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Social Relevance and Utility of Research in Cuba, Nicaragua and Bolivia: Examples of Best Practices

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SOCIAL RELEVANCE AND USEFULNESS OF HIGHER EDUCATION INSTITUTIONS IN CUBA, NICARAGUA AND BOLIVIA: EXAMPLES OF GOOD PRACTICES.

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INTRODUCTION

This paper has as aims to emphasize the social relevance of higher education – illustrating the analysis with good practices - in three countries of Latin America and the Caribbean, with diverse historical traditions and that develop today political processes of different sign.[2]

PART ONE

THE CASE OF CUBA: CREATION OF SCIENTIFIC CAPACITIES BY MEANS OF PUBLIC POLICIES OF HIGHER EDUCATION, SCIENCE AND TECNOLOGHY.

1. CHALLENGES OF THE PERIOD 1990-2007.

The main hypotheses of this paper is the following: In Cuba, massification (expansion) of HE with quality and equity through national policies of social inclusion, have had as results the development of science in the state of the art according to contemporary standards of research universities. Since devoted to fulfill national needs, this policy of HE – as well as science and technology policies- have had an important impact in the

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[2] La presente ponencia es una breve síntesis de los trabajos originales de Francisco López Segrera francisco.lopez-segrera@upc.edu , Carlos Tunnermann Bernheim ctb@teranet.com.ni y Crista Weise c.weise@umss.edu.bo . En los trabajos originales sobre Cuba, Nicaragua y Bolivia - que fueron integrados en esta ponencia ajustándose al límite de palabras señalado por los organizadores- hay abundancia de análisis, fuentes bibliográficas y cifras que no pudieron ser incluidas en esta síntesis por razones de espacio. ***Sending an email to authors you can ask for the original versions integrated in this resume.***

capacity building and development of human resources (human and social capital) in Cuba, as well as in other Less Developed Countries through Cuban international cooperation.

From 1989 up to the present (2007) the Cuban government is facing enormous challenges: the disappearance of the socialist countries; the intensification of US blockade; the emergency of an unipolar world led by USA; the economic and social crisis of the South; the "victory of neoliberalism"; the sequels of September 11 and of the current world recession; and the urgent need to be inserted in a new type of world global market. Cuba has resisted and continued its diverse programs of development and construction of the equity, among them those of the Higher Education Institutions (HEI), in this difficult environment.
The growth of the GDP of 2005 according to CEPAL was of about 5%. The Cuban government, according to its own methodology, estimated a growth of 11,8 % and in 2006 it reached 12,7 %.

2. CREATION OF EDUCATIONAL AND SCIENTIFIC CAPACITIES.

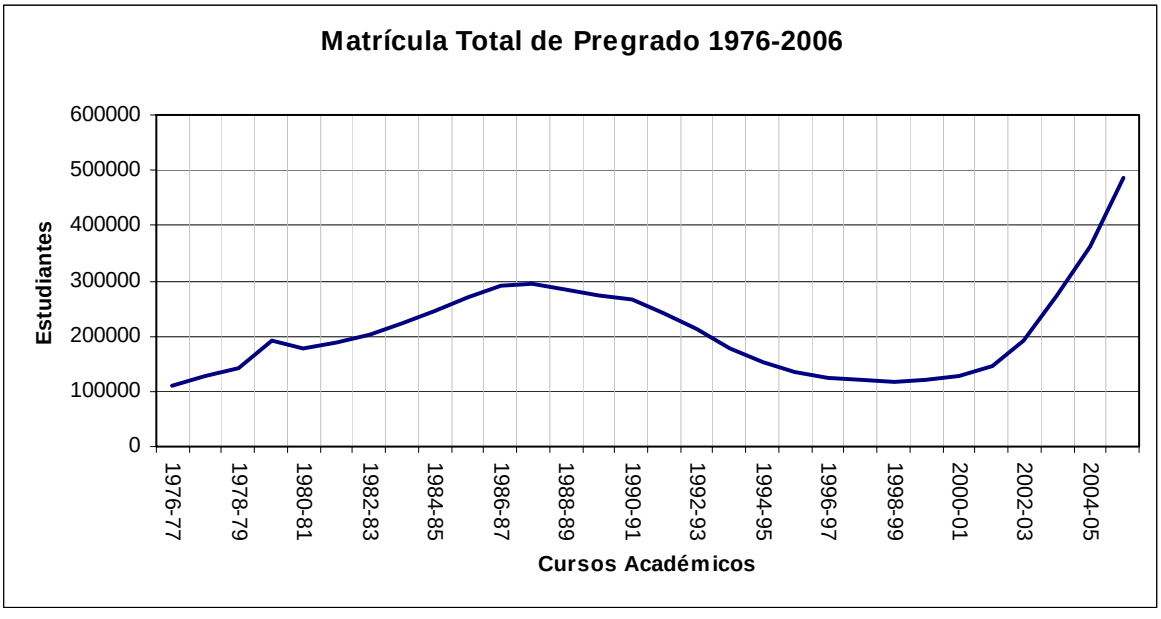
2.1 Indicators of Higher Education (HE).

The National Census of Population and Housings of Cuba (2002) reported a population of 11,17 million inhabitants, of which 712,672 are university graduates. This means that 6.91% of the whole has at least a HE title. Women constitute the majority with 52.05% of the above percentage.

University students are 11.63% of the segment of the population between 30 and 59 years and 10.01% of the economically active population, of this latter category the latter 10.45% are women and 8.30% men. The Gross Rate of Enrolment (GER) in the academic year 2006-2007 reaches 63.1%. In the course 2005-2006, 65.16 % of GER are women. [3]

The Cuban subsystem of HE is integrated by 65 institutions of HE and 3150 headquarters at municipal level. The matriculation estimated for the year 2006-2007 exceeds 620,000 students.

The evolution of the size of the subsystem during the last 30 years can be estimated in the following graph:



2.2 Transformation of the Tertiary Education: the universalization of the top education.

2.2 Transforming tertiary education: the universalization of HE[4].

Since the academic year 2001-2002 Cuban HE system is following new and important transformations with a view of extending the possibilities of university studies to the social sectors least favoured. This is being accomplished through the *universalization of the university*, which has implied a substantial increase of the GER.

Since the creation of this University Subsidiaries (US), the municipalities assume a more active role in preparing the professionals who need for its development. Research linked to local problems will be a reality in this US for Municipal University students.

2.3 Creation of scientific capacities by means of public policies of Science and Technology[5].

A first period of "Promotion Directed to Science" is inscribed between years 1960 and 1977, with predominance of the scheme of "Science Push". It is a stage identified by revolutionary transformations, massive access to education and the creation of a national system of health, in which begins and climbs the US blockade against Cuba.

Between the year 1960 and 1970 seven scientific institutions were created for a year as average. HE institutionalized the careers of sciences and engineering and creates an agenda of research centred on economic and social problems. It begins the massive training of human high-level resources taking advantage of the international cooperation. Institutions of coordination of science and technology appear during this period: in 1974, the National Council of Science and Technology and in 1976, the State Committee of Science and Technology. The second period, named "Model of Centralized Direction" (1976-1990) is characterized by concentrating trade and cooperation together with the trade with socialist countries of Eastern Europe, as a consequence of Cuba being a member in 1972 of the Mutual Economic Aid Council (CAME). The transfer of technology is dominant and a better use of scientific results is promoted, incorporating them into production and services. In 1987 appears the System of Introduction of Achievements, the number of researchers is doubled and a national system of scientific degrees is created.

As a consequence of the fall of European socialism and of the disappearance of the USSR and CAME, the country introduced changes in the economic model, and an important process restructuring agriculture and industry takes place. In this context, a third period of the "Model of Science and Technological Innovation" has been consolidated in managing and organizing science and technology. In the year 2002 Cuba invested about 1% of its GDP in activities related directly to science and technology.[6] The principal features of this model are: the creation of the Scientific-Productive Pole of the West of Havana and of every province of the country, dedicated to Biotechnology and to the Pharmacist Industry; the promotion of social movements

[4] "Estudio sobre el Financiamiento de la Educación Superior de Cuba". La Habana, diciembre de 2004. www.iesalc.unesco.org.ve

[5] "Política de Ciencia y Tecnología y Política Económica y Social en Cuba". Intervención en el Congreso Universidad 2006. Palacio de las Convenciones, La Habana, Febrero de 2006. Memorias Universidad 2006. ISBN 959-0282-08-3.

[6] Castro Díaz-Balart, F. "Impacto de las nuevas tecnologías en el desarrollo económico nacional. La experiencia cubana", p. 211. En H. Vessuri (compiladora) Universidad e investigación científica. UNESCO-CLACSO. Buenos Aires, 2006.

that stimulate and value innovation (Forum of Science and Technology, Association of Innovators, Technical Juvenile Brigades); a major emphasis of the technological management in the companies; creation of research groups in the universities; the extension of post graduated courses according to national needs; the universalization as well as municipalization of HE, which gives new opportunities to local innovation; the promotion of food sufficiency and a sustainable agriculture; the appearance of a sector of the Knowledge Economy in Biotechnology, and key developments in the Software Industry.

Biotechnology and the pharmaceutical industry have been the principal Cuban examples of creation of scientific capacities and of productivity of research. The genesis of the infrastructure for the biotechnological industry was the creation in 1965 of the National Centre of Scientific Researches (CNIC). The principal zone of scientific development is nowadays the scientific-productive Pole of West Havana, already mentioned, that constitutes an example of Good Practice. Among its principal institutions are: the Centre of Molecular Immunology (CIM), the Institute of Research Carlos J. Finlay and the Centre of Genetic Engineering and Biotechnology (CIGB).

The development of biotechnology has had great social relevance given its great impact in the Cuban public health by means of the creation of new products such as: the recombinant vaccine against hepatitis B; the PPG, a medicine for cholesterol control; estreptoquinasa recombinant, used in the treatments of the cardiac attacks; a factor of recombinant epidermic growth, used for cases of severe burns; the components of a diagnosis kit for the precise detection of the stocks of HIV virus; and monoclonal antibodies, used for the diagnoses, for example of hepatitis C, and the treatment of diverse diseases. These products constitute an important sample of the productivity of the Cuban investigations in this field[7].

CREATION OF SCIENTIFIC CAPACITIES
THE BIOTECHNOLOGY SECTOR

With the purpose of creating a sector of the biotechnology having an impact in the economy of Cuba, a series of key concepts were adopted:[8]

- Organizations in closed circuit. The most important institutions were structured in organizations of investigation, production and commercialization, in which all the cycle, from the money invested in the research, the development and the production, to the recovery of the investments in the market, was subordinated to the same management and to the same level of responsibility.
- Organizations oriented towards the export. Given to the reduced character of the Cuban internal market the development of products has the global market as an important destiny.
- Intellectual Property. The main organizations of the Cuban biotechnology are proprietors of more than 600 patents registered abroad.

[7] Ibid., p. p.214

[8] Ibid., 11-12

4. CONCLUSIONS: SOCIAL RELEVANCY AND CONTRIBUTIONS OF THE SYSTEM OF TERTIARY EDUCATION TO THE DEVELOPMENT OF THE COUNTRY. THE SYSTEM OF PUBLIC HEALTH LIKE AS AN EXAMPLE OF GOOD PRACTICE.

Cuban HE has been characterized by its high social relevancy: it has given responses adapted to the professionals' principal requirements, in harmony with the demands of the country for its needs in production of goods, services and research, as well as with its commitments of cooperation and solidarity with other countries of the world, particularly in education and public health.

HE - example of good practice in the area of the public health - has trained sufficient physicians and others health specialists. This allows Cuba to have a public universal free health system, accessible to the whole population. The system of public health is regionalized and has an integral character, within reach of all citizens in the city as well as in the country side.

The successful low infantile death rate is the minor of the Region and is among the best in the world. Cuba has the major rate of doctors for every thousand inhabitants of the world. Nowadays more than 20,000 Cuban doctors offer services in more than sixty different countries. Cuba offers thousands of free scholarships for students of less developed countries to be trained as university graduates in different branches of science; particularly, 12,000 students receive annually medical training in ad hoc schools.

HE subsystem provides to the educational system the teachers that it demands, including an additional amount required in order to fulfil new demand challenges. More than 90% of the teachers are university graduates and those who are not study to reach this level in university classrooms. Nowadays more than 70,000 university teachers follow courses of master degree.

The training of an important number of professionals with high qualification in different branches of science and with social vocation, has sustained the strategies of economic and social development adopted by Cuba, which has allowed the country to overcome successfully the principal difficulties of the economic crisis of the nineties and to sit solid bases to reach new and better results.

National Enrolment in Postgraduate Courses 2005.

Postgrado	TOTAL	MES[1]	MINED[2]	MINSAP[3]	OTROS
Cursos	385191	108629	106044	115289	55229
Diplomados	76870	20706	33030	15578	7556
Entrenamientos	20124	5360	2605	7127	5032
Maestría	98795	10617	76455	10833	890
Especialidad	14296	2564	91	11457	184
Doctorado	4129	2145	965	452	567
TOTALES	599405	150021	219190	160736	69458

[1]MES: Ministry of Higher Education; [2] MINED: Ministry of Education; [3]Ministry of Public Health. Source: Statistics Department, (MES), 2005

PART TWO
SCENARIOS, RELEVANCE AND SOCIAL USEFULNESS OF THE RESEARCH: THE CASE OF NICARAGUA

1. Current situation of the education in Nicaragua, with special reference to HE.

Nicaragua is, after Haiti, the poorest country of Latin America. From 5.9 million inhabitants, half of them live in situation of poverty and 20 % in extreme poverty. The annual revenue per capita is the lowest of Central America: USA$908 dollars.

From 1990, plans of structural adjustment are applied in Nicaragua, decided with the International Monetary Fund, in order to obtain a balance in the macroeconomic indicators. This policy will be continued by the present government, with a modest increase of the social expenses.

TABLE Nº 1

Educational Level	**GER**
Pre-School	23%
Primary	82%
Secondary	40%
HE	14%

HE in Nicaragua.

The University of Leon in Nicaragua was the second to be settled down in the captain-general of the Kingdom of Guatemala and the last one created by Spain in America during the colonial period (1812).

TABLE Nº 2

HEIs in Nicaragua(*)	
Universidades Públicas Miembros del CNU(+)	4
Universidades Privadas Miembros del CNU(+)	5
Centros de Educación Técnico Superior Miembro del CNU(+)	1
Instituciones Privadas no Miembros y autorizadas por el CNU(±)	42
Instituciones Privadas no reconocidas por el CNU	1
Total:	**53**

Source: IESALC-UNESCO: "***Educación Superior Universitaria Privada en Nicaragua***", junio 2006.

(*) No incluye a las Academias Militar y Policía.

(+) Beneficiadas con fondos públicos del 6% del Presupuesto General de la República (PGR).

(±) Se refiere aquellas universidades que no forman parte del Consejo de Rectores del Consejo Nacional de Universidades (CNU).

Of the total of students, a 60% attend private universities that do not belong to the National Council of Universities (CNU) and a 40% to universities subsidized by the State. To these public universities integrating the CNU, attended 75,945 students in 2006, of which 75% enjoyed total or partial exoneration concerning payment of tuition. These institutions graduated 7,270 professionals that same year.

The total of public and private universities offers altogether more than 500 careers of bachelor's degree level, and near 200 post graduates and specializations courses, with great repetition in the offers. For example: 33 programs of Business Administration exist, 24 of Tourism and Hotel management, 21 of Accounting, 20 of Systems Engineering, 15 Information Technologies, 14 of Economy and 10 of Diplomacy and

International Relations. In the post graduated courses the specialties of Medicine (33 programs) occupy the first place, followed by Law (18), Administration with 11 and Economy with 7.[9]

The State contributes by constitutional mandate, to the ten institutions of HE that integrate the CNU, with 6% of the National Budget, which is equivalent to the 1, 2% of the GDP (about 80 million dollars). The unit cost by student of the system subsidized by the State is of USA$911 dollars; this amount does not include the costs in books, transport, feeding, etc.

2. Situation of the scientific - technological development. Weaknesses and perspectives.

Of 151 institutions of research surveyed in 1993 by the Institute of European Latin-American Relations (IRELA) in Central America, Nicaragua shelters 18, 5 %.
Regarding the scientific publications with international recognition in the Science Citation Index (SCI), the written production of Nicaragua is very limited (3.6 %).

Nicaragua lacks a real National System of Science and Technology, and the investment in R&D is no more than the equivalent of one to 0.77 dollars per capita.

3. Problems of scientific research and construction of capacities. Challenges to overcome.

The function of research does not have the priority that deserves in the HEIs and the policies of scientific research lack the necessary resources to be implemented. Concerning the causes of this poor development of scientific research, can be mentioned: a) the profession oriented (and not research oriented) character of higher education; b) the deficiency of stimuli to the researcher; and c) the separation of research activities from post-graduated courses.

The main difficulties that research faces are, among others, the following ones:
a) Lack of an adequate relation between the scientific-technological infrastructure and the economic activities.
b) Limitation of financial and material resources, including the poor and deficient organization of bibliographical resources, collections of scientific magazines, centres of documentation, laboratories, computers, etc
c) Lack of "critical mass" to sustain a program of interdisciplinary research.

Nevertheless, in recent years, we are witnessing the emergency of positive signs towards the promotion of research and generation of capacities.
1. One can affirm that the scientific research is in an initial stage of development in HEI´s in Nicaragua.
2. Nicaragua has, at present times, the minimal necessary conditions to shape a National System of Science and Technology, but this one has not been created as such.
3. The international cooperation, specially the bilateral one with Sweden, has allowed beginning the construction of an endogenous capacity of R&D, which has been translated in the training in post-graduated courses of a still small but already significant

[9] Ver "***Tendencias y potencialidades del desarrollo de la educación superior en Nicaragua***", documento elaborado por Carlos Tünnermann Bernheim y Luis Yarzábal para ASDI/ SAREC (2002).

number of university teachers and the existence of several units, programs and projects of research supported by ASDI/SAREC.
4. In spite of it, research is developing in different academic units of the universities, especially in the public ones, due to the self-sacrificing spirit of the researchers and to its vocation.
5. The activities of R&D realized in the universities belonging to the CNU show, in the themes researched, a good degree of social relevancy. Nevertheless, it is not possible to evaluate adequately its quality and scientific and social impact due to the non-existence of databases and other sources with updated information.

4. Social relevance and usefulness of research. Examples of good practices.

Among the universities of the country, there are two public ones that are outstanding in the field of research and in what concerns the social usefulness. These are: the Autonomous University of Nicaragua, based in Leon, and the National University of Engineering (UNI), located in Managua, the capital city.

From the experience of these universities we extract the following examples of good practices.

UNAN-León has created in the last years Centres of Research and Post-Graduated courses that agglutinate academicians of the highest scientific level; they have an adequate infrastructure with basic and specialized equipment of the top technology available in the country and participate in networks with relevant international groups of their speciality for the exchange of experience and knowledge.

Research in Demography and Health Centre (CIDS).

In May 2002, CIDS was created with the mission to develop projects of research-intervention in the Public Health field; articulating the results of these researches with the programs of post-graduated training in Epidemiology and Public Health, as well as designing and formulating actions for the improvement of populations' living conditions and health. Its strategy allows to do parallel studies on various problems of public health, such as: traffic accidents, attempts of suicide within the young population, pregnancies in teenagers, profiles of factors of risk for cardiovascular diseases (consumption of alcohol, bad nourishing and sedentary habits), domestic violence and its impact in the health of the pregnant woman and the child, civil safety, and sexually transmitted diseases as HIV/AIDS.

Geographical Information Systems Centre (CSIG).

The CSIG, created in the year 2005, compiles and processes data and geographical information obtained by means of Systems of Geographical Information technology (SIG). The work focuses in the development and system application of geographical information of public health, management of environment and natural resources, prevention, mitigation and attention to disasters, local development, integral managing of hydrographical basins and renewable energies. It has geo-indexed information of 10 municipalities of Leon's department.

Worker's Health and Environment Research Centre (CISTA).

CISTA offers to the workers specialized tests in occupational health and developed, together with the Nicaragua's Central of Workers, the project of Promotion of health and security of the workers, (PROSSTRAB).

Infectious Diseases Re search Centre (CIEI).

CIEI was created in 2005 to improve the health of Nicaraguan and Central American population by generating and transferring knowledge and technologies, as well as training human resources, in the field of the infectious diseases. It has been relevant concerning quality assurance, ethics, the search of excellence and the permanent links with the community.

Research and Reproduction of Biological Controllers Centre (CIRCB)

CIRCB was constructed with the support of Japan's government. It was inaugurated in 2001 in order to obtain a mass production of the agents of biological control of agricultural plagues, principally Trichogramma and Chrysopa.

Engineering National University (UNI).

The narrow relation between teaching, research and extension is realized through increasing linkages with the productive public and private sector, especially with the small and medium enterprises (PYMES), together with the creation of strategic alliances with majors and municipalities of the whole country. Two special units, the office of municipalities and the office of relations with PYMES, coordinate these activities in the institutional area. The Centres or institutes of research of UNI are:
1.-The Program of Cities Territories Environmental Studies (PEA/UT) is part of the Centre of Research and Studies of the Environment (CIEMA).
2.-The Program of Research and teaching in Environment (PIDMA) is part of the Centre of Research and Studies of the Environment (CIEMA). This program works the in treatments of water, pollution and pollutants.
3.-The Program UNI/ASDI / FIQ, in the Faculty of Chemical Engineering attend Processes and Chemical Technology area, specially processes and unitary operations (Dried).

Other examples of Good Practices are: the Mediation and Resolution of Conflicts Centre and the National Agroplasticulture Reference Centre (CNRA).

In conclusion, till now most of the activities of Research and Development have been done in the public universities with the technical and financial support of the international cooperation, specially with the contribution of the Swedish Agency of Cooperation for International Development (ASDI) through its Department of Research (SAREC).
This Swedish cooperation (ASDI / SAREC) has been constant and has been developed in three phases. The first one, focused in the support of projects considered of great relevancy for the Nicaraguan society. The second one was orientated to the training of human resources at post-graduate level (masters, PhD). The third one, nowadays in process, is devoting itself to stimulate the construction of capacity for research (in health, environment, agricultural and natural resources and technologies) and the accomplishment of institutional reforms in four state universities.

PART THREE

PRODUCTIVITY AND RELEVANCE OF THE SCIENTIFIC AND TECHNOLOGICAL RESEARCH IN BOLIVIA: ROLE AND CONTRIBUTION OF THE UNIVERSITIES.

THE CHANGES IN THE POLICIES OF HE IN BOLIVIA, CONTEXT AND PERSPECTIVES.

In the last two decades two political and ideological (sometimes contradictory) visions emerged in Bolivia. They coexisted and prepared two different political projects, one in the decade of the nineties in which the neoliberal trends tried to construct a type of university based on the neoliberal paradigms of market and quality. The other one (2005) marked by the arrival to power of the populist nationalistic currents, with new offers of public policies, based on a current of Indian origin, aiming to "decolonize" the paradigms of neoliberal HE, but without replacing the structures and the characteristics of the model who tries to overcome.

The Research-oriented approach. National Plan of Research and Development.

As well as the scope of the education changes in Bolivia, also the new visions on development and production are expressed by the new governmental authorities in the modifications to the National Plan of Development, which incorporates the National plan of Science Technology and Innovation (PNCTI) (2004-2009). Somehow it respects the normative precedents of already existing policies of research, adding the emphasis in the recovery and systematizing of ancient knowledge.
In the above mentioned plan is admitted that the new productive counterfoil needs of the participation of science, technology and innovation. It proposes the implementation of the institutional structure that assures the interaction among the scientific - technological sector, the productive sector and the State, that it will be the Bolivian System of Innovation (SBI). This structure tries to break the technological and knowledge dependence that has sustained the colonial model for centuries. (PNICYT, 2006)

This system is based on two principal ideas, the development of a scientific dynamic research, capable of giving response to the needs of development; and the evaluation and systematization of local and ancient knowledge, the establishment of a scientific culture, with universal access to knowledge and technology.

In harmony with the above mentioned vision it establishes five strategic lines:

- Science, Technology and Innovation (STI) for the productive development.
- STI to study the natural and social reality and its potentials.
- STI for the solution of regional and national problems, with sovereignty and social inclusion.
- Scientific inclusive culture for the construction of a knowledge society with endogenous characteristics.
- Recovery, protection and utilization of the local's and ancient knowledge.

It is necessary to establish in a clear way the role of the universities and of other instances in this context.

Development of research capacities.

Research in the Bolivian universities is weak and sufficient relevancy has not been given to it. They have a very small percentage of teachers with exclusive dedication, which does not exceed a quarter of the whole academic personnel. Nevertheless, universities are the principal institutions that develop research.
The biggest number of researchers is located at the universities (60 % to 70 %), having the rest of sectors - NGO, private company, State – a very small amount of them.

PRODUCTIVITY, SOCIAL RELEVANCE AND LINKS WITH THE DEVELOPMENT.

Scientific research in the Universities.

Of a whole of 183 centres of research and development in Bolivia, 141 belong to the system of public universities, 25 centres of research depend on governmental organizations and the 17 remaining ones correspond to private organizations. In the cities of the so called "Backbone of Bolivia", integrated by the cities of La Paz, Cochabamba and Santa Cruz, resides most of the population of the country and the biggest amount of university students as well. These cities also shelter more than 60 % of the existing centres of research in the country.[10] In the private universities there exist smaller and less consolidated centres.
Nevertheless, the level of scientific production existing in the country as result of the activity of these centres presents many deficiencies and weaknesses. The gap with the countries of the region is still very big.
In 1986, from a million four hundred thousand articles published throughout the world, scarcely seven (7) had origin in Bolivia and the situation has not improved significantly since then. The technological production is equally small, less than 5 % of patents registered regionally have their origin in Bolivia (CEUB, 1993, pp. 14-15). The Diagnosis of scientific capacities of 1992 helps us to add, that though the public universities have the numerical majority of research activities, there does not happen the same thing in relation with the investments and expenses in R&D, that only are 21,20 % of the national whole. Inversely, the State fulfils only 23,20 % of scientific activities, but it manages 60,70 % of the total investment of R&D. Such percentages, in turn, would lack sense if we don't make explicit the total investment in R&D. Bolivia invested in R&D only 0,1 % of the GDP in 1982 and 0,3 % in 1992, that is to say, approximately 20 million dollars yearly[11]. According to the records of CONACYT, of this whole amount the public universities managed 4,3 million US dollars in 1992. According to the CEUB, in 1995, the investment would have risen to 56,7 millions. [12] Considering that in that year 142 centres of research were registered, the average for each of them was 47.183 dollars, this sufficiently illustrates the lack of funds for research and the difficulties of these centres and programs of research in order to survive.

[10] Para ampliar información a este respecto ver: G. Rodríguez y C. Weise,(2006). Informe nacional de educación superior. IESALC.

[11] El contraste con los países vecinos es flagrante: Brasil invierte tres mil millones y 500 millones anuales, Argentina o Chile.

[12] Según la memoria de la UMSA del año 1995, su presupuesto en "investigación y servicios" habría superado los tres millones y medio de dólares.

The percentage of the PIB dedicated to the Public Autonomous Universities (UPA) in Bolivia, increased during the last 15 years. (Jose Santa Cruz, 2005), Nevertheless, the main destination of the received funds, has been principally the internal functioning of the university. An average of 94 % of its total resources is devoted to the functioning of the universities and scarcely a 6 % for the investment. In 1995, the public universities only devoted 7,44 % to R&D rom their general budget.

Links of HE with the national sector of science and technology. Efforts for improving the social relevancy.

The support to R&D from the State is made through the national council of science and technology (CONACYT), the inter-ministerial commission of Science, technology and innovation (CIMCITI), as well as the departmental councils of science and technology.

These structures have not had an ideal functioning. They have weak links with the universities, giving them a rather sporadic support.

Nevertheless, in the last years research has received an important impulse in the public Universities, as results of the support given to research by the international cooperation. This support has come mainly from Sweden, through SIDA/SAREC, as well as from Belgium and France. Their financing is destined in a very specific way to strengthen the structures and capacities of research, principally in both of the biggest universities of the system: the UMSS and the UMSA in Cochabamba and La Paz, respectively. A priority of these funds is social relevant research.

The good practice of the UMSS has a special relevance. It has developed in 2006 an inventory of the scientific and technological potential and a plan of strategic development of research. This late plan tries to articulate the demands of development established in the National Plan of Development and the Plan of Science, Technology and Innovation.

The process of change of the UAJMS, the most consistent of the system, has been possible thanks to the strategic alliances that the institutional actors have established, with external actors linked to the processes of development, together with the support and commitment of IESALC/UNESCO.

CONCLUSIONS AND REFLECTIONS.

Bolivia is in a process of deep change, that questions the traditional and hegemonic ways of understanding and doing science and therefore also the nature and the role of the university institutions.

With the emergency of social movements of autochthonous and Indian origin, that they include as one of their principal demands the access to HE, we place ourselves in an scenario that is requiring from the universities, particularly from the public ones, to open their doors and to reorient the academic activity in order to contribute to the development and the improvement of the life quality of the whole population. Nevertheless, development in research and technology is still precarious: an enormous gap exists in relation to the countries of the region.

This implies that R&D has a particular importance, as well as the universities, which are the principal actors in promoting and generating scientific and technological knowledge in the country.

The neoliberal policies, which emphasized the professional function of the university (forgetting its research and civic function), have tried to reserve for the developed countries the control on the production of knowledge, weakening the scientific activity in the universities, mainly in less developed countries like Bolivia.

Nevertheless, we find good experiences and important efforts for developing and strengthening the scientific activity in the universities, with a long term search for relevance and pertinence in the production of knowledge.
In this context, we find important aspects that must be attended with the development of consistent and integrated policies of R&D:
1. The strengthening of the state structures for support and a policy of investment that determines priorities concerning R&D in the universities.
2. The impulse to the processes of academic university reform, in the frame of respect to the university autonomy.
3. To involve in a more consistent way, the companies and the productive and services sectors in the policies of R&D.
4. To recognize the fundamental role played by the international cooperation organizations, in countries with weak economies and deficient scientific policies like Bolivia.

PART FOURTH: GENERAL CONCLUSIONS.

The high place of Cuba (52) in the Human Development Index (HDI) is a result of mid term and long term policies of social inclusion. The Gross Enrolment ratio (GER) of the age group in HE is 63%. The correlation that you can observe among high enrolments rates in HE and a high place in HDI, is once again corroborated in the Cuban case.

In countries like Bolivia and Nicaragua, without mid and long term science & technology and HE policies, and lacking of policies of social inclusion, developments in these areas have been rather marginal and with a low impact in Human and Social Development Index (HDI). In Nicaragua Gross enrolment ratio (GER) in HE is 14% of the age group and occupies the number 112 in HDI. Bolivia has 41 as GER and the place 113 in HDI.

Situation in these last countries is improving due to recent political and social transformations. A key role has been played in recent times in these two countries in developing HE and research as well as in capacity building, through international cooperation projects, mainly of SAREC/SIDA.