDI plays a supporting role for democracy, not one that helps with retarding it as pessimists claim.

The empirical results across the board allow highly optimistic scenarios about the current round of globalisation. Globalisa-

tion benefits the poorer states, although most poor states are not as globalised as the arguments of the critics pretend they are. The results suggest policy-makers should seek to encourage globalisation by ensuring open access to products from poor countries and encouraging private investment abroad. Poorer countries should concentrate on building up human and institutional capital to welcome such investment, not deter it, as has been the case in the past. If there is substance to the idea of globalisation, it is simply that the world has shrunk through technological change that allows instant communication and rapid transportation, which no longer allows a comfortably rich North to ignore the plight of the majority of citizens of the world, most of whom are too poor to argue the merits and demerits of globalisation.

The results of the project will be published in Indra de Soysa: *Foreign Direct Investment, Democracy & Development: Assessing Contours, Correlates and Concomitants of Globalization* London: Routledge 2003.



Dr. Indra de Soysa is research fellow at ZEF and conducts research on globalisation, conflict and resources.

Doctoral Studies Program

Class of 1999 Graduates

The first class of doctoral students to enrol in ZEF have earned their doctoral degrees. Two of them, Abay Asfaw and Rolf Sommer, have won the prestigious "Josef G. Knoll-Wissenschaftspreis 2002" for their doctoral thesis (see article, p. 5).

ZEF's graduates are: Asfaw Abay (Ethiopia), Shyamal Chowdhury (Bangladesh), Doris Wiesmann (Germany), Fatondji Dougbéji (Niger), Felix Ankohma Asante (Ghana), Gi-Soon Song (Korea), Phuong Thi Le (Vietnam), Daniela Lohlein (Germany), Maria Andrea de Macale (Philippines), Alexandra Schleier (Germany), Rolf Sommer (Germany), Chodechai Suwanaporn (Thailand), Wensheng Wang (China).

These students joined the program three years ago. During the initial phase of eight months, they successfully participated in a preparatory course. Then they conducted field research abroad, in de-

veloping countries or in association with an international organisation or a national institute. During the last phase of the doctoral program, they returned to ZEF to write their theses, which were then evaluated by supervisors. Finally, the students publicly defended their theses in their respective faculties. The German Academic Exchange Service (DAAD), the German Federal Ministry for Economic Cooperation and Development (BMZ), Deutsche Gesellschaft für Technische Zusammenarbeit (German Technical Co-operation - GTZ) and other donors have financially supported those doctoral students with stipends and grants for their field research.

New applicants for the International Doctoral Program for Development Studies should have the following profile: excellent master or diploma degree in Economics, Political Science, Agricultural and Resource Economics, Engineering, Geo-

graphy, Mathematics, Natural Science or Agriculture, and excellent proficiency in English. The applicant should be younger than 32. The application written in English must include: a letter of application, ZEF's application form, 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 deadline for applications by non-EU citizens and DAAD scholarships (available only for applicants from developing countries) is September 30th of each year. The deadline for applications by EU citizens and scholarships of the Robert Bosch Foundation is May 31st of each year.

Information is available from Günther Manske (E mail: docp.zef@uni-bonn.de) and from the ZEF homepage (<http://www.zef.de>).

New Faces at ZEF

In October 2002, ZEF saw two important changes. Professor Joachim von Braun, who headed the ZEF Department of Economics and Technological Change, was appointed Director General of the International Food Policy Research Institute of Washington for the next five years. Professor Andreas Wimmer, who headed the ZEF Department of Political and Cultural Change, will be director of the Center for the Comparative Study of Ethnicity at the Department of Sociology at the University of California, Los Angeles (UCLA).

Professor Klaus Frohberg substitutes for von Braun as director starting October 2002. He is an agricultural economist with a Ph.D. from the University of Illinois



Prof. Klaus Frohberg

(1977). He published widely in the areas of international trade and resource management, development, environmental economics and modelling the agricultural sector. He has been Executive Director of the Institute of Agricultural Development in Cen-

tral and Eastern Europe as well as Professor of External Environment for Agriculture and Policy Analysis at Martin Luther University, Halle-Wittenberg, since April 1995. Professor Frohberg is a member of various Associations of Agricultural Economists.

Professor Thomas Bierschenk is the interim director of the department of cultural change. Professor Bierschenk is a social scientist with a Ph.D. from Bielefeld (1983) and a Habilitation from Berlin (1991). Professor Bierschenk currently has a chair at the Institute for Ethnology and African Studies in Mainz. His work is regionally focused on the Middle East and West Africa, where he works predominant-



Prof. Thomas Bierschenk

ly on forms and dynamics of politics. He has some ongoing projects on corruption and decentralisation. The sociology of the development policy and the ethnology of traditional herder culture are counted among his further research interests.

ZEF Scholars Receive Knoll Award

Two ZEF scholars, Abay Asfaw and Rolf Sommer, have won the prestigious Josef G. Knoll Science Award 2002 for their recently finished Ph.D. theses. The Award is given to young academics who study ways to improve the situation in developing countries.

Dr. Asfaw's study assessed the feasibility of community-based health insurance schemes in the provision of basic health care services in Ethiopia, where the health situation is one of the worst in the world, especially for rural households and high-risk groups. His study shows that the environment to initiate such schemes in rural areas is very promising both at the household and at the government level.

Dr. Rolf Sommer's study was devoted to water and nutrient dynamics in deep soils under shifting cultivation in the Eastern Amazon, a contribution to activities which aim at reducing the vicious slash-and-burn land-use practice in this former rainforest region, thus improving the sustainability of the system both ecologically and economically (cf. ZEF news 9). This science prize, awarded every two years since 1986 by the Eiselen foundation Ulm, is named after Professor Dr. Josef G. Knoll, the pioneer of agricultural research for developing countries in Germany. The prizes were presented during the German Tropentag 2002 in Witzenhausen.

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ZEF Discussion Papers on Development Policy

No. 48 – Chowdhury, S. K. (2002): Attaining Universal Access: Public-Private Partnerships and Business-NGO Partnership. Bonn. 37 pp.

No. 49 – Jinadu, L. A. (2002): Ethnic Conflict and Federalism in Nigeria. Bonn. 45 pp.

No. 50 – Stark, O. und Y. Wang (2002): Overlapping. Bonn 17 pp.

No. 51 – Zimmermann, R. und M. Qaim (2002): Projecting the Benefits of Golden Rice in the Philippines. Bonn. 33 pp.

No. 52 – Hazarika, G. und A. S. Bedi (2002): Schooling Costs and Child Labour in Rural Pakistan. Bonn. 34 pp.

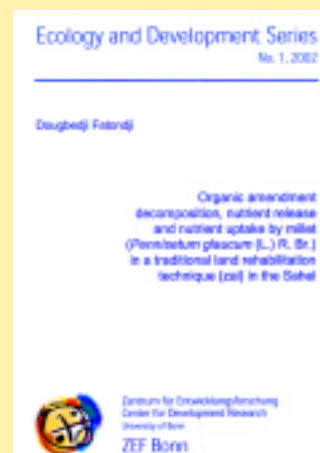
No. 53 – Bussmann, M. und I. de Soysa, J. R. O Neal (2002): The Effect of Foreign Investment on Economic Development and Income Inequality. Bonn. 35 pp.

ZEF Ecology and Development Series

NEW!

Fatondji, D. (2002): Organic Amendment Decomposition, Nutrient Release and Nutrient Uptake by Millet (*Pennisetum glaucum* (L.) R. Br.) in a Traditional Land Rehabilitation Technique (zai) in the Sahel (Ecology and Development Series No. 1) Cuvillier Verlag, Göttingen, pp. 140.

Macale, M. A. R. (2002): The Role of *Azolla* Cover in Improving the Nitrogen Use Efficiency of Lowland Rice (Ecology and Development Series No. 2) Cuvillier Verlag, Göttingen, pp. 111.



Interview with Bärbel Höhn, Minister of Environment, North Rhine-Westphalia

ZEF: *You have experienced the negotiations in Johannesburg directly; do you share the pessimistic mood of the press?*

Höhn: No, because it was already clear in the run-up to the Johannesburg summit that expectations were not as high as they had been for the summit in Rio. If you set out with low expectations, a result that compares to this situation will not necessarily be regarded as a failure. Johannesburg was more of a workshop. At the moment, the task ahead is to overcome the resistance that builds up if you follow the road to sustainable development, and to develop new perspectives. Unlike in Rio, we are not only dealing with visions. Rather, the issue at stake is action. So it stands to reason that everybody who is set to lose out in this process will try to oppose it, and those who are likely to win do not know that they will be the lucky ones.

ZEF: *Which aspects of sustainable development should we focus on? Germany, and probably North Rhine-Westphalia, too, have priorities.*

Höhn: In Johannesburg, the following topics were discussed in particular, and, in my opinion, they were treated appropriately. We very intensively dealt with two elementary questions for mankind, poverty and hunger, and also water, i.e. the supply of drinking water and sewage systems for the people. These topics are crucial to the survival of two billion people. They also constitute the foundation for a world economy based on solidarity, and they open up possibilities for development in the countries of the Southern Hemisphere. The question of energy is another important topic. Access to energy is necessary for development. At the same time, however, the Earth cannot take in any more CO₂ emissions and greenhouse gases. Therefore, it is crucial that we all advance. The developing countries have to get access to renewable resources while the industrial countries have to use energy more efficiently and build up renewable energies to reduce CO₂ emissions. This is the course

we have to opt for. Our task will be to follow the road of eco-efficiency and, at the same time, to inform the people about it. We have to explain to them that a future for this planet can only be developed jointly by the industrial and developing countries. Above all, the social, economic and ecological conditions for the countries of the Southern Hemisphere can and have to be developed by us. Only when we reach this goal will we be able to oppose terror and to fight the network of terror from a social point of view. This means that only when we really initiate development for the coun-



tries of the Southern Hemisphere will we provide the foundations for peace on this earth.

ZEF: *What can Germany, and in particular, North Rhine-Westphalia, do to keep the spirit of Johannesburg alive?*

Höhn: In my opinion, Germany has played a good, and, by the way, acknowledged, role in Johannesburg. Germany took the initiative in the EU, and the EU acted as a me-

diator for many questions. This was especially the case for the energy and renewable resources question. We have not been able to agree on exact numbers for specific years, as the EU wished, but at least we could write down an urgent and major extension. Germany proposed to organise a UN Energy Conference in Germany. Above all, Germany and the EU proposed to form an alliance of active countries against the policy of the USA. The United States has been totally blocking any changes in the area of energy policy concerning the Kyoto Protocol as well as renewable energies. With our strategy, we are creating new momentum and increasing the pressure on those who do not wish to join us but prefer to wait for the USA, which is putting on the brakes to determine the speed of the process.

ZEF: *What role can ZEF play to foster this process?*

Höhn: You know that we are working together well in many subject areas, and we want to continue doing so in the future. But the Ministry of Environment is not responsible for ZEF formally. Nevertheless it makes sense to say that we want to intensify international scientific co-operation concerning problems of global change. Everybody has to contribute to this process. I believe that it is very important to start a German and European discussion on globalisation and the solution of the questions emerging from this development and to discuss the fact that people are afraid of globalisation. It certainly makes sense to further develop Bonn into a centre for UN organisations concerned with the improvement of sustainability.

And therefore it may be significant that different institutions working in these areas intensify their co-operation and strengthen their networks to focus their efficiency.



Governance:

Examples in Thailand and Ghana

Chodechai Suwanaporn and Felix Asante

Issues of good governance range from reform of the legislative and budgetary processes to banking and decentralisation. The latter two have been the focus of ZEF studies in Thailand and Ghana, highlighting the importance of country specificity when devising governance policy.

Banking in Thailand

Thailand experienced some of the world's fastest economic growth rates until the 1997 Baht devaluation and subsequent financial crisis. The financial collapse has raised doubts about the efficiency of the Thai banking system. A ZEF study using micro-level bank data in the pre-crisis period (1992 – 1996) shows no empirical evidence of Thai banks having lent recklessly, which would have contributed to the financial crisis. Some risk components have been appropriately considered, and the relationship factor played an important yet appropriate part in the banks' lending decisions.

Thai banks did not increase interest rates to compensate for increased risk; they used restrictive lending policies to control the potential loss. This was to avoid the negative effect of increased interest rates and moral hazard problems. Rather than considering direct risk characteristics in their collateral requirements, the banks took indirect risk factors (age and firm's asset) into account. The pricing of loans depended on the bank's monopoly power vis-à-vis borrowers. There was no distinct finding on the impact of loan's period or borrower's industry.

As to relationship factors, the more banking relationships the firm had, indicat-

ing higher competition among banks, the more favourable the firm's loan pricing tended to be. This meant that competition was an important factor driving the lending decision. In relation to the amount of credit extended, banks provided more loans to firms with a closer relationship (housebank variable). On the other hand, banks secured more collateral from these close borrowers.

Decentralisation in Ghana

Decentralisation is conventionally advocated as an administrative arrangement which attains equity, efficiently allocates public goods and services, and reduces poverty. However, its ability to do that is largely dependent on the specific country context.

Since 1998, Ghana has been going through a decentralisation process that is moving decision-making from the national to the district and community levels. A ZEF study in rural Ghana has shown that access to public goods and services in a decentralised system can help to reduce poverty if income inequality within communities is reduced or eliminated. The degree of political decentralisation can influence the outcome of provision of public goods and services. Public expenditures at the district level in education are inefficient while health and water operate at increasing returns to scale. The role of civil society and of non-government organisations is important in the provision of education and water at the district level.

Chodechai Suwanaporn und Felix Asante have recently received their doctorate degrees at ZEF.

Facts and News

ZEF organised a workshop on "Community Based Irrigation Management in Northern Ghana" in Bolga Tanga, Ghana in May 2002 as part of the research group "Determinants and Effects of Alternative Institutions for Natural Resource Management in Developing Countries" funded by the Robert Bosch Foundation.

ZEF and the Economic Research Forum in Egypt organised a workshop on "Enhancing the Law Making Process for Economic Reform in Morocco, Egypt and Jordan" in June 2002 as a launching workshop for the project funded by the German Federal Ministry for Economic Cooperation and Development.

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Paradigms of Change

Reinhart Köblier

'Development' is a pervasive concern in natural, economic and social sciences. Nevertheless, a number of difficulties with this term emerge after three decades of development research. The usual understanding of 'development' as change with a supposedly known aim is far from what leading researchers today analyse as 'processes of change.'

In natural sciences in particular, the ideas of unalterable, objectively stated laws and reversibility were replaced, in the course of the 20th century, by notions of complexity, chaos, indefiniteness, fuzziness or irreversibility.

This paradigmatic discussion on the concepts of basic terms of the development discourse is addressed in ZEF's research program on "theories of development", which is situated in the interface of all three ZEF departments. To foster interdisciplinary research on this theoretical and methodological field, ZEF organised the workshop "Paradigms of Change" (23 - 25 May 2002), which was co-financed by the Volkswagen Foundation. The workshop brought together an array of internationally renowned scholars from such divergent fields as climate change, molecular biology, behavioural studies, and quantum physics in the natural sciences. Economics was represented by scientific approaches of path dependency, new institutional economics, as well as evolutionary economics and financial economics. From the broad range of social science, new modernisation theory, the historical strand in new institutionalism, critical rationalism, systems theory and transformation studies were presented.

Chaos, Complexity, Evolution

At this workshop related theories and models of 'complexity' and 'chaos' as well as 'evolution' and 'path dependency' were discussed across disciplinary boundaries. 'Complexity' and 'chaos' are central scientific concepts in the analysis of climate change. Both terms also apply to ap-

proaches in economics and social sciences: Processes with a large array of involved subjects are analysed by the concept of 'complexity', while 'chaos' is a suitable concept when it comes to prediction. The concept of 'evolution' has gained very wide currency in many fields since Darwin's time.

However, the presentation by Walter Fontana of the Santa Fe Institute revealed the distinction between 'evolution' and 'development' in the particular framework of molecular biology. While 'evolution' refers to entire species, 'development' is reserved for processes taking place in each single individual. Furthermore, changes in the genetic code occur long before they become manifest as mutations. It remained an open question how such concepts of the natural sciences can be adapted to social theory.

The Economic Analysis

Nevertheless, evolutionary concepts have also found widespread application in economics. In particular, the economic concept of 'path dependency' – development can only occur within the margins of a "path" pre-selected by historic events – is closely related to an understanding of 'evolution'.

The economic analysis of the consequences that either decisions or chance events can have on the shape of long-term developments is challenging. Celebrated examples of such 'lock-in' situations are the QWERTY lay-out of the typewriter, Microsoft's dominance of computer software, or long-term institutional arrangements such as in East European transformation societies.

Giovanni Dosi of the Scuola St. Ana, Pisa, stressed the impact of chance in the creation of such situations and also the difficulties involved in de-locking, i.e. changing the framework for further development. Presentations of social science approaches stressed how former concepts of uni-linear development have given way to the idea of a whole range of development paths. This was exemplified in particular by Samuel Eisenstadt of the van Leer Institute, Jerusalem, who presented his widely discussed concept of multiple modernities. Responding to similar challenges, societies in Western Europe, North America, Japan or other parts of Asia have developed quite

divergent responses. It remained an open question whether this has to be seen as a methodological divide. Raghavendra Gadagkar of the Indian Institute of Science at Bangalore emphasised the importance of being clear about what exactly is being transferred from one field to another - be it metaphors, concepts or whole methodological approaches. Her comments at least outlined a part of the avenue to follow if the issues that were raised at the workshop are to be further clarified.

Path Dependency and Chance

However it would overtax the possibilities of such a venture to expect neat results, ready for application. Rather, as was stated by some participants, the experience of this workshop took them to a fresh awareness of new possibilities of thinking, both in terms of conceptualising development and change, as well as in terms of methodology. This very fruitful venture was one further step on the road towards a closer interdisciplinary relationship – one endeavour among the many ZEF stands for.

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