

Capacity building for sustainable development: some Mexican perspectives

Eliane Ceccon¹ and Ana Maria Cetto²

¹Centro Regional de Investigaciones Multidisciplinarias, UNAM, Av. Universidad s/n, Cuernavaca, México

²Instituto de Física, UNAM, México

Key words: Capacity building, sustainable development, interdisciplinarity, Mexico

SUMMARY

A broadly defined scientific Capacity Building (CB) for Sustainable Development (SD) is needed all around the world, and the development of innovative capacities in the developing countries is a priority. For this, first we need to know how this concept is applied in some developing countries. In this paper we present some Mexican experiences in the field of capacity building for sustainable development. The main problems are the monodisciplinary training of the specialists, the absence of a sound policy for promotion, career development and assessment of researchers, as well as of their projects when they are interdisciplinary and development-oriented. The main proposals to solve these problems are the creation of mechanisms that foster and legitimize interdisciplinary work; a decentralized planning process with the specific objective of establishing the needs and orientations on a regional basis; provide resources to long-term projects, and finally, consensus on asking international funding agencies for stronger support for public higher education institutions in developing countries in order to increase and strengthen their capacity for education and research in general, and in the field of SD in particular.

INTRODUCTION

After having learned for many centuries to live from the environment, it has now become critical to learn to live in harmony with it. All around the world, a better general understanding of the complex interactions between man and nature is required. We need to increase our ability to analyze and predict the behaviour of natural and social systems, to characterize the impacts of their interactions, and to assess the roles of the social actors in the development process. Further, institutions and mechanisms must be put in place

to guarantee that whatever our specific development model, it has sustainability embedded in it – both as a matter of principle and in actual practice. Hence, broadly defined scientific Capacity Building (CB) for Sustainable Development (SD) is needed all around the world (ICSU, 2002a).

But there is also a growing recognition, even amongst the mainstream scientific establishment, that business-as-usual in science will no longer suffice, that new ways of doing science must be

Correspondence: E. Ceccon, Centro Regional de Investigaciones Multidisciplinarias, UNAM, Av. Universidad s/n, Circuito 2, Colonia Chamilpa, Cuernavaca, Morelos 62210, Mexico

explored, and that a revised 'social contract for science' is necessary to deal with the present planetary situation (Lubchenco, 1997; UNESCO, 2000). Fortunately, there are also valuable examples of experiences and good practices, from which important lessons can be drawn.

There is indeed an increasing body of evidence showing that the needed understanding must encompass the interaction of processes within the context of ecological and social characteristics in particular places and sectors. The research efforts must therefore integrate the effects of processes across the full range of scales from local to global. Moreover, the approaches followed by individual scientific disciplines have been shown to provide partial and incomplete pictures of a complex reality that cannot be subdivided into disciplinary compartments without losing essential elements. This points to the imperative of holistic, transdisciplinary approaches when dealing with ecosystems, human and social systems, and their interactions. The above statement refers to a question of essentially an epistemological and methodological nature, and illustrates an important aspect of the kind of change that is needed in science itself (ICSU, 1992). It is, however, not sufficient to recognize the interrelatedness of the various components of complex socio-ecosystems: appropriate institutions and practices need to be put in place accordingly.

Broad participation and inclusiveness are seen to be key to the success of SD. All sectors of society have a role to play in the process, each one in its own capacity. Popular participation and environmental management at local scales have proved to be of high benefit in SD experiences. Hence, the development of innovative capacities at the local level is a priority – mobilizing local resources and solutions to solve local problems that, in turn, will have beneficial global impacts (UNU, 2002). All stakeholders, including local governments, non-governmental organizations (NGOs) and community groups, need capacitating.

The need for broad participation is not just a matter of equity or democracy, it has to do with bringing together a wealth of knowledge, values, approaches and experiences that can and must mutually enrich each other. In particular, the multiplicity of forms and systems of knowledge

about nature and the human beings that have developed through the centuries in different parts of the world, prove today to be an invaluable asset in meeting the challenges of SD, often questioning the assumed superiority of scientific knowledge. In fact, a considerable number of documented experiences indicate that traditional and scientific knowledge play a complementary role and that they need to cooperate more closely than they have so far, to advance in the required understanding of nature and its interaction with human beings (UNESCO-MOST, NUFFIC-CIRAN, 1999). More efforts must therefore be undertaken to build a fair relationship between scientific and traditional knowledge, to strengthen the capacity of communities to revitalize and manage their own knowledge base, and to promote the integration of local knowledge, values, traditions and practices, in SD projects (ICSU, 2002b). An interesting instance of systematic experience in this field is provided by the network of biosphere reserves under the UNESCO programme, MAB (see e.g. UNESCO-MAB, 2000).

The present paper will give us occasion to report on the application of this broad concept to some Mexican experiences in the field of capacity building for sustainable development. Mexico is a Latin American developing country, with many social, economic, political and cultural characteristics that are shared with most other Latin American countries. However, in this country two singular forms of community-based ownership are currently recognized. The first of these involves the *ejidos*, which allow groups of people to petition for access to resources they previously did not have access to. The second form is a *comunidad*, which is a pre-existing corporate entity whose rights are recognized if its members can demonstrate prior, long-standing community-based use of the surrounding resources. Approximately three million households, which manage 59% of Mexico's land, belong to one of the two types of communities (Alcorn and Toledo, 1995). These special land-owner characteristics may simplify the social and scientific work of institutions in rural areas. Apart from this specificity, most of the perspectives, criticisms and examples found here, could be extended to a great part of the Latin American continent.

CB FOR SD IN MEXICO – SOME LESSONS

In the following, an overview is presented of activities carried out in a limited selection of public scientific institutions in Mexico, with special focus on the capacity-development aspects. It should be noted that we only considered the most important research/educational institutions, where most of the projects have an emphasis on biological or physical content with a strong social linkage. However, there are other research/education institutions devoted to social sciences in Mexico that have some SD projects, such as: i) the Regional Centre of Multidisciplinary Research (UNAM), with a programme on 'Social perspectives of environment' that attempts to describe and explain the socio-environment dynamics and their bio-cultural components; ii) the Research Centre for Development, Negotiation and Management of Natural Resources in the Rural Environment, at the Institute for Social Research (UNAM), with projects for diagnosis of the current state of the natural resources and socio-economic conditions in tropical regions, and a professional team able to survey natural and cultural resources, impart environmental education, promote eco-tourism, and coordinate activities between rural communities and public institutions. The Colegio de México is another institution for social research in Mexico, having an Environment and Sustainable Development Programme within the Department of Demographic Studies and Urban Development, also mostly with a social perspective approach.

The present summary is based on the information obtained through personal interviews with key persons in the respective institutions. Since the choice had to be limited, owing to practical restrictions, far from pretending to be comprehensive, we restrict ourselves to illustrating some particularly relevant experiences from which a few lessons can be drawn. It is interesting to note in the description that follows, the bias towards SD activities in rural areas; although an unprecedented process of urbanization and concomitant de-ruralization has taken place in recent decades, and this trend will clearly continue in the near future, it is evident that the national research and higher education system has not yet incorporated in any significant way the sustainable urban development in its agenda.

Department of Ecology of Natural Resources, Institute of Ecology, UNAM, Morelia, Michoacan

This department has a well established research staff carrying out interdisciplinary work with important social projections, in various basic and applied areas of ecology, with the purpose of providing socially, economically and ecologically viable alternatives for the peasant communities, as well as norms for the local and federal government sector. The department is planning to set up a Center for Research on Ecosystem Management, with the purpose of carrying out research and higher education from a truly interdisciplinary perspective, including the social sciences component. The center will also have an area specifically devoted to establishing links with the various sectors of society.

Institute of Ecology, AC, Xalapa, Veracruz

This institute carries out research and higher education in the areas of biodiversity, conservation and systematics, aimed at the rational use of ecosystems through a better knowledge of the mechanisms and processes taking place, rather than of the species themselves. A good deal of the research and educational projects include multidisciplinary activities involving ecology, economics, systematics, social psychology, sociology and anthropology. The institute was a pioneer in the creation of Biosphere Reserves where the inhabitants are involved in conservation activities. Social agreements are fostered among the productive sectors having a stake in the biosphere resources, thus contributing to solve conflicts of interest. The institute offers doctorate degrees in ecology and resource management, with a strong involvement of scientists in their social environment, and has centres in six Mexican cities (Xalapa, Chihuahua, Durango, Mapimí, La Michula, Pátzcuaro).

The College of the South Border (ECOSUR), Chiapas

This research centre is located in a region of major social conflict, in the south of Mexico,

WHAT IS CAPACITY BUILDING?

The term Capacity Building (CB) is used in a variety of contexts and with different connotations, which are most often not made explicit. In particular, it is frequently used with reference to just one aspect, namely the education and training of scholars. There is no doubt that education and training is at the heart of development efforts; without human resource development, most of these efforts would be ineffective. However, it seems convenient to start by recalling the broader and more complete definition adopted by the Rio Conference of 1992, which remains as valid as it was then:

'Specifically, CD encompasses the country's human, scientific, technological, organizational, institutional and resource capabilities. A fundamental goal of CB is to enhance the ability to evaluate and address the crucial questions related to policy choices and modes of implementation among development options, based on an understanding of environmental potentials and limits and of needs perceived by the people of the country concerned.' (UNCED, 1992)

In a previous UNDP briefing paper (UNDP, 1991) the concept of CB had been appropriately defined in its broadest sense, to encompass:

- The creation of an enabling environment with appropriate policy and legal frameworks;
- Institutional development, including community participation;
- Human resource development and strengthening of managerial systems,

and to conclude that CB is a long-term, continuing process, in which all stakeholders participate (ministries, local authorities, NGOs, producer and user groups, professional associations, academics and others).

SUSTAINABLE DEVELOPMENT: INQUIRING INTO AN ALTERNATIVE CONCEPT

The need to revise the established vision of Sustainable Development (SD) and to develop an alternative concept of it was already the message of the Brundtland report, *Our Common Future* (WCED, 1987). However, this revision

cannot be said to have taken place in a profound way. In fact, the expression 'SD' as in many others used in the development theme, remains a rather vague term. Its meaning is different for ecologists, environmental planners, economists, activists, etc., although often it is used as if there were a consensus on it. One of the reasons for this conceptual confusion is the lack of agreement on what it is exactly that needs to be sustained: in some occasions the objective of 'S' makes reference to the resource base proper; in others, to the output provided by this resource base. More recently, it is becoming clear that truly sustainable development encompasses necessarily the entire system; if just one part of it develops at the expense of others, there can be no sustainability in the long run. On the other hand, the term development has also had widely different connotations, for different circles and in different times, and one cannot say that there is a convergence of opinions on it. In the context of the present discussion, we propose to refer to 'development' as the process of improvement of the human condition and of the socio-ecosystem to which humans pertain, a process that does not necessarily require indefinite material growth (Gallopín, 2001).

The differences of approach to the environment in the North and in the South are not due solely to material conditions but also to the different epistemologies or knowledge systems (Redclift, 2002), and more broadly speaking, to differences in culture, values and traditions. In particular, communities in the South that rely for their survival on sound management of their local resources, tend to apply the strong concept of sustainability, according to which the ecosystem must at all times maintain the capacity to regenerate itself. In contrast, modern societies in the North tend to use the weak concept of sustainability, based on their confidence in technological development as a means to solve the problems created by the (human-induced) erosion of natural systems. There are, however, inverse tendencies: also in the North, some groups favour strong sustainability, notably among some ecologist NGOs and among scientists in the fields of ecology and natural resources, while in the South, the pressures of poverty and modernity often induce nonsustainable practices among the local communities.

and has centres in: Campeche, Villahermosa, Tapachula, Chetumal and San Cristóbal de las Casas. Fortunately, the concept of SD sets the basis for both research and higher education, including the productive, social and biodiversity components, and involving economics, anthropology, sociology, medicine, political sciences, ecology, agronomy, and biochemistry. The research work places emphasis on the limitations to the increase in primary production in the rural environment, the challenges for sustainability, and the use and conservation of biodiversity. It offers a masters degree in natural resources and a doctorate in ecology and SD. It has an area specifically devoted to establishing mechanisms for communication, integration and permanent exchange of knowledge, technologies and research experiences with the various sectors of local society.

Centre for Atmospheric Sciences, UNAM, Mexico City

Researchers in this centre originate mostly from the physical sciences. The centre does not carry out activities related directly to SD; however, much of its work is oriented to the study of possible consequences of climate change, with the necessary involvement of physics, geography, biology, sociology, economics and international relations. The area of climate change can be considered a strategic one for the country, since development plans can be compromised by climatic factors, normally ignored or disregarded by decision-makers. A significant interface with society is achieved in a study on the adaptability of social sectors to climate change, their vulnerability, and viable options involving preservation of natural resources and economic foresight. The graduate programme in earth sciences is multidisciplinary to a certain extent, depending on the specific topic chosen by the student.

In addition to the regular budget provided by the government, these institutions receive special funding for projects from various national and international sources, notably from the Packard Foundation, the MacArthur Foundation, the Ford Foundation, the Rockefeller Foundation, the National Institutes of Health, the Environmental Protection Agency, the Department of Agriculture and the Fish and Wildlife Service

(USA), as well as from the European Union, the Spanish Cooperation Agency, UNIDO, UNDP, UNEP, the GEF and the World Bank.

Most of these and other research and higher education programmes related to SD were initiated approximately five years ago, and the persons interviewed, while being absolutely convinced of the value of these multidisciplinary initiatives, pointed to a series of difficulties in their implementation.

THE MAIN OBSTACLES

The first obstacle is related to education at the undergraduate level, where students receive a monodisciplinary training of high specialization and oriented to specific topics, and their efforts are geared towards individual performance rather than collective work. Overall, the landscape of scientific training in Mexico is characterized as one of 'deep tunnels instead of wide horizons' (J. Sarukhan). Also, the researchers show a poor ability to establish connections with other disciplines, and most of them are not prepared to face failures in multidisciplinary projects and even less to share these failures with their colleagues in a collective fashion. The lack of democracy within the research groups and absence of previous agreement in the definition of individual roles in research projects is a common factor of failures.

An additional element of concern is the established policy of promotion, career development and assessment of researchers, as well as of their projects, which is far from stimulating interdisciplinarity and development-oriented research. The present assessment system is highly demanding in terms of scientific productivity (measured mainly by papers published in mainstream journals) and does not place any value on activities of social analysis and development, thus resulting in researchers being confined to their ivory tower, concentrated on their personal production and disconnected from reality. Most research institutions do not have an area devoted to establishing links with other sectors of society. There is, moreover, an absence of political will to promote activities aimed at SD, which is considered to be a result of the lack of scientific culture among politicians and society at large.

THE MAIN PROPOSALS

A number of proposals and suggestions were put forward by the various persons interviewed, with a remarkable coincidence of opinions among them. In general terms, it was considered important to create mechanisms that foster and legitimize interdisciplinary work, in particular by financing research projects that bring together multidisciplinary teams for addressing real problems. Also, the government is expected to generate initiatives that call for interdisciplinary research work. Some respondents placed particular emphasis on the earlier stages of education, at which the childrens' perception of nature and the environment can be oriented towards sustainability, and a multidisciplinary approach can be more naturally introduced in the learning process. For this change to take place in the educational system, it would be necessary to work closely with school teachers. It was also considered that researchers and university students need to be trained in community work, while at the same time other sectors of society should be induced to recognize the value of scientific contributions to SD.

In view of the country's diversity, a decentralized planning process is considered necessary, which could be undertaken by an institute created with the specific objective of establishing the needs and orientations on a regional basis. The government should develop a basic agenda for SD, and stimulate financing agencies to invest in line with this agenda. It is important to devote resources to projects having long-term objectives; the funding should cover the various phases of the project, including the socio-environmental diagnostic, the research proper, and the implementation.

In assessing the performance of researchers, it is important that work in the field of SD be evaluated by referees who themselves have an interdisciplinary perspective and who are prepared to consider the value of scientific activity that is not purely academic but is related to relevant societal issues and includes a component of community-related work.

Finally, there was a clear consensus on making a plea to international funding agencies (IMF, IDB, etc.) for definite and decisive support to public higher education institutions in developing countries, in order to increase and strengthen

their capacity for education and research in general, and in the field of SD in particular.

SOME GENERAL CONCLUSIONS

It used to be that donors and their representatives would, based on policy considerations and their own sets of priorities, determine which CB needs would be addressed, in what order and with what instruments or procedures. In some environments, particularly among African NGOs, agenda setting by the North still remains a dominant pattern in CB. Moreover, there are often serious external pressures to destroy ecosystems, exerted by private enterprises, local governments or other agents, national and international. For example, the World Bank and the IMF have indirectly encouraged governments to deplete their natural resources to pay off debt (Pimm *et al.*, 2001).

More generally speaking, there is among those involved in SD projects a widespread frustration with existing large-scale funding mechanisms, their associated patronage and the short-term focus on donor-defined results. Longer funding cycles are much more convenient for sustainable initiatives, even if these are modest in scope. New solutions (e.g. autonomous funds) are needed for getting away from donor-recipient principal-agent problems and moving toward a relationship of joint ownership and decision-making among the various stakeholders. It has become increasingly clear that CB does not take place in a vacuum, but in a specific social, economic, political and cultural context, which needs to be taken into account in every circumstance. With their experience and knowledge of local conditions, people are best placed to determine what can make the most significant contribution to CB efforts. Therefore, local scientists and communities should be the leaders of their own projects; outsiders, however well-meaning and committed, can only facilitate, catalyze and support the activities. In fact, leadership and commitment on the part of the participants are often compensating factors for resource deficiencies.

In *Our own agenda* (BID-PNUD, 1990), the Latin American contribution in preparation for the Rio Summit, it was made clear that there cannot exist a universal strategy to attain SD,

owing to the peculiar institutional, social, economic and environmental conditions of every country or region. In Latin American countries, justice, equity and peace are essential components of any strategy towards SD: one of the key elements, namely extreme poverty, was identified as requiring urgent attention, not from the traditional assistance perspective but by addressing the structural factors that determine the very existence of the phenomenon. Poverty and environmental degradation are known to negatively influence each other in a vicious cycle.

Neither socioeconomic conditions nor the state of the environment have improved globally in the region in the last ten years, and the corrective measures implemented have clearly been insufficient to reverse the negative trends. A recent comprehensive diagnostic points to severe environmental degradation, including i.e. loss of biodiversity, soil erosion, massive loss of native forests, freshwater depletion, and pollution of rivers (PNUMA-CEPAL, 2002). The causes for this degradation are multiple, and call for a complex, multidimensional strategy for their solution – a strategy that has to incorporate the fact that the SD of the region depends increasingly on factors lying outside the control of the region itself.

On the other hand, some positive changes that have taken place in the region are worth attention, in particular the gradual process of political democratization – essential for a good outcome of SD efforts – and a certain accumulation of positive experiences with SD projects. Although important work on ecosystems and environmental problems was initiated in a few universities and research centres in the 1970s, the last decade has witnessed some notable developments in this field.

Universities and other higher education institutions are a necessary component – the crucial node – in a healthy system of science and

technology for SD. A weak university system undermines the ability of countries not only to develop but also to retain young scientific talent. Underfunded universities often degenerate into profit-seeking organizations with poor track records of engendering innovation and providing quality education. The reduction in budgets of public universities – which is taking place on a widespread scale – is therefore a serious threat to CB for SD and should be a matter of serious consideration.

The epistemological, methodological, organizational and institutional changes that need to take place for science to respond to the challenges of SD, is a matter of serious consideration for the higher education system, where most public research is carried out. For the universities to take the lead in these changes, they must transform themselves in various ways, notably by thoroughly revising their curricula (towards interdisciplinarity), the organization of research and their working links with different sectors of society, especially in those areas where such sectors are called to play a role as partners in SD efforts.

To summarize, capacity building for sustainable development should be considered a most important tool to conduct Latin America towards the sustainable development utopia. A central imperative is that this development should not be guided by the market forces alone; instead, it should aim to serve the whole of society and be guided by the ethics of conservation.

ACKNOWLEDGEMENTS

The authors are grateful to Laura Barreza, Luis Garcia-Barrios, Carlos Gay, Sergio Guevara Sada, Miguel Martinez-Ramos and José Sarukán for their valuable responses in the interviews, and to Fernanda Paz for interesting comments.

REFERENCES

- Alcorn, J. and Toledo, V. (1995). The Role of Tenurial Shells in Ecological Sustainability: Property Rights and Natural Resource Management in Mexico. pp. 123–40. In *Property Rights in a Social and Ecological Context*. (Washington, DC: The World Bank)
- BID-PNUD (1990). *Nuestra Propia Agenda*. Comisión de América Latina y el Caribe para el Desarrollo y el Medio Ambiente, BID-PNUD, Washington DC
- Gallopín, G. (2001). *Science and technology, sustainability and sustainable development*. ECLAC LC/R, 2081
- ICSU (1992). ASCEND 21. *An Agenda of Science for the Environment and Development into the 21st Century*. (Paris: International Council for Science)
- ICSU (2002a). *Science education and capacity building for sustainable development*. Series on Science for Sustainable Development No.5. (Paris: ICSU) Available at www.icsu.org
- ICSU (2002 b). *Science, traditional knowledge and sustainable development*. Series on Science for Sustainable Development No.4. (Paris: ICSU) Available at www.icsu.org
- Lubchenco, J. (1997). Entering the century of the environment; A new social contract for science. *Science*, **279**, 491–7
- Pimm, S.L., et al. (2001). Can we defy nature's end? *Science*, **293**, 2207–08
- PNUMA-CEPAL (2002). *La sostenibilidad del desarrollo en América Latina y el Caribe*. Programa de las Naciones Unidas para el Medio Ambiente, Santiago de Chile
- Redclift, M. (2002). *Sustainable Development: Extending the scope of the debate*. Available at www.clades.org/310-art9.htm
- UNCED (1992). *Agenda 21*. United Nations Conference on Environment and Development, Chapter 37
- UNDP (1991). *A strategy for water sector capacity building*, United Nations Development Programme, Delft
- UNESCO (2000). Science for the twenty-first century: A new commitment. In Cetto, A.M. (ed.) *Proceedings of the World Conference on Science*, pp. 461–84. (UK: Banson)
- Singh, S., Sankaran, V., Mander, H. and Worah, S. (2000). *Strengthening Conservation Cultures – Local communities and biodiversity conservation*. (Paris: UNESCO) 211 pp.
- UNESCO-MOST and NUFFIC-CIRAN (1999). *Indigenous Systems of Knowledge in Sustainable Development*. (Paris: UNESCO)
- UNU (2002). *Diversity and Homogeneity: Fostering Innovativeness for Local Environmental Management*. International Symposium, United Nations University, Tokyo
- WCED (1987). *Our common future*. Brundlandt Report, (Oxford: Oxford University Press)

CB FOR SD IN MEXICO – SOME LESSONS

In the following, an overview is presented of activities carried out in a limited selection of public scientific institutions in Mexico, with special focus on the capacity-development aspects. It should be noted that we only considered the most important research/educational institutions, where most of the projects have an emphasis on biological or physical content with a strong social linkage. However, there are other research/education institutions devoted to social sciences in Mexico that have some SD projects, such as: i) the Regional Centre of Multidisciplinary Research (UNAM), with a programme on 'Social perspectives of environment' that attempts to describe and explain the socio-environment dynamics and their bio-cultural components; ii) the Research Centre for Development, Negotiation and Management of Natural Resources in the Rural Environment, at the Institute for Social Research (UNAM), with projects for diagnosis of the current state of the natural resources and socio-economic conditions in tropical regions, and a professional team able to survey natural and cultural resources, impart environmental education, promote eco-tourism, and coordinate activities between rural communities and public institutions. The Colegio de México is another institution for social research in Mexico, having an Environment and Sustainable Development Programme within the Department of Demographic Studies and Urban Development, also mostly with a social perspective approach.

The present summary is based on the information obtained through personal interviews with key persons in the respective institutions. Since the choice had to be limited, owing to practical restrictions, far from pretending to be comprehensive, we restrict ourselves to illustrating some particularly relevant experiences from which a few lessons can be drawn. It is interesting to note in the description that follows, the bias towards SD activities in rural areas; although an unprecedented process of urbanization and concomitant de-ruralization has taken place in recent decades, and this trend will clearly continue in the near future, it is evident that the national research and higher education system has not yet incorporated in any significant way the sustainable urban development in its agenda.

Department of Ecology of Natural Resources, Institute of Ecology, UNAM, Morelia, Michoacan

This department has a well established research staff carrying out interdisciplinary work with important social projections, in various basic and applied areas of ecology, with the purpose of providing socially, economically and ecologically viable alternatives for the peasant communities, as well as norms for the local and federal government sector. The department is planning to set up a Center for Research on Ecosystem Management, with the purpose of carrying out research and higher education from a truly interdisciplinary perspective, including the social sciences component. The center will also have an area specifically devoted to establishing links with the various sectors of society.

Institute of Ecology, AC, Xalapa, Veracruz

This institute carries out research and higher education in the areas of biodiversity, conservation and systematics, aimed at the rational use of ecosystems through a better knowledge of the mechanisms and processes taking place, rather than of the species themselves. A good deal of the research and educational projects include multidisciplinary activities involving ecology, economics, systematics, social psychology, sociology and anthropology. The institute was a pioneer in the creation of Biosphere Reserves where the inhabitants are involved in conservation activities. Social agreements are fostered among the productive sectors having a stake in the biosphere resources, thus contributing to solve conflicts of interest. The institute offers doctorate degrees in ecology and resource management, with a strong involvement of scientists in their social environment, and has centres in six Mexican cities (Xalapa, Chihuahua, Durango, Mapimí, La Michula, Pátzcuaro).

The College of the South Border (ECOSUR), Chiapas

This research centre is located in a region of major social conflict, in the south of Mexico,