Vietnam - Germany

Scientific-Technological Cooperation in the Field of Water and Sustainability Research

German Federal Ministry of Education and Research (BMBF)
and
Ministry of Science and Technology of the Socialist Republic of Vietnam (MOST)

November 2015

Deutschland – Vietnam
1975 – 2015
Đức – Việt Nam

SPONSORED BY THE

Federal Ministry of Education and Research

SPONSORED BY

Ministry of Science and Technology

Imprint

Ministry of Science and Technology of Vietnam
Department of International Cooperation

Dr. Le Thanh Binh – Deputy Director General
Mrs. Nguyen Thi Van – Head of European Division
Mr. Tran Van Hung – Official of European Division

No. 113 Tran Duy Hung Street, Cau Giay District, Hanoi
Tel: +84-4-39435376
Fax: +84-4-39439987
Web: www.most.gov.vn

Federal Ministry of Education and Research
Ref. 724: Resources and Sustainability

Dr. Helmut Löwe – Regierungsdirektor

Heinemannstr. 2, 53175 Bonn, Germany
Tel.: +49 228 99 57-0
Fax: +49 228 99 57 821 10
Web: www.bmbf.de

Publisher:

VD - OFFICE
VD-Office for Water and Sustainability Research
Room 409
34T Hoang Dao Thuy Building
Cau Giay District, Hanoi, Vietnam

IEEM gGmbH
Institut für Umwelttechnik
und Management an der
universität
Witten / Herdecke

Institute of Environmental
Engineering and Management at the
Witten / Herdecke University
Alfred-Herrhausen-Str. 44
58455 Witten, Germany
Tel.: +49 / (0)23 02 / 9 14 01 - 0
Fax: +49 / (0)23 02 / 9 14 01 - 11
E-Mail: mail@uni-wh-ieem.de
Internet: www.uni-wh-ieem.de

Editorial staff:
Prof. Dr. mult. Karl-Ulrich Rudolph (IEEM gGmbH),
M. Sc. Stefan Hörter (IEEM gGmbH),
Dipl-Ing. Sandra Kreuter (IEEM gGmbH),
Ulrich Wollförster (IEEM gGmbH),
Dang Thi Thu Giang (VD Büro),
Bui Xuan Trung (VD Büro)

Cover pictures:
LEGATO, RAME, AKIZ, SAFEUSE, TRAIN@MINE, Hoan Kiem Lake

Layout and composition:
IEEM gGmbH
Alfred-Herrhausen-Straße 44
58455 Witten, Germany
Tel.: -+49 (0)2302 91401-0
Fax: +49 (0)2302 91401-11
E-Mail: mail@uni-wh-ieem.de
Homepage: www.uni-wh-ieem.de

Print:
Hoang Chuong Trading Service MTV Company Limited
78, Dong Xuan Street, Hoan Kiem District
Hanoi, Vietnam

Contact:
Vietnamese-German Office for Water and Sustainability Research
Room 409, 34T Hoang Dao Thuy Building
Cau Giay District, Hanoi, Vietnam
Tel.:+84 (4) 626 888 08
Fax: +84 (4) 626 888 08
E-Mail: info@vd-office.net
Homepage: www.vd-office.net

The sole responsibility on the content of this publication lies with the authors of the different chapters.

The brochure is not intended for commercial distribution.

ISBN: 978-3-00-041141-0

4th edition, November 2015

Vietnam - Germany

Scientific-Technological Cooperation in the Field of Water and Sustainability Research

German Federal Ministry of Education and Research (BMBF)
and
Ministry of Science and Technology of the Socialist Republic of Vietnam (MOST)

November 2015

SPONSORED BY THE

Federal Ministry of Education and Research

SPONSORED BY

Ministry of Science and Technology

Content

Page

1. Vietnamese-German Cooperation in the Field of Water and Sustainability Research 8

2. Project Locations of the Scientific-Technological Cooperation between Vietnam and Germany 9

3. Ongoing Projects

3.1 Water and Environmental Technology

3.1.1 Mineralogical Characterisation and Sustainable Processing Strategies for the REE Deposit Nam Xe, Vietnam (REE NamXe) 10 - 12

3.1.2 Management of Mineral Resource Extraction in Hoa Binh Province - a Contribution to Sustainable Development in Vietnam (MAREX) 13 - 15

3.1.3 Vietnamese-German Cooperation for Development of Sustainable Technologies for the Karst Water Management (KaWaTech) 16 - 18

3.1.4 Options for the Rehabilitation and Future Utilization of the Landfill Site Gò Cát in Ho Chi Minh City under the Aspects of Optimized Climate Protection and Land Use (SAFEUSE) 19 - 21

3.1.5 Concept Development for Textile Wastewater Treatment in Vietnam using photocatalytic oxidation with Titanium dioxide nanoparticles (NaViTex) 22 - 24

3.1.6 Integrated Wastewater Concept for Industrial Zones (AKIZ) 25 - 27

3.1.7 Technologies for Sustainable Environmental and Water Protection of Coastal Zones in Vietnam (EWATEC-COAST) 28 - 30

3.1.8 Real-Time Monitoring of Urban Transport - Solutions for Transport Management an Urban Planning in Hanoi (REMON) 31 - 33

3.2 Land Management and Urban Development

3.2.1 Rapid Planning – Sustainable Infrastructure, Environmental and Resource Management for Highly Dynamic Metropolises 34 - 36

3.2.2 Land-Use Itensity and Ecological Engineering - Assessment Tools for Risks and Opportunities in Irrigated Rice-Based Production Systems (LEGATO) 37 - 39

3.2.3 Land Use and Climate Change Interactions in the Vu Gia Thu Bon River Basin, Central Vietnam (LUCCi) 40 - 42

3.3 Vocational Training Export

3.3.1 Internationalising of Training in the Mining Sector to Ensure Sustainability in Resource Management (train@mine) 43 - 45

4. Finalised Projects

4.1 Mining and Environment Vietnam (RAME - Research Association Mining and Environment) 46 - 48

4.2 Integrated Water Management Concept for Craft Villages illustrated for Dai Lam in Vietnam (INHAND) 49 - 51

4.3 Water-Related Information System for the Sustainable Development of the Mekong Delta in Vietnam (WISDOM) 52 - 54

4.4 International Water Research Alliance Saxony, Sub-Region Southeast Asia / Vietnam, (IWAS) 55 - 57

Content

		Page
4.5	Integrative Urban and Environmental Planning Framework - Adaptation to Climate Change for Ho Chi Minh City (urban.network HCMC)	58 - 60
4.6	Treatment of Tapioca Wastewater and Sustainable Water Pollution Control Management of Key Economic Zones in Southern Vietnam (TAPIOKA)	61 - 62
4.7	Solutions for Semi-Centralised Supply and Disposal Systems in Urban Areas - A Case Study in Hanoi, Vietnam (SEMIZENTRAL)	64 - 66
4.8	Development of Strategies and Procedures for Sustainable Rehabilitation, Stabilisation and Cultivation of Hoan Kiem Lake in Hanoi, Vietnam	67 - 69
4.9	Closing Nutrient Cycles in Decentralised Water Treatment Systems in the Mekong-Delta in Vietnam (SANSED)	70 - 72
4.10	Scientific Bases for the Management of Contaminated Sites in Vietnam (Register for Contaminated Sites)	73 - 75
4.11	Integrated Water Resource Management Vietnam (IWRM Vietnam)	76 - 78

3.1.2 Management of Mineral Resource Extraction in Hoa Binh Province – a Contribution to Sustainable Development in Vietnam (MAREX)

Authors: Prof. Dr. Bernhard Müller, Prof. Dr. Pham Ngoc Ho, Dr. Peter Wirth

· Project Period: 09.2015 - 08.2018

· www.marex-project.de

1. Project Background

Vietnam is a fast developing country with a strong economic growth. The expected nationwide economic growth rate in the next 15 years is 7% per year. Mining is a sector of high importance as raw material extraction provides a basis for the processing industry, for energy supply, and for the construction sector. The share of mining industry is 11 % of the Vietnamese GDP (2011).

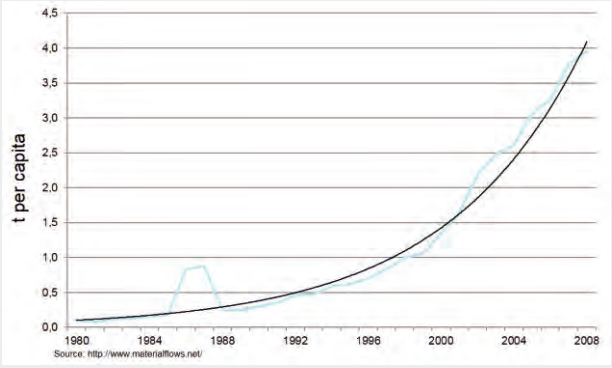

Fig. 01: Consumption of construction material in Vietnam per capita

However, like many other resource-rich countries, Vietnam is currently experiencing a severe threat to its natural environment due to increasing mining activities. The nature of mining processes has negative impacts on ecosystems and the provision of ecosystem services both during mining operations and after mining has ended. For example, typical externalities are landscape devastation, soil degradation, loss of biodiversity, as well as air and water pollution. Often land use conflicts emerge as a result of the degradation of cultivated land.

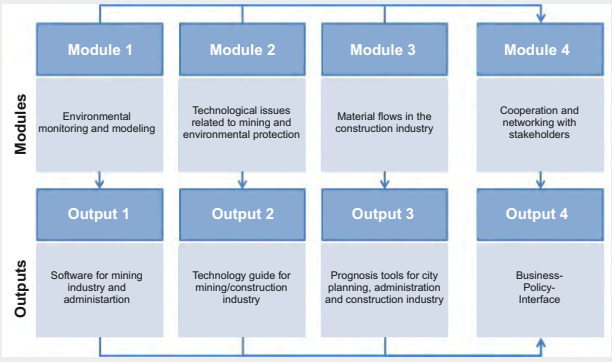

Fig. 02: Moduls und Outputs, Source: MAREX

This is especially true for mining regions located close to fast growing metropolitan areas where, in addition to other mining activities, the construction industry causes a high demand on the extraction of stones, gravel and sand as building materials. Urbanisation is the crucial driving force for the increasing demand of building material. According to assumptions, the urban population in Vietnam is expected to increase from approximately 30% in 2013 to more than 50% in 2025.

The big cities are the drivers of development initiatives, and currently the development of Hanoi City (6.6 million inhabitants) is the first priority in the governmental strategy to create a large-scale capital as well as a national political-administrative, cultural, scientific, educational, economical and trading hub of international importance. The urban hinterland, such as Hoa Binh Province, is expected to support this strategy. However, this is also the place where negative environmental effects are to be conceived.

Fig. 03: Gravel production facility, Picture: Wirth

It has to be noted that there is a lack of knowledge both in mining companies and the respective governmental authorities regarding cleaner production technologies in the mining sector and the appropriate rehabilitation techniques concerning devastated mining areas. Moreover, proper land use planning is hampered by fragmented or lacking information regarding monitoring and regional environmental impacts of mining, as well as by an insufficient knowledge about tools to estimate and forecast building industry material flow and its related land consumption. Under these conditions an effective management of the mining sector and its regional impacts cannot be realised. The mentioned challenges are a major concern of companies and the government authorities, and they are addressed in this project.

2. Objectives

The main objective of the project is to make a contribution to sustainable development in Vietnam by improving the management of mineral resource extraction. The Hoa Binh Province is taken as a model case and reference to provide the basis for a wider application within and outside of Vietnam. This is a region where the demand for goods and products is decisively characterised by an adjacent metropolis with a high development dynamism (in this case: Hanoi).

Fig. 04: Building boom in Hanoi, Picture: Schiller

In order to achieve the main objective, four subgoals are addressed:

(1) To enhance the knowledge base regarding environmental problems and land use change effects in regions caused by mining activities,

(2) To improve the capacities of mining companies regarding the implementation of cleaner production technologies and the application of rehabilitation techniques of environmentally degraded areas in mining regions,

Fig. 05: German - Vietnamese Project partners in Hoa Binh, Picture: Schiller

(3) To introduce methods of material flow analysis in order to better forecast the demand side regarding the extraction of minerals and to foster better land use planning,

(4) to establish a cooperation platform of governmental bodies and the economic sphere (Business-Policy Interface, BPI).

3. Main Project Tasks

The first subgoal is oriented towards the development and implementation of a software tool which allows better monitoring and evaluating mining activities and their regional environmental effects. The software tool shall be developed in close cooperation with the mining and building industries as well as with the respective environmental agencies.

Fig. 06: Lime stone production at Hoa Binh, Picture: Schiller

The second subgoal addresses two issues, (a) the application of cleaner production principles and technologies in the mining sector, and (b) the creation of awareness and knowledge regarding options of rehabilitating environmentally devastated areas in mining regions. The work has a strong knowledge transfer component regarding technology and its application.

Fig. 07: Raw material handling beside a residential area, Picture: Schiller

The third subgoal is focussed on the development of an analysis tool, which will be suitable to illustrate the future demand for construction materials and to estimate quantitatively the effects on mining activities associated with land-use impacts in the surrounding provinces. The respective forecasting tool shall be elaborated in cooperation with the mining and building industry as well

as with government authorities in the Region of Ha Noi/Hoa Binh.The fourth subgoal aims at integrating the products to be elaborated under the first three targets into a business-policy interface. It consists of a cooperative management approach, bringing together the private sector (producers and customers) as well as regional planning and environmental development authorities.

Fig. 08: On-site visit at stone quarry in Hoa Binh, Picture: Wirth

4. Expected Results

On the one hand it is expected to provide applicable products for the Vietnamese construction industry (cp. the main project tasks). From a scientific point of view the project deals with questions of institutional change in the field of extraction and processing of raw meterials in Vietnam and its influence on sustainable development.

5. Project Area in Vietnam

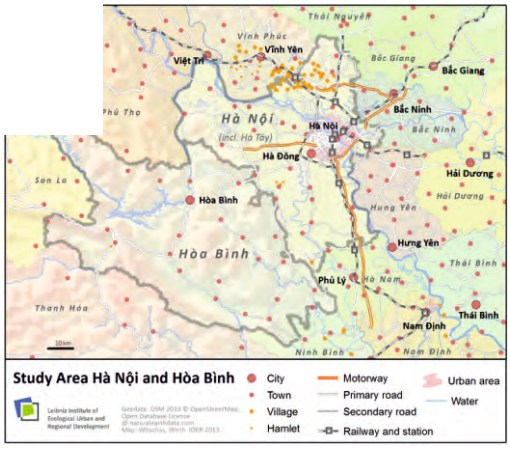

Fig. 09: Study Area Hanoi and Hoa Binh, Source: MAREX

German Partners

- Leibniz Institute of Ecological Urban and Regional Development (IOER), Dresden
- C&E Consulting and Engineering GmbH, Chemnitz, KMU
- Technische Universität Dresden, Chair of Spatial Development
- TU Dortmund University, Research Area Spatial Information Management and Modelling
- Saxony Economic Development Corporation, Dresden
- United Nations University, Institute for Integrated Management of Material Fluxes and of Resources (UNU-FLORES), Dresden
- HAVER NIAGARA GmbH, Münster
- Allgemeine Baustoff-Handels-Contor GmbH, Erfurt

Vietnamese Partners

- The Institute of Environment and Automation (IEA), Hanoi
- VNU University of Science, Vietnam National University; Research Centre for Environmental Monitoring and Modelling (CEMM), Hanoi
- Province government Hoa Binh, Department of Natural Resources and Environment (DoNRE),
- Quang Long Company of Construction and Trading (Quang Long), Hoa Binh, SME
- Hop Tien Company of Trading and Construction & Transportation (Hop Tien), Hoa Binh, SME
- Binh Minh Joint Stock Company of Trading and Construction (Binh Minh), Hoa Binh, SME

Coordination

Prof. Dr.-Bernhard Müller, Dr. Peter Wirth
Leibniz Institute of Ecological Urban and Regional Development (IOER), Dresden

Weberplatz 1 • 01217 Dresden, Germany
Tel.: +49 (0)351-4679-232 Fax: +49-(0)351-4679-240
E-Mail: b.mueller@ioer.de, p.wirth@ioer.de
Homepage: www.ioer.de

Prof. Dr. Pham Ngoc Ho
The Institute of Environment and Automation (IEA), Vietnam

R4-2211, Royal City urban area, 72 Nguyen Trai street,
Thanh Xuan district, Hanoi, Vietnam
Tel.: +84 (0)435375279
Fax: +84 (0)435375279
Email: vientdhmt@gmail.com

Publisher:

VD - OFFICE

VD-Office for Water and Sustainability Research

Room 409
34T Hoang Dao Thuy Building
Cau Giay District, Hanoi, Vietnam
www.vd-office.net

IEEM gGmbH
Institute of Environmental Engineering and Management at the
university
Witten / Herdecke
www.uni-wh-ieem.de

Alfred - Herrhausen - Straße 44
D - 58455 Witten
www.uni-wh-ieem.de