

Organisation for Economic Co-operation and Development  
Directorate for Education  
Education Management and Infrastructure Division  
Programme on Institutional Management in Higher Education (IMHE)

**Supporting the contribution of Higher Education Institutions to  
Regional Development**

**Peer Review Report:**

***Northern Paraná  
Brazil***

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The views expressed are those of the authors and not necessarily those of the OECD or its Member countries.

*This Peer Review Report is based on the review visit to Brazil in August 2006, the regional Self-Evaluation Report, and other background material. As a result, the report reflects the situation up to that period. The preparation and completion of this report would not have been possible without the support of very many people and organisations. OECD/IMHE and the Peer Review Team for the Northern Paraná region in Brazil wish to acknowledge the substantial contribution of the region, particularly through its Coordinator, the authors of the Self-Evaluation Report, and its Regional Steering Group.*

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## PREFACE

We have written this report with three main readerships in mind. The first is the people working together to nurture the development of Paraná, a diverse and dynamic state in the southern part of Brazil in which the region of Northern Paraná was chosen as a case in point for the purposes of this review. We hope that the report will help them along their path of partnership between the region and its universities to guide and bring about the balanced development of the region. Our primary consideration is to give back to the region something of value that will contribute to further development.

Secondly, the report is intended to be of interest, relevance and benefit to others in Brazil concerned about balanced national and regional development and to those interested in making higher education institutions central actors in such a process. Over recent decades, Brazil has experienced substantial economic growth and modernisation, reaffirming its place as the largest economy and most powerful economic engine in South America. With the rapid development accelerated by increased trade within the Mercosur region and an aggressive international trade agenda, the pace of change for regional and local governments has quickened. Nonetheless this review suggests that further changes are required if a region like Northern Paraná is to develop effectively and its universities are to play a full part in that process.

Thirdly there is the Organisation for Economic Cooperation and Development (OECD) and the Higher Education Funding Council for England (HEFCE) which commissioned, and along with the region itself, “own” this review. The interest of these partners is in learning internationally about the role of higher education in regional development across regions in a number of countries, mostly members of OECD with exception of Brazil, that are taking part. In addition we hope to interest a wider international readership, and to provide something of value to regions both within and beyond the OECD that are not included directly in this project.

Our report is written in a way that seeks to be comprehensible and useful to all these potential readers, with a minimal number of assumptions about local knowledge and as few acronyms as possible. We have drawn upon the substantial Northern Paraná regional Self-Evaluation Report (SER) available on the OECD website.<sup>1</sup> Readers requiring more background data should refer in particular to that study. We have departed little from the initial draft OECD reporting template in the interest of facilitating inter-regional comparison.

We are grateful for the generous hospitality of those who prepared the SER and hosted the Review visit from 20 to 26 August 2006.

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1 . See [www.oecd.org/edu/higher/regionaldevelopment](http://www.oecd.org/edu/higher/regionaldevelopment)

## EXECUTIVE SUMMARY

### *Background: OECD/IMHE review*

This review of the Northern Paraná region in Brazil is part of the OECD/IMHE project entitled Supporting the Contribution of Higher Education Institutions to Regional Development which embraced 14 regions in 12 countries in 2005/2006. The IMHE thematic review project was launched as a response to a multiplicity of initiatives across OECD countries seeking to mobilise higher education in support of regional development. The aim was to synthesise this experience into a coherent body of policy and practice to guide higher education institutions and regional and national governments. At the same time, the IMHE project was designed to assist with capacity-building in each country/region through providing an opportunity for dialogue between HEIs and regional stakeholders and clarifying roles and responsibilities.

### *Review process*

The Peer Review drew on a self-evaluation process guided by an OECD template. This asked HEIs to critically evaluate, with their regional partners and in the context of national higher education and regional policies, how effective they were in contributing to the development of their regions. Key aspects of the self evaluation related to: the contribution of research to regional innovation; the role of teaching and learning in the development of human capital; the contribution to social, cultural and environmental development and the role of the HEIs in building regional capacity to act in an increasingly competitive global economy.

The Northern Paraná self-evaluation was coordinated by a team of researchers from the Federal University of Paraná (UFPR) commissioned by the State Secretary for Science, Technology and Higher Education (SETI). Participation from higher education institutions, government-related agencies and businesses was pursued.

The direct costs of the project were covered by the state government. The OECD review visit took place on 20-26 August 2006. The Peer Review Team – José Ginés Mora-Ruiz (Spain), José Ferreira Gomes (Portugal), Paulo Haddad (Mexico) and Francisco Marmolejo (Mexico) – met with more than 88 people from universities, government agencies, community based organisations and companies.

### *The Northern Paraná region*

Paraná is a state located in the southern part of Brazil. With an area of 199 554 km<sup>2</sup>, it represents 6% of the Brazilian GNP and 5.62% of the total population. It has a unique racial composition in Brazil: whites represent almost two-thirds of the population. Paraná's capital city is Curitiba with a greater metropolitan population of close to 2 million. Curitiba is rapidly becoming the site of new investments in the Brazilian automobile industry.

The State of Paraná is divided into municipalities. For analytical purposes the Brazilian Institute of Geography and Statistics (IBGE) has divided the state in ten regions, which have no formal government authority. One of these "regions" is Central-Northern Paraná, which is the second most important region in Paraná composed of 71 municipalities. These include Londrina and Maringá, the two biggest cities after

Curitiba, each hosting one of the two main state universities in Paraná and each making their own efforts to develop their respective microregions.

Thus, the region of North Paraná has, to some extent, a fuzzy identity. It is a “statistical region” but does not have an overseeing political or administrative structure. In addition, its integration in the State of Paraná is also weak as a consequence of its distinct migratory settlement patterns. The region’s settlement and development around the 1950s was motivated by coffee bean plantations, which have declined since the middle of the 1970s. Since the 1980s, the economy of the Northern Paraná has achieved good results, mainly thanks to the agribusiness industry; a regional specialisation in services; and growth in a variety of industries such as clothing, fabrics, furniture, food, alcohol, plastics and mechanical parts.

Northern Paraná has one of the highest standards of living in Brazil. While it is performing positively in economic and social terms, it has been losing its relative position in the state economy since the 1970s. The regional economy, however, has great potential to grow at a faster rate than the state economy and even the national economy, especially in the areas of biotechnology, bio-energy, consumer goods, and agro-industrial food production. The favourable perspectives for economic development highlight the question of the role to be played by higher education institutions in the development strategies.

### ***Higher education institution’s contributions to region building***

Paraná is one of the few states where the state system of higher education is larger than the federal system. Its expenditures reach 7% of state revenue. The state system includes five universities and 11 faculties with a total enrolment of 70 510 students representing 24% of the total enrolment of 292 018 higher education students. In Northern Paraná, only 4.7% of the 18-22 year-old youth enter higher education, a figure well below the Brazilian average of 7.6%, which, in turn, is rather low when compared with other Latin American countries.

Higher education in Paraná includes one federally funded university located in the capital of the state, five state funded universities and a variety of privately owned institutions. Two of the state funded institutions are located in the Northern region: the State University of Londrina (UEL) and the State University of Maringá (UEM). Together, the two institutions represent 50% of the total student population enrolled in state universities in Paraná. They offer 45% of all undergraduate courses, 56% of specialization courses, 80% of master courses and 100% of doctoral programs made available by state universities in Paraná. In addition, there is a variety of private higher education institutions which complement the academic offerings of the state universities including UNOPAR, CESUMAR and UNIFIL.

HEIs in Northern Paraná are non-substitutable regional protagonists because government and business sector have proposed plans for the future of the region including activities which are intensive in scientific and technological knowledge and which are essential part of the HEIs’ institutional missions. These development strategies cannot be implemented without the strong and continuous action of HEIs in the region. HEIs are prepared to promote consistent research and innovation to deal with the economic, social and environmental issues of the sustainable development processes of Northern Paraná. Also, a new national legal framework has been set up to induce research programs from higher education institutions towards more active and effective regional engagement.

However, some obstacles need to be overcome if universities are to be fully engaged in region building. These include: (1) limited organisational flexibility in HEIs; (2) a lack of institutionalized system of financial incentives for engagement in regional innovation, ideological tension inside HEIs; (3) limited vision and capacity in SMEs in the region; (4) limited collaborative framework among industry and HEIs; (5) outdated research infrastructure in HEIs in the region; and (6) a lack of policy for innovation at the regional level.

The study program offerings of the state universities are ample and, in general, appear to be responsive to local needs and to the requests of the local community. While the efforts made by many members of the university community to respond to societal needs are commendable, there is also ideological resistance among staff to partnerships with industry. Systematic channels of communication between society and universities for curricular reform remain limited. Despite recent increase in academic collaboration between higher education institutions, there is an evident need for more coordination and collaboration among them.

### ***Key points of the review***

This report and the reports from other regions participating at this OECD project will be a useful tool that can be used by higher education institutions and regional stakeholders as a catalyst to start a beneficial development spiral that many with whom we spoke would like to see and contribute to. This Peer Review Report includes a number of specific recommendations for the federal, state and local governments, business and community-based organizations, and higher education institutions designed to assist with the evolution of policy and practice of the higher education system in Paraná. The following paragraphs highlight some of the most important themes underpinning these specific recommendations.

### ***The national perspective***

In recent years, Brazil has experienced rapid growth and transformation in higher education in an environment characterized by demographic pressures, political diversification, economic globalization, and government decentralisation.

As the country faces the need to play a more effective role in the knowledge-based society, higher education institutions in Northern Paraná, with the active involvement of the business sector and the state government, are in a unique position to develop and implement a strategic partnership for regional engagement. This could be used as a basis for a constructive dialogue with the national government and the key ministries involved, as well as with the broader national higher education community, the business sector and other important actors to further review and implement necessary changes to issues such as funding mechanisms, regulations for quality assurance, institutional governance, levels of flexibility in the offering of academic programs, contracting of academic staff and internationalisation of institutions.

### ***The regional perspective***

There is perceived competition between the two main cities, Maringá and Londrina. The two poles of the Maringá-Londrina Axis have a lot of similarities from an economic and social point of view. In this sense, North Parana is a region with shared interests but without a formal structure for building cooperation and a common future. The relevance of a jointly configured Maringá-Londrina Axis would be much greater than the relevance of each city independently. It is therefore critical to develop a regional economy and society that can face the competitive world with confidence. The region could become an economic pole of reference at the national level and an attractive site for inward investments. Some steps have already been taken to this direction, including the creation of joint institutions at a micro-regional level, aimed at developing a more prosperous future together. These serve as a good example of the promotion and development of collaboration, including institutional collaboration between universities.

The concept of a stronger and more consolidated region will be beneficial for all the citizens. That is why it is critical that municipal authorities, employers, development associations, and social entities take a more proactive role in seeking regional integration. It also implies that HEIs in the area become active partners in the development of this regional capacity.

The various HEIs in Northern Paraná must work more effectively, both separately and together as a system. This is only likely to take place if there is firm leadership and direction from the state government in establishing a higher education plan and system and in creating an appropriate regulatory framework, funding mechanisms, quality assurance mechanisms and incentive systems (institutional and individual) that align with these purposes and needs.

On the one hand the government of Paraná should use its influence to persuade and require that universities adapt in this way. It is apparent that the institutional missions of the HEIs need to be clarified and diversified to better serve the community. On the other hand, the state government, together with the universities and other regional stakeholders, should lobby and persuade the national government to make the required legal, regulatory and financial changes that will allow the region and its higher education institutions to more effectively address the challenges ahead. HEIs will need to have strengthened autonomy to be able to become more entrepreneurial.

This review process has stimulated dialogue in Northern Paraná about the importance of higher education in the region's development. This opportunity should be seized to develop a stronger consensus and working agenda for higher education action in and for the region. This is a process not to be left to higher education institutions alone, but a participatory one in which relevant stakeholders should be actively engaged. This will lead the region to further appreciate the importance of higher education, to better use the talents and capacity of higher education institutions, to refine the work that related government and state agencies conduct, to engage the business sector in a more responsive way, and to foster necessary change in the higher education sector by abandoning some old attitudes and habits, and create the channels and means for working together.

### *The HEI perspective*

In recent decades, Brazilian higher education institutions have developed a strong interest in research but limited involvement in fostering regional development. Although some groups of researchers are dedicated to innovation, these ideas are not a main driver of public universities. The worldwide trend is to transform universities to become more entrepreneurial and active in using their potential to act as engines of social, cultural and economic development. These changes are bringing additional resources to universities – essential to coping with current and future challenges. These universal trends are not yet apparent or strong enough in HEIs in the Northern Paraná region.

Teaching activities in Northern Paraná universities seem to be focused on the provision of traditional knowledge and less on general competences and transferable skills which are considered the paradigm for preparing individuals able to compete in the knowledge society. HEIs in the region must start a process of reflection about their new mission and roles in the knowledge economy and the way to better accomplish these functions. There is a need to review the social role of universities in the region with regards to the problems of access, equity and low participation in higher education and to implement measures to address these issues. Creating a more diversified teaching portfolio including shorter degrees and continuing education courses could better serve the needs of the region and its population.

HEIs also need to initiate a process of collaboration with the objective of strengthening their positions in the academic world and in the social and economic development of the region. In particular, public universities must develop better and more efficient systems of communication and collaboration to combine efforts in research and teaching and transform themselves into partners, to take a proactive role and become the engine for the economic and social development at the regional level and to explore more collaboration with private institutions, especially for teaching activities.

## ***Conclusion***

The state of Paraná and Northern Paraná are facing major challenges which have profound implications for both higher education and territorial development. If the stakeholders in the region address regional capacity building as an urgent task, the region and its universities can turn their distinctive features to their advantage. The process of reflection initiated by the OECD review may serve as a good basis for a comprehensive process aimed at further improving the interface between higher education and the wider society regionally. It is up to the region and its main stakeholders to move ahead.

## ABBREVIATIONS AND ACRONYMS

<b>ACRONYM</b>	<b>ENGLISH</b>	<b>PORTUGUESE</b>
<b>ACIM</b>	Commerce and Industry Association of Maringá	Associação Comercial e Industrial de Maringá
<b>ADETEC</b>	Association for Technological Development in Londrina and its Region	Associação de Desenvolvimento Tecnológico de Londrina e Região
<b>AMUSEP</b>	Association of Municipalities from the Northern Region of Paraná	Associação de Municípios da Região Setentrional do Estado do Paraná
<b>CAPEs</b>	Federal Agency for Training and Development of Higher Education Academic Staff	Coordenação de Aperfeiçoamento de Pessoal de Nível Superior
<b>CETs</b>	Technological Education Centres	Centros de Educação Tecnológica
<b>CESUMAR</b>	Maringá University Centre	Centro Universitário de Maringá
<b>CNE</b>	National Education Council	Conselho Nacional de Educação
<b>CNPq</b>	National Council for Scientific and Technological Development	Conselho Nacional de Desenvolvimento Científico e Tecnológico
<b>CODEL</b>	Londrina's Development Corporation	Companhia de Desenvolvimento de Londrina
<b>CODINES</b>	Council of Higher Education Institutions' Presidents	Conselho de Dirigentes de Instituições de Ensino Superior
<b>FAFIPAR</b>	State Faculty of Philosophy	Faculdade Estadual de Filosofia
<b>FINEP</b>	Federal Financing Agency for Studies and Projects	Financiadora de Estudos e Projetos
<b>FTE / ETI</b>	Full time equivalent	Equivalente a tempo integral
<b>GDP / PIB</b>	Gross Domestic Product (GDP)	Produto Interno Bruto (PIB)
<b>HEI</b>	Higher Education Institutions	Instituições de Ensino Superior

<b>HDI</b>	Human Development Index	Índice de Desenvolvimento Humano
<b>IBGE</b>	Brazilian Institute of Geography and Statistics	Instituto Brasileiro de Geografia e Estatística
<b>IMHE</b>	OECD's Institutional Management in Higher Education Programme	Programa de Gestão de Instituições de Ensino Superior da OCDE
<b>MCT</b>	Federal Ministry for Science and Technology	Ministério da Ciência e Tecnologia
<b>MEC</b>	Federal Ministry of Education	Ministério da Educação
<b>MERCOSUR / MERCOSUL</b>	Southern Common Market	Mercado Comum do Sul
<b>NP</b>	Northern Paraná's Region	Região Norte do Paraná
<b>OECD / OCDE</b>	Organisation for Economic Co-operation and Development (OECD)	Organização para a Cooperação e o Desenvolvimento Económico (OCDE)
<b>OTRPC</b>	Office for Transference of Research Outcomes to the Community	Órgão de Transferência dos Resultados de Pesquisa para a Comunidade
<b>PRR</b>	Peer Review Report	Relatório de Avaliação Externa
<b>PRT</b>	Peer Review Team	Comité de Avaliação Externa
<b>R&amp;D / P&amp;D</b>	Research and Development (R&D)	Pesquisa e o Desenvolvimento (P&D)
<b>SEBRAE</b>	Brazilian Agency for Small and Medium Size Companies	Serviço Brasileiro de Apoio a Pequena e Média Empresa
<b>SER</b>	Self-Evaluation Report	Relatório de Avaliação Interna
<b>SETI</b>	State Secretary for Science, Technology and Higher Education	Secretaria de Estado da Ciência, Tecnologia e Ensino Superior
<b>SINAES</b>	National System for Evaluation of Higher Education	Sistema Nacional de Avaliação da Educação Superior
<b>SME</b>	Small and Medium Size Enterprise	Pequena e Média Empresa
<b>SRC</b>	Steering Regional Committee	Comité Regional do Projeto OCDE/IMHE
<b>SWOT</b>	Strengths, Weaknesses, Opportunities and Treats	Pontos fortes, pontos fracos, oportunidades e ameaças

<b>UEM</b>	State University of Maringá	Universidade Estadual de Maringá
<b>UEL</b>	State University of Londrina	Universidade Estadual de Londrina
<b>UEPG</b>	State University of Ponta Grossa	Universidade Estadual de Ponta Grossa
<b>UFPR</b>	Federal University of Paraná	Universidade Federal do Paraná
<b>UNICENTRO</b>	State University of Central West	Universidade Estadual do Centro-Oeste
<b>UNIFIL</b>	Philadelphia University Centre	Centro Universitário Filadélfia
<b>UNIOESTE</b>	State University of West Paraná	Universidade Estadual de Oeste de Paraná
<b>UNOPAR</b>	University of Northern Paraná	Universidade Norte do Paraná

## 1. INTRODUCTION

### 1.1 Evaluation context and approach

This review of the Northern Paraná region in the State of Paraná, Brazil is part of the OECD/IMHE project entitled *Supporting the Contribution of Higher Education Institutions to Regional Development*. The project involves the participation of fourteen regions across twelve countries.

The project was initiated by OECD/IMHE in spring 2004 in response to a wide range of initiatives across OECD countries to mobilise higher education in support of regional development. There was a need to synthesise this experience into a coherent body of policy and practice that could guide institutional reforms and relevant policy measures such as investment decisions seeking to enhance the connection of higher education institutions (HEIs) to regional communities. Current practice needed to be analysed and evaluated in a way that was sensitive to the varying national and regional contexts within which HEIs operate.

The aim of the IMHE project is to compare and evaluate the efficiency and effectiveness of regional initiatives and partnerships, to provide an opportunity for dialogue between higher education institutions and regional stakeholders, to assist with identification of roles and responsibilities of stakeholders, to provide advice at the national level on the impact of policy initiatives e.g. funding initiatives at a regional and institutional level, and to lay the foundations of an international network for further exchange of ideas and good practice.

Each of the participating regions has been engaged in a self-review process followed by site visits by international review teams. Participating regions have designated Regional Co-ordinators and Regional Steering Committees (RSC) to oversee the process. Each regional review is conducted by an International Peer Review Team with two International Experts, one being the Lead Evaluator, as well as a Domestic Expert and a Team Co-ordinator. The entire project is coordinated and led through project management at the OECD secretariat and a Project Task Group which is also charged with the task of nominating the members of the Peer Review Teams. Each regional review produces two independent reports, a Self-Evaluation Report (SER) and a Peer Review Report (PRR). All reports are published online on the OECD project website for the benefit of the participating regions and a wider audience. A final OECD synthesis report, drawing from the experiences of the participating regions and a comprehensive literature review, will follow in 2007.

The focus of the IMHE project is on collaborative working between the higher education institutions and their regional partners. It seeks to establish a regional learning and capacity-building process.

Northern Paraná is the only region from a non-member OECD country participating in this IMHE project.

## 1.2 The conduct of the evaluation

### *Self-evaluation process and Self-Evaluation Report (SER)*

The self-evaluation exercise of the Northern Paraná region was coordinated by a team of researchers from the Federal University of Paraná (UFPR) commissioned by the State Secretary for Science, Technology and Higher Education (SETI). Active participation from higher education institutions, government-related agencies and businesses was sought.

The entire direct cost of the project was approximately EUR 88 000 which was covered by SETI. In addition, it is calculated that the equivalent to EUR 8 000 were provided by the various participating institutions as in-kind contributions, mostly accounting for the time dedicated to the project by participating staff.

A Regional Steering Committee (RSC) was formed for the project. It was composed of the rectors of the state universities in the State of Paraná. The RSC was chaired by Prof. Lygia Lumina Pupatto, former rector of *Universidade Estadual de Londrina* (UEL) and current State Secretary of SETI; and Prof. Cássio Frederico Camargo Rolim, professor of economics at UFPR, served as Regional Coordinator for the project.

The Self-Evaluation Report was written by the Regional Coordinator and Prof. Mauricio Aguiar Serra, current Coordinator of Graduate Programs in Economic Development at UFPR, with important input provided by researchers from the two state universities in the region under review: *Universidade Estadual de Londrina* (UEL) and *Universidade Estadual de Maringá* (UEM). The first draft chapters were produced in June 2006.

A pre-visit by Prof. José Ginés Mora, the Lead Evaluator and Mr. Francisco Marmolejo, from the OECD/IMHE Secretariat took place on 19-20 June 2006. It included meetings with the rectors from the participating HEIs, the authors of the self-evaluation report, and a variety of stakeholders including government agencies, business organisations, research centres, community-based organisations and universities. Meetings were held in the cities of Londrina and Maringá. The main objectives were to prepare for the OECD review visit in August 2006, to achieve a shared understanding of the processes and objectives of the review, to develop a first draft for a potential program of the review visit and to discuss the logistics. The authors of SER took the opportunity of the pre-visit to organise two formal meetings in which stakeholders conducted a SWOT analysis both in Londrina and Maringá. The outcomes of the SWOT analysis were later used in the development of the SER.

During the pre-visit the PRT members got the impression that stakeholders had positive opinion about the importance of the universities. However, in some cases their understanding of the purpose and the process of the review were unclear. It was also evident that the writing team needed to do additional work to produce a final version of the SER attuned to the project guidelines and inclusive of other stakeholder perspectives.

### *International peer review*

The international Peer Review Team (PRT) was comprised of Prof. José Ginés Mora-Ruiz (Spain) as the Lead Evaluator, Prof. José Alberto Ferreira Gomes (Portugal) as the second International Expert, Prof. Paulo Haddad (Brazil) as the Domestic Expert, and Mr. Francisco Marmolejo (Mexico) as the Team Co-ordinator.

In August 2006 the first full draft of the Self-Evaluation Report was submitted to the Peer Review Team. This document was distributed for feedback among regional stakeholders during the OECD review visit which took place from 21 to 26 August 2006.

The review visit included a total of 14 meetings in which over 88 individuals participated. The team met with the rectors of different universities and their respective leadership teams, business sector representatives, government agencies and community leaders among others. Most of the activities were held in Maringá and Londrina, although the initial and wrap-up meetings were held in Curitiba, the capital of the state (see appendix 3 for the full program of the visit).

All the meetings were conducted in Portuguese and Spanish without any difficulties.

### ***Future plans***

The Northern Paraná SER represents a major piece of ground-breaking work for the region. There is no recollection of a similar effort being conducted in the past. Issues discussed, and recommendations made by the Peer Review Report could be used and even emulated to the benefit of the State of Paraná and in other regions of Brazil. Some of the recommendations being issued by PRT have implications at a national level. It is advisable for Paraná to continue the work begun through their participation in the project, including efforts to disseminate the results of the review to the general public in the region, and to hold a symposium involving stakeholders and a wider interest group around the issues.

*The Peer Review Team recommends that those involved with this review in Northern Paraná undertake efforts to further disseminate the results and use the project as a basis for discussions at institutional, regional state and national levels.*

### **1.3 The structure of this report**

Chapter Two provides a panoramic view of the environment in which the Northern Paraná review took place and analyzes the role of HEIs in the development of the region within the state and national higher education policy contexts.

Chapter Three examines issues associated with the contribution of research and innovation to regional development in Northern Paraná, while Chapter Four discusses teaching and learning in a parallel way. Chapter Five considers the social, cultural and civic contribution of HEIs to the region.

Chapter Six looks into capacity-building for regional cooperation in Northern Paraná. In the final chapter we provide a summary of the conclusions both for the region and for wider comparison, drawing together the various recommendations that arose in preceding chapters.

## 2. THE NORTHERN PARANA REGION

### 2.1 The region: A brief description

Paraná is a state located in the southern part of Brazil. With an extension of 199 554 km<sup>2</sup> – equivalent to 2/3 the size of Italy – Paraná represents around 6% of the Brazilian GNP and 5.62% of the total population of the country. Its capital city is Curitiba, with a greater metropolitan population of close to 2 million. Curitiba is rapidly becoming the site of new investments in the Brazilian automobile industry. Londrina and Maringá – both in the northern region – are the second and third largest cities respectively.

The State of Paraná has one of the highest standards of living in Brazil. Its economic power, on one hand, is mostly due to its modern and high intensity agriculture. On the other hand, the state's capital, Curitiba, has important electrical and electronic and metal-mechanical industries. It also hosts major automobile companies such as Volvo, Renault, Audi and Chrysler.

Paraná's racial composition is unique in comparison with the rest of the country since whites represent almost two-thirds of the population. Substantial inflows of immigrants beginning a century ago have made Paraná the state with the largest number of inhabitants of Eastern European descent and the second largest number of inhabitants of Japanese descent.

The State of Paraná is divided into municipalities. For analytical purposes, the Brazilian Institute of Geography and Statistics (IBGE) has divided the state in ten regions, although there is no formal government authority established at such a level. In other words, these regions are supposed to be a basis for administrative decentralization, but are actually used merely for geographical and statistical reference. One of those "regions" is known as Central-Northern Paraná, which is the second most important region in Paraná composed of 71 municipalities including Londrina and Maringá, the two biggest cities after Curitiba, each hosts one of the two main state universities in Paraná.

**Fig. 2.1 Northern Paraná**



Source: IBGE. 2006

### 2.2 The economic circumstances and the development dynamics of the region: Past and future

Northern Paraná is a developing region. A recent study prepared for the Brazilian Ministry of Planning shows that among the 5 507 municipalities of Brazil, the 71 located in the Northern Paraná region can be classified as a cluster of developing areas with high or medium endogenous capacity. These

municipalities have social and political capacity to mobilize local and regional resources in order to solve their socioeconomic problems and realize their economic potential.

At the state level, Northern Paraná is the second most important region, second only to the Metropolitan Area of Curitiba. This region's settlement and development around the middle of the 20th Century was motivated by coffee bean plantations, which have declined since the middle of the 1970s due to the economic slowdown in the results of this harvest as well as of climatic problems. Normally, regions which have agricultural commodities as their economic base, suffer from the eventual deterioration of their terms of trade, and are also vulnerable to adverse climatic changes. Their business cycles are unstable and somewhat erratic, making them unlikely to support a long, sustained period of economic growth for their inhabitants.

**Fig. 2.2 Regional distribution in Paraná.**



Source: IPARDES. 2003

Since the 1980s, the economy of the Northern Paraná region has achieved good results through exploiting the value chain of agribusiness: (1) the cultivation of soybeans and cattle raising have increased remarkably; (2) industries related to the agribusiness productive subsystem have concentrated some of their activities in the region; and (3) the region has developed a tradition of organising big cooperatives which distribute agribusiness products.

In addition, the main urban centres in the region have experienced a growth in a variety of industries such as clothing, fabrics, furniture, food, alcohol, plastics and mechanical parts. However, it is worth noting that due to the accelerated urbanization process along the Londrina-Maringá axis, the services sector has become the major economic sector in the region.

The economic diversification of the Northern Paraná region has brought wealth and prosperity to its inhabitants as indicated by some selected economic and social indicators (Self-Evaluation Report, Chapter 1):

- In 2003, the region's share of Paraná's GDP was 16.14% and 1.03% of the total Brazilian GDP;
- In 2002 the region's population represented almost 20% of the total population of the State of Paraná;
- In 2002, the region was responsible for 10% of the total industrial exports of Paraná;

- The region is the most important producer of sugar cane in Paraná, and the second largest producer of soybean and corn;
- The Human Development Index (HDI) was equal to 0.74 in 2000 for the average of 71 municipalities of the region; this average was equal to 0.67 in 1991. In 2000 three municipalities in the region could be classified as having a high (> 0.80) HDI: Maringá (0.841), Londrina (0.824) and Ibiporã (0.801).

Despite the favourable socioeconomic indicators, the region has been losing its relative position in the state economy since the 1970s. At that time, the region had more than 25% of the total economic value added in Paraná; nowadays, it has only 16%, mainly due to the emergence of the Metropolitan Area of Curitiba as a new locus for Brazilian industry. This loss in relative position is confirmed by many other economic indicators. As a case in point, the participation of the region in the total value of fiscal revenues in the industrial sector of Paraná has decreased from 14.6% in 1989 to 10.9 in 2000; a similar decline can be observed in the primary sector (from 23.6 % to 15.8%) and in the service sector (from 22.8% to 15.2%).

There could be a strong reversal in this situation since the region has significant potential to grow at a faster rate than the state and even the national economies in the next years. In a study prepared in 2005 by the Spanish Agency OPTI for the SENAI/FIEP, using the methodology of “future technology analysis”, the conclusions suggest that the most promising sectors and technological areas for the State of Paraná, looking forward to 2015, are:

- biotechnology applied to the agricultural and forestry sectors;
- bio-energy (ethanol and bio-diesel);
- consumer goods with innovative designs and production technologies;
- agro-industrial food production with innovations in conservation and packaging processes and functional food products;
- biotechnology applied to health services and products.

This study also suggests that the technological development of the Northern Paraná region should be concentrated in the following three strategic areas:

- the development of biotechnology related to its applications in soybean and agro-energy products;
- the creation of a Technological Centre for the agro-industry of food products; and
- the technological modernization of the furniture and clothing industries.

The favourable perspectives for the economic future of the region raise the question of the role to be played by higher education institutions in these development strategies. This role can be considered to have a dual dimension. On one hand, in the Northern Paraná region, HEIs are non-substitutable regional protagonists because all the proposed objectives for the future of the region as well as the future of Paraná include activities which are intensive in scientific and technological knowledge and which are essential part of the HEIs’ institutional missions. These development strategies cannot be implemented without a strong and permanent action of the HEIs in the region. On the other hand, Maringá and Londrina, the two

main cities in the region are transforming themselves from regional metropolises into medium-sized cities of national importance in the upper hierarchy of urban centres in Brazil.

To accelerate this process of upgrading their status in the national urban system Maringá and Londrina can count on two factors: (1) they are constantly being included in the list of cities which present the most favourable location factors for the spatial distribution of activities in the new expansion cycle of the Brazilian economy in the next two decades; (2) although agribusiness and non-heavy industries are important for future regional economic prospects, Maringá and Londrina see the services activities emerging very intensively and in a sustained way in their economic structure. This process will enhance the importance of high-technology services, where the HEIs need to play a prominent role. This is more than a mere hypothesis. It is a challenge that needs a response. As Seneca says: “there is no favourable wind for he who doesn’t know where he wants to go”.

### **2.3 Higher education in Northern Paraná**

Higher education in Paraná includes one federally funded university located in the capital of the state, five state funded universities and a variety of privately owned institutions. Two of the state funded institutions are located in the Northern region: the State University of Londrina (UEL) and the State University of Maringá (UEM). Both institutions represent 50% of the total student population enrolled in state universities in Paraná. Together they offer 45% of all undergraduate courses, 56% of all specialization courses, 80% of all master courses, and 100% of all doctoral programs made available by state universities in Paraná. In addition, there is a variety of private higher education institutions which complement the academic offerings of the state universities in a significant way, including UNOPAR, CESUMAR and UNIFIL.

### **2.4 Relevant local, state and national socio-political dimensions**

Since 1990, Brazil has faced many challenges and obstacles to the development of its political and institutional agenda in order to ensure a smooth transition from the autocratic military regime established in 1964 to an open democratic society, passing through the 1988 Constitutional reform. The stage was set at the end of the 1980s for an experiment in democratization and inflation stabilization in which economic, social and political factors have been intertwined in a complex web. As a result of this process, the political decision-making autonomy of state and local administrations has been re-established after a long period of dependency on the economic instruments and mechanisms controlled by the central government.

The higher degree of autonomy granted to states and municipalities has led them to choose, with more political freedom and administrative flexibility, their own economic and social priorities in conceiving and implementing public policies, since they had, as a result, more fiscal resources to manage and greater control over economic instruments.

Some of the sub-national governments such as the State of Paraná and the municipalities of Maringá and Londrina decided to allocate a greater share of their public expenditure to higher education institutions. Their argument was that the lack of sufficient and adequate knowledge, in terms of general education, professional training and scientific and technological capabilities, is a major stumbling block for the development of regions and localities.

They argued that they had a set of unique socioeconomic characteristics that could produce better economic results if regional growth potentialities were unleashed by investing a greater share of fiscal resources in improving their education system. These characteristics include the dynamism and flexibility of the regional and local entrepreneurial class and labour force which have shown a great capacity to adapt

– when adequately stimulated – to a new, more globalized environment with economic uncertainties and increasing competition.

In general, the economic growth of Brazil and its regions has been constrained by the intractability of high inflation, the overwhelming intervention of government in the economy, and the excessive protection given to domestic industry over many decades. Accelerating the processes of privatization, deregulation and foreign trade liberalization would facilitate the unfettered development of the Brazilian economy. Improving the allocation of resources and enhancing the mobilization of domestic and external savings would reactivate the immense potential of the country for growth within a new model of economic and social development for the coming decades. This model should be based on three socioeconomic vectors:

- *Competitive transformation:* in an era of economic globalisation, Brazil should restructure many segments of its productive system, abandon economic activities based on “artificial” competitiveness (such as those activities based on fiscal exemptions, financial subsidies, overexploitation of a surplus of labour, degradation of the ecosystem) and identify areas of competitive advantage;
- *Social equity:* Brazil has some of the worst social indicators among Latin American countries, and one of the largest gaps in concentration of income and wealth distribution in the world. In Brazil, the concept of poverty has gone through various definitions;<sup>2</sup>
- *Sustainability:* during the periods of accelerated economic growth that have occurred since World War II, Brazil has shown little regard for the impact of private and even public investments on the environment. It is not surprising, therefore, to find a long list of well-known ecological disasters in investments such as the construction of dams and of irrigation systems, and mining activities. All new expansion cycles should incorporate the concept of sustainable development, so that the rates of use of renewable and non-renewable resources fall below their recovery and maintenance rates (given the available technological changes and economic opportunities).

Even considering the effort made in the last fifteen years to deal with the improvement of these three socioeconomic vectors, there is a lot of work to be done, since:

- The number of children living in extreme poverty conditions and in need of having an efficient educational system available to develop their future opportunities is growing;
- According to UNICEF, in 2002 Brazil has spent only 4.15% of its GDP on education, while Bolivia, in turn, has spent 6.22% of its GDP; in 2000, the average number of years of schooling for the population group older than 15 years was 4.88 in Brazil, 8.83 in Argentina, 7.55 in Chile, 7.23 in Mexico and 6.18 in Paraguay;
- In 2005, Brazil has one of the lowest trade coefficients (exports plus imports divided by GDP) in a group of 68 countries analysed by the International Monetary Fund and the World Bank;

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2 . In the 1950s, poverty was understood as a relative phenomenon – represented by the number of families unable to follow the consumption patterns of those who are better off. In the 1960s and 1970s, as a result of the processes of heavy industrialization, accelerated urbanization and a growth pattern benefiting primarily the top deciles, poverty came to be perceived as an absolute phenomenon – represented by the number of families living below a standard of consumption that was regarded as the minimum necessary for the civilized reproduction of human beings. Finally, poverty came to depict a new dimension (often referred to as “Asian poverty”) – an increasing number of families living miserably on the outskirts of metropolitan regions and in the depressed rural areas, with no clear identification of their citizenship rights;

- In the last fifteen years, the yearly rate of growth of the Brazilian GDP per capita is equal to 0.9%, the lowest among all emerging countries.
- Even with the progress made in the last three years, the Gini Index, which measures the relative equality of income distribution by family,<sup>3</sup> is still around 60.7 in Brazil, an extremely high level by international standards.

The State of Paraná and the municipalities of Londrina and Maringá, in their quests for a new model of sustainable development, recognized the critical importance of investing in education and the production of knowledge, considering that they contribute in an unequivocal way to: (1) the dissemination of values, the ethical dimension and adequate social behaviour to develop modern citizenship and institutional capital; (2) engendering skills and capabilities indispensable to facing increasing international competitiveness based on technological progress.

In addition, improving political and administrative autonomy stimulated the municipalities of Maringá and Londrina to look for some innovative organisational experiences in public management such as the possibilities of envisioning and establishing a regional development axis (see Box 2.1) and organizing associations of urban centres within their areas of influence in order to obtain economies of scale in solving common problems of economic and social infrastructure.

#### **Box 2.1 : A regional development axis**

Whenever there is an efficient transportation and communications infrastructure linking two urban growth poles, such as Maringá and Londrina, there are many opportunities for planning a regional axis. This infrastructure is necessary but not a sufficient condition for the development of a regional axis. Development will take place only if there is a mobilization or an activation of regional and local socioeconomic forces and energies. Physical capital is important but social capital (human, institutional, etc.) is indispensable to inducing the idea of a regional development axis into an effective project. Basically, this project can only be conceived as a political and social construction. When the axis is well designed its advantages are innumerable:

- the growth poles increase their competitive advantages in the national urban system to attract new private and public investment projects in order to mobilize joint economic opportunities;
- the size of the regional market increases and creates conditions for additional activities that depend upon economies of scale;
- there are greater possibilities of integrating the planning objectives and strategies of different regional institutions by creating economies of scope;
- the regional political system is upgraded with regard to its capacity to secure external, national and international resources, benefiting all growth poles in the axis.

Recent international experiences show that the biggest obstacles to organizing a regional development axis are the lack of confidence and trust among community leaders to build a project of common interest and unfavorable political conditions to create an environment of cooperation. Ineffective communication inhibits productive dialogue within the private sector to build joint economic activities and between the private sector and the government to leverage synergies to the benefit of urban development. In the context of economic and financial globalization, the political leadership of growing urban poles may not be aware that there is the risk of a high degree of vulnerability to competition that can easily erode their present advantages often thought to be sustainable.

3. The Gini Index measures the extent to which the distribution of income (or consumption) among individuals or households within a country deviates from a perfectly equal distribution. A value of 0 represents perfect equality, a value of 100 perfect inequality. In accordance with the most recent U.N. Human Development Report (2003), Denmark ranks first in equality (Gini Index of 24.1) [http://hdr.undp.org/reports/global/2003/indicator/indic\\_126\\_1\\_1.html](http://hdr.undp.org/reports/global/2003/indicator/indic_126_1_1.html)

### 3. THE CONTRIBUTION OF RESEARCH TO REGIONAL INNOVATION

#### 3.1 Introduction: The role of innovation in regional development

Attracting new investment projects to a region can raise the rate of growth of its GDP. If this flow of new investments is sustained in the long run, the region may live a period of economic prosperity with the improvement in its main economic variables: GDP per capita, family income, tax base, business opportunities, *etc.* Long cycles of regional economic expansion can be supported by new economic activities such as the production of agricultural commodities or the extraction of mineral deposits. But this does not mean that the region is going through a process of sustainable development.

A regional sustainable development process includes critical elements, such as:

- a productive system dynamically competitive at a global scale;
- a persistent process of increasing social inclusion;
- a political commitment of regional communities to the protection and conservation of their natural environment;
- an increasing synchronization of intersectoral and territorial growth;
- an enlarging collective perception of belonging to the region.

Basically, what distinguishes traditional economic growth from sustainable development processes is the role of innovation. By innovation we mean the application of inventions of new production processes and methods to productive activities, as well as the introduction of new products. Innovation may also include the introduction of new social and institutional methods of organisation and management, associated with modern ways of conducting economic and social activities.

Therefore, innovation does not mean only the discovery of a new product (*e.g.* hybrid soybean), a new production process (*e.g.* a cheaper and more efficient way of producing soybean in the savannas) a new market (*e.g.* a new communication logistics to reach the Asian Pacific markets), or a new management process (*e.g.* a participatory decision making process). It also means modernization of ideals often regarded necessary for sustained economic growth, including rationality, economic planning, social and economic equalization and improved institutions and attitudes. In this sense, the organisation and the efficient operation of a regional development axis between Londrina and Maringá or the micro-regional association of the municipalities around Maringá (AMUSEP) to manage their social and economic infrastructure cooperatively may both be considered to be genuine innovations.

#### 3.2 How higher education institutions of Northern Paraná respond to regional innovation needs

In neoclassical economic growth theories, technical progress and innovations were considered to be exogenous (not explained within theories), as if they had “fallen from heaven”. Instead, we must understand how they are created by human beings and institutions, operating under the normal context of personal motivations and economic stimulus, trying to solve production problems and also social and environment malaises, learning from past experiences, *etc.* Innovation is thus a social construction that can be scientifically explained in terms of its failures and successes. Thus, the purpose of endogenous regional

growth theories is to seek some understanding of the interplay between technological knowledge and various structural characteristics of the regional economy and society.

When we look at the innovations needed to support the regional sustainable development of Northern Paraná, there is a fundamental consensus coming from various sources including the “*Conferência Estadual de Ciência, Tecnologia e Inovação*”, coordinated by SETI during the period 2003/2004; the document “*Setores Portadores de Futuro para o Estado do Paraná*”, a research financed by SENAI/FIEP and elaborated by OPTI in 2005; and the interviews made by the Peer Review Team with regional stakeholders. This consensus can be expressed in the following agenda:

#### *Economic Issues:*

Many economic activities in Northern Paraná, both industrial and agricultural, fail to create the necessary conditions for innovation because their comparative advantages are based on the availability of natural resources and cheap labour. These sources of advantage are highly imitable – be they raw materials, location, climate or cheap labour – and there will always be another location that has better natural resources or that can operate at a lesser expense.

In failing to differentiate their products or to diversify their activities into more attractive productive segments which pay a higher price-premium, many regional firms keep doing their traditional business where market competition in terms of cost is fierce, profit margins are lower and dependence on exogenous variables such as exchange rates or financial subsidies are high.

Therefore, an agenda of science, technology and innovation for the economic transformation of the regional productive system of Northern Paraná can be concentrated in some strategic areas, such as: biotechnology applied to any number of a variety of product options in the soybean industry (soybean oil products, whole soybean products and soybean protein products), to modern health services and products, and to efficient bio-energy (ethanol and bio-diesel); modernization of agro-industrial, textile and furniture industries (design, new products and processes, forward and backward integration, clustering, *etc.*) with a broad competitive scope with clearly differentiated products.

#### *Social Issues:*

For the last ten years, the three levels of government in Brazil (federal, state, and municipal) have been allocating a greater share of fiscal resources as a result of public policies intending to alleviate poverty and reduce social inequalities and asymmetries. However, there are persistent doubts about the effectiveness of these increasing current and future public expenditures: in education to induce social mobility, in subsidized credit to promote poor family rural production, in nutrition programs to reduce infant mortality, in retraining the labour force to integrate the structurally unemployed in new emerging productive sectors *etc.* Therefore, public authorities are in need of a system for monitoring and evaluating their social policies in order to orient their actions for practical results and have delivered an increasing flow of offerings of multipurpose research contracts to the regional higher education institutions located in the areas where their programs and projects are being implemented, such as in the Northern Paraná region.

#### *Environmental Issues:*

The Northern Paraná region faces a long list of environmental problems. From among the available policy solutions, the contribution of research from local higher education institutions is indispensable. Although there is a system of public institutions in the State of Paraná involved with the control of environmental problems (air pollution, water pollution, toxic chemicals, *etc.*) through the regulatory approach and the use of economic incentives, a regional approach is unavoidable in order to come to grips with how to appreciate and protect important ecosystems.

In many areas of Northern Paraná, the ecosystem has deteriorated as a result of agribusiness activities since the 1950s: with the expansion of coffee bean plantations in Mata Atlântica, virgin forests were cleared for the purpose of selling the standing timber as well as providing farm land; the water quality of regional river basins was dramatically reduced as the result of organic material deposited in water-ways or lakes; more species of plants and animals have joined the endangered list; *etc.* Addressing the collection of environmental problems requires a multidisciplinary approach. Regional higher education institutions offer the unique scientific capabilities that can significantly contribute to finding solutions.

### **3.3 Framework conditions for promoting research and innovation in the higher education institutions of Northern Paraná**

When approached from a static point of view, higher education institutions seem to be prepared to promote consistent research and innovations to deal with the economic, social and environmental issues of the sustainable development processes of Northern Paraná. Also, from the legal standpoint, there is a new Law of Innovations which provides a national legal framework to induce research programs from higher education institutions towards more active and effective regional engagement. There is also a variety of institutions providing financial resources for research and innovation including agencies at the national level (FINEP, CNPq, CAPES) and also at the state level (Fundação Araucária). Those entities have now accumulated high-level well-trained human capital and expertise and adequately specialized infrastructures that place them in a strong, relatively advantageous position to promote research better connected to regional innovation (see the Self-Evaluation Report, for more details).

However, there are obstacles and bottlenecks worth mentioning:

- The organisational structures of the regional public HEIs are not flexible enough to facilitate the development of research contracts with other public and private partners;
- There is no institutionalized system of financial incentives to reward researchers in the regional public HEIs to move ahead with new activities oriented to regional innovation;
- The interviews with regional stakeholders identified an ideological resistance among public HEIs researchers vis-à-vis engagement in innovative partnerships with industry in any market-based activity;
- Regional small, medium and large enterprises have limited vision about the role of HEIs in the regional sustainable development process;
- There is a lack of confidence among HEI researchers and industry leaders that would be needed to build a solid framework for promoting research and innovation that benefits regional development;
- if this solid framework were to be built in the long run, more investment in specialized infrastructure at the HEIs would be necessary (labs, techno-parks, technological incubators) to consolidate the efforts being made in Maringá and Londrina;
- research policy in the regional HEIs does not incorporate a priority agenda with a set of regionally dimensioned issues; priority is given to the generation of knowledge for the national/international academic community rather than to the application of the established knowledge for the local/regional community's development.

### **3.4 Instruments and mechanisms to facilitate knowledge exploitation and transfer between HEIs and regional stakeholders**

The main reason why regional public HEIs are not prone to allocating their resources for regional innovation is that there are no systemic instruments or mechanisms to stimulate their engagement. Most expenditure related to salaries and benefits are defined by the state's central administration (SETI). HEIs do not have freedom to administer their budgets with operational flexibility, and there is no competitive system in place in the public sector to promote quality. The public HEIs need to be transformed into more independent and autonomous organisations, subject to public supervision and operating within a competitive environment for resources.

From the demand side for research related to regional innovation, two dimensions can be identified: (1) government institutions having any relationship with matters requiring research work, such as health, education, environment, energy, communications and transportation should have flexible resources to contract for research with the HEIs in their areas of interest; (2) private institutions located in Northern Paraná should stimulate regional entrepreneurs to analyze their position regarding competitors in other regions and countries so that they can anticipate areas in which they may be vulnerable to competition and make more informed and strategic choices, facilitating productive dialogue between the public sector and the private sector. According to Michael Porter, the firms in a region will not be competitive if the region itself is not also competitive (in terms of its institutions, its economic and social infrastructure, its labor force, *etc.*).

Therefore, in order to build effective interface frameworks to facilitate knowledge exploitation and transfer from HEIs and to better communicate the demands of regional private and public institutions to the HEIs, certain mechanisms need to be implemented in a systematic way in the following areas (see Self-Evaluation Report, Chapter 7, for more details):

- research contracts, collaboration and consultancy;
- intellectual property transactions;
- promotion of spin-offs, incubators science parks and clusters;
- special training for civil servants and private workers with high education levels;
- infrastructure and support to enable the HEIs to more widely publicise and disseminate their research and innovative initiatives (regular demonstrations and exhibitions, regional web page entry points, *etc.*).

### **3.5 Conclusions: How to improve the contribution of the HEIs of Northern Paraná to regional innovation and development?**

Three critical elements should be taken into consideration in order to improve the contribution of higher education institutions in Northern Paraná to regional innovation and development: (1) comprehensive planning, (2) institutional flexibility and (3) targeted funding.

It is evident that there is plenty of room to further connect the expertise and infrastructure of HEIs in Northern Paraná with the aims and needs of the regional development. However, in order to produce greater synergy between well-trained human capital and the specialized infrastructure available at the regional HEIs in Northern Paraná, it is critical to do so in a planned manner.

*The Peer Review Team recommends developing, implementing and evaluating a comprehensive multi-year strategic planning process aimed at defining concrete goals for the contribution of research to regional innovation. This should be conceived as a joint-venture of both state HEIs, and should be aimed at achieving stronger collaboration between government, business, non-profit civil society organisations and HEIs as key partners in regional development.*

Also, a long term perspective should consider ways to define and re-define priorities, and mechanisms to support related actions on a sustained basis.

*The PRT recommends that the HEIs implement concrete collaborative efforts with private and public stakeholders in areas that strengthen the national and international competitiveness of the economy of Northern Paraná, in a context of social equity and environmental quality. In order to reach this objective, the state government should develop (or adapt) a specific regional funding program for combined and collaborative efforts conducted by both public regional HEIs in projects of higher education, science and technology.*

Last but not least, a more flexible and less bureaucratic approach should be adopted in the development and implementation of institutional innovation policies in HEIs.

*The PRT considers that in order to use innovation and applied research efforts conducted by both state HEIs in support of a series of regional development actions, public universities need more administrative autonomy, including autonomy to manage their budgets in a more flexible but accountable manner, so that financial incentives can reach researchers involved in new contracts as is happening successfully in many other federal and state universities in the country.*

## **4. THE CONTRIBUTION OF TEACHING TO THE LABOUR MARKET AND TO SKILLS DEVELOPMENT**

### **4.1 Higher education in Northern Paraná**

Paraná is one of the few states where the state system of higher education is larger than the federal system and its expenditures reach 7% of state revenue. This may be compared with 18% of the state revenue which is allocated to basic and secondary education and 2% allocated to science and technology. The state system includes five universities and 11 faculties<sup>4</sup> with a total enrolment of 70 510 students representing 24 % of the total enrolment of 292 018 higher education students at the state level. However, these figures should be considered with caution since this number includes some 50 000 distance education students from other states matriculated in a single private institution in Paraná.

In Northern Paraná, only 4.7% of the 18-22 year-old youth enter higher education, a figure well below the Brazilian average of 7.6%, which, in turn, is rather low when compared with other Latin American countries.

The State Universities of Londrina (UEL) and Maringá (UEM) are the only two comprehensive research intensive universities in the region. The private sector is larger in terms of number of institutions and student enrolment but the state system seems to be more relevant. Due to their perceived quality and the fact that they are free of charge, UEL and UEM are clearly the first option for students. Students appear to give first preference to the state institution closest to their place of residence. This certainly proves that the state universities are serving their communities well, even when compared with more mature and better financed universities elsewhere. Furthermore, a fair number of young applicants from the neighbouring State of São Paulo seek higher education in Northern Paraná.

### **4.2 Educational offerings and societal needs**

The study program offerings of the state universities are ample and, in general, they appear to be responsive to local needs and to the requests of the local community. The PRT was positively impressed with the involvement of the local society in university business. This involvement takes many forms and shapes. Their influence in the running of the university is real, even when not perceived as such by the external parties. While the effort made by many members of the university community to respond to societal needs is commendable, some internal resistance remains.

However, the PRT could not identify the existence of systematic channels of communication between society and universities where curricular reform is considered. The views of the employers should be given more attention and a systematic follow-up of employment trends, perceptions and performance of graduates would provide invaluable information. The overall scope in curricular design and in teaching appeared conservative and with limited flexibility. Even if this proved satisfactory for today's conditions, it may be risky in the future. Current students may come to suffer the consequences by being prepared in academic programs with obsolete or less relevant content. The current situation may reflect the fact that the

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4 . In Brazil, faculties are smaller centres delivering few university level courses with no research duties.

primary sector of the economy is very prominent in Northern Paraná. This sector is likely to maintain a prominent role in the regional economy, production and jobs, but new employment will come more and more from on the other sectors. Global competition will press further in this direction.

*The PRT recommends that local universities lend more attention to worldwide trends in higher education reform in order to keep pace with tomorrow's expected needs.*

Regarding alternative educational programs, the members of the PRT learnt that short cycle programs in the field of technology play a very minor role in Paraná's higher education and, as a consequence, the offering by the state system is very limited indeed. The State of Paraná took a leading role in the creation of new technological universities, with the launching in 2005 of the *Universidade Federal Tecnológica do Paraná*, the first of its kind in the whole country.

*The PRT encourages state institutions to seriously consider their possible role in the offering of new types and levels of higher education programs, and to consult with external stakeholders on this matter.*

While, there is unemployment of graduates in some areas, the demand for holders of these short cycle (2 1/2 years) degrees in technology appears to be very strong. Successful higher education systems tend to be much differentiated in other countries. In Northern Paraná, the PRT repeatedly heard requests for this type of graduates.

*The PRT identified the need to increase access and to enlarge the role of the short cycle (2 1/2 years) degree programs to satisfy the needs of the labour market and the expectations of students. Both the state government and the universities, individually, must consider how to best respond to this need.*

In addition, distance education plays a relevant role in the special training programs for school teachers at all levels. There may be some limitations in the quality, but this is perhaps the best solution in order to rapidly increase the number of appropriately trained teachers, especially in remote areas far from the urban centres. The PRT was made aware of the success of private institutions headquartered in Northern Paraná in developing and offering this type of programs not only in the region but nationwide. In many parts of the world, provision of education at a distance plays an important and growing role in continuing education. Northern Paraná is not an exception.

*The PRT suggests that state universities consider more seriously their role in sectors related with distance and continuing education. Distance education technologies based on ICT are of increasing importance to reinforce learning not only for non-traditional students but also for conventional resident students. The PRT recommends that institutions increase their distance education based academic offerings as a way to widen access to higher education, and also to raise the awareness of students about the capabilities of the internet as a learning tool. All teaching staff should progressively use Web-based material in their courses and all teaching aids should be made available this way.*

#### **Box 4.1 : Good practices In higher education planning**

The Londrina Municipality accepts that the model of regional development based on extensive grain production has exhausted its potential, and that more aggressive action in transforming the regional economy towards a knowledge-based economy is critical for the future success of the region. This requires the involvement of both public and private universities. The largest state university of Paraná, the UEL, is based in Londrina and several private universities also operate there. Among them, UNOPAR has 12 000 conventional students and 63 000 distance education students mostly from outside Paraná. This institution alone provides 30% of the distance education in Brazil.

Limited access to higher education remains a critical weakness. Since the share of the young finding places and able to afford to attend local universities is low, the municipality recently attracted Pontifical university into town by donating land on the condition that a certain portfolio of degree programs be implemented in the next few years. Furthermore, the establishment of an extension of the Federal Technological University is helping to guarantee the availability of the short degrees that they offer which are highly demanded by the labor market. The first programs to be offered are on Food Technology and Industrial Chemistry where special needs were identified.

### **4.3 Innovation in education**

Throughout this section we would like to emphasise that universities worldwide are undergoing a deep process of renewal of the educational process. First, the goals and objectives of the university degree itself are changing. Then, the relationships among the student, the university and the teaching staff are also changing. With the massification of higher education, the role of shorter degrees of different standing and contents grows in relevance. The Brazilian system of *Bacharelado – Mestrado – Doutorado* contributes to the conventional vertical segmentation of graduates. It may be argued that, in some respects, the existence of strong public and private sectors introduces a horizontal differentiation as private institutions, especially when for profit, do not carry out research, take a markedly different view of teaching and employ a different kind of teacher.

In many countries, short degrees play an important role. Now they appear to be in high demand in Brazil, too. Institutional or degree differentiation requires a differentiation of the learning culture created for the student to live in. In turn, the students entering each year bring in their own new expectations and a markedly new learning culture. The traditional formal lecture loses out but is not easy to replace. More than information, the new graduate is expected to have competences and skills that he or she should somehow acquire while in university. How this is done is a difficult question as it implies a change of the learning culture. Different students require different strategies and may acquire different competencies. Everywhere, experimentation is going on about what is desirable and how it can be achieved. What is required in Europe may not be so important in the U.S. The strategies attuned to the U.S. may fail completely in Brazil, and so on. Each institution has to reinvent its goals and to recreate strategies to pursue them. The PRT found a lot enthusiasm and effort being placed in the teaching but could not certify an awareness of what is being pursued in other parts of the world.

*The PRT recommends more attention from Northern Paraná higher education institutions to the need to reinforce innovation in their educational programs, responding to the expectations of students and, especially, anticipating their future needs.*

*The PRT also recommends that higher education institutions regularly invite external experts active in the local (or not so local) labour market to teach special topics to students at all levels. Short cycle programs and continuing education courses for graduates (“especialização” or *lattu sensu* post-graduate courses) created to fit more rapidly to external needs should make extensive use of external experts.*

It has been noted that research in education suffers in prestige from the fact that it is a field which seems to receive lower institutional priority. The PRT is not in a position to pass a judgement on this, but it is evident that all members of academic staff should get involved in some form of modernization of their teaching by seeking a more efficient learning process for the contents of their subjects while ensuring that students acquire the specific and general competences and skills deemed relevant in graduates.

All the previously suggested efforts could be much more effective if institutions collaborated in a more effective way. During the review visit, the PRT constantly observed that there is a very limited, if not absent, collaboration among higher education institutions in the region. This is evident not only between the two public state universities, but also between private institutions, and among public and private ones. This limited collaboration leads to an unhealthy trend in duplicating efforts and wasting resources. A clear case is the offering of duplicative degree programs.

*The PRT found very limited inter-institutional cooperation among higher education institutions in the region regarding the provision of degree programs, and recommends that universities seek new ways of pooling resources to better serve their communities.*

The need for such cooperation has also been felt in specific areas of research and post-graduate work under pressure from regulatory and financing agencies. This same strategy might work well in undergraduate teaching and, especially, in continuing education courses (*lattu sensu*). In fact, external demand frequently goes into areas where internal expertise is scarce and cooperation between institutions might improve the quality of the program while still leaving room for inviting non-academic experts. Continuing education is an area where universities under-perform in many parts of the world due to the tendency of institutions to look only at their available human resources rather than “shopping” around for the best talent.

#### **4.4 Educating for innovation**

Modern societies are evolving, very quickly putting high demands on university graduates. Not only are the technical contents of the professions changing quickly but the very existence or relevance of some professions may be in doubt in the future. Students cannot trust that a certain professional profile will survive throughout their careers. This is a new situation that educational institutions need to contemplate. While students must certainly learn the contents of a certain domain in depth, it is more important that they acquire the capacity to update and expand whatever they have learnt during the formal degree period. On the other hand, more and more graduates never really take up work in the area in which they were trained. The university was traditionally a training ground for public and private employees. However, today’s society is evolving in a way that self employment is becoming more important outside the traditional liberal professions and many positions of employment in large organisations require from their employees a role akin to self employment. In other words, new graduates must leave the university with new competences for continuous innovation in the workplace and a degree of entrepreneurship.

*The PRT recommends the renewed attention of the committees in charge of curricular reform in higher education to relatively new areas and approaches, including entrepreneurship. These committees should include the active involvement of employers and alumni.*

Higher education institutions are also becoming more diversified. Not all higher education institutions around the world have the mandate, or actually do carry out research, especially research that measures up to international standards. For example, in Britain, some mainly teaching-based colleges are becoming universities whereas public research funding is being concentrated in a small number of universities. In the United States, more than two thirds of higher education students study in teaching-only community colleges while research at an internationally competitive level is concentrated in a relatively small number

of universities. Different students may do best in different institutions. The only point where agreement exists is that institutional missions should be made clear to the public and taken seriously. Whatever the strategy might be, higher education should always stimulate innovation and creativity and attempt to enhance these capabilities in students. The variety of higher education institutions hosted by Northern Paraná is likely to cover the spectrum of social expectations. However, the PRT was not assured of the transparency and accountability of some institutions to students, their families and employers as well as the general public.

#### **4.5 Teaching, research and extension**

Universities, especially public universities, are expected to operate in the triangle of teaching, research and extension. Students should experience this institutional culture beginning in their first undergraduate year. Academic staff members are supposed to perform well in these three areas, balancing their portfolio of activities and passing on their experience to students.

The PRT agrees that the university must keep its sphere of academic culture and autonomy but it is widely recognized that modern universities must be more responsive to community needs. Today's leading universities, even centuries old and well-endowed, are becoming heavily involved with society and active in commercial ventures. These endeavours have frequently been shown to be advantageous to the education provided to their students and to the success of their teachers/researchers. In these institutions, the more active researchers (as assessed by the most rigorous and traditional criteria) are frequently also the best lecturers and the most successful in the commercial exploitation of research results.

The PRT heard criticism from several external stakeholders that public universities are not sufficiently open to local needs and that it is not always easy to get a timely response. On the other hand, it became clear that universities felt that they were making an effort to contribute actively to the region's development and that they were not always given the means to satisfy the very high expectations of their external counterparts. University authorities agreed that academic staff members were, in some instances, reluctant to participate in commercial ventures and that internal career incentives might further discourage opening to local needs.

*The PRT recommends reviewing the staff promotion policy in public universities in order to consider the full portfolio of teaching, research and extension, in such a way that no weakening of the research that meets with international standards is caused.*

Along the same line, university authorities sadly commented that state, local or private partners were not ready to make available the means neither to execute the requested work nor to create the incentives that might contribute to the required cultural change. The PRT knows only too well that this picture may be found in many universities all over the world and that the most common avenue to success involves public policies that induce institutional change. The legal apparatus appears to be in place. The PRT considers that a cultural change is needed both within the institutions and in the external interested parties. If institutions wish their staff to balance their interests in teaching, research and extension, then promotion policies must be devised considering the full portfolio of activities without weakening research at an international level. The PRT found in Northern Paraná examples of this balance at the highest level and their replication should be strongly encouraged.

*Teaching, research and extension should not be seen as incompatible in a modern university and internal regulations should be adapted to foster staff development in all three dimensions. The PRT detected a strong cultural reservation among some university staff in involving the university in extension work and in collaborating in economically relevant projects. It should be emphatically stated that a modern research university must be active in partnerships with economic relevance.*

It is commendable that one of the public universities in the region recently established an office devoted to match external opportunities of collaboration with internal competencies and expertise of potential application in the region. But, of course, the areas of interaction of the two state universities may have to be redefined. As these universities strengthen their research capabilities, they may decide that in certain topics they are in a position to play a national or indeed global role. This may be done without forgetting their local awareness. Knowledge knows no borders and UEM and UEL should be further encouraged to seek a role in the Brazilian university system and beyond. With the appropriate incentives, this will bring back to their region larger gains, both in terms of the quality of their degrees and of the capability to promote local development. Universities and their academic staff work best in response to external incentives. For research activities, incentives are well established in Brazil. However, both applied research and extension work may gain by improving the system of incentives. For instance, regarding applied research, more private organisations should become involved, although this may require more active regional policies than those that are currently in place. Extension work would be at its best if marginal costs were paid by the interested parties or by someone representing their interests. PRT feels that private organisations may improve their financial participation in these activities with mutual benefits.

#### **Box 4.2 : The Change of academic culture in the state universities**

The accelerated upgrading of credentials of academic staff in the state universities is the result of a change introduced in 1996 in the statutes concerning internal promotion. Since then, most academic staff sought to obtain graduate degrees. Today more than 1400 professors at the state universities of Londrina and Maringá hold a PhD.

The success of this regulatory change now requires a great effort to create the right conditions for these prospective researchers to find their own areas of inquiry. The alternative for the most active of them is to leave if they find better conditions elsewhere. This is a great potential that institutional leaders, together with state and local authorities and private interested parties, need to take advantage of to give both the universities and the Northern Paraná region an international standing in science and make them contribute to the socio-economic and cultural development of the region. The stimulus to develop scientific work of international standing comes mostly from national agencies like CNPq and CAPES. Another entity, FINEP stimulates applied research of national priority.

It is left to state authorities to create the incentives needed for their academic communities to be more responsive to local needs. The Government of Paraná has established funds to this end. A detailed evaluation must be made on how best to use them to achieve the desired goals. Private parties must be called upon to contribute to this effort. Only they can contribute to making the best use of public funds and establishing closer links between researchers and local activities.

#### **4.6 Global awareness for local needs**

Education of new generations requires a global scope to guarantee that the future graduate will feel comfortable working wherever she/he may be led and with whomever she/he may find convenient. Most universities have deep local roots however, and most students are expecting to start their professional lives not far from their hometown. The education provided must serve both ends: be global in scope and be local in content and aims. Paraná has an evolving economy where this apparent paradox applies fully. The universities, namely UEL and UEM, must bring in the international picture that society needs to evolve and be ready for the probable changes required as a result of social and economic development in the next few years. With that said, they must also be very aware of the realities of the local society and economy and prepare their students to contribute actively to improving that very society. Too many graduates have to move elsewhere to find the employment they seek and it may be that other graduates will adapt too well to the current local economy with little personal drive to improve it.

*The PRT recommends that the universities establish a unit to do systematic follow-up with their alumni to seek information about their career development. Universities should seek alumni input on a*

*regular basis to consider curricular reform or new initiatives on campus. Of course, local employers should also contribute regularly to the development of the university.*

Another way to bring the university closer to local realities is the regular invitation of experts from local organisations to lecture on special topics in the regular degree programs. This applies at all levels but especially at the graduate level where this connection to regional life and expertise is particularly important for graduates willing to enter the job market.

*The PRT recommends that short cycle programs and continuing education courses for graduates (“especialização” or lattu sensu post-graduate courses) be reinforced to satisfy regional needs making use of the appropriate mix of internal academic expertise with specially invited external experts. Alumni are the most likely target for these programs and their help may be sought to identify community needs or opportunities.*

#### **4.7 Access**

The pressure to increase the access to higher education in Brazil in general, and in Paraná in particular is intensifying. Brazil has the best system of post-graduate education across Latin America but is far behind other countries with regards to undergraduate access. Public finance appears to have reached its limit (as in many other countries) and private finance is already high as more than 2/3 of Brazilian higher education students pay their full cost at municipal and private institutions. However, most private institutions focus their academic offerings in “paper & pencil” programs like law, business or psychology, forgoing the higher costs of good scientific and technological programs. Public authorities, especially at the state and local levels, may have limited instruments to shift this trend but the problem should not be dusted aside. Brazil needs a wider and fairer system of access to higher education.

Access to higher education is still an important instrument for upward social mobility in Brazil. Access and support in primary and secondary school are probably the most important limiting factors to a fairer access to higher education. The design and competitiveness of the selection system, the *vestibular*, put a further weight on the quality of the secondary education that pupils could get or could pay for. The recently created affirmative action initiative establishing entrance quotas for applicants from public and from private schools and for blacks may be an improvement but an extra effort might be considered to target very able students that lack the means and the environmental conditions to perform well in the *vestibular*.

The development of short cycle degrees in the field of technology may be a cost efficient means to increase and widen access.

#### **4.8 Mobility and internationalization**

Universities must strive to educate their young students for the requirements of tomorrow’s world. This includes the need to include more global contents in the curriculum, internationally competitive skills – including the command of a second language – and more accessible opportunities for international student mobility. Tomorrow’s graduates will be required to be more prepared for greater mobility, both geographic and in terms of the type of work. It has been recognized that a good number of the graduates in Paraná do not work in the specific profession for which they received their university training. This may be the result of a mismatch between the degree offered, student expectations and the realities of the job market. But it is generally believed that higher education institutions should design their programs in a way that makes graduates better able to deal with the realities and unforeseeable shifts in the job market.

*The PRT recognizes the effort being made by Northern Paraná universities to adapt their pedagogies to the evolving characteristics of their students but recommends a far stronger movement towards a*

*student-centred learning, enhancing attitudes about innovation and entrepreneurship that will prepare graduates to find their own path of personal development throughout their hopefully long active lives.*

In addition, the relevance of foreign languages and multicultural environments does not appear to be fully recognized and these may be very important for future graduates individually and for the development of Northern Paraná. After the consolidation phase of the last few years, UEL and UEM are now in a position to seriously consider devising strategies to increase the mobility of students and staff. Paraná benefits from the great internal mobility of its population and from the considerable diversity of its origins. The universities may be able to capitalize on these to offer a more international learning environment. Many universities in Brazil are doing the utmost to improve this and the PRT feels that Northern Paraná must follow if it wants to be prepared to take up new opportunities of development in a global framework.

*The PRT detected a need for universities to pay more attention to international trends and strategies to make learning more effective and more adjusted to the needs of graduates in a borderless world. Students should acquire competences to act in a wider context without losing their strong local roots. The PRT recommends that all undergraduate students should be trained for innovation and entrepreneurship.*

#### **4.9 Higher education and science and technology steering**

The PRT collected everywhere a strong message that the coordination of higher education by the state government of Curitiba is too weak and causes imbalances that may hinder the social and economic development of the region. The PRT has the perception that, even at the current level of expenditures, the state government might be able to guarantee a more equilibrated educational offering, especially in the scientific and technological areas and in the shorter degree programs in particular. The institutional missions may have to be clarified and differentiated in order to better serve the needs of prospective students and the requirements of the labour market. The current higher education council appears too weak in its mandate to achieve these goals.

*The PRT recommends that the state government of Paraná consider creating the instruments necessary to achieve a higher level of planning to better satisfy the requirements of faster regional economic and social development.*

The PRT finds that the existence of many academically qualified staff in state universities is a new reality with a significant potential for regional development but requiring a quick response from state authorities. At several instances, we heard of unfulfilled very basic infrastructural needs that should be addressed as a prerequisite for an advanced teaching and research environment. The university infrastructure may need consolidation for these young researchers to start their own programs and the state must create a steering system to make full use of this potential. The alternative is a suboptimal use of human resources and their continued migration to other states.

*In this context, the PRT recommends that the state government of Paraná conduct a profound review of the work that the various state agencies do directly or indirectly with higher education, science and technology and regional development in order to achieve higher levels of coordination and, in that way, better and more efficiently support the education system focusing research potential on local needs.*

Some work in this area may exist but the feeling that the PRT got was that it is ineffective. State institutions have been developed in the last few years to the extent that their consolidation now requires a renewed approach, since further development may be hindered by keeping old practices and instruments. Strong independent bodies should be established to steer the educational offering of the state government,

namely to establish and enforce a financing policy. In research, the state government will improve the contribution of research infrastructure to regional development by defining clear and stable policies.

For public institutions to make optimal use of the public resources available, they must be granted a larger operational autonomy while the mechanisms to evaluate their performance and accountability are improved upon. Everywhere, public authorities are finding it convenient to withdraw from the day to day administration of universities. The PRT heard of belated staff contracts, a sign that the government of the State of Paraná had not yet developed a modern machinery to steer higher education institutions without interfering in small administrative decisions. The performance and the efficiency of the system will improve when the government keeps for itself only decisions at a higher level that guide the system to politically established goals, and refrains from intervening in operational activities.

#### **Box 4.3 : University reform across borders: A useful experience for Brazilian higher education institutions**

Higher education is undergoing a time of major reform in most of the world. The European paradigms established early in the 19th century in the aftermath of the Napoleonic wars are the major reference in most of Europe, Latin America and elsewhere. The professional model predominates where society perceives the university to be a place to train young people for professions that hopefully they can pursue during their working lives. The reality may be very different but training as a medical doctor, a lawyer, an engineer or a school teacher, an accountant or a fashion designer is still what most young people look for in the university. However, the realities of the labor market create frustration as the envisioned position does not materialize and, even when it does, the graduate finds that there is a lot more to be learnt. In today's world, working knowledge in most professions is changing so quickly that the most up to date contents of the degree curriculum become obsolete in a few years. Job mobility is a fact of life for most people and this is expected to increase and widen in the future.

The 19th century professional university was able to adapt well during the 20th century but is now facing the need for radical change. The "knowledge society" requires a different education for the new generations, where current curricular contents are less important than the attitude of the student toward the process of learning as a habit to retain for the rest of his/her life. Most universities around the world are in a process of reconstructing the teaching process towards a student centred learning process with a lot of experimentation of alternative modes of interaction between the learner and that which is learnt.

While society in many parts of Europe, Latin America and elsewhere sees the university as a professional school, most universities prefer to think of themselves as Humboldtian centres of creation and transmission of knowledge. Research, blue sky research, is then the noblest of the goals for academic staff and a permanent conflict sets in between this goal and the limited resources available and the poor motivation of the majority of the students. Humboldt strived to protect the university from the interference of princes and churches. The academic freedom is still a crucial value of university life but it is not incompatible with its responsiveness to the current needs of society. It is just this freedom that allows academic researchers to follow the lead set by funding agencies and by private enterprises. The most successful researchers are able to define a line that brings in finance from public and private sources to build a line of fundamental inquiry, while at the same time contributes to solving some very real and pressing problems. They will be publishing in the best journals while filing patents or participating in some other, perhaps related, confidential project. It is not easy to build such a portfolio of research interests but that is what defines an academic researcher.

Traditional universities up to the middle of the 20th century were designed to serve a tiny part of the population. Their tremendous success led to a surprising growth and now more than 50% of the youth of some of the most advanced countries go through some form of higher education. This new university bears little resemblance with older models. Also, the expectations that the society has with respect to these new universities are totally new and far more complex than in the past. The education provided changed and is changing. The content of degree programs evolves to better answer the expectations of students and the changing needs of the workplace. Students currently being trained in universities will have to deal tomorrow with a more complex world. Globalization came to stay and students need an education that helps them to live a better life in a world without economic or cultural borders. Mobility, internationalization and multi-culturalism are buzzwords associated with the university's intended response to these new uncertainties. There is no unique solution to these new challenges. Universities are becoming more diverse.

The governance of institutions is being adapted to make it more responsive, agile and accountable. Quality control systems, both internal and external to the institutions, are springing up in a way that would have been thought unacceptable only a few years ago. Also, the cost of higher education grew to levels that the public purse has been unable to subsidize and different systems of cost sharing between governments, families and the society at large are being experimented with.

## 5. THE CONTRIBUTION TO CULTURAL, SOCIAL AND ENVIRONMENTAL DEVELOPMENT

### 5.1 Public universities as government agents

Public higher education institutions in Brazil are usually strongly concerned with local development. They may be looked at as privileged government agents of development that should use their human and material resources to foster goals far beyond tertiary education. In Paraná, state institutions have a degree of institutional autonomy but a close dependence in financial and administrative terms. This will certainly lead to their readiness to expand on the state policies not only in education but also in cultural, social and environmental development. The contacts of the PRT in Maringá and in Londrina confirmed the relevance of both universities for their regions in a multitude of areas.

### 5.2 The impact of the state universities of Londrina and Maringá

The SER gives some information about the activities led by UEL and UEM. For UEL the great impact of the health services is emphasized. The university hospital is the only large public hospital in Northern Paraná integrated in the unified health system. It has 333 beds and a multitude of associated services. The university has the largest laboratory for the production of medicines in Paraná. Their low cost medicines contribute to federal and state policies, and most important, are of direct benefit to the population. The SER report contains less information for UEM in this area but it is likely that the smaller size of its health sector allows for more limited action.

The situation appears to be similar in the area of legal services where UEL is active through its legal office (*Escritório de Aplicação de Assuntos Jurídicos*)<sup>5</sup> a unit where students and staff provide free legal advice to under-privileged inhabitants of the region. The House for Culture of UEL is a large institution with 114 staff (of which 52 belong to the symphonic orchestra).

UEM has an extension and culture service which appears also very active with a variety of initiatives in areas ranging from the promotion of science and technology among school children to languages and a small museum that is installed in the first house built in what is now Maringá.

There is no doubt that UEL and UEM are major actors in the cultural life of their towns and regions and have a unique role in many social activities. In the discussion of environmental problems, they have a leading position. The universities are active in solving some of these problems through their research and extension projects.

Cultural, social and environmental work by universities has two goals or justifications. On the one hand, society expects from its university, whatever its location and statute of ownership, a contribution to local development and the institution designs activities to this end. On the other hand, and this is perhaps the most important aspect, a university is a community of students and teachers seeking to construct new knowledge and disseminate it. This dissemination is intergenerational as between teacher and student but it is also interpersonal affecting the whole society. The construction of knowledge is a social process that

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5 . Universidade Estadual de Londrina. (2006), *Escritório de Aplicação de Assuntos Jurídicos*, <http://www.uel.br/eaaj>

involves the community of teachers and students and overflows into the whole society. It is this process that university authorities must somehow structure.

*The PRT recommends that renewed efforts be made to structure the cultural and extension services offered by the universities in the region so that all students feel compelled to actively participate to their benefit and to the benefit of the surrounding community.*

### **5.3 Steering of cultural, social and environmental activities**

The universities and their academic staff appear to be active in a variety of cultural, social and environmental activities probably because they feel that this is part of their mandate from the state government. However, if we assume it desirable that publicly funded higher education institutions should become more efficient and competitive, this mandate should be clarified.

*The PRT recommends that the transfer of funds from the state government include more clarification regarding the cultural, social and environmental activities the universities are expected to carry out.*

This can be done by funding specific projects in which the included activities are listed or through project finance where activities are financed on an individual ad hoc basis. In most countries, universities work with a mixture of the two mechanisms and the government of Paraná might consider the opportunity of introducing these strategies. Institutions are well trained to respond to external stimulus and it is always found that performance improves with this cultural change. This external steering by public authorities should also aim at partnerships with private organisations and enterprises.

*The PRT recommends that the leadership of the universities in the region take advantage of their close connections with the local community to convince them of the opportunities that collaboration with the academic community may create for both sides.*

A small financial incentive contributing to the (relatively small) marginal costs of an activity may work very efficiently to steer the university capabilities towards external aims. Local authorities and private enterprises should be invited to participate in these activities for their mutual benefit.

## 6. CAPACITY-BUILDING

### 6.1 The state universities of Northern Paraná looking into the future

#### 6.1.1 *In search of a new role for universities in the knowledge society*

The two state universities considered in the study have many similarities. Both are relatively new (they are in their fourth decade); both are financed by the State of Paraná (in contrast with other universities funded by the federal government or a private institution); both are of similar size (more than ten thousand students); both have a good level of academic staff (a relatively high proportion of them with a doctoral or master's degree and relatively well organised research structures).

On the other hand, they have similar organisational structures based on the tradition of public Brazilian universities, a mix of Napoleonic model (where training professionals is the main goal of universities) with some flavours of the Humboldtian model (relevance of research and science as main goals of the institution). These universities are ruled under a traditional collegial model where decisions about almost every detail are made by collective bodies.

In the Brazilian tradition, at least in the last decades, state universities try to become research universities, focusing on basic research, developing postgraduate programs and with academics looking to publish in prestigious journals. The ideas of serving the community, being entrepreneurial or becoming actively involved in fostering regional development are not generally accepted among academic staff (who, at the same time, have a major influence in the governance of universities). Consequently, although some groups of researchers are very dedicated to innovation, these ideas are not a main driver of public universities as is the case nowadays in many other world regions.

The tendency all around the world is to transform universities into centres for the creation, dissemination and application of knowledge, not only for the traditional young students but for students of any age, for the business sector, and for the community at large. Universities are becoming more entrepreneurial and more active in using their potentials for acting as engines of social, cultural and economic development. These changes are bringing additional resources to universities – essential to coping with current and expected challenges. These fairly universal trends are not apparent or at least not strong enough at UEM and UEL.

In the same sense, teaching activities in Northern Paraná universities seems to be excessively focused in traditional knowledge and less in general competences which are considered the paradigm for preparing individuals able to compete in the knowledge society. The necessary pedagogical change, required in order to appropriately respond to new social needs, has not yet been undertaken by these universities.

As a consequence of the new roles adopted by universities, they are becoming complex institutions where new ways of governance are necessary to the success of managing complex and very dynamic situations. Flexibility, leadership and good governance are now key aspects for leading universities in the knowledge society. Nevertheless, UEL and UEM still have models of governance which present difficulties for the running of HEIs in the modern world.

Changing the governance of universities by moving to models that are more efficient and more adapted to the needs of modern and democratic societies would be advisable. In this respect

*the PRT recommends that:*

- *State universities in the region start a process of reflection about their new missions and roles in the knowledge economy and the way to better accomplish these functions through changes in their governance models and in their relationships with the community;*
- *State universities in the region begin a process of reflection about the predominant research model they are following and try to become more oriented to the social and economic needs of the community;*
- *State universities in the region start a process of reflection about their pedagogical model. Preparing new citizens for the knowledge society cannot be the same as preparing the traditional professional due to the radical changes taking place in contemporary society.*

Access to higher education in the region is still low, at least compared with more developed countries and even with some other Latin American countries. Access to public institutions (with no tuition fees) is even lower. The PRT was struck by the fact that 1 out of 20 candidates to public institutions are rejected based on low entrance scores. Rejected students, independently of their socio-economic background, enrol in private institutions, obviously paying tuition fees. Research results read by this team indicate that those who receive the main benefits of this selection process are students from upper social classes who enter free public higher education in a higher proportion than students from lower social backgrounds. This situation, which is not unique to Northern Paraná, is a very serious problem. Higher education should be a means for social equalization and not the opposite as is likely given the current situation.

*The PRT recommends that public authorities at the state and municipal levels and university leaders reflect on the social role of public universities in the region with regards to the problems of access and equity and implement measures to solve these problems.*

### **6.1.1 The need to coordinate efforts**

The PRT concluded that in the case of Northern Paraná both state universities (UEM and UEL) have reached a good level of scientific development and serve a high number of higher education students in the area; they are well viewed by employers, public authorities and society at large in the area; but they have some shortage of scientific resources (laboratories and others) and, in general, of economic resources.

Our opinion, taking into account the data provided by the SER and our observations during the visit, is that in spite of the fact that both universities have reached a good level of quality:

- From a scientific point of view, neither university is large enough to allow it a relevant role at a national or international level. Even at the regional level, their positions could be improved, especially in the area of innovation;
- The universities do not compete with one another, but collaboration appears also to be very limited. There are only four joint postgraduate programs. No collaboration is taking place at the graduate level and it is unclear as to whether or not there is collaboration taking place in research;

- The general mentality at the state universities is far from what could be considered an entrepreneurial university serving scientific advancement, social needs and especially the needs of the community.

The regional context has some characteristics which should be taken into consideration:

- The economic, social and cultural problems of both micro-regions (Maringá and Londrina) have similarities and consequently the solutions provided by the universities could also be quite similar;
- The world is moving towards a new situation where globalisation is a reality. Universities and regions are acting in a global territory where knowledge and innovation are the driving forces. Universities acting solely as local institutions have no future as academic institutions or as engines for the knowledge society.

The PRT concluded that UEM and UEL should initiate a process of collaboration with two main objectives:

- strengthening their positions as leading universities in the academic world; and
- strengthening their positions as leaders of the social and economic development of the region.

Where feasible, this collaboration between public HEIs should be extended to the private ones that are also playing a relevant social role in training a high proportion of the human resources of the region.

*Consequently the PRT recommends that:*

- *UEL and UEM should develop better and more active systems of communication, understanding and collaboration;*
- *UEL and UEM should combine their efforts in research and teaching and transform themselves into partners. If these universities were able to come together (acting as a two-pole institution) they would become leaders at a national level, and relevant at an international level;*
- *The UEM-UEL axis should take a proactive role and become the engine for the economic and social development at the regional level;*
- *Collaboration with private institutions, especially for teaching activities, should be explored in order to improve the quantity and quality of human resources in the region.*

## **6.2 The region of Northern Paraná looking into the future**

The PRT has concluded during the review visit that the Region of Northern Paraná has to some extent a fuzzy identity. Northern Paraná is a “statistical region”, but does not have an overseeing political or administrative structure. In addition, from a cultural point of view, its integration in the State of Paraná is also weak as a consequence of its distinct migratory settlement patterns (something that happened quite recently – in the 1950s).

There is competition between the two main cities, Maringá and Londrina. Both of them are making efforts aimed at developing their own micro-region by bringing together their surrounding municipalities to participate in collaborative work. Even in the language of politicians, business leaders and university

administrators, when mentioning to the region, their framework of reference is usually constrained to the respective micro-region rather than to the whole Maringá-Londrina region or, for that matter, the Northern Paraná region. Consequently, it is difficult to define the region of Northern Paraná. It is probably better to refer to the “Maringá-Londrina Axis” or “Londrina-Maringá Axis” as a two-pole region.

The two poles of the Maringá-Londrina Axis have a lot of similarities from an economic and social point of view. In this respect, it could be viewed as a naturally conformed region with shared interests but lacking a formal structure for building cooperation and a common future. What we have said in the previous section regarding universities is also true for the two cities and their surroundings. The relevance of a jointly configured Maringá-Londrina Axis will be much greater than the relevance of each city independently.

Therefore, the two cities should forget any unhelpful competitiveness and develop a regional economy and society that can look forward with increasing confidence in a difficult and competitive world. The cities, working together in a Maringá-Londrina Axis could become an economic pole of reference at the national level and an attractive focus for attracting foreign investment.

Some efforts have already been made to this direction. Recently, the cities have created joint institutions at a micro-regional level. These cities are also compatible for a broader approach. They only need to combine efforts and establish permanent links for developing a more prosperous future together. In this sense the experience of TERRA ROXA (see Box 6.1) is a good example of an effort to promote and develop collaboration, including collaboration between universities.

With regards to the building of the region as a real entity, the PRT considers it important to reflect seriously and proactively on this matter. The concept of a stronger and more consolidated region will be beneficial for all the citizens.

*The PRT recommends that:*

- *the region as a whole treats capacity-building as an urgent requirement;*
- *regional and municipal authorities, employers, development associations and social entities take a more proactive role in seeking regional integration which facilitates the relevance and prosperity of the Londrina-Maringá Axis and take advantage of the significant potential that universities have available in terms of human capital and technological infrastructure;*
- *the two public universities in the region take part as active partners in the development of this regional capacity.*

#### **Box 6.1 : Terra Roxa - An inclusive capacity building concept**

TERRA ROXA Investments is a development agency in Northern Paraná. From a legal point of view it is a civil society public interest organization and was created to promote the region of Northern Paraná and to attract inward investments. It focuses on economic development and on making the potential of the region of Maringá-Londrina known not only to Brazil but also to the rest of the world. Its activities reach all the state's Old Northern cities – a population of approximately 3.5 million. Hosted in the city of Rolândia – a third neutral city – TERRA ROXA was officially established in December 2004. Its founders include representatives of the thirteen cities in the region.

The goal is to work for a new concept of development where unity and regional articulation increase the relevance of the previously isolated interests of individual cities. TERRA ROXA is supported by the Trade and Industrial Association of Londrina, Maringá, Rolândia and other municipalities; the Industrial Federation of the State of Paraná; the Councils for Economic Development of Maringá and Londrina; the Brazil-Germany Chamber; the Association for Technological Development of Londrina and its Region among other associations. The private university CESUMAR is also one of its partners.

### **A TERRA ROXA project: the regional railroad connection**

In May of 2006, TERRA ROXA assumed the regional coordination of the project for a passenger train running through the Ibiporã-Paiçandu corridor. This will be a west-east corridor connecting the 13 main cities and towns of the region of Northern Paraná. According to analysis made by a national research institute, this corridor is among the nine most viable in the Country. A seminar on Metropolitan Railroads held in Maringá in May of 2006 concluded that there is a need to create a commission to co-ordinate the project and they appointed TERRA ROXA as the most appropriate agency for this objective. The passenger train will create a corridor of regional development integrating the cities of the Northern Paraná region. It will be a 140 km long railroad with 28 trains, each with four wagons running at an average speed of 100 km/h.

TERRA ROXA will make the necessary efforts to overcome bureaucratic and political difficulties associated with a project of this magnitude. This includes searching for support in all the cities which would benefit from the project; the mobilization of communities about the importance of the project; the development of studies and negotiations with the Ministry of Transportation; and ongoing work to promote the project in the political arena to assure support independently of changes in regional government. New studies by the Ministry of Transportation are underway to prove the viability of, and identify funding sources and potential investors for its implementation.

(<http://www.terraroxa.org.br/>)

### **6.3 The connection between the region and the universities**

Northern Paraná is an active region from an economic point of view. The main productive sectors are related with agriculture, agro-industry and light industry such as furniture and clothes. While the high-technology sector is absent and the value-added by traditional sectors is low, the economic potential and the dynamism of employers are strong enough for optimism about the success of a deep transformation in the economic structure of the region.

In the region there are strong and dynamic initiatives working to transform its economic reality. Some examples are the *Tecnopark* (Technological Park of Maringá) projected as a area of technological development for the city and surrounding municipalities; *Arco Norte*, an ambitious plan for regional development in the area of Londrina; *Terra Roxa* (see remark Box 6.1) trying to promote the Maringá-Londrina Axis. This is just a short list of examples of the many initiatives which demonstrate the very positive attitude of social and economic regional stakeholders in favour of the socioeconomic development and modernisation of the regional structure.

In addition, there are 32 HEIs in the region of Northern Paraná. These institutions deliver 262 programs at the bachelor's level and 116 post-graduate programs (most of them available through the two state universities, UEL and UEM). Consequently, the region has approximately 40% of the research potential of the entire State of Paraná (taking into account the researchers, research groups, *etc.*).

The region has two obvious strengths: a dynamic society and a good higher education system. Nevertheless, it seems that, despite the good intentions, (mostly found in the upper echelons of leadership, connections between and among both sectors are rather more limited than one would expect given the strong possibilities of collaboration. It is true that UEM and UEL (and other private universities) are well regarded in general by the productive sector, and the local governments. It is also true that the universities participate – although marginally – in many local activities and associations. The SER presents some figures about the contracts of private companies with universities. If there is no mistake in these figures, they are really insignificant (and totally absent at one university). It is surprising to find such a low level of real collaboration between the two sectors which apparently maintain good formal relationships.

In spite of the fact that regional companies are mostly in the area of low technology, there is room to develop a new economic context. As mentioned in Chapter 3, a recent report on the future of the State of Paraná (OPTI-SENAI report) recommends three areas for technological development:

- development of biotechnology, especially as related to soybean products;
- establishment of a National Technological Centre for Agro-industry in the region;
- a plan for the technological modernization of the textile and furniture industries.

How can mutual relationships between HEIs and the economic sector be developed in support of the regional economic, social and cultural development of the region? Good intentions are not enough. It is quite evident that these good intentions do exist, but they do not yet result in mutually beneficial relationships. It is necessary to provoke a cultural change in both universities and the business sector. This cultural change has to be carried out in universities, especially in the minds of researchers, but also in companies. Although years of mutual distance are not easily forgotten, the necessities of a new economy compel stronger relations. This is not just an opinion; this is a necessity that sooner or later will be evident to everyone.

With this objective, apart of disseminating ideas and good practices on mutual cooperation, the best way to produce the necessary change is through a broad system of incentives to:

- **Universities:** It is important to create financing programs of cooperation with the productive sector in order to respond to the technological needs and to promote innovation in the region. In a second stage, the cooperation with the productive sector will provide universities with additional funds as is evident in the most active universities throughout the world;
- **Researchers:** It is important to motivate researchers to become change agents, actively involved in innovation. This can be done by integrating third role activities into staff recruitment, reward and promotion policies;
- **Companies:** It is necessary to create a climate where companies trust universities and consider them as partners in meeting their technological needs. Incentives to companies could be part of the same program as incentives to universities.

*In order to strengthen the connection between regional universities and the productive sector, the PRT recommends that public authorities from the state and the municipalities should make an effort to create a new framework for relationships between universities and the productive sector. This is a cultural change that probably can only be carried out through a double system of incentives to universities and companies for developing programs together and to researchers for making them more interested in innovation.*

#### **6.4 The role of the State of Paraná in supporting the contribution of universities to regional development**

The State of Paraná is responsible for the State universities in the region. There are two bodies responsible in this mission; the SETI (State Secretary for Science, Technology and Higher Education) and CEE (Higher Education Council). The first is a governmental body directly responsible of higher education matters related to HEIs in the state. It is especially responsible of financing state institutions, as it is the case of the UEM and UEL. The second is an advisory body to support SETI in its decisions.

The PRT had the impression, perhaps inaccurate, that the SETI takes responsibility for the state institutions instead of the whole state system of higher education. In other words, it looks like there is no a coherent entity or inter-governmental arrangement to oversee the higher education system as a whole. For instance, there are many private higher education institutions established in the Northern Paraná region which, incidentally, are extremely relevant for the socioeconomic development of the region. The PRT had the impression that these private institutions are not well coordinated with the state system of higher education and consequently not well coordinated with other institutions in the region. This limitation is even reflected in the scope of the SER. For instance, in the case of Londrina the only university included in the SER was UEL, but no further analysis was made regarding a private university established in the city which has around 80 000 students (most of them enrolled in distance learning). It is unclear for the PRT to what extent there is a real higher education system in the state and to what extent public policies take into account all the inputs to higher education, especially in teaching activities, regardless of who owns the institutions.

One of the consequences of this apparent lack of state-wide higher education policy is that quality assurance of HEIs seems to be insufficient to guarantee citizens an appropriate level of higher education. Postgraduate courses are quite well controlled by CAPES (the federal agency for these studies), but students in these courses represent a very small part of the whole system. For the remaining courses the only quality assurance system is the *Prova*, a nation-wide examination of students in the last year of graduation. The PRT considers that this may be insufficient for guarantying quality especially in the numerous private institutions extended around the state.

The PRT concluded that *Fundacion Araucária*, the state agency for supporting research, is doing a good job. Nevertheless, public money should also be used to promote applied research and innovation in universities. Creating incentives with this objective would be a good strategy for the medium term.

*The PRT recommends that at the state level:*

- *The SETI should take further responsibility for the coordination of the whole state higher education system, transforming the current agglomeration of institutions into a real system of higher education, research and innovation. Private institutions should be considered part of this system;*
- *The SETI should take further responsibility on quality assurance matters in order to guarantee a good level of quality in their studies for students enrolled in any type of institution or program;.*
- *The SETI should develop a system of incentives in order to promote the collaboration between universities and industries through a program for the funding of joint projects and another to provide incentive to academics for participating in such projects.*

## 7. CONCLUSIONS AND RECOMMENDATIONS

In this concluding chapter we summarise our understanding of the situation in Northern Paraná with respect to the role of the two state public universities, along with other educational providers, in contributing to regional development.

We then draw together a number of specific recommendations that appear throughout the course of the text of earlier chapters in the context of the discussion and analysis where their rationale is set out. The summary of recommendations is brought together here for the convenience of various parties and levels, but the full text and context are needed to understand their rationale. We order our recommendations beginning with the universities themselves and moving on to the crucial regional level, before adding a small number of recommendations for the State government of Paraná.

### 7.1 General conclusions

The State of Paraná has one of the highest standards of living in Brazil. Its economic power is mainly based on its modern and high intensity agriculture. The region of Northern Paraná is composed of 71 municipalities including Londrina and Maringá, the two biggest cities which each host one of the two main state universities in Paraná. The economic diversification of the Northern Paraná region has brought wealth and prosperity to its inhabitants as indicated by economic and social indicators.

The two poles of the Maringá-Londrina Axis have a lot of similarities from an economic and social point of view. In this sense, it is a naturally conformed region with shared interests, but lacking a formal structure for building cooperation and a common future. From any point of view, the relevance of a jointly configured Maringá-Londrina Axis will be greater by far than the relevance of each city independently. In this sense the cities should forget any unhelpful competitiveness and develop a regional economy and society that can look forward with increasing confidence in a difficult and competitive world. The cities, working together in a the Maringá-Londrina Axis could become an economic pole of reference at the national level and an attractive focus for attracting foreign investment.

The region has two obvious strengths: a dynamic society and a good higher education system. Nevertheless, it seems that, despite the good intentions (mostly found in the upper echelons of leadership), connections between and among both sectors are more limited than one would expect given the strong potential for collaboration. It is necessary to provoke a cultural change in both universities and the business sector. This cultural change has to be carried out in universities, especially in the minds of researchers, but also in companies. Although years of mutual distance are not easily forgotten, the necessities of a new economy compel stronger relations. HEIs are non-substitutable regional protagonists because all the proposed objectives for the future of the region as well as the future of Paraná include activities which are intensive in scientific and technological knowledge and which are essential part of the HEIs' institutional missions. These development strategies cannot be implemented without a strong and permanent action of the HEIs in the region.

The PRT collected everywhere a strong message that the coordination of higher education by the state government is too weak and causes imbalances that may hinder the social and economic development of the region. The PRT has the perception that, even at the current level of expenditures, the state government might be able to guarantee a more equilibrated educational offering. The institutional missions may have to

be clarified and differentiated in order to better serve the needs of prospective students and the requirements of the labour market. One of the consequences of this apparent lack of state-wide higher education policy is that quality assurance of HEIs seems to be insufficient to guarantee citizens an appropriate level of higher education.

HEIs in the region have now accumulated significant high-level and well-trained human capital and expertise and adequately specialized infrastructures that place them in an advantageous position to promote research better connected to regional innovation. However, there are obstacles which need to be overcome. These include: (1) the organisational structures of the regional public HEIs are not flexible enough to facilitate the development of research contracts with other public and private partners; (2) a lack of institutionalized system of financial incentives to reward researchers in the regional public HEIs to move ahead with new activities oriented to regional innovation; (3) ideological resistance among public HEIs researchers to engage in innovative partnerships with industry in any market-based activity; (4) regional small, medium and large enterprises have limited vision about the role of HEIs in the regional sustainable development process; (5) a lack of the confidence among HEI researchers and industry leaders; (6) more investment in specialized infrastructure at the HEIs would be necessary; and (7) research policy in the regional HEIs does not incorporate a priority agenda with a set of regionally dimensioned issues. The PRT concluded that UEM and UEL should initiate a process of collaboration with two main objectives: (1) to strengthen their positions as leading universities in the academic world; and (2) to strengthen their positions as leaders of the social and economic development of the region.

The PRT was positively impressed with the involvement of the local society in university business. This involvement takes many forms and shapes and their influence in the running of the university is real, even when not perceived as such by the external parties. The effort made by many members of the university community to answer societal requirements is commendable but some internal resistance is recognized as very high and not always healthy. However, there appears to be no systematic channels of communication between society and universities for curricular reform. The views of the employers should be given more attention and a systematic follow-up of employment trends, perceptions and performance of graduates would provide invaluable information. The overall scope in curricular design and in teaching appeared very conservative and with limited flexibility.

As the number of young people entering higher education increases, the role of shorter degrees of different standing and contents grows in relevance. Different students require different strategies and may acquire different competencies. Short cycle continuing education programs play a very minor role in Paraná's higher education and, as a consequence, the offering by the state system is very limited indeed. While, there is unemployment of graduates in some areas, the demand for holders of short cycle degrees in the field of technology appears to be very strong. Successful higher education systems tend to be much more differentiated in other countries.

Modern societies are evolving very quickly putting high demands on university graduates. Students must certainly learn the contents of a certain domain in depth, but at the same time it is more important that they acquire the capacity to update and expand whatever they have learnt during the formal degree period. New graduates must leave the university with new competences for continuous innovation in the workplace and a degree of entrepreneurship. The education provided must serve both ends: be global in scope and be local in content and aims. Universities must also be very aware of the realities of the local society and economy and prepare their students to contribute actively to improving that very society. On the other hand, universities should include more global contents in the curriculum, internationally competitive skills – including the command of a second language – and more accessible opportunities for international student mobility.

In Northern Paraná, only 4.7% of the 18-22 year-old youth get to higher education, a figure well below the Brazilian average of 7.6%, which, in turn, is rather low when compared with other Latin American countries. Brazil has the best system of post-graduate education across Latin America but is far behind other countries with regards to access. Brazil needs a wider and fairer system of access to higher education, because access to higher education is an important instrument for upward social mobility. The development of short cycle degrees in the field of technology may be a cost efficient means to increase access.

There is no doubt that UEL and UEM are major actors in the cultural life of their towns and regions and have a unique role in many social activities. In the discussion of environmental problems, they have a leading position. The universities and their academic staff appear to be active in a variety of cultural, social and environmental activities probably because they feel that this is part of their mandate from the state government. However, if publicly funded higher education institutions are to become more efficient and competitive, this mandate should be clarified. A small financial incentive contributing to the (relatively small) marginal costs of an activity may work very efficiently to steer the university capabilities towards external aims. Local authorities and private enterprises should be invited to participate in these activities for their mutual benefit.

## **7.2 Recommendations**

In this last section we summarise the recommendations presented along the report classifying by the agent who should take in consideration the specific recommendation.

### ***7.2.1 Recommendations to the universities***

The Peer Review Team recommends to universities:

- to start a process of reflection about their new missions and roles in the knowledge economy and the way to better accomplish these functions through changes in their governance models and in their relationships with the community;
- to lend more attention to worldwide trends in higher education reform in order to keep pace with tomorrow's foreseeable needs;
- to start a process of reflection about their pedagogical model. Due to the radical changes in contemporary society the process of preparing citizens for the knowledge society cannot be the same as that of preparing the traditional professionals;
- to reinforce innovation in their educational programs responding to the expectations of students and, especially, anticipating their future needs;
- to pay more attention to international trends and strategies to make learning more effective and more adjusted to the needs of graduates in a borderless world. Students should acquire competences to act in a wider context without losing their strong local roots;
- to consider their possible role in the offering of new types and levels of higher education programs and to consult with external stakeholders on this matter;
- to increase and widen access and to enlarge the role of the short degree programs to satisfy the needs of the labour market and the expectations of students. Both the state government and the universities, individually, must consider how best they can respond to this need;

- to consider more seriously their role in sectors related with distance and continuing education. Distance education technologies based on ICT are of increasing importance to reinforce learning not only for non-traditional students but also for conventional resident students. The PRT recommends that institutions increase their distance education based academic offerings as a way to widen access to higher education and also to raise the awareness of students about the capabilities of the internet as a learning tool. All teaching staff should progressively use web-based material in their courses and all teaching aids should be made available this way;
- to invite external experts active in the local (or not so local) labour market to teach special topics to students at all levels.
- to provide short cycle programs and continuing education programs (especialização or lattu sensu post-graduate courses) to satisfy regional needs and to strengthen these programs with the appropriate mix of HEIs' internal academic expertise and invited external expertise. Alumni are the most likely target for these programs and their help may be sought to identify community needs or opportunities;
- to lend renewed attention of the committees in charge of curricular reform in higher education to relatively new areas and approaches, including entrepreneurship. These committees should include the active involvement of employers and alumni;
- to establish a unit for systematic follow-up with their alumni to seek information about their career development. Universities should seek – on a regular basis – input from the alumni and employers to consider curricular reform or new initiatives on campus.
- to start a process of reflection about the predominant research model and to try to become more oriented to the social and economic needs of the community;
- to take a proactive role and become the engine for the economic and social development at the regional level;
- to review the staff promotion policy in public universities in order to consider the full portfolio of teaching, research and extension in such a way that no weakening of the research that meets with international standards is caused;
- to make renewed efforts to structure the cultural and extension services offered by the universities in the region so that all students feel obliged to actively participate to their benefit and to the benefit of the surrounding community;
- to overcome the very limited inter-institutional cooperation among higher education institutions in the region regarding the provision of degree programs and to seek new ways of pooling resources to better serve their communities.
- to develop better and more active systems of communication, understanding and collaboration between both state universities in the region;
- to combine the efforts of the two state universities in the region in research and teaching and to transform them into partners. If these universities were able to come together (acting as a two-pole institution) they would become leaders at a national level and relevant at an international level;

- to collaborate with private institutions, especially in teaching activities, to improve the quantity and quality of human resources in the region.

### ***7.2.2 Recommendations to the region***

The Peer Review Team recommends:

- to the region as a whole: to consider capacity-building with universities and stakeholders as an urgent requirement for development;
- to the region as a whole: to implement concrete collaborative efforts with private and public stakeholders in order to strengthen the national and international competitiveness of the economy of Northern Paraná in a context of social equity and environmental quality. In order to reach this objective, the state government should develop (or adapt) a specific regional funding program for combined and collaborative efforts conducted by both public regional HEIs in projects of higher education, science and technology;
- to regional and municipal authorities, employers, development associations, and social entities:
  - to take a more proactive role in seeking regional integration which facilitates the relevance and prosperity of the Londrina-Maringá Axis:
  - to take advantage of the enormous potential that universities have available in terms of human capital and technical infrastructure.
- to public authorities from the state and the municipalities: to make an effort to create a new framework for relationships between universities and the productive sector. This is a cultural change that can only be carried out through a double system of incentives: to universities and companies for developing programs together and to researchers for making them more interested in innovation.
- to the leadership of the universities in the region: to take advantage of their close connections with the local community to convince them of the opportunities that collaboration with the academic community may create for both sides;
- to public authorities at the state and municipal levels and university leaders: to reflect on the social role of public universities in the region with regards to the problems of access and equity and to implement measures to solve these problems.

### ***7.2.3 Recommendations to the state government***

The Peer Review Team recommends to public state authorities:

- to undertake efforts to further disseminate the results and use the project as a basis for discussions at institutional, regional (state) and national levels;
- to develop, implement and evaluate a comprehensive multi-year strategic planning process aimed at defining concrete goals for the contribution of research to regional innovation. This should be conceived as a joint-venture of both state universities and should be aimed at achieving stronger collaboration between government, business, non-profit civil society organisations and universities as key partners in regional development;

- to grant more administrative autonomy to state universities including autonomy to manage their budgets in a more flexible but accountable manner so that financial incentives can reach researchers involved in new contracts as is happening successfully in many other federal and state universities in the country;
- to consider creating the instruments necessary to achieve a higher level of planning to better satisfy the requirements of faster regional economic and social development;
- to conduct a profound review of the work that the various state agencies do directly or indirectly with higher education, science and technology and regional development in order to achieve higher levels of coordination and, in that way, better and more efficiently support the education system focusing research potential on local needs;
- to make clearer the funding of the cultural, social and environmental activities the universities are supposed to carry out;
- that the SETI should take further responsibility for the coordination of the whole state higher education system, transforming the current agglomeration of institutions into a real system of higher education, research and innovation. Private institutions should be considered part of this system;
- that the SETI should take further responsibility on quality assurance matters in order to guarantee a good level of quality in their studies for students enrolled in any type of institution or program;
- that the SETI should develop a system of incentives in order to promote the collaboration between universities and industries through a program for the funding of joint projects and another to provide incentives to academics for participating in such projects.

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## APPENDIX 1. THE OECD PEER REVIEW TEAM

### Lead Evaluator

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### International Expert

**Jose Alberto Nunes Ferreira Gomes** is full professor in the Chemistry Department, School of Sciences, at University of Porto (UP), Portugal. He published more than 80 papers on international journals in Theoretical Chemistry and many oral presentations. On Higher Education and on Research policy and management, he has a vast array of public intervention. At the UP, he was Vice President in 1998-2006. In addition, he has served as president of the Scientific Council of Exact Sciences at the Science and Technology Foundation in Portugal, president of the Portuguese Chemistry Society, member of a variety of executive committees at the European Federation of Chemistry Societies, and president of the Inter Ministerial Commission for Mobility and its representative at the European Union. He obtained a doctoral degree in Chemistry at Oxford University, the undergraduate degree in Chemical Engineering at University of Porto, and more recently, a Master's degree in Higher Education Management at Polytechnic University of Catalonia.

### National Expert

**Paulo Haddad** is consultant in regional development and emeritus professor at the Federal University of Minas Gerais (UFMG). With an extensive career in the public sector, he has served at the federal level as Brazilian Finance Minister, and Planning Minister, and also at the state level as Finance and Planning Secretary in the State of Minas Gerais. An economist trained at UFMG, with a specialty in Economic Planning at the Institute of Social Studies at Hague, Holland, Prof. Haddad has been professor at UFMG in which he founded and led the Center for Regional Planning and Development. He has visiting professor at Vanderbilt University in the U.S. and has been teaching courses in Chile, Uruguay, Colombia and Brazil under the auspices of United Nations. He has been consultant with the American Organization of States (OAS), the U.N. Program for Development (PNUD), the *Vale do Rio Doce* Company, Acesita and CDL/BH. Since 1989 he has been consultant with Fiemg, World Bank, Sebrae and the state governments of Maranhão and Alagoas, in the areas of methodology for the promotion and development of clusters and local productive systems.

## **Team Coordinator**

**Francisco Marmolejo-Cervantes** has served since 1995 as executive director of the Consortium for North American Higher Education Collaboration (CONAHEC), a network of higher education institutions from Canada, the U.S. and Mexico, headquartered at the University of Arizona. He holds an M.B.A. from the Autonomous University of San Luis Potosi (UASLP) and has conducted doctoral studies at the National Autonomous University of Mexico (UNAM). Previously an American Council on Education fellow at the University of Massachusetts-Amherst, he was vice president for administration and finance and vice president for academic affairs at the Universidad de las Américas in Mexico City. Marmolejo consults for Mexican and South American universities and has consulted for the Mexican Ministry of Education (SEP) on issues related to administration and international initiatives. He serves on the external advisory board of the Universidad Autónoma de Nuevo León (UANL), UASLP and the Mexican Association for International Education in which he serves as President of the Advisory Board. During the 2005-2006 academic year, while on sabbatical leave, he collaborated as an international consultant at the Organisation for Economic and Co-operation Development (OECD), Programme on Institutional Management in Higher Education (IMHE), based in Paris.

## APPENDIX 2. MEMBERS OF THE REGIONAL STEERING COMMITTEE AND AUTHORS OF THE SELF-EVALUATION REPORT

### **Regional Steering Committee**

Prof. Lygia Lumina Pupatto, State Secretary for Science, Technology and Higher Education, Government of Paraná.<sup>6</sup> (*President*)

Prof. Angelo Priori, Rector of the State University of Maringá – UEM.<sup>7</sup>

Prof. Wilmar Sachetin Marçal, Rector of the State University of Londrina – UEL.<sup>8</sup>

Prof. Paulo Roberto Godoy, Rector of the State University of Ponta Grossa – UEPG

Prof. Alcibiades Luiz Orlando, Rector of the State University of West Paraná – UNIOESTE

Prof. Vitor Hugo Zanette, Rector of the State University of Central West – UNICENTRO

Prof. Antonio Alpendre da Silva, Director of the State Faculty of Philosophy, Science and Letters of Paranaguá – FAFIPAR and Representative of State Faculties.

Prof. Jorge Bounassar Filho, President of Araucária Foundation

Prof. Nelson Maculan, Director of SESU – MEC

### **Regional Coordination**

Prof. Cássio Frederico Camargo Rolim. Regional Coordinator – Federal University of Paraná

### **Self-Evaluation Report Working Group**

Prof. Cássio Frederico Camargo Rolim, Regional Coordinator – Federal University of Paraná

Prof. Mauricio Aguiar Serra, Regional Vice- Coordinator – Federal University of Paraná

Prof. Antonio Carlos Lugnani, Local Coordinator – State University of Maringá

Prof. Rossana Lott Rodrigues, Local Coordinator – State University of Londrina

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6. Previously Prof. Aldair Tarcisio Rizio

7. Previously Prof. Gilberto Cesar Pavanelli

8. Previously Prof. Lygia Lumina P

### APPENDIX 3. PROGRAM OF THE REVIEW VISIT

#### OECD Review Visit to the Northern Parana Region, 21-26 August 2006

##### Sunday 20 August. Curitiba

18:30 - 21:00 Review Team private meeting.

21:00 Welcoming Dinner

##### Monday 21 August. Curitiba and Londrina

09:30 - 11:30 Regional Coordination Team (members of the Regional Advisory Committee and authors of the Self Evaluation Report)

*Lygia Lumina Pupatto*, Secretaria de Estado da Ciência, Tecnologia e Ensino Superior  
Governo de Paraná, and Chair of the Steering Committee

*Antonio Alpendre Da Silva*, Diretor, FAFIPAR

*Alvaro de O. Borges Ficho*, Professor Adjunto, UNICENTRO

*Jorge Bounassar Fiho*, Presidente, Fundação Araucária

*Paulo Roberto Godoy*, Reitor, UEPG

*Antonio C. Lugnani*, Representante de Reitoria, UEM

*Ricardo Costa de Oliveira*, Coordenador de Ciência e Tecnologia, SETI

*Alcibiades L. Orlando*, Reitor, UNIOESTE

*Cássio Frederico Camargo Rolim*, Professor, Departamento de Economía, Universidade Federal do Paraná

*Mauricio Aguiar Serra*, Professor, Departamento de Economía, Universidade Federal do Paraná

*J. Francisco P. Trindade*, Coordenador de Ensino Superior, SETI

*Carlos Luciano Vargas*, Pro-Reitor Administração, UEPG

*Vitor Hugo Zanette*, Reitor, UNICENTRO

12:00 - 13:30 Meeting at Universidade Federal de Paraná

*Zaki Akel Sobrinho*, Director of Applied Social Sciences

17:00 Private meeting. Peer Review Team. Londrina

##### Tuesday 18 April. Maringá

08:30 - 10:30 Leadership of the State University of Maringá (UEM)

*Sônia A. Lopes Benites*, Pró-Reitora de Ensino

*José Roberto Pinheiro de Melo*, Assesor de Planejamento

*Maria Helena Ambrosio Dias*, Diretora, Pró-Reitoria de Pesquisa e Pósgraduação

*Neio Lucio Peres Gualda*, Diretor, Centro de Ciências Sociais  
*Antonio Carlos Lugnani*, Coordenador de Desenvolvimento Regional  
*Rafael Bruno Neto*, Diretor, Pró-Reitoria de Extensão e Cultura

11:00 - 12:30 Meeting with researchers from State University of Maringá (UEM) and State University of Londrina (UEL)

*Mauro Luciano Baesso*, Professor, Departamento de Física, UEM  
*Maria Aparecida Fernandez*, Coordenadora da Central de Biologia Molecular e Estrutural do COMCAP, UEM  
*Carlos Roberto Ferreira*, Coordenador Colegiado do Cursos de Economia, Pesquisador e Professor, UEL  
*Celso Vataru Nakamura*, Coordenador da Central de Microscopia do COMCAP, UEM.  
*José Luiz Parré*, Coordenador de PME, Departamento de Economia, UEM  
*Rossana Lott Rodrigues*, Professora, Departamento de Economia, UEL

14:00 - 15:45 Meeting with representatives of the business sector

*Adolfo Cochia Junior*, Presidente, Sindicato da Indústria da Construção (SINDUSCON-NOR)  
*Luis Fernando W. Ferraz*, Diretor, Sindicato de Vestuario (SINDVEST)  
*Antonio Carlos Lugnani*, Coordenador de Desenvolvimento Regional, UEM  
*Paulo Meneguetti*, Coordenador Regional, Federação das Indústrias do Paraná  
*Marcos Antonio Miguel*, Diretor, SINDUSCON-NOR  
*Carlos Walter Martins Pedro*, Presidente, Sindicato das Indústrias Metalúrgicas, Mecânicas e de Material Elétrico de Maringá

16:00 - 17:45 Meeting with private universities

*Wilson de Matos Silva*, Reitor, CESUMAR, Centro Universitario de Maringá  
*José Carlos Barbieri*, Diretor General, Faculdade Cidade Verde  
*Lupercio Cascote*, Diretor General, UNIFAMMA

18:00 Private meeting. Peer Review Team

### **Wednesday 19 April. Maringá and Londrina**

08:30 - 10:15 Meeting with Pró-AMUSEP

*Sydney Aparecido Baroni*, Eng. Agronomo, EMATER  
*Silvio M. Barros II*, Prefeito Municipal, Prefeitura do Municipio de Maringá  
*Maly Benatti*, Prefeita Municipal, Prefeitura do Municipio de Nova Esperança e Presidente de AMUSEP  
*Mateus Ferreira*, Analista de Sistemas, Fórum Regional do PRO-AMUSEP  
*Antonio Carlos Lugnani*, Coordenador de Desenvolvimento Regional Universidade Estadual de Maringá  
*José Odiar Mazia*, Eng. Agronomo-Fruticultura, EMATER  
*Ednaldo Michellon*, Coordenador, Escritorio de Negócios, Universidade Estadual de Maringá  
*Vicente Pedatella Netto*, Assessor de Reitoria, CESUMAR, Centro Universitario de Maringá  
*Rosária Séqua*, Fórum Regional do PRO-AMUSEP  
*Claudio Serrato*, Consultor, SEBRAE  
*Marcos H. de Souza*, Consultor, Instituto para el Desenvolvimento Regional (IDR)

*José Ernesto Tavares*, Coordenador, Fórum Regional do PRO-AMUSEP  
*Luiz Caetano Vicentini*, Assessor Técnico, EMATER  
*Angelo Celso Zampieri*, Prefeito Municipal, Prefeitura do Município de Iguaraçu e Vicepresidente de AMUSEP

10:30 - 12:15 Meeting with technology incubators and the Metropolis Observatory. Technological Incubator of Maringá  
*José Roberto Pinheiro de Melo*, Assessor de Planejamento, Universidade Estadual de Maringá  
*João Celso Sodi*, Secretário Coordenador de Desenvolvimento Econômico, Prefeitura do Município de Maringá  
*Ely Mitic Massuda*, Professora, CESUMAR, Centro Universitário de Maringá  
*Rosa Izelli Martins*, Diretora, Instituto Tecnópole Maringá  
*Ivana Verardo*, Professora, Universidade Estadual de Maringá  
*Ana Lúcia Rodrigues*, Coordenadora, Observatório das Metrôpoles, Universidade Estadual de Maringá  
*Vânia Calsavara Bueno*, Gerente, Incubadora Tecnológica de Maringá

12:30 – 14:30 Working lunch with Maringá Commission for Economic Development (CODEM)  
*Celina Meneguetti*, Assessora da Diretoria, Conselho de Desenvolvimento Econômico de Maringá (CODEM)  
*Valdir Antônio Scalon*, Presidente, Conselho de Desenvolvimento Econômico de Maringá (CODEM)  
*João Celso Sodi*, Secretário Coordenador de Desenvolvimento Econômico, Prefeitura do Município de Maringá

17:00 Private meeting. Peer Review Team. Londrina

#### **Thursday 20 April. Londrina**

08:30 - 10:30 Leadership of State University of Londrina (UEL)  
*Cesar Antonio Caggiano Santos*, Vice-Reitor, UEL  
*Paulo Basan*, Pro-Reitor de Extensão, UEL  
*Rossana Lott Rodrigues*, Professora, Departamento de Economia, UEL

11:00 - 12:30 Meeting with teaching coordinators from State University of Londrina (UEL) and State University of Maringá (UEM).  
*Virgilio de Almeida*, Vice-Coordenador, Curso Economia, UEL  
*Sirlei Bennemann*, Coordenador, Curso Biología, UEL  
*Carlos Roberto Ferreira*, Coordenador, Colegiado do Curso de Ciências Econômicas, UEL  
*Paulo Sergio L.Freitas*, Coordenador, Curso Eng. Agrícola, UEM  
*Tania Ap. Silva Klein*, Coordenadora, Estágios, Ciências Biológicas, UEL  
*Rossana Lott Rodrigues*, Professora, Departamento de Economia, UEL  
*Bibian Denise Mai*, Coordenadora, Curso Enfermagem, UEM  
*Sonia Maria Vieira Negrão*, Coordenadora, Curso Pedagogía, UEM  
*Rossana Lott Rodrigues*, Professora, Departamento de Economia, UEL  
*Ricardo de J. Silveira*, Vice-Coordenador, Colegiado do Curso de Ciências Sociais, UEL  
*Mauricio Ursi Ventura*, Coordenador, Curso Agronomia, UEL

- 14:00 -15:45 Meeting with employers  
*Clóvis Souza Coelho*, Vice-Presidente Executivo e Coordenador Regional, Federação das Indústrias do Estado do Paraná (FIEP)  
*José Augusto Rapchman*, Vice-President, TERRAROXA
- 16:00 -17:45 Meeting with private universities  
*Wilma Jandre Melo*, Pró-Reitora Administrativa, UNOPAR  
*Alessandro Filla*, Coordenador do Curso de Arquitetura, UNIFIL
- 18:00 Private meeting. Peer Review Team

### **Friday 21 April. Londrina and Curitiba**

- 8:30 - 11:30 Meeting with Conselho de Desenvolvimento Económico de Londrina (CODEL) and municipal authorities  
*Gerusa Alves da Silva*, Conselheira, Conselho Municipal do Meio Ambiente (CONSEMMA)  
*Humberto Marques de Carvalho*, Gerente de Planejamento e Asesor, Instituto de Pesquisas e Planejamento Urbano de Londrina (IPPUL)  
*Délio Nunes César*, Diretor de Ciência e Tecnología, Conselho de Desenvolvimento Económico de Londrina (CODEL)  
*Henrique Ayres Dias*, Eng. Civil, Secretaria Municipal de Obras Publicas (SMOP)  
*Luis Fernando Pinto Dias*, Vice Prefeito, Prefeitura do Municipio de Londrina  
*Patricia Campana de Castro Fávoro*, Pedagoga, Instituto de Pesquisas e Planejamento Urbano de Londrina (IPPUL)  
*Rodne de Oliveira Lima*, Chefe de Gabinete, Prefeitura do Municipio de Londrina  
*Luiz Figueira de Mello*, Diretor Presidente, Instituto de Pesquisas e Planejamento Urbano de Londrina (IPPUL)  
*Auber Silva Pereira*, Socio Director, FLEXTV  
*João Batista Moreira Souza*, Conselheiro, Conselho Municipal do Meio Ambiente (CONSEMMA)  
*Simona de O.F. Vecchiatti*, Gerente de Projetos Arquitetônicos e Urbanísticos, Instituto de Pesquisas e Planejamento Urbano de Londrina (IPPUL)

16:00 - 19:00 Private meeting. Peer Review Team. Curitiba

19:30 - 20:30 Wrap-up session with authors of the Self-Evaluation Report

*Cássio Frederico Camargo Rolim*, Professor, Departamento de Economía, Universidade Federal do Paraná  
*Mauricio Aguiar Serra*, Professor, Departamento de Economía, Universidade Federal do Paraná

### **Saturday 22 April. Curitiba**

8:30 - 10:00 Wrap-up session of members of the Peer Review Team