

**COOPERATIVE APPLIED ENVIRONMENTAL SYSTEMS RESEARCH
OF URBAN-RURAL INTERFACE**
**Sustainability in water-management and land use in Havana-Region
(CAESAR)**

September 1, 2002 - August 31, 2005

Summary

The Cuban way of development during the last four decades led to a special handling of nature, the vitally important resources, e.g. water and resulted partially in a radical change in land use systems and the consumption of existing resources, causing serious geo-ecological and urban problems. The main aim of the CAESAR-project was the development of sustainable environmental management systems for land use and water management. Guidelines were drawn up for sustainable territorial planning in order to contribute to an improvement in quality of life.

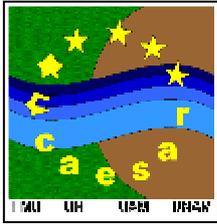
Objectives

Using an innovative and interdisciplinary approach the CAESAR-project intended to achieve the integration of geo-ecological analysis, detailed environmental monitoring and assessment of environmental systems, enhanced by an analysis of the social, economical, medical-health related and environmental policy situations in the area. Territorial planning recommendations are elaborated, based on the assessment of geo-ecological conditions, landscape degradation and the determination of the ecological capacity of so called geo-ecological and visual landscape units, which are classified and evaluated using a specially created field-work method and a Geographical Information System (GIS). The analysis of the human ecological condition of the area in geo-medical terms took place by social scientific perception method. Environmental political measures, educational and awareness measures were elaborated to illustrate environmental problems using as well multimedia documentation.

Team

Germany: Ludwig-Maximilians-Universität München: Department für Geo- und Umweltwissenschaften, Sektion Geographie (*Coordinator; scientific contribution: landscape ecology, transformation processes, environmental management, photo- and video-documentation*) / **Cuba:** Universidad de La Habana: Facultad de Geografía (*Regional and local organisation; scientific contribution: landscape ecology, hydrology, environmental planning, urban planning, sociology, video-documentation*) / **Spain:** Universidad Autónoma de Madrid: Departamento de Ecología (*Scientific contribution: human ecology, biology, sociology and psychology*) / **Mexico:** Universidad Autónoma Nacional de México: Instituto de Geografía (*Scientific contribution: water management, urban planning, remote sensing, information technology*)

The continuous strong cooperation with local decision-makers, governmental and non-governmental organisations aimed at the implementation of the project results. *Gobierno Ciudad de La Habana, Ministerio de Ciencia, Tecnología y Medio Ambiente (CITMA) – Ciudad de La Habana, Dirección Provincial de Planificación Física de Provincia Ciudad de La Habana (DPPFCH), Grupo para el Desarrollo Integral de la Capital (GDIC), NGO ProNaturaleza*, shall be exemplarily mentioned here.



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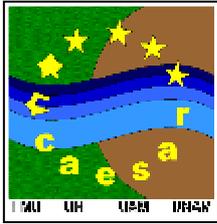
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Research hypothesis and actual work

In the province Ciudad de La Habana there are various complex environmental problems. Because of infrastructural deficits, e.g. waste water from outdated industrial plants is be introduced directly into rivers as well as from private households. Likewise domestic rubbish remains in the residential areas or is also disposed into the rivers because of a not functioning waste disposal. Apart from that degradation of the natural systems there are also negative consequences for the socio-economic systems of Havana. The main cause of these problems lies in a missing integrative land and water management for the province Ciudad de La Habana. Environmental systems research in order to respond to the variety of interactions between environmental systems and anthropogenic activities related to social systems has to be of an integrative character. The strength of the consortium was and is based on the diversity of scientific disciplines (geography, hydrology, biology, landscape ecology, urban ecology, environmental management and planning, human ecology, sociology and psychology, information technology and remote sensing) working together in an integrative manner, using a common language defined through various discussions during preparative meetings.

The research was cut into five thematic workpackages and was designed to take place on two different scales: the territory of the province *Ciudad de La Habana* and two exemplarily chosen drainage basins (*Río Quibú* and *Río Almendares*), where detailed data of water, soil and vegetation was recorded (e.g. some hundred measurement points; soil samples analysed in respect of their heavy metal content (Pb, Cu, Zn, Ni, Cd); water samples analysed in respect of their NO₂, NO₃, NH₄, PO₄, contents and particular materials). To mention only some tasks, these reached from the preparation of basic information and data, the set up of a Geographical information system (GIS) and database, geo-ecological field work, the realization of a bio-social survey with the participation of a representative section of the residential population in the Río Quibú drainage basin (1.111 persons) to the elaboration of measures for environmental education. A nearly ongoing presence of project members in the area proofed very helpful to project management and the scientific dialogue. Yearly project meetings were the main forum for joint scientific discussion and for the elaboration of the intended recommendations for a sustainable environmental planning. Landuse related recommendations are divided into agricultural land use, urban planning, conservation and regional planning. The recommendations concerning effective water management are in a water cycle based structure: sources, availability and protection of water; distribution and consumption of water; and finally the disposal of water and water treatment.

The actual work is focussed on the elaboration of multimedia presentations of the projects findings and the documentation of the project outputs. During an upcoming international conference (24.-28. of may 2005 in Havana) the transferability of the methodology on similar regions in Latin America will be discussed. Enforcing the scientific and political dialogue by this final conference, the project results are to be seen in an even more positive effect for the efforts of preserving the environment.



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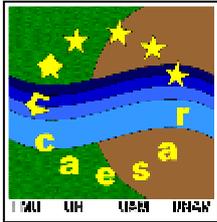
Outputs

- Reports and recommendations on the sustainable development of land use and water management, environmental policy, education and health conditions.
- Scenarios and guidelines for effective land use and water management systems and recommendations for sustainable environmental political measures and territorial planning.
- Exemplary contribution to environmental education through recommendations for educational and awareness measures and for improved dealings with environmental health, illustrated by multi-media documentation.
- A strong linkage of research to educational aspects, realized through the incorporation of students in field work, thesis (some 10) and dissertations (3)
- Former contacts and new partnerships, the scientific exchange and the connection within and outside the European science can be intensified and the research infrastructure between Europe and Latin America strengthened.

Impact

Because of the strong and narrow contact of the Cuban partners to governmental institutions and non-governmental organisations all main project findings are reported to the most important decision-makers and stakeholders. The GIS and the respective database was delivered to the local governments and planning institutions to fulfil the commitment of the transfer of knowledge from the project to stakeholders and decision makers. Working closely with local organisations like the *Talleres de Transformación Integral del Barrio* (TTIB) or local leaders enabled their participation in project tasks as well as the uptake of project results. During the field work project members of the German partner came in contact with local leaders in an marginal part of Ciudad de La Habana. In the following months common plans in respect of the installation of an environmental park within the mentioned part of Havana (Marianao-District) were drawn up, implementing the project findings. With broad acceptance by the local and provincial government as well as broad participation of the whole neighbourhood first steps of the parks installation were realized. Activities of environmental education are foreseen to begin within the next months. Funding was achieved from other cooperating German Governmental and Non-Governmental Institutions. The installation of this park is only one example of how the integrative CAESAR-project focussed the research activities as well at the service of society and contributes so to overcome certain societal problems. Further plans for future activities containing concrete development actions in respect of water-management and land use planning are elaborated, but lack of the necessary financing.

The increased experience of the Cuban scientists and the created necessary infrastructure will help to a future application to other similar regions inside the country. Here is to be mentioned that the Facultad de Geografía of the Universidad de La Habana, representative for the whole team, has won the 2004 National Award of the Ministry of Higher Education for the best applied research project.



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Photo 1 (left): Meeting of CAESAR project members with members of the local government from the Marianao district on the topic of the legalization of the environmental park (Hasdenteufel 6/2004).

Photo 2 (right): Members of a planting brigade of the government from the Marianao district, planting trees in the environmental park at the Quibú river (Ammerl 11/2004).

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