A PROFILE OF SCIENTIFIC RESEARCH ON HEALTH IN VENEZUELA

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ABSTRACT

This paper analyzes the case of Venezuelan health research and constitutes part of a broader project which includes Argentina, Cuba, México and Brazil. Research projects, Researchers, Graduate Courses and available information systems are considered. Research activities in health are considered further than just biomedical research, including research projects in all those activities that affects the quality of human life. Venezuelan Data Bases are very incomplete, discontinuous and far to be updated, so the information in this project comes mostly from primary sources. The purpose is to try to establish a different kind of data base and help in the design of health science and technology policies. Preliminary results show some characteristics such as regional and institutional concentrations of projects and graduate courses, a majority of women in the field but a higher proportion of males in research projects. Venezuelan research activities in health seem to be an individual task; more than 55 of the total are developed by one person. Production in health (publications) appears mainly in international journals. Graduate courses were used as a scientific potential indicator which, in the case of health, seems to come more from the non-medical field.

RESUME

Cet article étudie le cas de la recherche en santé au Venezuela. et fait partie d'un plus large projet qui inclut l'Argentine, Cuba, le Mexique et le Brésil. Les projets de recherche, les chercheurs et les cours de troisième cycle sont étudiés. Les activités de recherche en santé sont considérées dans un sens plus large que la seule recherhe

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biomédicale, et incluent des projets qui affectent la qualité de la vie. Les bases de données vénézuéliennes sont incomplètes de sorte qu'il a fallut créer un base à partir de données primaires. L'objectif est de construire une base de données utile pour la prise de décision dans ce domaine. Les résultats préliminaires montrent certaines caractéristiques comme la concentration régionale et institutionnelle des projets et des cours de troisième cycle, la forte participation des femmes dans le domaine mais une plus large portion d'hommes au sein des projets de recherche. Les activités de recherche sont essentiellement issus d'initiatives individuelles; plus de 55% des projets sont menés par une seule personne. La production en santé (publications) paraît essentiellement dans des revues internationales. Les cours de troisième cycle sont utilisés comme un indicateur valable du champ et montrent que la majorité des activités a lieu en dehors du strict domaine médical.

I- INTRODUCTION

The main purpose of this project is the characterization of research activities in the field of health in Venezuela, considered in the socioeconomic situation of the country. The case study of Venezuela is a part of a larger project that includes similar studies in Argentina, Brazil, Cuba and México. These studies have been sponsored by the Pan American Health Organization during 1988-1990.

The field of health is considered in its extended meaning, not reduced to biomedical studies. The characterization of scientific research activities had centered on the gathering and analysis of primary and secondary information (with the aid of computer processing). The units of analysis are research, centers, projects, researchers, graduate courses, professors, production and information services. This information in presented by means of a set of indicators and Tables similar for all the countries participating in the project.

An important goal of the project has been to provide a more integrated view of scientific activity by means of the simultaneous consideration of projects, graduate courses and publications. The interaction between these activities are considered an important source for understanding the dynamics of the field and key elements for exploring its prospective behavior.

The links between the profile of scientific research and the analysis of socioeconomic conditions is meant to provide support for policy design for scientific research on health.

II- INFORMATION AND INDICATORS

It is not possible in Venezuela, as in many other Latin American countries, to know with precision the state of research in the field of health. This is mainly due to the fact that there are no adequate data bases. Those that do exist are discontinuous, incomplete incompatible in their classifications and in most cases not focused on academic and disciplinary characteristics of research or

researchers but on administrative and economic aspects at a very aggregate level. Management of resources for research on health has been done following traditional criteria, predominantly oriented towards medical problems, and the role of the planning agencies has often been superseded by researchers' personal and individual interests. These are possibly some of the reasons why the use of resources may not always correspond to the country's priorities on health

The project had to dedicate an important part of its efforts to create a more complete data base from information acquired directly from the institutions and the researchers. After decades of important discussions, programs for creating the technical capacity and availability of computer power (hardware and software) oriented to the creation of information systems and data bases on scientific capacity in Venezuela, there still does not exist adequate information on research activities. The government's Secretariat for Science and Technology (Consejo Nacional de Investigaciones Cientificas y Tecnologicas, CONICIT) has done important efforts in this direction, but they have had to struggle against the absence of systematized information at the research center level, which should provide it for aggregation, being forced to gather it directly from the researchers (an estimated 4300 for 1984).

In the health field the MESH and BIREME classifications have contributed very much to achieve common terms for classification of materials. Nevertheless, the fact that there is still not a universal use of this classification and the need in this project to use other not strictly medical or health sources, demanded reclassification of some materials, with new possible sources of error and still another mediation for assignation to fields.

Advances to more pertinent and sophisticated indicators in relation to scientific and technological activities, require that the more basic type of information, even simple inventories, exist in a continuous and compatible data base. Lack of reliable and up to date inventory type of information is still the more important bottleneck for advance in work on indicators. A very important part or resources (financial, technical) and time available for indicator work, has to go to the gathering of the basic unavailable data, and compatibilization of multiple partial sources.

Indicators refer to: thematic and disciplinary areas, of the projects, the researchers, graduate courses according to level. They are considered in relation to age, sex, geographical situation, concentration, institutional links, scientific publications, etc. The time period considered is 1988-89 for the research projects, 1984-89 for the graduate courses and 1979-89 for the publications. The number of research centers included is 218 (at the most desegregated level), the number of projects 1776 and the number of graduate courses 279. In the analysis, more aggregate levels are considered such as faculties, universities and regions.

The projects and graduate courses were classified by subject fields according to the BIREME classification for health and disciplines according to the UNESCO classification. Researchers were classified according to their project

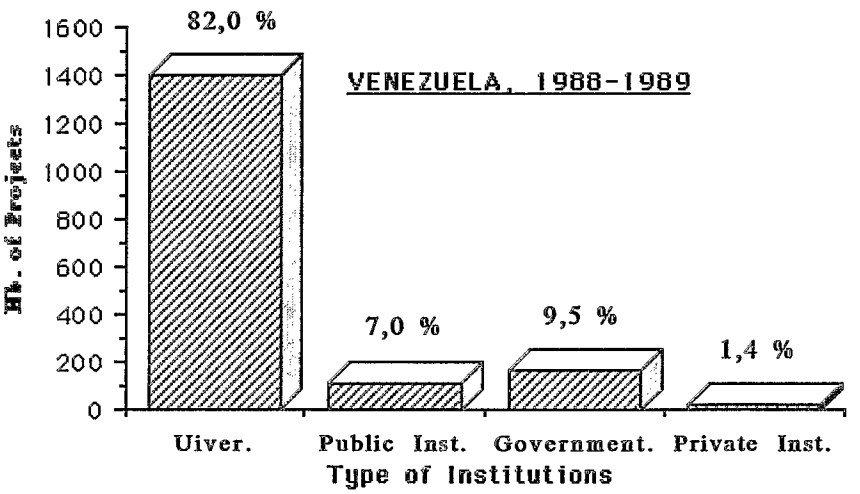
affiliation (if a researcher appears in more than one project he will be counted as many times as he appears in the corresponding subjects or disciplines). This common classification permits cross tabulations of the characteristics of projects, researchers and graduate courses, and to a lesser extent, publications.

Data bases on production (publications) for the period were not available. The information on this variable was obtained from several data bases of international character with coverage of health such as LILACS, MEDLINE and EXCERPTA MEDICA. This search was done for the project as a whole by CICH Universidad Nacional Autónoma de México and UNICAMP (University of Campinas, Brazil). The subject classification was fully compatible only for data from LILACS which covered the same BIREME fields as those considered for projects, graduate courses and researchers.

III. INSTITUTIONAL LOCUS OF RESEARCH ON HEALTH

The "institution" is the research center where the projects are located. Only those institutions where two or more projects were identified, have been included.

Figure 1. Research projects in health by type of institutions



Source: Proyecto ISVEN. CENDES. Caracas, 1990

This figure shows a high concentration of projects in public universities (82%) and only 1,4 % in private institutions. It was also found (Table A, annexes), that in the institutions with the largest number of projects, there existed

the largest dispersion of subjects and the least dispersion (greatest concentration on subjects) in those with the smallest number of projects.

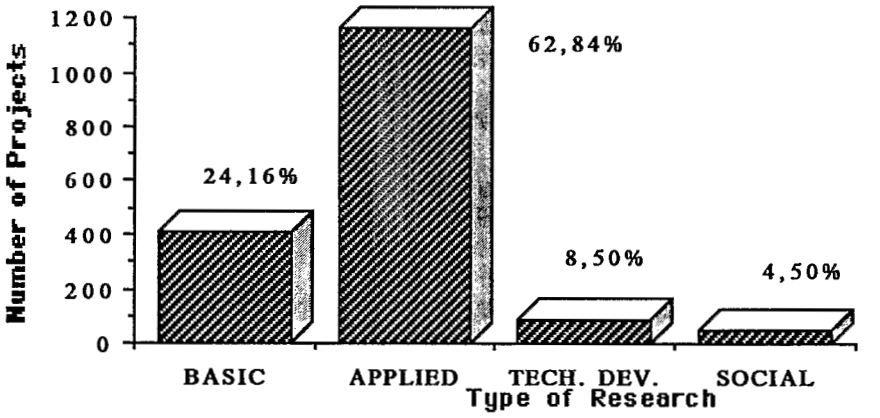
More than two thirds of the institutions are located in the Capital region where Caracas, the capital city, is situated. From the institutional point of view there is a great concentration not only regional, but also in terms of the type of institutions. Of the 1776 projects registered, 72 % are located in the Capital Region, 57.7 % of these at the Universidad Central de Venezuela and 80 % of them at the School of Medicine. Therefore, concentration is not only a matter of geographical location by region but also a question of institutional location. Notwithstanding, it must be said that we also found some regions in which some disciplines were particularly relevant, as is the case of Anthropology in the Andean region, having 66,3 % of the total research being done during the period under study.

IV.SUBJECTS AND DISCIPLINES OF RESEARCH PROJECTS

At the most aggregated level of analysis, we found that more than nine hundred projects out of 1776, are concentrated in three subjects: Diseases, Biological Sciences and Medical Instruments. Only forty projects have to do with health care.

Projects were grouped according to type in Basic, Applied, Technological Development and Social Sciences. Most of Venezuelan research on health is applied, one fourth is basic research and only 4.5 % has to do with Social Sciences. Figure 2 shows the distribution of projects according to the type of research.

Figure 2. Research projects in health by type of research



Source: Proyecto ISVEN. CENDES. Caracas, 1990

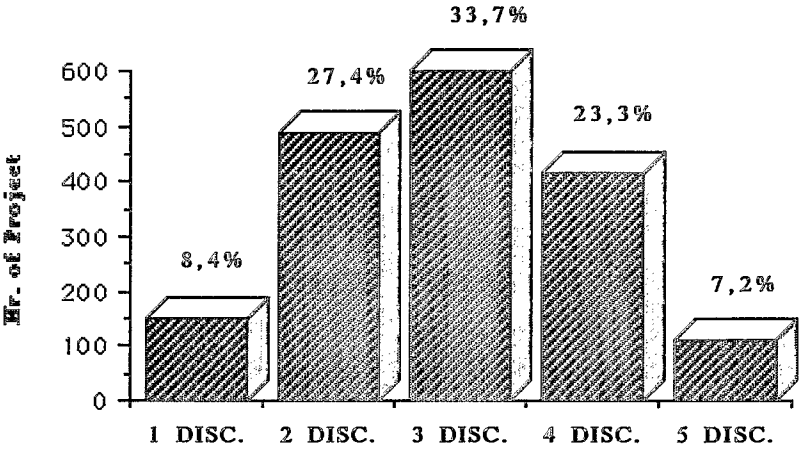
Although we do not have a precise information about the type of matters included in the projects, we do have the number of disciplines each of them incorporates. Figure 3, shows the number of disciplines per project.

V- SOME ATTRIBUTES OF THE RESEARCHERS.

One of the most salient features of the researchers studied was the number of researchers per project. Almost 90 % of the projects are carried out on the basis of research teams made up of 1 to 4 persons. Individual projects represent the largest group, 55.2 % (699) are carried out by a single person.

Information in relation to the age of the researchers has not been completed yet, but some indicators have been estimated on the information available on 811 (out of 1413) researchers. This group graduated between 1935 and 1988; 340 of them obtained their degrees between 1969 and 1977, which seems to indicate that the group of researchers is aging. This coincides with the present worry of the Venezuelan Scientific Community that not enough young researchers are being

Figure 3. Health research projects by number of disciplines incorporated



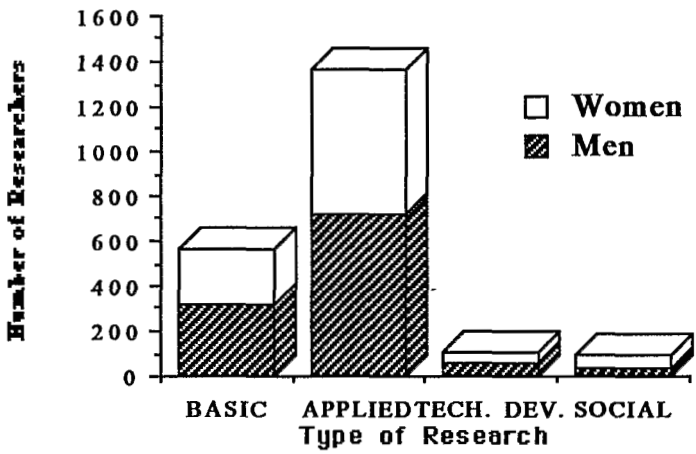
Source: Proyecto ISVEN. CENDES. Caracas, 1990

incorporated and trained for the future. There are more women (723, that is 51.1%) than men (690) working in research on health.

Figure 4 shows the composition of researchers according to the different types of projects; (as we mentioned before the total number may be larger than 1776 due to their being counted ore than once if they participate in more than one

project). It is also interesting to take a look to what happens with women and men in the different disciplines of the projects in Table 1.

Figure 4. Researchers by type of projects and sex (1988-1989)



Source: Proyecto ISVEN, CENDES, Caracas, 1990

Table 1. Researchers by main discipline and sex (1988-1989)

	MEN		WOMEN				
DISCIPLINE	N	%	N	%	Total	N	W
Mathematics(12)	3	75,0	1	25,0	4	0,2	0,1
Physics(22)	9	81,8	2	18,2	11	0,7	0,2
Chemistry(23)	83	42,8	111	57,2	194	6,8	9,8
Sciences of Life(24)	469	52,7	421	47,3	890	38,3	37,1
Agricultural Sciences(31)	23	62,2	14	37,8	37	1,9	1,2
Medical Sciences(32)	562	55,6	449	44,4	1011	45,8	39,5
Technological Sciences(33)	35	36,8	60	63,2	95	2,9	5,3
Planning(39)	2	66,7	1	33,3	3	0,2	0,1
Anthopology(51)	1	25,0	3	75,0	4	0,1	0,3
Demographics(52)	13	41,9	18	58,1	31	1,1	1,6
Economical Sciences(53)	2	100,	0	0,0	2	0,2	0,0
Political Science(59)	1	14,3	6	85,7	7	0,1	0,5
Psychology(61)	9	37,5	15	62,5	24	0,7	1,3
Sociology(63)	13	27,1	35	72,9	48	1,1	3,1
Ethics(71)	1	100,0	0	0,0	1	0,1	0,0
TOTAL	1226	100,0	1136	100,0	2362	100,	100,

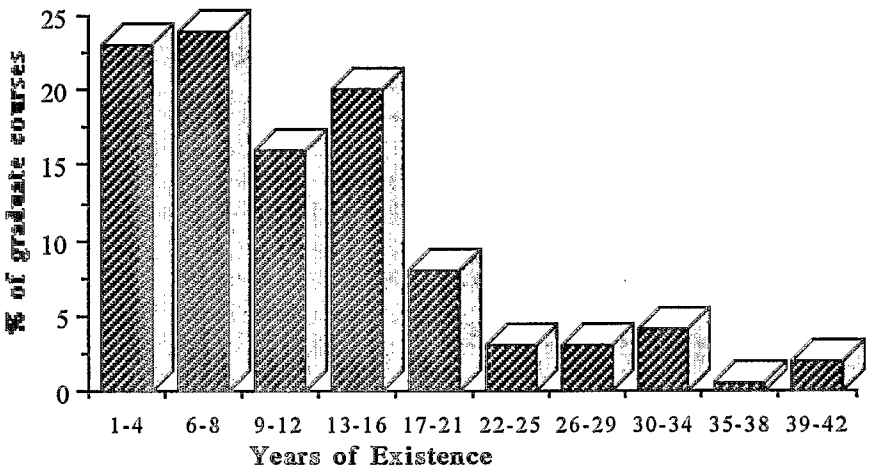
Source: Proyecto ISVEN. CENDES, Caracas, 1990

Women are present in more than 63 % of the Technological Sciences research projects and in 57 % of research on Chemicals and Drugs. Differences in other disciplines are not notorious. In Medical Sciences and Agricultural Sciences, men are still majority. This, and the fact that there are more women than men in the enrollment at university level in Venezuela, may indicate that the next generation of researchers will probably be mostly female.

VI. EVOLUTION OF GRADUATE HEALTH COURSES IN VENEZUELA

Figure 5 presents the proportion of graduate courses in relation to their span of existence. Courses in Medical Sciences are the oldest ones. The first ones were created in 1937, but the majority of them started in the 70's. If we look at the regional distribution we perceive the same proportions we saw in relation to projects. However the growth of courses after 1980 occurs in other regions outside the Capital. This trend could be related to changes in educational and economic policies, that seek to decentralize the country's administration.

Figure 5. Venezuelan graduate courses in health by years of existence



Source: Proyecto ISVEN. CENDES. Caracas, 1990

Fundación Gran Mariscal de Ayacucho (FUNDAYACUCHO) is the name of one of the main financing agencies for graduate studies. Especially during the period of rising oil prices, it provided funds for studies not only in Venezuela, but in foreign countries also. Table 2 shows the number and proportion of scholarships awarded by FUNDAYACUCHO in all fields, and in health in particular, between 1979 and 1984.

Table 2. Scholarships awarded by FUNDAYACUCHO in health (1979-1984)

YEARS	TOTAL	N	%
1979	1174	92	7,8
1980	1436	142	9,9
1981	986	132	13,4
1982	559	67	12,0
1983	592	89	15,0
1984	476	109	22,9
TOTAL	5223	631	12,1

Source: Ciencia y Tecnología en Cifras. CONICIT. Caracas, 1986.

Medical graduate courses represent the largest group. However, when one thinks of graduate courses as indicators of scientific potential, there appears a problem that requires some prior clarification. There are three types of courses under consideration: "Especialización" a professional type of training course that confers the degree of "Especialista", Master's Degree, and the Doctorate level (Ph.D.). There are 202 courses out of 279 located in Medical Schools; 189 of those are specialization courses which are mainly used for the training of personnel in fields where health services are needed. Master and Ph.D. courses are specifically designed for training in research (cf.Table 3).

Table 3. Graduate courses by institution and conferred degree

	Especializ.		Magister		Doctorate		
INSTITUTIONS	N	%	N	%	N	%	Total
U. Central de Venezuela	119	55,3	18	37,5	8	50,0	145
Universidad Simón Bolivar	5	2,3	2	4,2	2	12,5	9
Universidad del Zulia	36	16,7	6	12,5	0	0,0	42
U.C-O.Lisandro Alvarado	8	3,7	0	0,0	0	0,0	8
U.N.Exp.Francisco de Miranda	3	1,4	1	2,1	0	0,0	4
Universidad de Los Andes	16	7,4	6	12,5	0	0,0	22
Universidad de Carabobo	18	8,4	1	2,1	0	0,0	19
Universidad de Oriente	7	3,3	4	8,3	0	0,0	11
Universidad Rafael Urdaneta	2	0,9	0	0,0	0	0,0	2
CIPPSV	1	0,5	3	6,3	0	0,0	4
Inst.Ven.de Inv. Científicas	0	0,0	7	14,6	6	37,5	13
TOTALS:	215		48		16		279
PERCENTAGES		77.1		17.2		5.7	

Source: Fichas de Postgrado. Proyecto ISVEN. CENDES. Caracas, 1990

Graduate courses constituted by one discipline are 67 % of the total, and this could be associated with the majority of "especialización" courses which are more specifically and narrowly oriented than Masters' and PhD.'s ; therefore the less specialization, the more disciplines they incorporate.

VII- SCIENTIFIC PRODUCTION IN HEALTH.

The search carried out in the different data bases provided results (table 4) that may give a preliminary idea of the distribution of publications by subject. More detailed work is still being done. Still, these numbers provided only an approximated image, since they express particular search strategies that cover only a selection of what may have been included. The different percentages for the same subjects permit us to see that the presence of the different subjects differs according to the data bases and remind us, once more, that those results must be very carefully used. The tendency to prefer international journals for publications by most researchers in almost every underdeveloped country, the very small number of Venezuelan journals included in these data bases must also be taken into consideration for the interpretation of these numbers.

Table 5. Biomedical production by Venezuelan Scientists in National and International Journals

	79	80	81	82	83	84	85	86	87	88	89	Total
National	297	273	264	345	298	289	192	227	186	53	3	2427
International	322	337	387	393	428	409	353	300	313	328	244	3814
Total	619	610	651	738	726	698	545	527	499	381	247	6241
National	225	213	207	261	233	222	159	197	164	46	2	1929
International	194	200	231	239	265	249	220	184	209	220	153	2364
TOTAL	419	413	438	500	498	471	379	381	373	266	155	4293

Source: same as table 4.

In this series one can see how the number of publications increased until 1983, and then consistently decrease. Though it may be a premature conclusion, this decrease seems to coincide with the financial crisis, devaluation of the bolívar (Venezuelan currency) in relation to its dollar equivalence, or it could also be seen as an inverse of the increase in the rate of inflation during that period.

Table 4. Publications of Venezuelans in several data bases classified by MESH Categories, 1979-1989.

	MED LINE Inter.		MED LINE Nat.		EXCE RPTA MED Inter		EXCE RPTA MED Nat.		BIOSIS		BIBL AT		PERIO DICA	
CARDIOVASCULAR	85	6,60	28	2,40	134	7,32	5	1,22	107	7,06	64	7,41	86	5,16
SURGERY	39	3,03	41	3,51	24	1,31	19	4,63	38	2,51	33	3,82	215	12,91
DERMATOLOGY	85	6,60	17	1,45	102	5,57	15	3,66	66	4,36	45	5,21	34	2,04
ENDOCRINOLOGY	21	1,63	9	0,77	86	4,70	15	3,66	84	5,54	40	4,63	63	3,78
FARMACOLOGY	88	6,84	29	2,48	192	10,49	19	4,63	126	8,32	116	13,43	80	4,80
GASTROENTEROLOGY	38	2,95	154	13,17	75	4,10	67	16,34	68	4,49	44	5,09	100	6,00
HUMAN GENETICS	67	5,21	28	2,40	71	3,88	8	1,95	56	3,70	27	3,13	34	2,04
OBSTERTICS AND GYN.	10	0,78	16	1,37	25	1,37	20	4,88	47	3,10	19	2,20	239	14,35
HEMATOLOGY	40	3,11	21	1,80	106	5,79	14	3,41	226	14,92	51	5,90	44	2,64
NMUNOLOGY	71	5,52	19	1,63	169	9,23	11	2,68	166	10,96	107	12,38	69	4,14
MICROBIOLOGY	204	15,85	74	6,33	285	15,57	29	7,07	79	5,21	96	11,11	163	9,78
NEFROLOGY	30	2,33	5	0,43	74	4,04	9	2,20	41	2,71	29	3,36	34	2,04
NEUMOLOGY	15	1,17	5	0,43	27	1,48	6	1,46	29	1,91	11	1,27	30	1,80
NEUROLOGY	44	3,42	9	0,77	141	7,70	13	3,17	101	6,67	58	6,71	81	4,86
OFTALMOLOGY	9	0,70	0	0,00	22	1,20	49	11,95	0	0,00	6	0,69	42	2,52
ONCOLOGY	60	4,66	58	4,96	75	4,10	9	2,20	45	2,97	42	4,86	72	4,32
OTORRINOLARINGOLOGY	5	0,39	1	0,09	17	0,93	2	0,49	9	0,59	4	0,46	8	0,48
PEDIATRICS	122	9,48	198	16,94	72	3,93	31	7,56	59	3,89	28	3,24	144	8,64
PSICHIATRY	59	4,58	97	8,30	28	1,53	9	2,20	66	4,36	18	2,08	28	1,68
PUBLIC HEALTH	195	15,15	360	30,80	105	5,74	60	14,63	102	6,73	26	3,01	100	6,00
SUBTOTAL	1287	100	1169	100	1830	100	410	100	1515	100	864	100	1666	100
OTHERS	322		392		283		195				68		64	
TOTAL	1609		1561		2113		605		1515		932		1730	

SOURCE: La Producción Científica Latinoamericana en Biomedicina, Centro de Información Científica y Humanística, UNAM, Mexico, Dec. 1989. (*) Data Bases icluded in previous Table.

VIII- PROJECTS; RESEARCHERS; GRADUATE COURSES; SCIENTIFIC PRODUCTION.

The classification by subjects and disciplines provides the basis for the tables relating the proportions for projects, researchers, graduate courses and scientific production. The next Tables (6 and 7) present these by subject (BIREME) and by discipline (UNESCO). In the case of subjects, production is included according to the BIREME classification of "presence of terms" (which means one article can be present many times if classified according to several terms) and terms refer to contents of Venezuelan journals (which may include contributions by non-Venezuelans) as well as publications by Venezuelans in journals of other countries.

As may be seen, there seem to be important differences in the presence of subjects in each of the different types of activities. There are situations where the number of graduate courses seems to be to too small in relation to the number of projects, and others where the number of courses does not seem to be backed by proportionate presence of projects or researchers. Production (with the restrictions mentioned above), presents a similar situation.

This last group of indicators summarizes the different dimensions of research on health and may serve as a more complex, interrelated profile of what "is going on" in the field, what potential may be not used enough, and what groups may be overburdened and should receive more support.

FINAL COMMENTS

Complex and single indicators used as a set provide a relatively simple approach to a more adequate identification of profiles of research in scientific and technological fields.

Indicators used in this project demonstrate that the use of any single ones cannot provide an adequate "profile" of health research. The use of "complex indicators" (a set of single ones), seems a better solution than an "index" representing the aggregation of different elements or single indicators.

The quality, or even possibility of existence of adequate indicators for Science and Technology in Venezuela, requires new efforts in the construction of data bases that may provide the elementary components of existing activities that may serve as the basis for more efficient and pertinent complex indicators.

On the other hand, if the trends described are going to be used in the design of scientific policies, it is important to consider the near future trying to imagine what the situation could be. Research activities supposedly made up mainly by women, a lack of significant organization for scientific production, and a restricted potential, should drive the public and private agencies to develop a different policy than just one that considers mainly the financial and

Table 6. Graduate courses, projects and researchers classified by bireme categories and some of the relationships between them, Venezuela, 1990.

	GRAD. COURSES		PROJECTS		RESEARCHERS	
BIREME CATEGORIES	N	%	N	%	N	%
ANATOMICAL TERMS	18	6,47	153	8,61	215	9,10
ORGANISMS	0	0,00	136	7,66	190	8,04
DISEASES	116	41,73	389	21,90	506	21,42
CHEMICALS AND DRUGS	3	1,08	192	10,81	220	9,31
MEDICAL INSTRUMENTS	75	26,98	319	17,96	404	17,10
PSYCHIATR. AND PSICHOL.	12	4,32	33	1,86	51	2,16
BIOLOGICAL SCIENCES	38	13,67	379	21,34	536	22,69
PHYSICS	0	0,00	9	0,51	17	0,72
ANTHROP.EDUC.SOCIAL Sc.	0	0,00	33	1,86	44	1,86
TECNOL.IND.AGR.FOOD	7	2,52	65	3,66	76	3,22
HUMANITIES	0	0,00	2	0,11	2	0,08
INF.AND COMMUNIC. Sc.	0	0,00	9	0,51	14	0,59
NAMED GROUPS OF PEOPLE	0	0,00	11	0,62	16	0,68
HEALTH CARE	9	3,24	46	2,59	71	3,01
TOTAL	278	100	1776	100	2362	100

BIREME CATEGORIES	GRAD. COURSES PER PROJECTS	GRAD COURSES PER RESEARCHERS	PROJECTS PER RESEARCHER
ANATOMICAL TERMS	0,75	0,71	0,95
ORGANISMS	0,00	0,00	0,95
DISEASES	1,91	1,95	1,02
CHEMICALS AND DRUGS	0,10	0,12	1,16
MEDICAL INSTRUMENTS	1,50	1,58	1,05
PSYCHIATRY AND PSICHOL.	2,32	2,00	0,86
BIOLOGICAL SCIENCES	0,64	0,60	0,94
PHYSICS	0,00	0,00	0,70
ANTHROP.EDUC.SOCIAL Sc.	0,00	0,00	1,00
TECNOL.IND.AGR.FOOD	0,69	0,78	1,14
HUMANITIES	0,00	0,00	1,33
INF.AND COMMUNIC. Sc.	0,00	0,00	0,85
NAMED GROUPS OF PEOPLE	0,00	0,00	0,91
HEALTH CARE	1,25	1,08	0,86

SOURCE: Proyecto ISVEN. CENDES. Caracas, 1990. Preliminary Results.

Table 7. Graduate courses, projects and researchers by disciplines (UNESCO) and some relationships between them, Venezuela, 1990.

	GRAD. COURSES		PROJECTS		RESEARCHERS	
DISCIPLINES	N	%	N	%	N	%
MATHEMATICS	0	0,00	3	0,17	4	0,17
PHYSICS	0	0,00	6	0,34	11	0,47
CHEMISTRY	2	0,72	106	5,97	194	8,21
SCIENCES OF LIFE	35	12,54	590	33,22	890	0,88
AGRICULTURAL Sc.	8	2,87	50	2,82	37	1,57
MEDICAL SCIENCES	212	75,99	835	47,02	1011	42,80
TECHNOLOGICAL Sc.	15	5,38	104	5,86	95	4,02
PLANNING	3	1,08	2	0,11	3	0,13
ANTHROPOLOGY	0	0,00	3	0,17	4	0,17
DEMOGRAPHICS	0	0,00	23	1,30	31	1,31
ECONOMICAL Sc.	1	0,36	5	0,28	2	0,08
POLITICAL SCIENCE	0	0,00	6	0,34	7	0,30
PSYCHOLOGY	3	1,08	20	1,13	24	1,02
SOCIOLOGY	0	0,00	22	1,24	48	2,03
ETHICS	0	0,00	1	0,06	1	0,04
TOTAL	279	100	1776	100	2362	100

BIREME CATEGORIES	GRAD. COURSES / PROJECTS	GRAD. COURSES / RESEARCHERS	PROJECTS / RESEARCHER
MATHEMATICS	0,00	0,00	1,00
PHYSICS	0,00	0,00	0,73
CHEMISTRY	0,12	0,09	0,73
SCIENCES OF LIFE	0,38	0,33	0,88
AGRICULTURAL Sc.	1,02	1,83	1,80
MEDICAL SCIENCES	1,62	1,78	1,10
TECHNOLOGICAL Sc.	0,92	1,34	1,46
PLANNING	9,55	8,47	0,89
ANTHROPOLOGY	0,00	0,00	1,00
DEMOGRAPHICS	0,00	0,00	0,99
ECONOMICAL Sc.	1,27	4,23	3,32
POLITICAL SCIENCE	0,00	0,00	1,14
PSYCHOLOGY	0,95	1,06	1,11
SOCIOLOGY	0,00	0,00	0,61
ETHICS	0,00	0,00	1,33

SOURCE: Proyecto ISVEN. CENDES. Caracas, 1990. Preliminary Results.

administrative aspects. Is it possible to bring together researchers of varied fields, to define priorities, and work as teams? Would the researchers oppose this initiative because of the necessary freedom of the scientist?. Scientific policies are not easy to implement because they are related, not only with the groups' interests, but also with the social needs and demands and the whole country's political future as well as with the broader political forces that play prominent roles in Venezuelan society.