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ORSTOM'S COOPERATIVE RESEARCHES IN BRAZILIAN AMAZONIA: A BRIEF OVERVIEW

ORSTOM, the French Research Institute in Cooperation for the Development, has been cooperating for 25 years with Brazilian research institutes, mostly through cooperation agreements established with CNPq and EMBRAPA. In the special case of Amazonia, the first program began in 1979 in cooperation with INPA in Manaus. Since, 17 different programs have been carried-out or are currently developed with different institutes. As a detailed presentation of them all would be beyond the main issues of this meeting -data banks, researches for sustainable development and need of interdisciplinarity -, we shall only present them in a synthetic table. For more details, readers should report themselves to the G. Leprun's book which relates the history of ORSTOM's cooperation with Brazil.

In the table, programs are ranked depending on the date of their start. Most of them have been quite long and this is a characteristic of ORSTOM's cooperation which favours long-term programs to which different researchers will collaborate through time. Therefore the titles point out a broad problematic rather than addressing to a specific operation. From one year to an other, programs can evolve through different sub-programs, depending on different factors such as the former results, the evolution of global concerns of the research in Amazonia, the disponibility of the Brazilian and French collaborators etc.

The main institutional partner is obviously CNPq, followed by EMBRAPA. This confirms the global choice of ORSTOM in cooperating with foreign countries, that is to favour links with a few institutional partners. But cooperation with other partners remains possible as shown by the example of the hydrological researches which have been achieved with DNAE

Among the 17 programs, 9 have been developed with Amazonian institutes, MPEG (4), INPA (4), and Institute E. Chagas (1). The other ones have been carried-out in cooperation with Brazilian Institutes from other regions of the country which are involved in Amazonian researches: EMBRAPA's different units (3), USP (2), CENA (1), DNAE (1), UnB (1). Three of those programs deal with questions which relate to wider regions and where Amazonia only constitutes one of the numerous fields.

The programs usually support students who find there scientific and financial conditions to work-out their thesis: Masters or Brazilian equivalent, Ph.D. or engineer degree. Field works are carried-out within the projects and the thesis are defended in Brazilian or French universities.

The table demonstrates the wide range of disciplines which are involved in the programs and which reflect the ORSTOM's interest in physical, biological and social sciences. From the 41 programs or sub-programs, 16 are obviously interdisciplinary. Meanwhile, interdisciplinarity mostly links sciences that belong to the same group, that is to say biological sciences or human sciences. Attempts in linking biological and human sciences, which is the main methodological challenge that environmental problems currently address to scientific community, have been made through some of the sub-programs such as the "extractivism" one. Such experiences need to overpass obstacles which are briefly discussed further.

Sustainable development is not the main issue of those programs but most of them are concerned with it. Almost all of them contribute to document the physical, biological or sociological conditions of the

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sustainable development (marked 1 in the table). But some of them discuss directly the viability or the feasibility of sustainable development projects within local conditions (marked 2 in the table)

INTERDISCIPLINARITY

The distinction between multi- and interdisciplinarity, as synthesized in Brazil by Texeira (1995), is today broadly recognized but remains insufficient. It should be first point out that the nature of the linked disciplines influences strongly the feasibility of interdisciplinarity. Interdisciplinarity is currently carried-out between the different natural sciences on one hand, and the various social sciences on the other. This is well demonstrated in most of the ecological projects which use to document and analyse relationships between the different parts of the ecosystems, or in numerous projects linking social sciences such as demography and socio-economy, anthropology and linguistic and so on. But the true problem remains in the development of relationships between natural and social sciences which should be the base of the methodology applied to the research programs which deal with environment and development. With this in mind, we suggest a rough classification of interdisciplinarity levels.

The first level is multidisciplinary where each discipline contributes to document a subject (marked 1). This kind of approach is widely carried-out, but the final document only gives the different disciplinary points of view of the studied subject. The second level (marked 2) is interdisciplinarity within the same group of sciences (natural or social). It generally addresses to the study of local scale processes and needs to define new problematics that could be integrated in the different disciplines involved. This kind of approach can lead to the development of a new discipline with its own concepts. This have been the case of ecology in the past.

The third level (marked 3) corresponds to a social and natural sciences interdisciplinary approach that addresses to a problematic which involves local scale processes. In Amazonia for example, numerous studies that belong to this level may be found through the ethno-biological researches. The fourth level of interdisciplinarity is achieved when the interdisciplinary research deals with local and global scales processes and interactions. This upper level should be the main methodological concern in all environmental research.

Discussions with colleagues who worked in the different programs mentioned in the table, demonstrate that even if most of the researchers think than interdisciplinarity of rank 3 should be at least desirable in environmental research, the conditions to realize such an approach are usually missing. This can be related to numerous causes and we may point out a few.

Researchers are usually organized within monodisciplinary nets. This does not allow to evaluate easily who could be the right people to be included in a interdisciplinary research team. With this in mind one of the first task of the Amazonian database should be to establish a researcher directory that could help in programs development.

The second point is linked with the disponibility and the motivation of the researchers. All the interdisciplinary experiences show that one of the main difficulty is making every participant equivalent, or in other words, to impede one of the researcher to feel a simple source of information. Interdisciplinarity can only work if each researcher appropriates the program by integrating the problematics of the research in the paradigm of his own discipline. Therefore the different subjects and the scales of the research have to be carefully chosen.

The third one is institutional. Interdisciplinarity needs specific committees to evaluate the interest and the feasibility of the projects and to asses the quality of the research. On the Brazilian level, CNPq and EMBRAPA could play a decisive role in organizing such committees.

DATA BANKS

Very few of the programs listed in the table have led to a database. The main one is the geographical information system SISGEO which links different bases related with soils, climates, socio-economics, maps, vegetation and plant diseases but which does not address exclusively to the Amazonian region. Another database consists in a *lingua geral*, Portuguese, dictionary already published as a book but which does exist on a computer medium and could easily be included in a general Amazonian database.

CONCLUSION

The Brasilia workshop organized by CNPq and European Union has been a valuable contribution to the Amazonian research development. Meanwhile such a project needs further development in both the field of information and interdisciplinarity. The first stages of the implementation of the Amazonian database seem to be guaranteed by the involvement of ETFRN and SIAMAZ. Meanwhile, further development will probably need a broader European net which should include scientists that do not work in the strict field of forestry. The promotion of interdisciplinarity obviously need specific workshops which should first inventory the interdisciplinary projects, evaluate the difficulties encountered and encourage the development of interdisciplinarity through publications and training. With this in mind, epistemologists should be associated to the further thoughts and discussions.

LITERATURE CITED

- Leprun J.-C., 1994. ORSTOM-Brésil: trente ans de coopération scientifique. ORSTOM Éditions, Paris, 559 p.
- Teixeira O.A., 1995. Agricultura, meio ambiente e pesquisa interdisciplinar: alguns elementos para o debate. *Agricultura sustentável*, jan/jun. 1995: 31 - 37.

No.	Title	Date	Institutional agreement	Main partner	Other partners	Number of researchers	Number of supported thesis	Disciplines	Inter-disciplinarity	Sustainable development	Data bank
1	Ecological changes due to agro-sylvicultural uses of the Amazonian forest	1979-1995	CNPq	INPA		Fr.p.: 13 Fr. m.: 10 Br.: 16		Botany, Ecology, Microbiology, Entomology, Pedology, Anthropology, Sociology, Linguistic, Economy, Geography			no
1.1.-	Expansion of agricultural frontier in Rondônia : spatial organization and land pattern dynamics	1980-1984	CNPq	INPA		Fr.p.: 1		Geography	0	1	no
1.2.-	Palms of central Amazonia	1980-1984	CNPq	INPA		Fr.p.: 1 Br.: 1		Botany, Ecology	0	0	no
1.3.-	Risk evaluation of cultivation's parasites and pests	1983-1991	CNPq	INPA		Fr.p.: 2 Br.: 3		Microbiology, Entomology	1	1	no
1.4.-	Ecological and economic conditions of the production in a várzea island: a case study in Careiro island	1985-1988	CNPq	INPA	Max Plank	Fr. p.: 5 Br.: 3	1 (Dr. Fr.)	Botany, Ecology, Microbiology, Entomology, Ichthyology	2 (3)	2	no
1.5.-	Physical and chemical characteristics of the soils: biogeodynamic and water balance	1987-1992	CNPq	INPA		Fr.p.: 3 Fr.m.: 6 Br.: 6		Pedology	2	1	no
1.6	Soil biology	1980-1994	CNPq	INPA		Br.: 6		Pedology, soil fauna	2	1	
1.7.-	People in Amazonia	1983-1988	CNPq	INPA	MPEG	Fr.p.: 2 Br.: 2		Anthropology, Linguistic	2	1	yes (lexic)
1.8.-	Linguistic changes and representation of environment in contact situations in Brazilian Amazonia	1987-1991	CNPq	INPA		Fr. p.: 1	0	Linguistic	0	1	no
1.9.-	Extractivism in central Amazonia: viability and development	1990-1995	CNPq	INPA	MPEG Aarhus Univ.	Fr.p.: 3 Fr. m.: 2 Br.: 6	7	Botany, Ecology, Phytophysiology, Sociology, Anthropology, Economy	3 (4)	2	no

Table 1 - 1 Researchers (seniors and juniors): Fr.p.: French researchers living in Brazil; Fr.m.: French researchers carrying field-work in Brazil; Br.: Brazilian researchers. Thesis : Dr. = French doctorate or Brazilian doutorado; Ms. = Mestrado; DEA = French Master; Ig.: Degree of engineer. Interdisciplinarity: 0 = none; 1 = multidisciplinary; 2 = interdisciplinarity within the same group of sciences. 3 = interdisciplinarity between social and biological sciences, local scale; 4 = interdisciplinarity between social and biological sciences, local and global scales. Sustainable development: 0 = no concern; 1 = document conditions of sustainable development; 2 = discusses sustainable development. Data are from Leprun (1994) and from conversations with some of the program's leader scientists.

No.	Title	Date	Institutional agreement	Main partner	Other partners	Number of researchers	Number of supported thesis	Disciplines	Inter-disciplinarity	Sustainable development	Data bank
2	<i>Fresh-water resources in Amazonia</i>	1980-1989	CNPq	INPA		Fr.p.: 5 Fr.m.: 2 Br.: 14	1 Dr. 2 Ms.	Ichthyology, Carcinology			no
2.1.-	Impacts of the Tucuruí barrage on the aquatic macrofauna and the fishing in the Rio Tocantins.	1980-1987	CNPq	INPA	Electro-norte	Fr.p.: 3 Br.: 7		Ichthyology, Carcinology	2	1	no
2.2.-	Ecological and economic conditions of the production in a várzea island: a case study in Careiro island	1986-1987	CNPq	INPA	Max Plank	Fr.p.: 5 Fr.m.: 1 Br.: 8	1 Dr. 2 Ms.	Ichthyology, Carcinology	2 (3)	2	no
2.3.-	Fishing systems in central Amazonia	1982-1989	CNPq	INPA		Fr.p.: 2 Br.: 1?		Ichthyology	0	1	no
3.-	Arboviral infections and haemorrhagic fevers	1981-	CNPq	Inst. E. Chagas		Fr.p.: 2 Br.: 6		Ecology, Medicine	1	1	no
4.-	Hydrology and water resources management	1983-	DNAE			Fr.p.: 6 Fr.m.: 2 Br.: 10		Hydrology	0	1	yes
6.-	Soils organic matter and its functions in the Brazilian tropical ecosystems	1983-	CNPq	USP	CENA	Fr. p.: 3 Fr.m.: 3 Br.: 6		Pedology	1	1	no
7.-	Elaboration of a geographic information system on the rural environment in Brazil: SISGEO. (SISSOLOS, SISCLIMA, SISECSO, SISMAPAS, SISFITO, SISPRAGAS)	1984-1992	EMBRAPA			Fr. p.: 5 Br.: 7		Pedology, Climatology, Ecology, Geography, Remote detection, Entomology, Computing	2 (3)	1	yes

Table 1 - 2

No.	Title	Date	Institutional agreement	Main partner	Other partners	Number of researchers	Number of supported thesis	Disciplines	Inter-disciplinarity	Sustainable development	Data bank
8.-	Demographical and Economic aspects of the frontier expansion in Amazonia: social changes and production dynamics	1984-1994	CNPq	MPEG		Fr.p.: 5 Br.: 4	5 Dr, 3 Ms	Rural Sociology , Demography, Anthropology, Socio-economy			no
8.1.-	Social differentiation and accumulation patterns in recently colonized areas	1984-1993	CNPq	MPEG		Fr.p.: 1		Rural Sociology.	0	1	no
8.2.-	History of the Amazonian spatial occupation	1984-1994	CNPq	MPEG		Br.: 1		Anthropology	0	1	no
8.3.-	History, impact and representation of inter-ethnic contact among Yanomami indians	1985-1987	CNPq	MPEG		Fr.p.: 1	1 Ms.	Anthropology	0	1	no
8.4.-	Demography and rural development on the trans-Amazon highway	1985-1990	CNPq	MPEG		Fr.p.: 1		Demography, Rural Sociology	2	1	no
8.5.-	Social relations, domestic based representations and religious fields in recently colonized areas	1986-1994	CNPq	MPEG		Br.: 1	1 Dr. 1 Ms.	Anthropology	0	1	no
8.6.-	Construction of folk and scientific knowledge on the frontier	1986-1994	CNPq	MPEG		Br.: 1	1 Dr.	Anthropology	0	1	no
8.7.-	The dominating social groups and the State in Amazonia	1989-1993	CNPq	MPEG		Fr.p.: 1		Socio-Anthropology	0	1	no
8.8.-	Social trajectories and the emergence of political elites in eastern Amazonia	1989-1994	CNPq	MPEG		Br.: 1	1 Dr. 1 Ms.	Sociology	0	1	no
8.9.-	Exploitation through trade, representations and development in Amazonia.	1990-1993	CNPq	MPEG		Fr.p.: 1	1 Dr.	Socio-Economy	0	1	no
8.10.-	Migration of small farmers from south-west Parana to Amazonia	1990-1994	CNPq	MPEG		Fr.p.:1	1 Dr.	Socio-Economy	0	1	no

Table 1 - 3

No.	Title	Date	Institutional agreement	Main partner	Other partners	Number of researchers	Number of supported thesis	Disciplines	Inter-disciplinarity	Sustainable development	Data bank
9.-	Health and disease anthropology among eastern Tukano indians of the upper Rio Negro, Amazonas, Brazil.	1984-1987	CNPq	MPEG		Fr.p.: 1		Antropology	0	1	no
10.-	Coastal and continental environments during the last climatic cycle (last 120.000 years)	1986-1992 1992 -	CNPq	USP ON-RJ		Fr.p.: 8 Br.: 5		Pedology, Geology, Palynology	2	0	no
11.-	Inter-ethnic contacts, social changes and economic development in the northern region of Amazonia.	1988-1994	CNPq	UnB		Fr.p.: 2 Br.: 6		Anthropology	0	0	no
11.1.	Health and disease anthropology among eastern Tukano indians of the upper Rio Negro, Amazonas, Brazil.		CNPq	UnB		Fr.p.: 1 Br.: 4		Anthropology	0	1	no
11.2.	Indigenous societies and the frontier extension in Amazonia : history, impacts and representation of inter-ethnic contact among Yanomami indians.		CNPq	UnB		Fr.p.: 1 Br.: 4		Anthropology	0	1	no
12.-	Systematic, biogeography and autecology of fresh water organisms in Amazonia	1989-1995	CNPq	INPA		Fr.p.: 2 Br.: 11	8	Ichthyology, Carcinology, Entomology, Botany, Systematic, Parasitology, Cytotaxonomy	2	0	available within 2 years
13.-	Biogeodynamic of lateritic soils (BICOL)	1992 -	CNPq			?		Pedology	0	0	no
14.-	Palms of Amazonia	1993 -	EMBRAPA	CENA	INPA	Fr.p.: 2		Botany, Ecology, Ethnobotany	2	0	no

Table 1 - 4

No.	Title	Date	Institutional agreement	Main partner	Other partners	Number of researchers	Number of supported thesis	Disciplines	Inter-disciplinarity	Sustainable development	Data bank
15	The role of languages in educational systems and in the construction of identity in indigenous Amazonia	1993-	CNPq	MPEG	CNRS (Fr.)	Fr.p.: 2 Br.: 1		Linguistic	0	1	no
16-	Land degradation, reconstitution and restoration in Amazonian forest ecosystems.	1994 -	CNPq	INPA	EMBRAP CATUniv. Paris VI	Fr.p.: 9 Br.: 19		Botany, Pedology, Ecology, Soil fauna	1 (2)	1	no
17.-	Population, identity and environment in Brazilian Amazonia	1995 -	CNPq	MPEG		Fr.p.: 4 Br.: 5		Anthropology, Socio-Economy	1	1	no
17.1.	Clientelism practices and social intervention patterns among the migrants of Maraba region (Pará)	1995-	CNPq	MPEG		Fr.p.: 1 Br.: 1		Socio-Economy	0	0	no
17.2.	Paternalism and paternity in Acre	1995-	CNPq	MPEG		Br.: 1		Anthropology	0	1	no
17.3.	Social, economic and political impacts of narcotraffic development in Amazonia	1995-	CNPq	MPEG		Fr.p.: 1		Anthropology	0	2	no
17.4.	Development incentives, local communities and environment	1995-	CNPq	MPEG		Fr.p.: 1		Rural Sociology	0	2	no
17.5.	Ethnicity, environmentalism and development in Brazilian Amazonia	1995-	CNPq	MPEG		Fr.p.: 1		Anthropology	0	2	no
17.6.	Labour and identity in the upper Rio Negro: an historical approach.	1995-	CNPq	MPEG		Br.: 2		Anthropology	0	1	no
17.7.	Ethnic and social movements in the upper Solimões	1995-	CNPq	MPEG		Br.: 1		Anthropology	0	1	no
17.8.	Logging in protected areas and sustainable development in Amazonia	1996	CNPq	MPEG		Fr.p.: 1		Ecology, Anthropology	3	2	no

Table 1 - 5

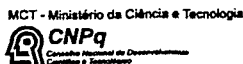
Interdisciplinary Research on the Conservation and Sustainable Use of the Amazonian Rain Forest and its Information Requirements

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