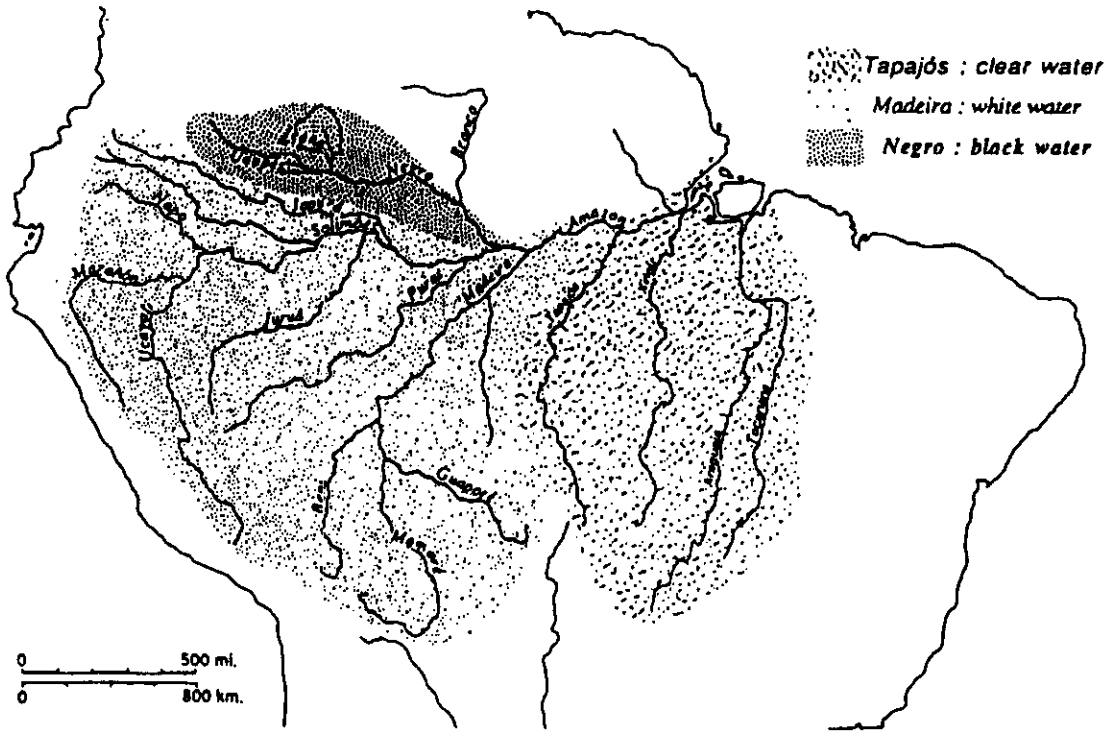
付属資料

付属資料 5.1.3-1　アマゾン河の水系



付属資料 5.1.4-1 マナウスの気象データ (1/2)

1999

Month	Temperature						Relative Humidity %	Rain			Wind velocity m/s
			Maximum Absolute		Minimum absolute			Rain	Max. 24 hr		
	Maximum	Minimum	Degree	Day	Degree	Day		Total(mm)	Total(mm)	Date	
Jan.	30.3	21.0	33.0	31	19.0	27	93	411.6	67.8	24	0.7
Feb.	30.2	20.8	33.0	24	19.0	25	93	260.8	57.2	23	0.8
Mar.	30.4	20.6	32.8	23	19.0	13	91	233.2	59.0	7	0.6
Apr.	30.5	20.9	32.8	12	20.0	20	91	421.2	133.2	27	0.7
May	30.1	20.9	34.2	19	20.0	4	92	445.4	89.6	22	0.3
Jun	31.2	21.0	33.4	30	20.0	6	90	149.3	53.0	3	0.4
Jul	31.7	21.2	33.1	24	19.5	7	83	27.3	11.0	11	0.6
Aug	32.6	21.6	35.2	29	18.0	17	79	40.6	27.0	12	0.6
Sep	33.0	22.0	36.0	8	20.5	13	82	98.8	51.8	27	0.7
Oct	33.5	22.0	36.0	27	20.0	15	77	123.3	44.2	7	0.6
Nov	33.0	22.7	35.2	22	21.0	1	79	203.5	70.0	14	0.7
Dec	32.4	22.7	35.2	14	20.5	28	82	198.3	51.2	21	0.6

1998

Month	Temperature						Relative Humidity %	Rain			Wind velocity m/s
			Maximum Absolute		Minimum absolute			Rain	Max. 24 hr		
	Maximum	Minimum	Degree	Day	Degree	Day		Total(mm)	Total(mm)	Date	
Jan.	31.3	23.2	33.8	24	21.4	5	85	302.6	55.6	2	0.6
Feb.	32.3	23.6	34.6	2	22.4	7	85	171.7	31.6	4	0.6
Mar.	31.5	23.1	34.0	29	21.0	20	89	210.8	38.2	20	0.8
Apr.	31.3	22.4	33.8	8	20.0	12	91	407.2	60.6	2	0.3
May	31.0	22.5	33.0	26	20.0	17	90	273.4	64.8	6	0.4
Jun	31.3	21.9	33.2	12	20.0	5	89	167.2	32.1	2	0.4
Jul	31.9	22.2	34.0	26	21.0	9	87	92.0	25.4	10	0.4
Aug	33.1	22.0	35.0	25	20.0	30	85	41.8	22.0	2	0.5
Sep	32.8	21.9	35.2	19	20.0	14	86	115.6	67.2	21	0.8
Oct	33.3	22.5	35.2	20	21.0	15	85	73.5	31.1	15	0.9
Nov	32.0	22.0	34.8	10	20.0	28	89	153.6	32.8	23	0.8
Dec	32.6	21.7	35.0	4	20.0	1	85	191.0	69.2	24	0.7

1997

Month	Temperature						Relative Humidity %	Rain			Wind velocity m/s
			Maximum Absolute		Minimum absolute			Rain	Max. 24 hr		
	Maximum	Minimum	Degree	Day	Degree	Day		Total(mm)	Total(mm)	Date	
Jan.	30.2	23.3	33.6	3	22.1	13	86	220.6	40.6	29	1.2
Feb.	30.0	22.9	32.4	3	21.4	8	87	344.5	55.8	18	0.9
Mar.	29.9	23.0	33.4	25	21.9	26	89	534.9	54.6	9	0.9
Apr.	30.7	23.5	33.2	7	22.2	5	85	310.8	75.2	12	0.9
May	30.9	23.7	33.0	20	22.2	10	83	252.2	105.0	6	0.9
Jun	32.1	24.2	33.1	23	23.0	3	76	9.5	4.4	10	1.1
Jul	33.3	24.6	34.6	18	23.0	2	73	0.0	0.0	1	1.4
Aug	33.0	23.7	35.2	29	21.2	9	73	111.5	64.3	12	1.2
Sep	35.2	24.4	36.6	16	22.8	7	64	40.5	28.2	9	1.1
Oct	35.8	24.8	38.0	26	19.4	6	74	60.9	31.4	5	0.8
Nov	33.2	24.0	36.5	8	22.0	12	80	182.3	56.6	29	0.6
Dec	32.1	23.8	35.2	7	22.0	28	83	261.5	88.4	18	0.4

付属資料 5.1.4-1 マナウスの気象データ (2/2)

1996

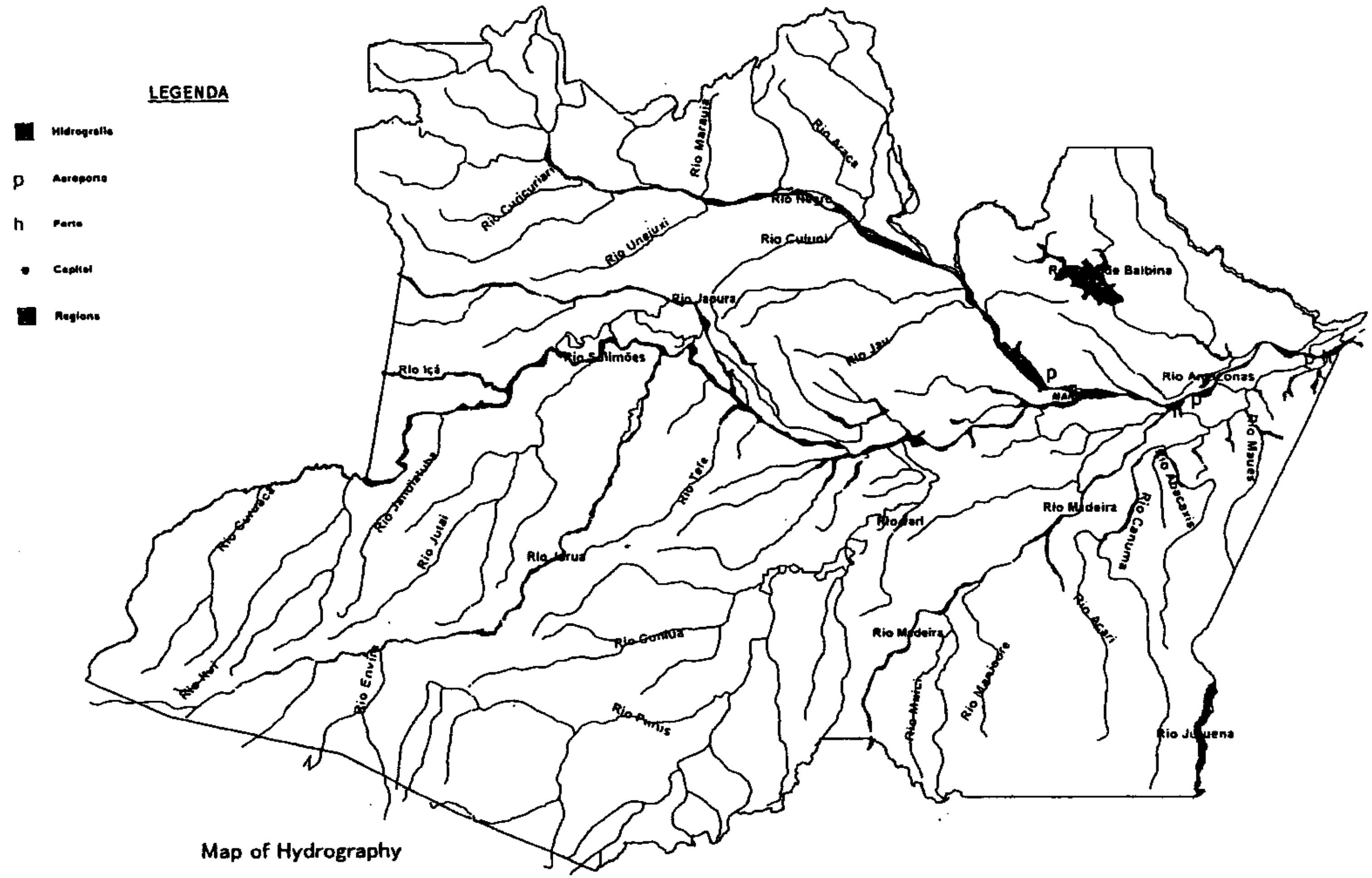
Month	Temperature						Relative Humidity %	Rain			Wind velocity m/s
			Maximum Absolute		Minimum absolute			Rain	Max. 24 hr		
	Maximum	Minimum	Degree	Day	Degree	Day		Total(mm)	Total(mm)	Date	
Jan.	29.9	22.6	33.2	27	21.4	30	87	571.3	155.0	15	0.9
Feb.	30.2	22.8	32.6	26	21.4	21	85	257.6	50.4	17	0.8
Mar.	30.6	23.1	32.8	21	21.4	15	85	338.1	66.6	4	1.1
Apr.	30.1	23.1	33.8	14	21.6	11	86	428.5	72.0	18	0.8
May	30.9	23.5	33.2	3	22.4	29	84	127.5	22.6	16	0.9
Jun	30.6	22.4	32.6	17	17.0	30	81	185.1	33.4	5	1.0
Jul	31.6	22.7	33.4	6	19.5	1	76	16.9	6.0	15	1.0
Aug	32.1	23.4	34.2	27	21.6	20	80	65.0	22.6	4	1.0
Sep	33.1	23.9	35.0	3	21.3	23	76	114.0	46.2	23	0.5
Oct	32.6	23.3	35.0	30	21.2	15	80	186.0	51.6	15	1.0
Nov	32.3	23.7	35.0	2	21.2	17	81	163.0	49.0	17	1.0
Dec	31.4	23.6	33.8	19	21.4	12	84	142.2	92.0	2	1.0

1995

Month	Temperature						Relative Humidity %	Rain			Wind velocity m/s
			Maximum Absolute		Minimum absolute			Rain	Max. 24 hr		
	Maximum	Minimum	Degree	Day	Degree	Day		Total(mm)	Total(mm)	Date	
Jan.	31.0	-	33.8	9	-	-	82	286.0	96.2	14	1.1
Feb.	31.0	23.5	33.7	14	21.2	25	83	132.0	24.0	25	1.5
Mar.	31.1	23.0	34.3	24	21.0	9	84	301.4	43.8	13	1.3
Apr.	30.6	22.9	33.0	30	21.5	23	87	480.5	89.0	19	0.8
May	30.8	23.2	32.8	6	21.6	22	87	217.5	55.8	21	1.1
Jun	30.8	23.2	33.2	19	21.6	28	82	107.0	29.0	2	1.0
Jul	32.3	23.5	34.0	29	20.2	3	76	76.9	32.6	3	1.0
Aug	33.5	24.4	34.6	3	21.0	8	73	34.2	15.4	8	1.0
Sep	33.6	24.4	38.0	15	20.2	11	75	72.4	40.0	6	0.5
Oct	33.5	24.2	36.6	6	21.0	24	76	81.0	25.0	11	1.0
Nov	31.3	23.3	34.2	9	21.9	13	86	312.0	59.4	9	1.0
Dec	31.5	23.3	33.5	10	21.4	14	85	160.5	39.1	16	1.0

1994

Month	Temperature						Relative Humidity %	Rain			Wind velocity m/s
			Maximum Absolute		Minimum absolute			Rain	Max. 24 hr		
	Maximum	Minimum	Degree	Day	Degree	Day		Total(mm)	Total(mm)	Date	
Jan.	29.9	22.5	32.9	28	20.9	21	91	371.1	58.0	20	1.3
Feb.	29.8	22.7	32.0	22	20.9	2	90	399.5	64.2	18	1.1
Mar.	30.6	23.1	33.6	15	21.2	9	87	259.5	54.0	7	1.1
Apr.	30.6	23.1	32.6	27	21.3	30	86	258.7	106.6	30	1.0
May	30.6	23.0	32.6	26	20.5	3	85	174.2	35.0	29	1.0
Jun	30.2	22.7	32.2	7	21.3	29	85	125.2	34.0	8	1.0
Jul	31.2	22.9	33.4	30	20.3	10	78	29.9	13.4	14	1.3
Aug	32.3	22.9	34.0	30	19.3	25	79	96.7	21.0	26	1.1
Sep	32.8	23.7	34.4	24	20.3	13	78	62.6	24.1	13	1.3
Oct	33.1	23.7	35.4	19	20.9	7	76	91.8	22.3	26	0.9
Nov	32.8	23.4	35.0	16	21.3	15	79	207.3	106.7	23	0.8
Dec	31.2	23.2	33.6	5	19.1	26	84	222.5	47.0	25	1.3



付属資料 5.1.5-1　アマゾナス州の水文地図

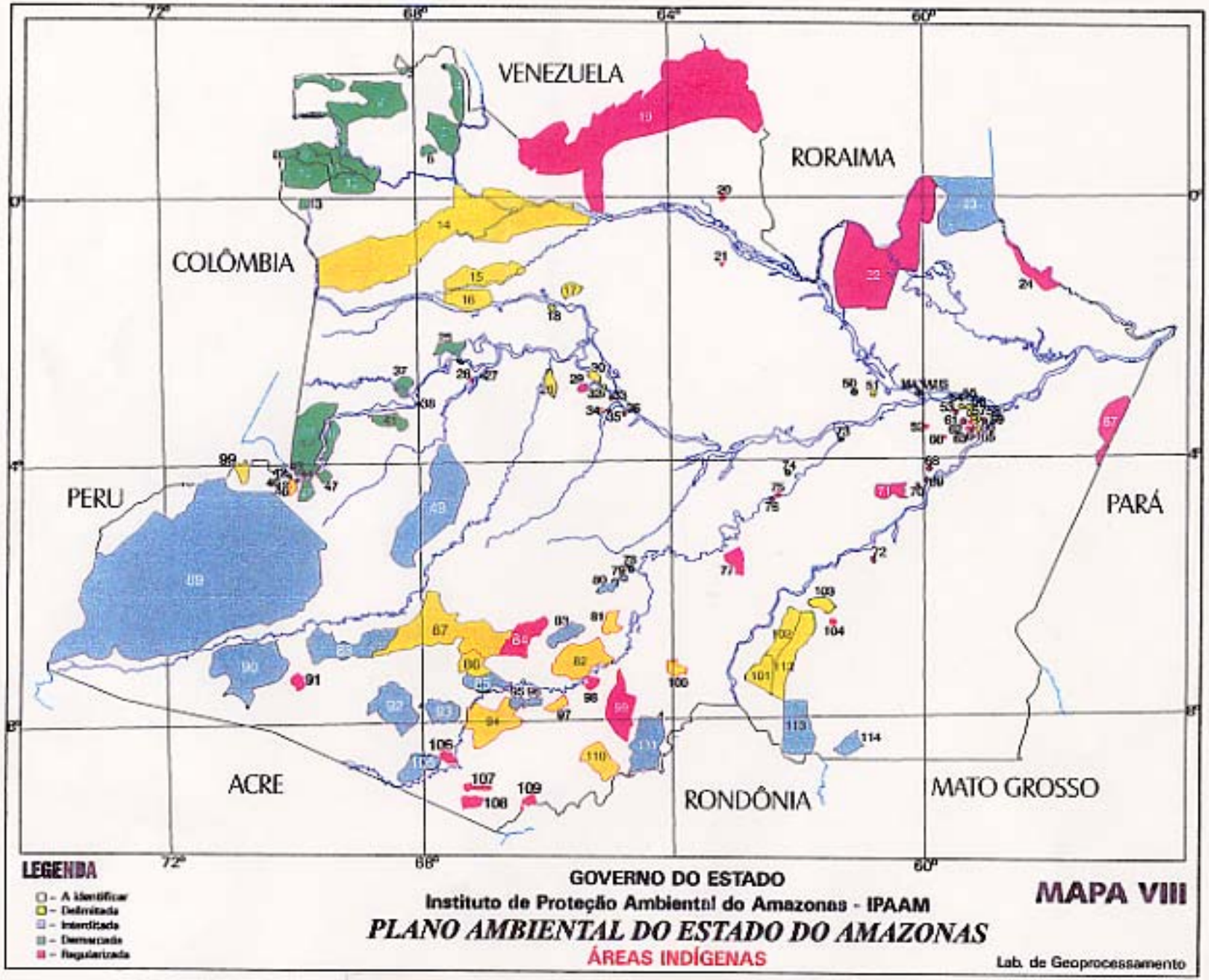
付属資料 5.2.1-1　アマゾナス州の水産業における主要対象魚種

Biological classification	Local name	Traditional preference of local people *1)
Osteogrossiformes		
Arapeimidae		
Arapaima gigas	Pirarucu	1st
Osteoglossidae		
Osteoglossum bicirrhosum	Aruana	-
Clupeiformes		
Clupeidae	Apapa	-
Ilisha amazonica		
Characiformes		
Prochilodontidae		
Semaprochilodus insignis	Jaraqui escama grossa	2nd
S. taeniurus	Jaraqui escama fina	2nd
Prochilodus nigricans	Curimata	2nd
Curimatidae		
Potamorhina latior	Branquinha-comum	2nd
Characidae		
Brycon cephalus	Mantrincha	1st
Triportheus angulatus	Sardinha	1st
Serrasalmidae		
Colossoma macropomum	Tambaqui	1st
Metynnis hypsauchen	Pacu	1st
Piaractus brachypomus	Pirapitinga	2nd
Perciformes		
Cichlidae		
Astronotus crasipinis	Acara-Acu	Special
Cichla sp.	Tucunare	Special
Cichlasoma spectabile	Cara	-
Astomidae		
Leporinus friderici	Aracu-cabeca-gorda	-
L. fasciatus	Aracu-amarelo	2nd
Schizodon fasciatus	Aracu-comum	-
Sciaenidae		
Plagioscion spp.	Pescada	Special
Siluriformes		
Pimelodidae		
Pseudoplatystoma fasciatum	Surubim lenha (Pintardo)	3rd
P. tigrinum	Surubim tigre (Pintardo)	-
Brachyplatystoma flavicans	Dourada	3rd
B. vaillantii	Piramutaba	3rd
B. filamentosum	Piraiba	3rd
Leiarius marmoratus	Jandia	3rd
Brachyplatystoma filamentosum	Filhote	-
Paulicea luetkeni	Jau	-
Phractocephalus hemioliopterus	Pirarara	-
Hypophthalmidae		
Hyopophthalmus spp.	Mapara	-
Doradidae		
Pterodoras lentiginosus	Bacu liso	-
Oxydoras niger	Cuiu-cuiu	-
Callichtyidae		
Holplosternum litoralle	Tamoata	-
Loricaridae		
Liposarcus pardalis	Acari-bodo, Bodo	-

Source:

*1): After Falabella P. G. R. (1994). Family and scientific name, and local name are amended according to Ruffino et al. (1998).

[ ]: Species to be investigated with priority in this Study



付属資料 5.2.3-1　ブラジル国全土の保護区分

付属資料5.2.3-2　アマゾン保護地域区分

Federal Conservation Unit

NO.	Name	Area	Number
1	National Park	4,487,000	3
2	Biological Reserve	848,900	4
3	Ecological Reserve	461,476	3
4	Ecological Station	922,668	2
5	National Forest	6,887,795	16
6	Relevant Ecological Interest Area	18,288	2
7	Experimental Reserve	11,000	2
8	Forest Reserve	3,790,000	1
9	Natural Patrimony Particular Reserve	104,286	6
10	Native Animals Particular Refuge	2,700	1
11	Fauna Reserve	14,150	1
	Mining Reserve	253,227	1
	Total	17,801,490	

State Conservation Unit

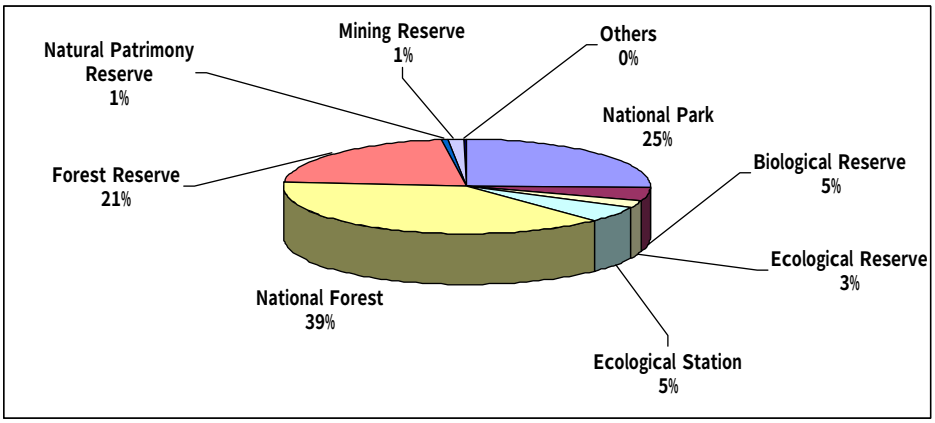
NO.	Name	Area	Number
1	Environmental Protection Area	2,475,691	5
2	State Park	2,283,112	3
3	Biological reserve	36,900	1
4	Development Sustained Reserve	3,437,000	2
	Total	8,232,703	

Municipal Conservation Unit

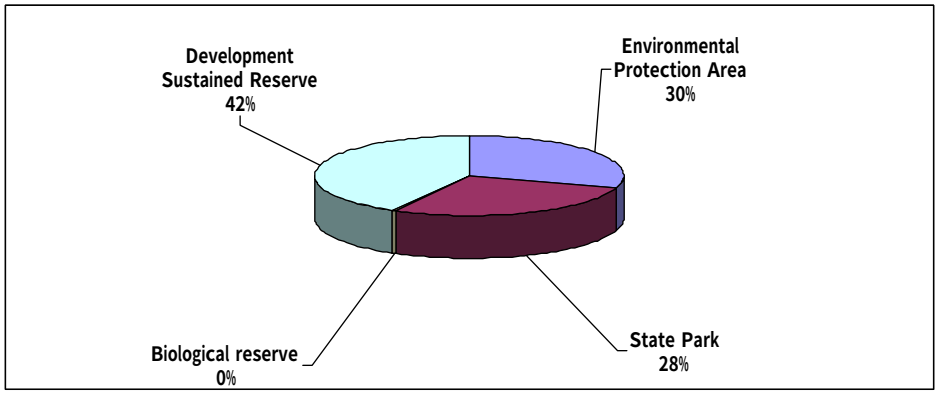
NO.	Name	Area	Number
1	Municipal Park	391	4
2	Municipal Garden	-	1
3	Natural Monument	-	2
4	Environmental Protection Area	879,378	5
5	Ecological Station	2,750	1
6	Botanical Garden	2	1
7	Zoo	-	2
8	Environmental Unit of Manaus	26,346	7
	Total	879,769	

- : Data is not available

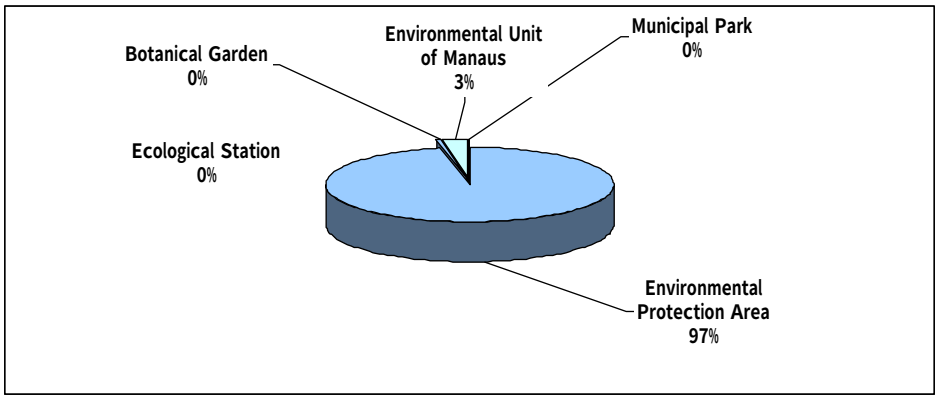
Data source : IPAAM



Federal Conservation Unit of Amazon

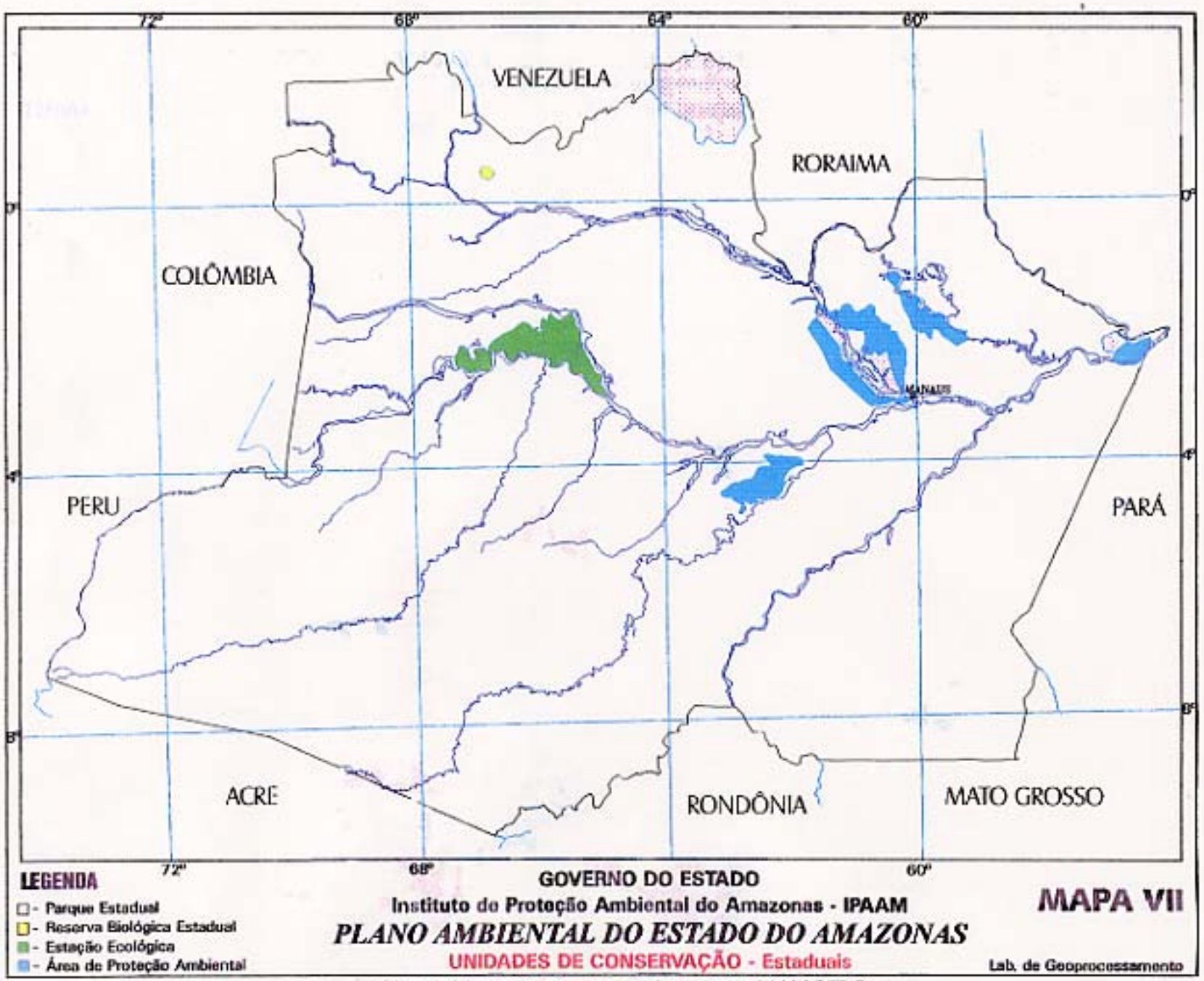


State Conservation Unit

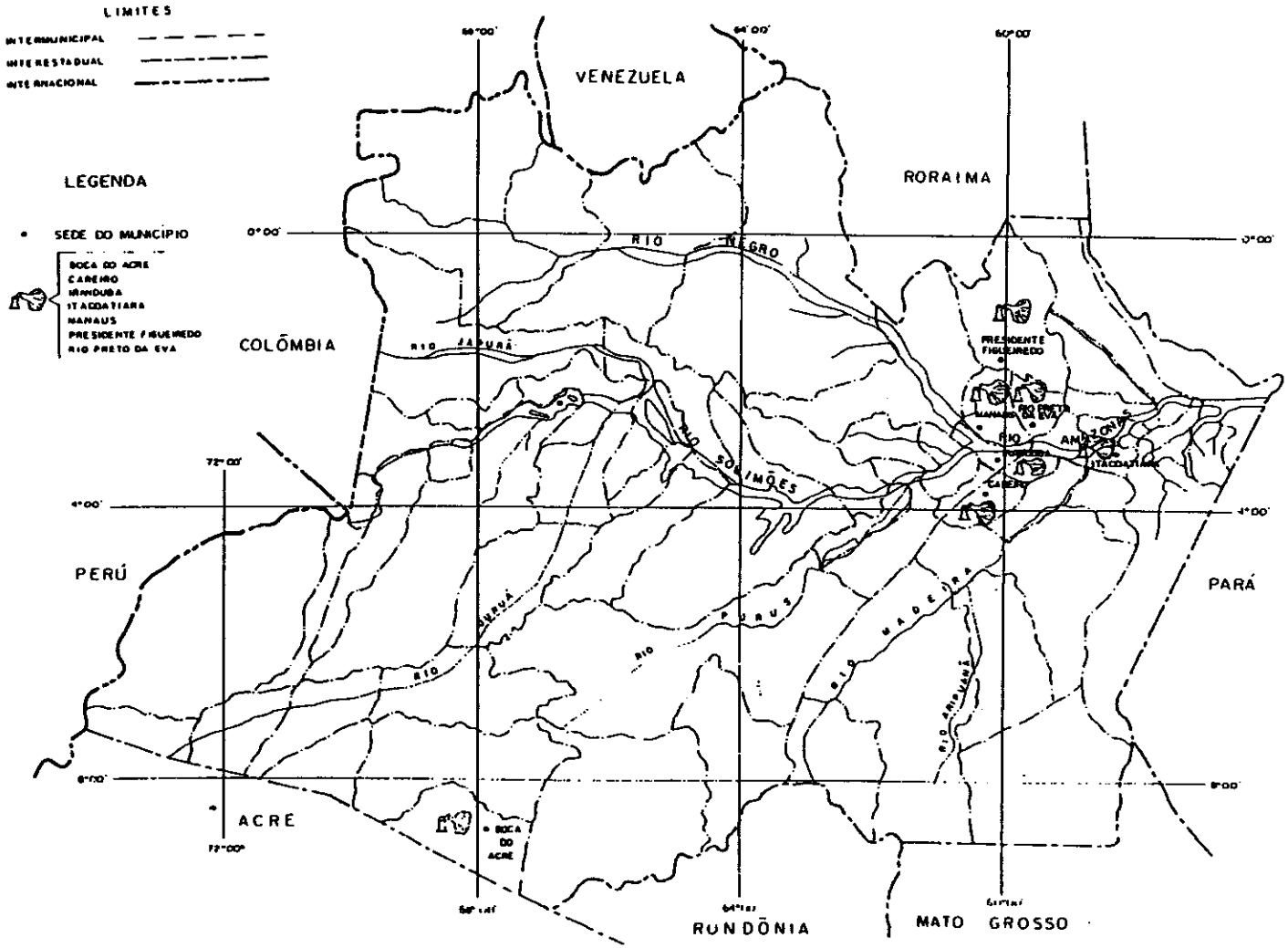


Municipal Conservation Unit

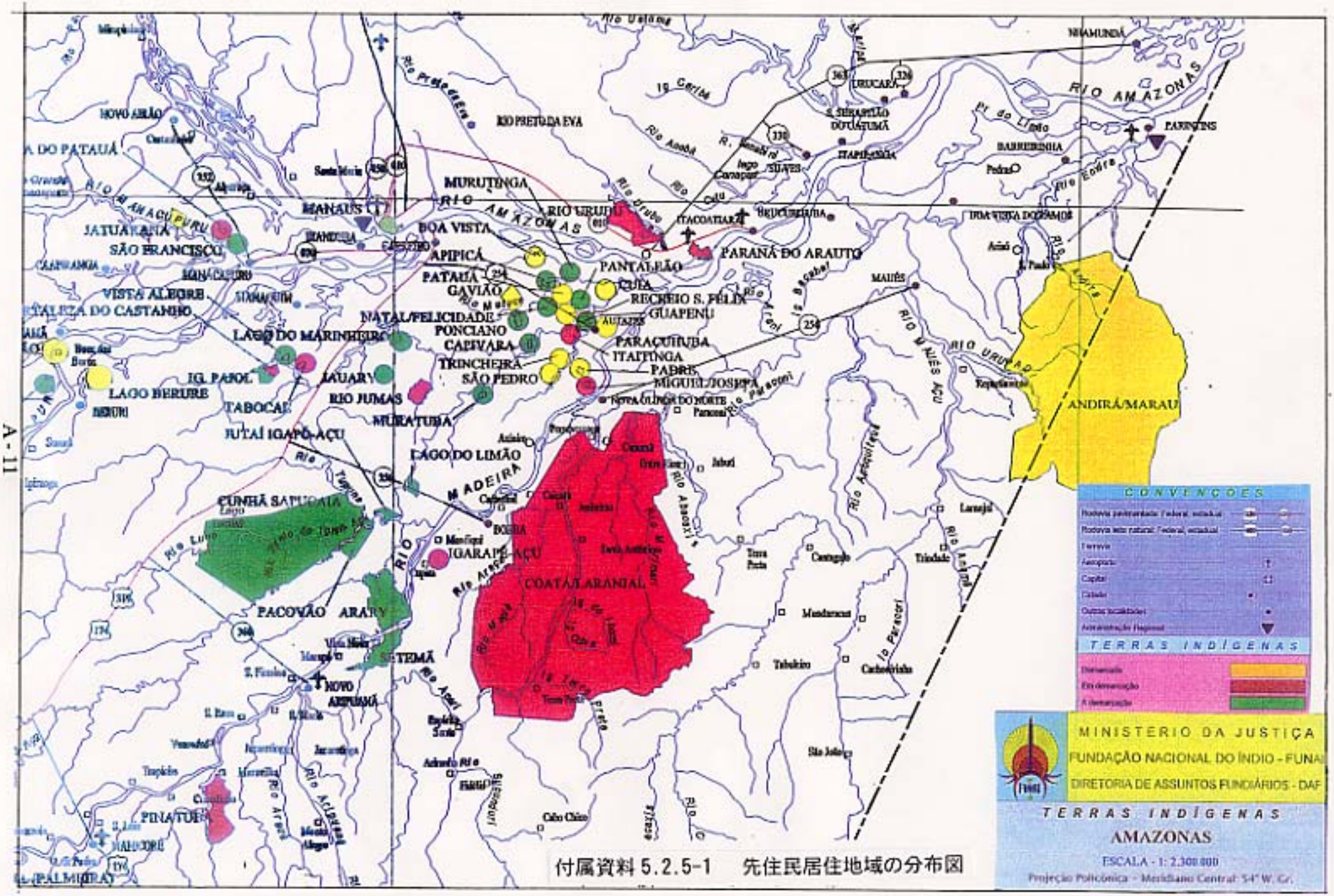
アマゾナス州 環境調和型地域住民生計向上計画調査	付属資料　5.2.3-3
国際協力事業団 (JICA)	国立公園及び保護地域区分



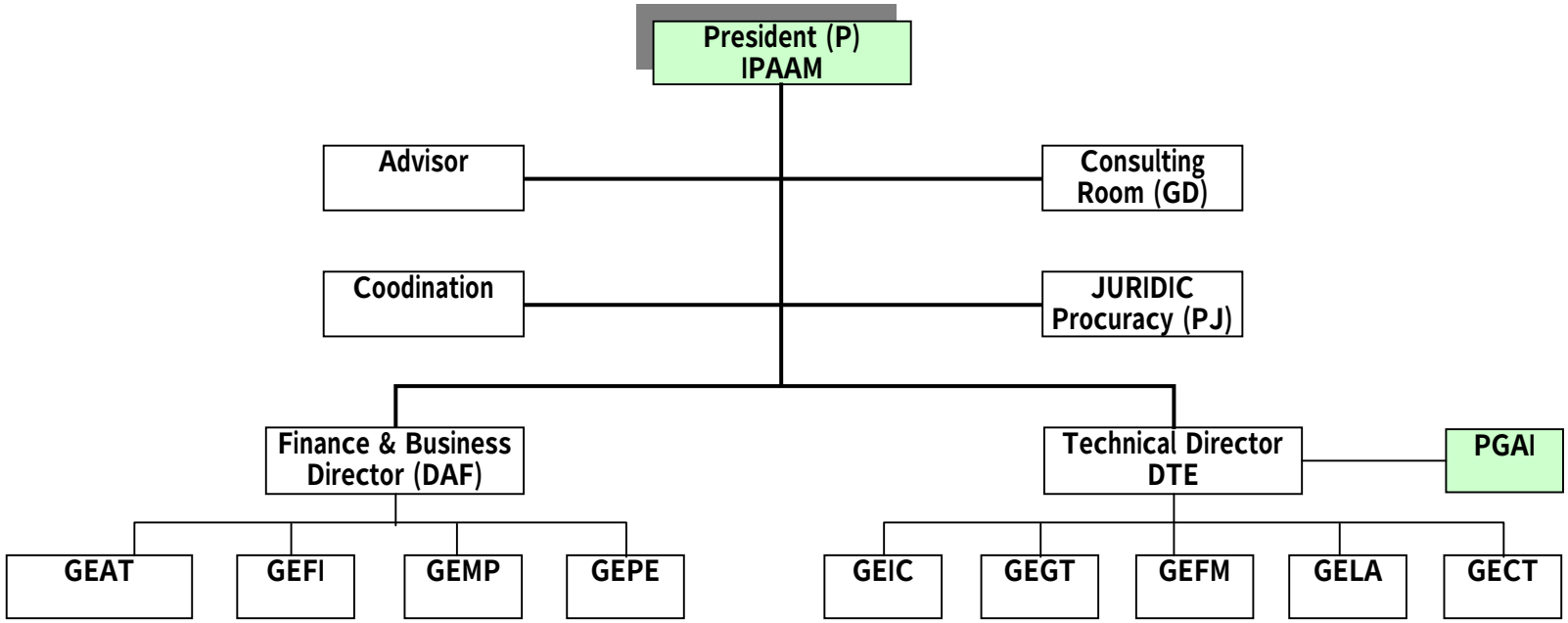
付属資料 5.2.3-4　アマゾナス州保護地域区分



付属資料 5.2.4-1　森林伐採多発地域

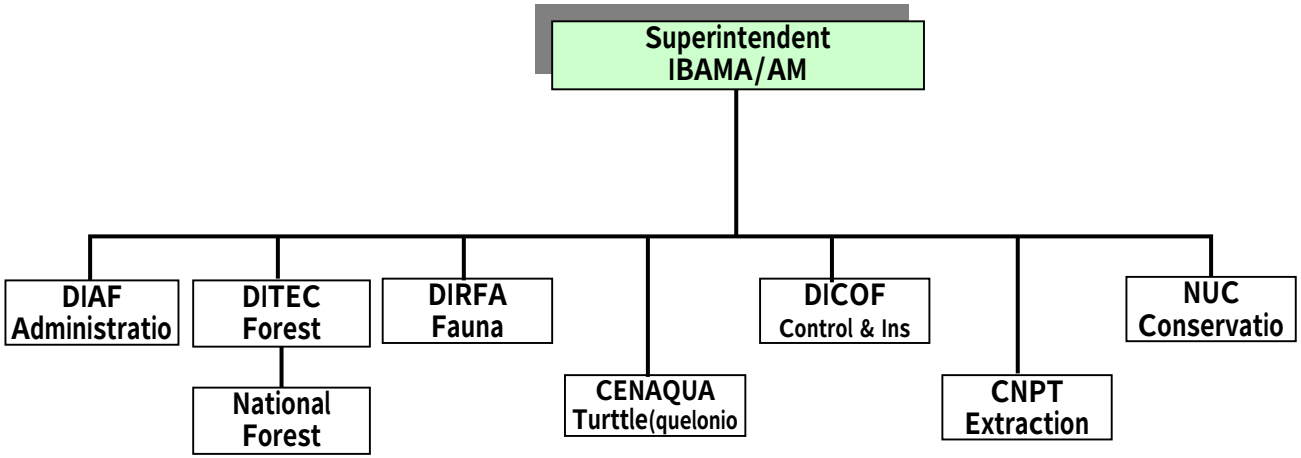


付属資料 5.2.5-1　先住民居住地域の分布図



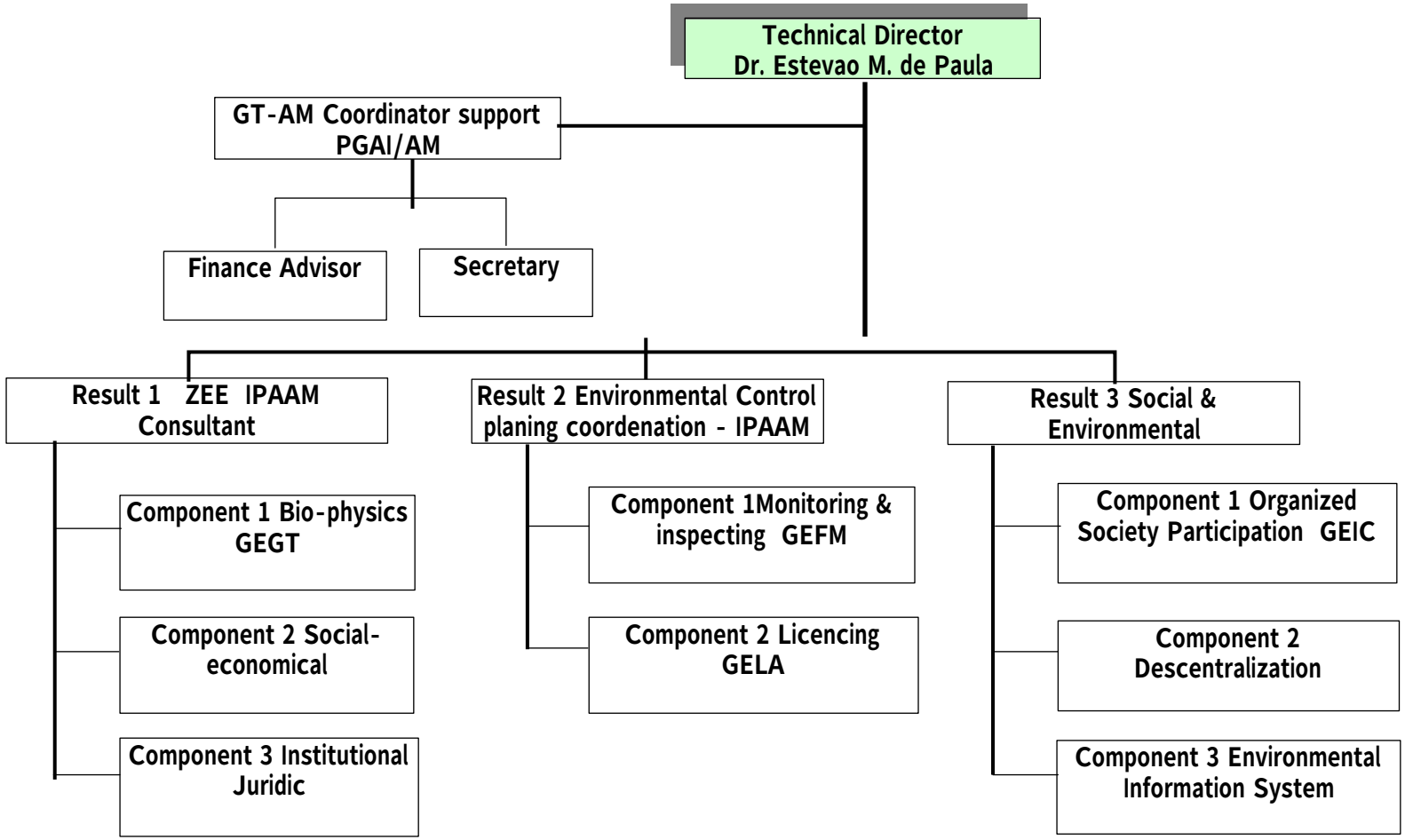
GEAT	Transport and support management	GEIC	Environmental education & information & comunication management
GEFI	Financial management	GEGT	Teritorial mangement
GEMP	Material and patrimony management	GEFM	Monitoring & inspecting management
GEPE	Personnel management	GELA	Licencing management
		GECT	Sciencce & Technology management
		PGAI	Integrated environmental management

アマゾナス州 環境調和型地域住民生計向上計画調査	付属資料 5.3.1-1
国際協力事業団 (JICA)	IPPAM 組織図

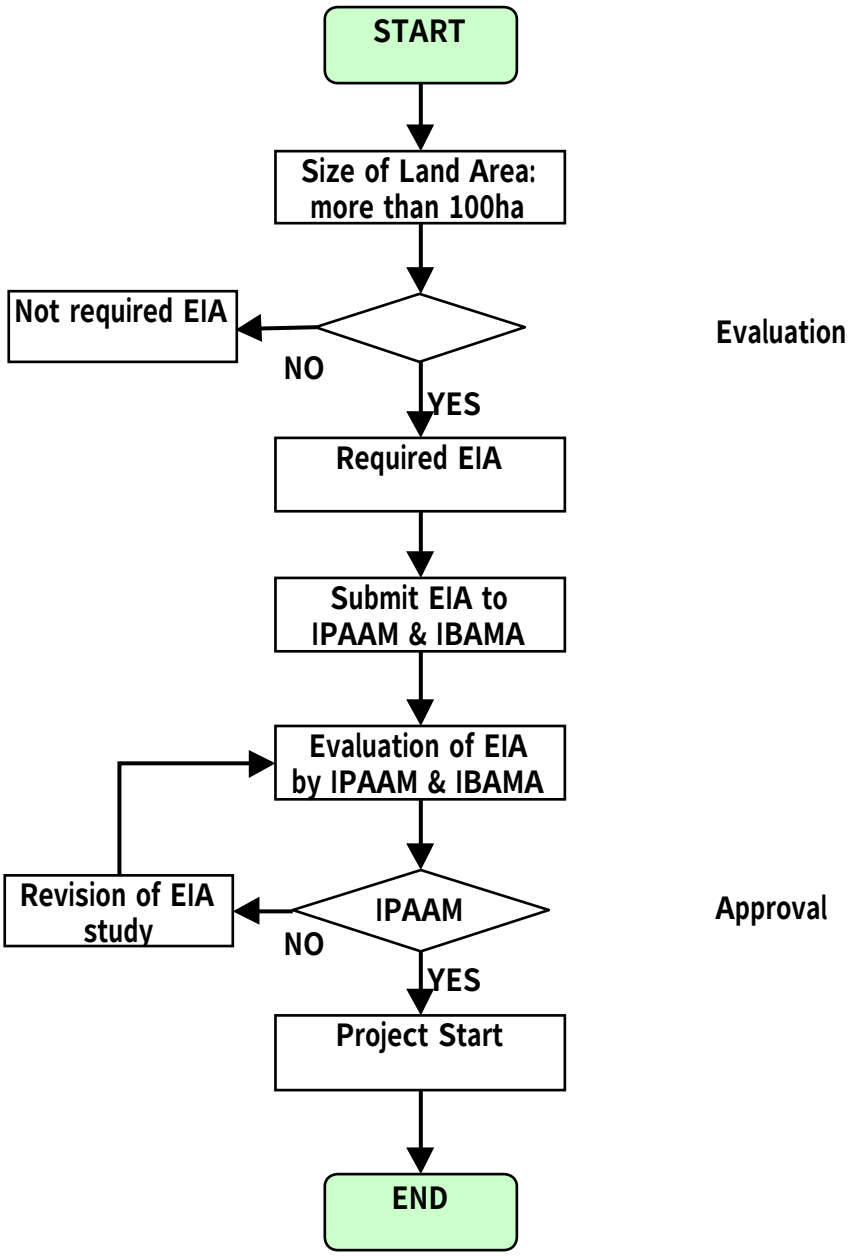


DIAF Finance & Administration Director
DITEC Technical Director
DIRFA Fauna Director
DICOF Inspection & Control Director
NUC Conservation Unit
CNF National Forest Center
CENAQ Turtle (quelonio) National Center
CNPT National Center for the Development of traditional population

アマゾナス州 環境調和型地域住民生計向上計画調査	付属資料 5.3.1-2
国際協力事業団 (JICA)	IBAMA/AM 組織



アマゾナス州 環境調和型地域住民生計向上計画調査	付属資料 5.3.1-3
国際協力事業団 (JICA)	PGAI/AM 組織図



アマゾナス州 環境調和型地域住民生計向上計画調査	付属資料 5.3.2-1 EIA (RIMA)の手順
国際協力事業団 (JICA)	

付属資料 5.3.4-1　現在進行中のプロジェクト及びサブプログラムの目的（1/3）

1. Natural Resources Policy Subprogram (SPRN)
   1) To strengthen state environmental agencies
   2) To implement zoning, monitoring, command and control in priority areas.
   3) To decentralize the environmental management.

2. Demonstration Projects Subprogram (PD/A)
   1) To generate knowledge about conservation, preservation and sustainable management of natural resources through demonstration activities involving local communities' participation.
   2) To transfer the knowledge resulting from the experiences to other communities, other NGOs, decision makers, government technicians and other representative groups.
   3) To strengthen the organization, articulation and technical capacity of local populations to elaborate and implement projects.

3. Science Centers and Directed Research Subprogram (PDD)
   1) To strengthen institutional management and administration.
   2) Rehabilitation and expansion of research infrastructure and development.
   3) Increase human resource capacity in scientific research and education.
   4) Disseminate research results.
   5) Key policy studies and strategic plan at Museu Paraense Emílio Goeldi.

4. Indigenous Land Project (PPTAL)
   1) To legalize the indigenous lands in the Legal Amazon.
   2) To protect the populations and indigenous areas.

5. Extractive Reserves Project (RESEX)
   1) To complete the legalization of extractive reserves and other procedures required to guarantee traditional populations' access to natural resources.
   2) To strengthen community-based organizations and set up social and communal infrastructure in the reserves.
   3) To develop, try and publicize appropriate technologies to improve subsistence and commercialization of productive activities mainly in non-timber forestry products.
   4) To improve the conservation and management of natural resources in the extractive reserves.
   5) To promote a participatory management and administration method in the project.

6. Forest Resources Management Project (PROMANEJO)
   1) To contribute to the forestry-based economic activities to result from areas managed in a sustainable way and contribute for the development of a learning process among the several wood-based productive businesses.
   2) To develop strategic analysis of the main policies and incentives affecting the forestry sector, proposing new systems and key reforms.
   3) To encourage people, firms, NGOs and communities to develop sustainable management techniques and/or adopt forestry exploitation standards compatible with sustainable development principles capable of being replicated later on.

4) To implement an integrated monitoring and control pilot system on timber harvesting in a “terra firme” area in Pará state and flooded “Várzea” area in Amazonas state.
5) To develop and implement a participator y resources management plan for the sustainable use of the National Forest of Tapajós.

7. Fire Prevention, Mobilization and Training Project (PROTEGER)
1) To mobilize and train rural communities on the prevention of fire in the Amazon.
2) To create community-based fire brigades.
3) To carry out research on the alternatives to burning during land preparation.

8. Monitoring and Analysis Project (AMA)
1) To promote learning about the Pilot Program and the application of lessons learnt.

9. Support of the Brazilian coordination of the Pilot Program
1) Management and coordination of the Pilot Program
2) Monitoring
3) Interaction and articulation between subprograms and projects
4) Support to public policies

10. Floodplain Resources Management (PROVARZEA)
1) Development of management, monitoring and control systems. This includes economic and environmental analysis of floodplain soils use and management of natural resources, environmental legislation, land-tenure aspects and political analysis.
2) To develop innovative floodplain natural resources management systems in an economically, socially and environmentally sustainable manner.
3) To implement a pilot integrated monitoring and control system for the use of floodplain natural resources in two selected areas (Santarém/PA and Silves/AM) to produce and promote knowledge base to be used in the management of floodplain natural resources project proposals.

11. Support of the NGO Networks (GTA)
1) To guarantee GTA network participation in the design, execution and monitoring of the Pilot Program activities and PD/A in particular.
2) To enable the GTA network to follow, execute and monitor public programs and policies for the Amazon.
3) To implement mechanisms for GTA’s sustainability.
4) To implement a mobilization and training project on the prevention of fires in the Amazon (PROTEGER).
5) To set up an Amazonian network for the commercialization of sustainable products.

12. Fire and Deforestation Control Project (PRODESQUE)
1) To contribute to reducing actual deforestation and forest fire in the Amazon.
2) To monitor and control fire and deforestation in priority areas.
3) To study and promote alternatives to fire and deforestation.

4) To implement a monitoring and control program against illegal deforestation and fire to reduce their current levels in the Amazon deforestation arch.
5) To stimulate the involvement of local players to create a co-responsibility system related to deforestation and dissemination of relevant technical information.
6) To develop guidelines for public policies to reduce fire and deforestation rates in the Amazon.

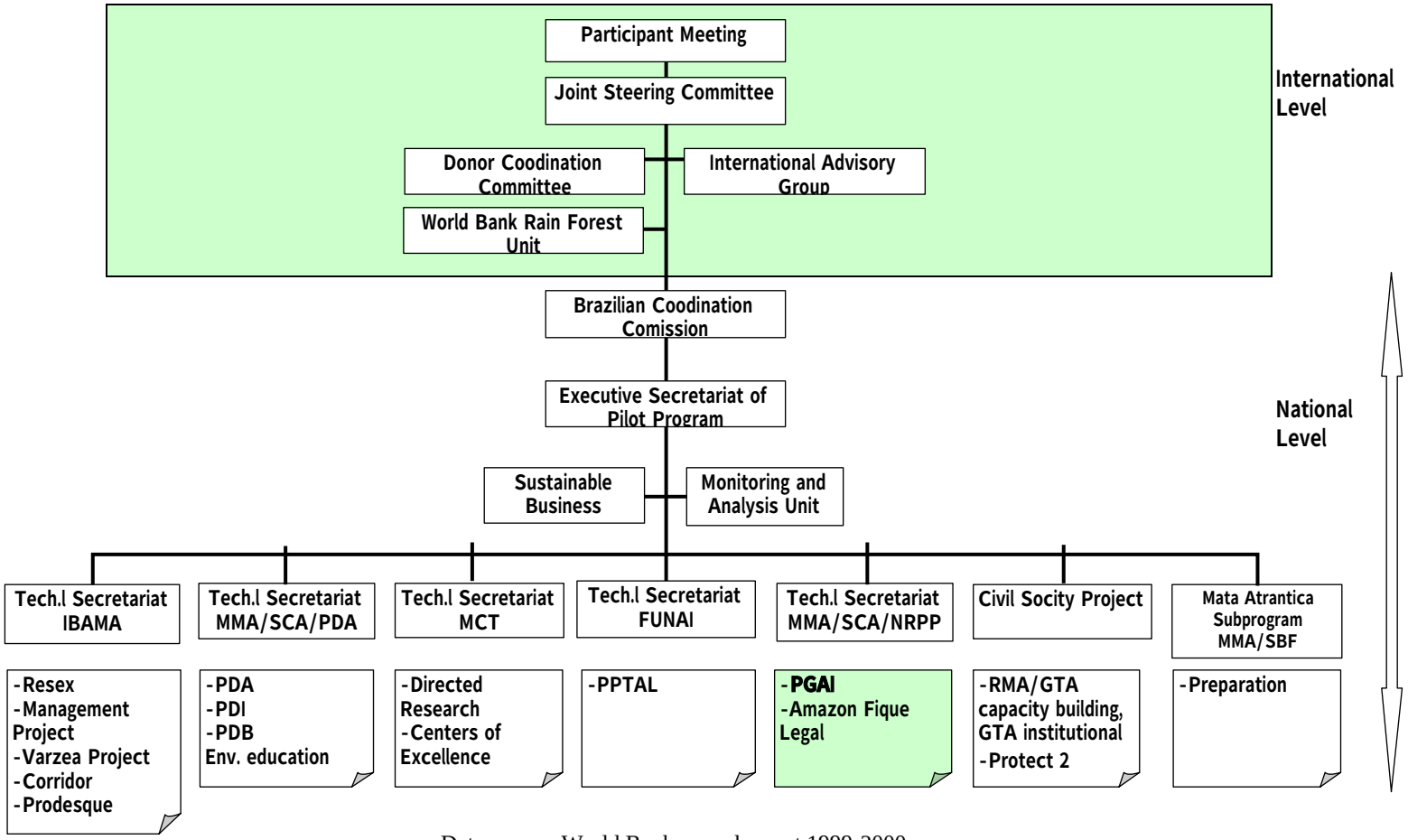
13. Ecological Corridors Project (CE)
1) To contribute for the effective conservation of biodiversity by implementing ecological corridors in the Amazon and Mata Atlantica regions including relevant players, to preclude or reduce deforestation of remaining fragmented forest areas and increase the connection between protected areas.

14. Environmental Education (CEDUC)
1) To stimulate the development of pilot non-formal environmental education demonstration experiences in the legal Amazon to disseminate already known proven initiatives as well as to promote generation and dissemination of new relevant knowledge on the issues of preservation, conservation and sustainable development in the region.
2) To stimulate the involvement of rural associations and other civil society organizations, public and private institutions committed to non-formal environmental education to develop pilot demonstration experiences in the region.
3) To strengthen partnerships between government and non-governmental institutions involved in training, production and dissemination of non-formal environmental education.

15. Demonstrative Projects by Indigenous Peoples (PD/PI)
1) To improve the prospects for economic, social and cultural sustainability of indigenous peoples in their lands, and to conserve the existing natural resources.

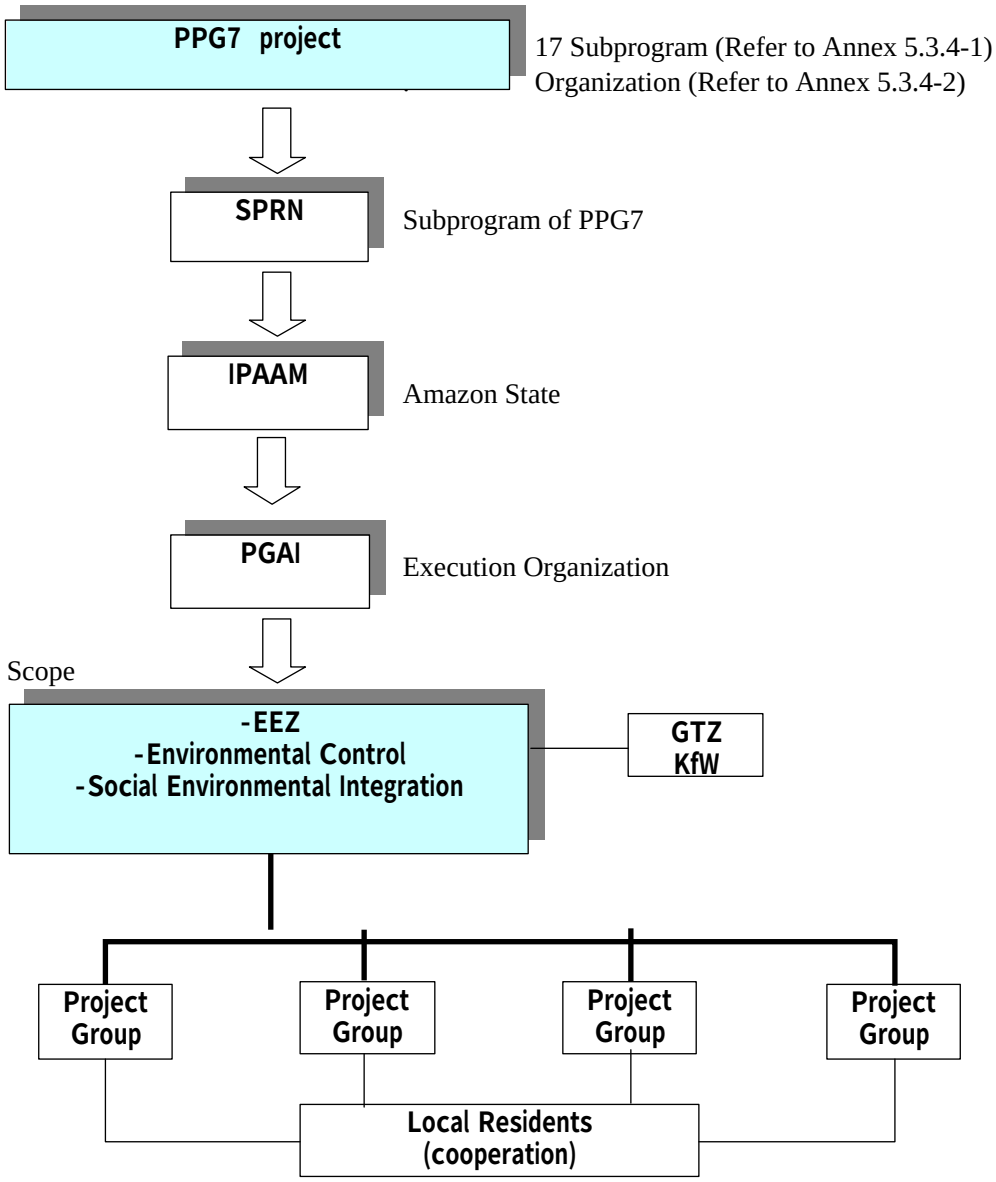
16. Municipal Demonstration Projects (PD/B)
1) To realize pre-investment activities and partnerships in order to implement sustainable productive projects in Amazonian municipalities.
2) To finance community projects in partnership with the private and/or public sectors to promote sustainable use of natural resources in tropical forests.
3) To reinforce the management capacity of the PD/A Technical Secretariat for the implementation of the Phase 2 activities.

17. Sustainable Business Practices (SBP)
1) To increase the economic sustainability of the initiatives started by other Pilot Program projects and promote independent environmentally sustainable companies outside of the Pilot Program.



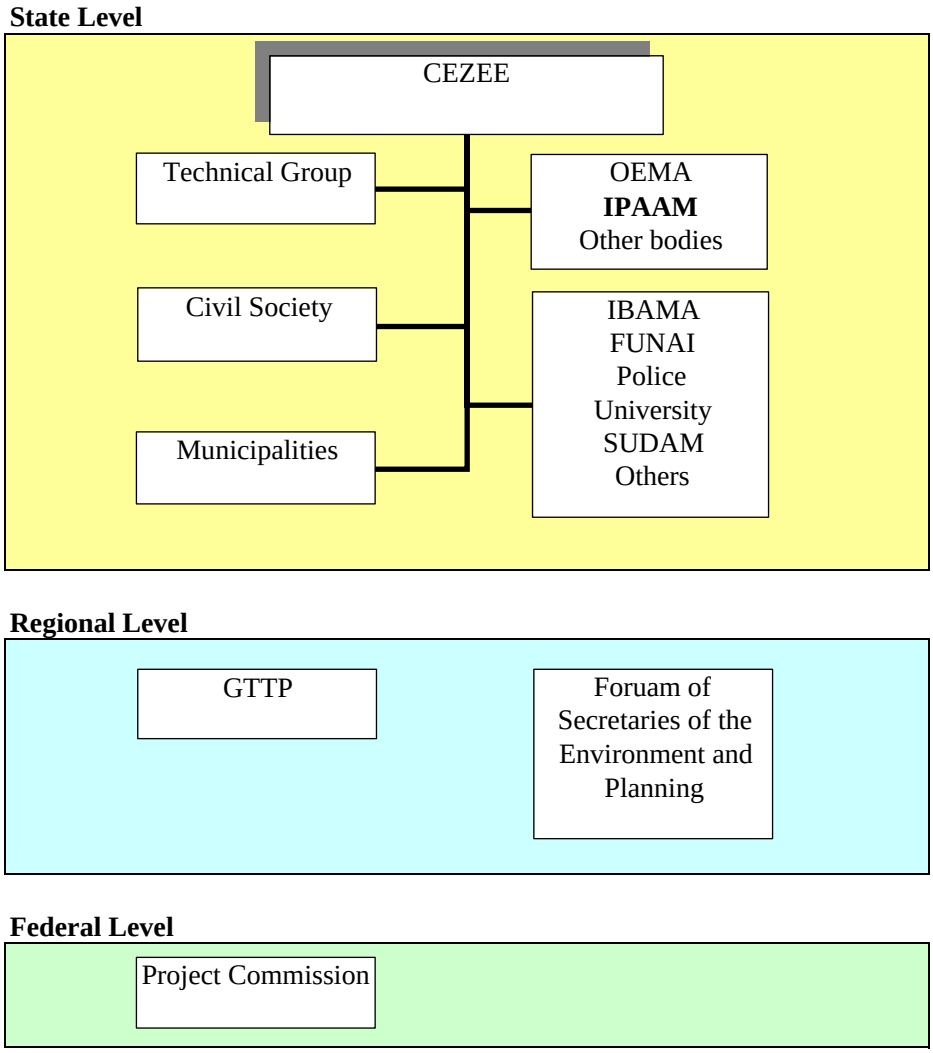
Data source: World Bank annual report 1999-2000

アマゾナス州 環境調和型地域住民生計向上計画調査	付属資料 5.3.4-2
国際協力事業団 (JICA)	PPG7の組織構造



IPAAM	Institute of Environmental Protection on Amazon
PGAI	Project for Integrated Management of the Environment
EEZ	Ecological Economic Zoning
SPRN	Natural Resource Policy Subprogram
GTZ	German Technical Cooperative Agency
KfW	German Bank of Development

アマゾナス州 環境調和型地域住民生計向上計画調査	付属資料 5.3.4-3 EEZプロジェクトの流れ及びプロジェクトに係る既存組織
国際協力事業団 (JICA)	



CEZEE	State EEZ Commission
FUNAI	National Indian Foundation
GTTP	Permanent Technical Working Group
IBAMA	Brazilian Institute of the Environment and Renewable National Resources
OEMA	State Environmental Agency
IPAAM	Institute of Environmental Protection on Amazon
SUDAM	Superintendence for the Development of the Amazon Region

Data source : MMA

アマゾナス州 環境調和型地域住民生計向上計画調査	付属資料 5.3.4-4 EEZプロジェクト実施に係る組織
国際協力事業団 (JICA)	

付属資料 5.3.4-5　PPG7 に係る新プロジェクトに関する情報 (1/3)

The international group of scientific assistance - GIAC, responsible for the independent evaluation of the scientific and technological subprogram, consider the progress, notable and had a very positive impression about the subprogram which is part of a objectives of PPG-7.

23 projects that are in their finishing phase and 30 new one's are part of the directed research project (PPD) of the subprogram of PPG-7.

Those new projects will open 4 principal priority areas:

1. environmental infrastructure;
2. better life quality of the Amazon Region;
3. research of the ecosystem;
4. technologies to develop the Amazon.

The Jacaranda Project is a result of the collaboration between the Japanese and Brazilian Government, through PPG-7/MCT/INPA/ABC and JICA
First phase started in April/95 and finished in Marc 98.

The second phase has an investment preview of 4,26 million USD from Japan, for the next five years. This phase started in October 98

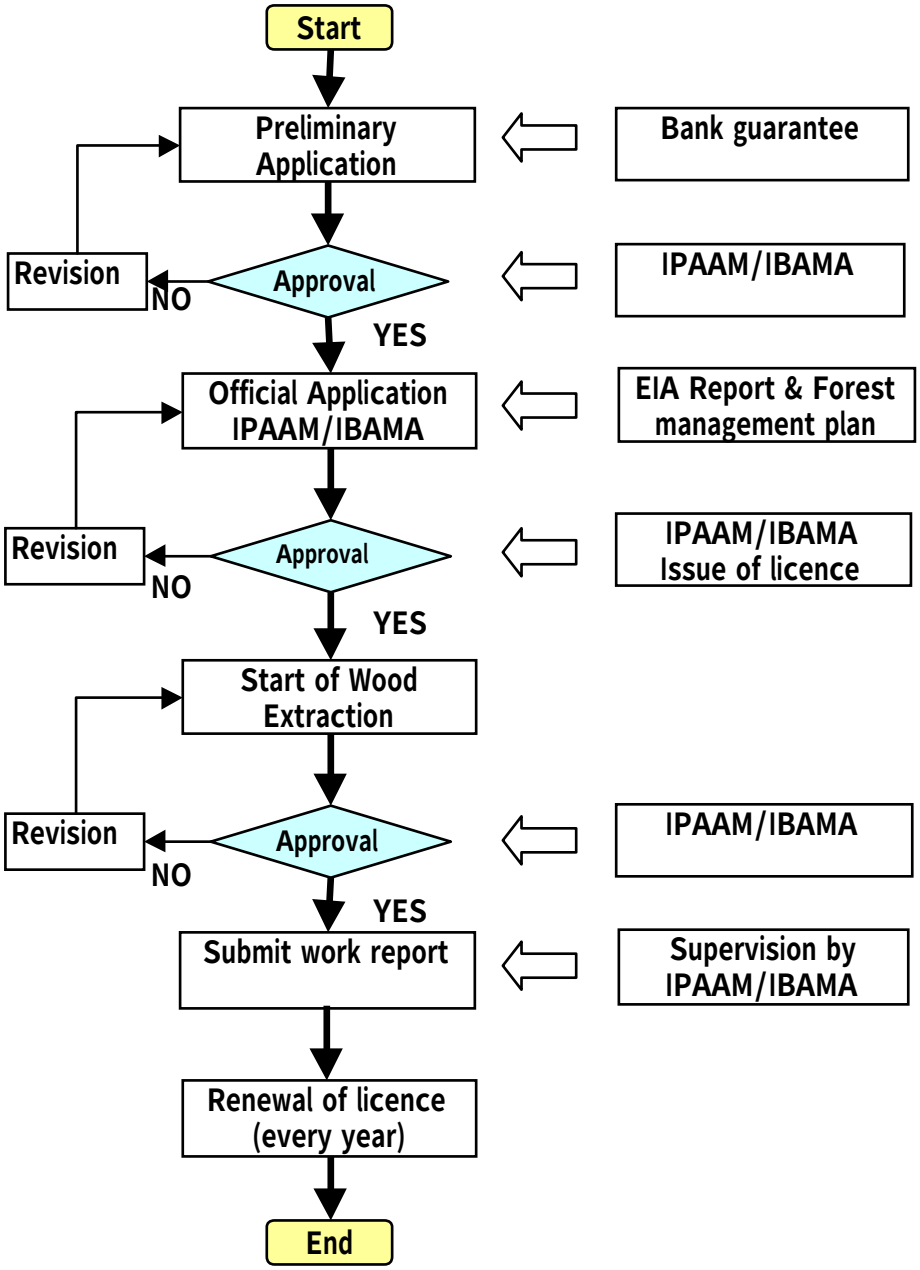
No.	NAME OF PROJECT	RESPONSIBLE	OUTPUT
1	Malaria and Amazon Ecosystem; Transmission and control.	INPA	The main objective of this project is to study the dynamics of transmission and strategies to control the malaria decease on the Amazon Ecosystem.
2	The Amazon Forest contribution for the global balancing of carbon.	INPA	Recent studies have shown that the water is very important for the physiological process of plants and that it affects directly the changes of the atmosphere, consequently, the absorption of CO2. this project will follow up for two seasons the dynamics of transfer and the storage of water in the various sections of the ecosystem to be studied.
3	Extensive Fishery of Tambaqui on Varzea (holm) forest.	INPA	This project will study the conditions of Tambaqui fishery in the Amazon varzea, if it would be suitable and what would be its monetary impact within the communities. Also it will be analyzed genetic aspects relevant to the addition of the species of fish
4	Development and co-activity of Agroforestory system.	INPA	This project is dedicated to develop an Agroforestory proposal for interested producers. Both husband and wife will define what kind of plantation based on the quality of the land and producers they wish. The project will accompany, analyze and follow up the plantation development. More than 100 kinds of plantations have been installed already, with 76 producers in 3 regions. They're all located in areas previously deforested.
5	Preservation and Management of the Amazon Manatee.	INPA / LMA	Considered an endangered specie, the Amazon Manatee project will study aspects like its nutrition, eating habits, health, physiological, reproduction and social behavior. Only after this data is collected will any preservation and management of the manatee be possible.
6	Evaluation of the viability of populations, on the long run, through generic analysis: ALUOATTA BELZEBUL (Primates Platyrrhini) 15 years after the construction of the hydroelectric plant of Tucurui (Para).	Federal University of Para - FADESP	Compares the genetic of the mentioned populations of primates before and after the construction of Tucurui.

7	The impact of politics on the handling of communities and the natural resources of the Amazon.	Institution of Environmental Research of the Amazon - IPAAM.	Handing of forest and holm areas by communities, preserving the ecosystem, taking effects with locals, using natural resources of the Amazon and neighbor countries.
8	Technological development for the handling and cultivation of Acai and to produce fruits.	Institution for Scientific and Technological Research of the State of Amapa IEPA	This project is to develop handing technologies of the native acai with the purpose to produce fruit pulp. Maintaining stocks this fruit pulp will increase the income of the population at the river sides.
9	New technologies for family agriculture of the Eastern Amazon (Amazonia Oriental).	EMBRAPA / CPATU	Develop technologies to avoid deforestation and the burning of areas.
10	Genetic variety and productive flow of forest species of high economical value.	INPA	Genetic characteristics of 4 types of the tropical forest. 1-Mogno, 2-Sumauma (Bomacacia family), 3-Castanha-do-Para and 4-Piquia; 1-Mahogany, 2-Kapok Tree, 3-Brazil Nut Tree.
11	Alternatives to the development of tendencies of the dislocation in the Amazon area.	MPEG Museum Emilio Goeldi of Para	Study about the exodus from the interior.
12	Use of the soil, landscape dynamic and constructing the space of the Easton Amazon (Amazonia Oriental)	UFPA Federal University of Para	Create and test monitoring systems of human activity in the frontier of agriculture of the Amazon.
13	Research and monitoring of information in Preservation Areas, with a Traditional Administration of Populations.	Association of lately extractors and farmers of the Reserve Alto Jurua.	Create methods and procedures which can be applied in other areas with a similar activity.
14	Classification, Processing and Utilization of the Pupunha (Bactris gasipaes Kunth) Acai (Euterpe oleracea Mart) and Cubiu (Solanum sessiliflorum Dunal).	INPA	Collect Agronomic, Therapeutic, Economic, Nutritional and Technological information about the Pupunha, Acai and Cubiu.
15	Effects of long periods without rain: (when does the forest become inflammable?)	IPAAM	Study about hydro stress of the rain forest.
16	The use of Primates of the Amazon for Bio-Medical research.	UFPa Federal University of Para.	Making use of primates as models for Bio-Medical research.
17	Alternative Production Systems of Catitu (Tayassu Tajacu) for the small farmer of the Amazon.	EMBRAPA / CPATU	This project is to study the breeding of the Catitu (small wild pig)
18	Evaluation of the potential and sustainability of small Agroforestry Properties.	INPA	Study of the projects of RECA Association if, they are sustainable.
19	Health Nutrition and Settlement: comparative between Indian settlements and Settlements of missions.	ISA Socio-Ambiental Institute - Rio Negro Program	After help to the Indian Associations and others locals, prepare mechanisms for nutrition and sanitary control.
20	About areas of wood extraction in the Amazon.	IMAZON Amazon Man and Environment of Amazon Institute.	15 - 20% of the production PIB of the State of Para, Mato Grosso and Rondonia is wood. Government agencies need to have more infomation about the pertinent activities.
21	Interactions between Savannah and Forests of the Amazon and their importance for the Biodiversity.	INPA	Evaluation of the Biodiversity of the region of Santarem.

付属資料 5.3.4-5　PPG7 に係る新プロジェクトに関する情報 (3/3)

22	Use of Medicine Herbs to attend and treat the health of the communities of the interior.	IEPA Scientific and Technologic Research Institute of Amapa State.	Create through fitotherapic measures an alternative for the population of the interior.
23	Development of a method to monitor the chemicals in the atmospheres of the Amazon of the LBA experiment.	EMBRAPA	This project tries to understand the today's influence of the Amazon as a provider of tropical nutrients.
24	Aromatic Plants of the Amazon: compositions of insecticides, fungicide their use and the Biologic Control.	MPEG Museum Emilio Goeldi of Para	Increase the data bank which holds already 800 complete entrances.
25	Domestication of Camu Camu forest germopleasma (Myrciaria dubia (H.B.K.) MC V AUGH) for agro-industrial use in the Amazon.	INPA	Project to find a way of regional exploitation and plantation of the Camu Camu.
26	Increment, increase of a forest or firm soil. Ecological experiments with its commercial species.	INPA	This project is the continuation of a project that stated in 1980. The project wants to test the dynamic of the forest.

Source : IPAAM



Conditions: Application for the wood extraction more than 2,000 ha

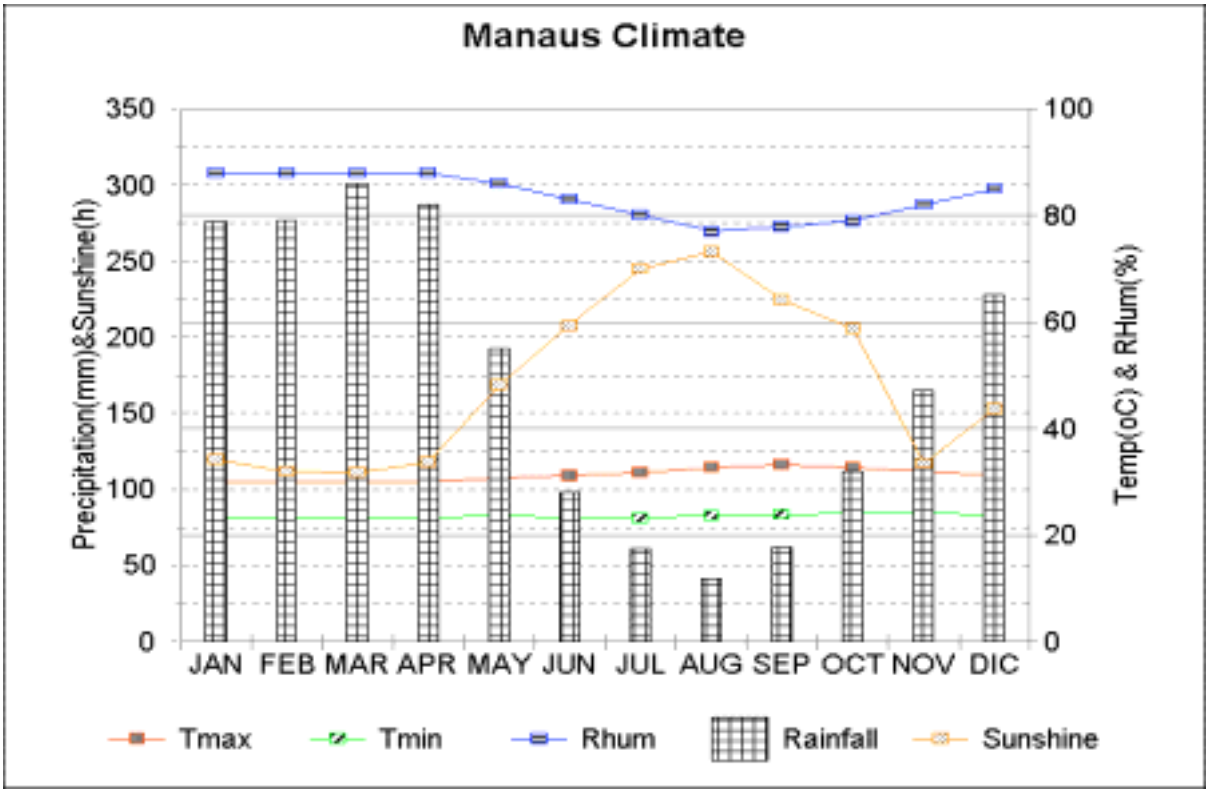
アマゾナス州 環境調和型地域住民生計向上計画調査	付属資料 5.3.5-1 森林管理計画の適用と手順
国際協力事業団 (JICA)	

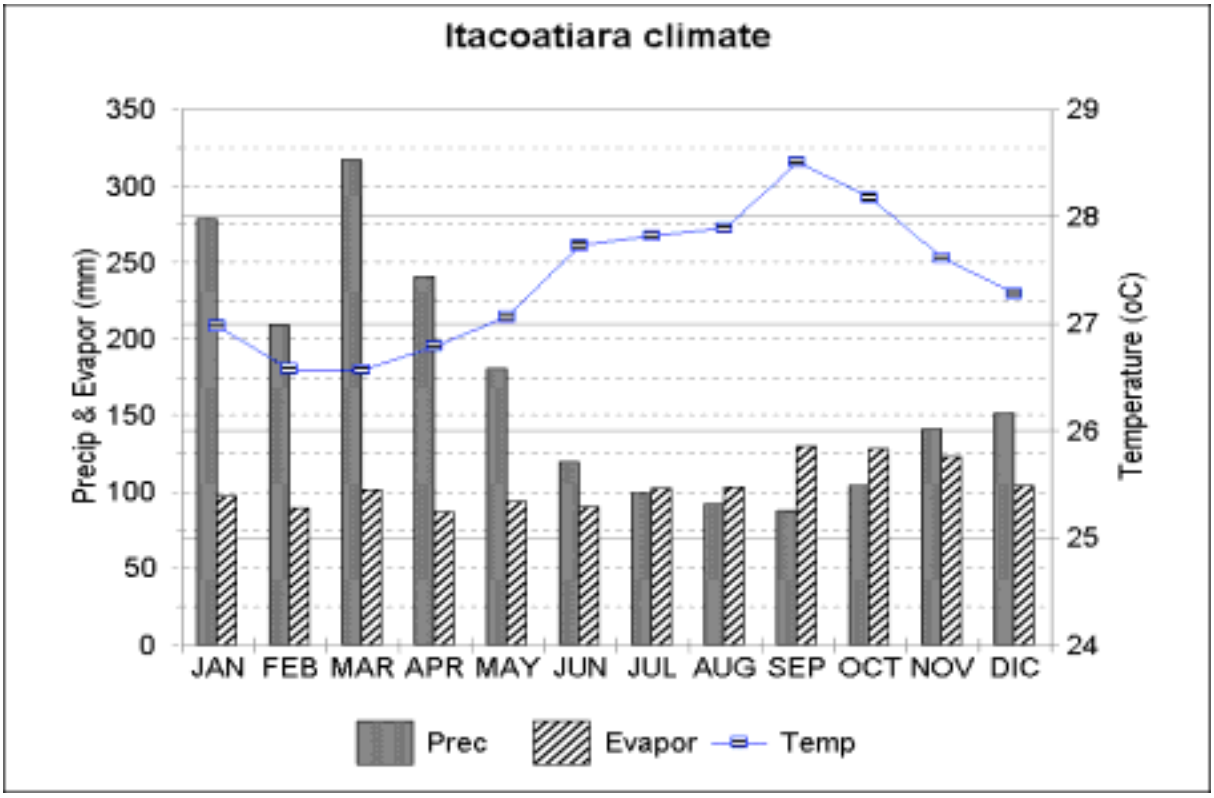
付属資料 5.5.2-1　調査対象地域における野菜生産 (1997-2000年)

PRODUCT (Production)	1997				1998				1999			
	# of Farmers (IDAM/ Total)	Total Area Planted (ha)	Total Area Harvested (ha)	Total Production	# of Farmers (IDAM/ Total)	Total Area Planted (ha)	Total Area Harvested (ha)	Total Production	# of Farmers (IDAM/ Total)	Total Area Planted (ha)	Total Area Harvested (ha)	Total Production
IRANDUBA												
Watermelon (1,000 fruit)	60/70	45	28	57	55/183	90	90	225	111/185	137	127	381
Cabbage (tons)	37/60	30	8	128	64/194	41	26	416	34/48	43	32	384
Green Pepper (tons)	5/10	2	3	20	84/191	31	31	372	47/69	42	24	288
Long Bean-meter (1000bunches	21/70	12	6	1200	-	-	-	-	90/90	26	18	1,008
Okra (ton)	0	0	0	0	0	0	0	0	0	0	0	0
Pumpkin (ton)	0	0	0	0	80/83	56	40	400	43/54	40	30	900
Spring Onion (1000 bunches)	32/60	10	9.1	1820	114/210	10	7	126	58/91	22.2	14	252
Sweet potato (ton)	0	0	0	0	0	0	0	0	0	0	0	0
Lettuce (1000 head)	0	0	0	0	114/380	4.99	4.99	309.38	52/82	26	21	1302
Couve (1000 bunches)	0	0	0	0	43/94	17	17	374	26/57	9	4	88
Coantro (1000 bunches)	90/100	6.5	4.5	90	89/261	14.5	14	252	64/118	64	54	972
Cucumber (tons)	0	0	0	0	89/98		17	340	101/108	69	67	1340
Tomato (ton)	0	0	0	0	28/53	9	9	108	ND/53	9	9	108
Eggplant (ton)									48/48	18	12	468
ITACOATIARA												
Watermelon (1,000 fruit)	0	0	0	0	0	0	0	0	0	0	0	0
Cabbage (tons)	0	0	0	0	0	0	0	0	0	0	0	0
Green Pepper (tons)	0	0	0	0	0	0	0	0	0	0	0	0
Okra (ton)	0	0	0	0	0	0	0	0	0	0	0	0
Pumpkin (ton)	0	0	0	0	0	0	0	0	0	0	0	0
Lettuce (1000 head)	0	0	0	0	0	0	0	0	0	0	0	0
Couve (1000 bunches)	0	0	0	0	0	0	0	0	0	0	0	0
Coentro (1000 bunches)	0	0	0	0	0	0	0	0	0	0	0	0
Spring Onion (1000 bunches)	0	0	0	0	0	0	0	0	0	0	0	0
Sweet potato (ton)	0	0	0	0	0	0	0	0	0	0	0	0
Long Bean (1000 bunches)	0	0	0	0	0	0	0	0	0	0	0	0
Cucumber (tons)	0	0	0	0	0	0	0	0	0	0	0	0
Tomato (ton)	0	0	0	0	0	0	0	0	0	0	0	0
MAUES												
Watermelon (1,000 fruits)	0	0	0	0	4/50	100	100	400	/50	100	60	360
Cabbage (tons)	0	0	0	0	0	0	0	0	0	0	0	0
Green Pepper (tons)	0	0	0	0	0	0	0	0	0	0	0	0
Okra (ton)	0	0	0	0	0	0	0	0	0	0	0	0
Pumpkin (ton)	0	0	0	0	0	0	0	0	0	0	0	0
Lettuce (1000 head)	0	0	0	0	0	0	0	0	0	0	0	0
Couve (1000 bunches)	0	0	0	0	0	0	0	0	0	0	0	0
Cilantro (1000 bunches)	0	0	0	0	0	0	0	0	0	0	0	0
Spring Onion (1000 bunches)	0	0	0	0	0	0	0	0	0	0	0	0
Sweet potato (ton)	0	0	0	0	0	0	0	0	0	0	0	0
Long Bean (1000 bunches)	0	0	0	0	0	0	0	0	0	0	0	0
Cucumber (tons)	0	0	0	0	0	0	0	0	0	0	0	0
Tomato (ton)	0	0	0	0	0	0	0	0	0	0	0	0

* Projections by IDAM Planning Division

Source: IDAM Consolidated Tables of ATER Activities (1997-2000)





アマゾナス州 環境調和型地域住民生計向上計画調査	付属資料 5.5.3-1 マナウスとイタコアティアラの気象状況
国際協力事業団 (JICA)	

付属資料 5.5.4-1 ブラジルの漁業生産量 (1993-1997年)

	Production (x 1000 ton)					Composition in 1997 (%)		
	1993	1994	1995	1996	1997			
Total Fish Production	*676.4*	*701.3*	*652.9*	*693.2*	*732.3*	100.0	100.0	100.0
1. Capture fishery	673.9	697.5	606.7	632.5	644.6	88.0		
1.1 Marine fishery	470.2	494.2	413.6	422.2	465.7		63.6	
Fishes	387.4	413.6	339.5	362.1	399.0			54.5
Crustacean	76.9	74.8	66.1	55.8	61.2			8.4
Molluscus	5.9	5.9	8.0	4.4	5.6			0.8
1.2 Freshwater fishery	203.7	203.2	193.0	210.3	178.9		24.4	
Fishes	201.8	201.3	191.6	207.6	176.7			24.1
(Amazonas State)	*(57.3)*	*(57.4)*	*(57.5)*	*(63.1)*	*(48.5)*			
crustacean	1.9	1.9	1.4	2.7	2.2			0.3
2. Aquaculture	2.5	3.8	46.2	60.7	87.7	12.0		
2.1 Marine water	2.2	3.4	5.4	8.5	10.2		1.4	
Crustacean	0.7	0.7	2.0	3.4	3.6			0.5
Mollusca	1.5	2.7	3.4	5.1	6.6			0.9
2.2 Freshwater	0.4	0.4	40.5	51.8	77.0		10.5	
Fishes	0.3	0.3	40.1	51.3	76.5			10.5
Crustacean	0.1	0.1	0.3	0.5	0.5			0.1

Source: DPA, MAA

付属資料 5.5.4-2 アマゾナス州Frigorifico社の冷凍魚生産量 (1994-1998年)

Unit: ton

Municipal/frigorifico	1994	1995	1996	1997	1998	% in 1998
Manaus						
Fepesca (Codepesca)	40	-	-	-	-	0.0%
Rio Amazonas (Surubim)	680	537	779	79	54	0.7%
Fripeixe	573	809	356	881	975	12.0%
Iranduba						
Friuba	2,925	2,629	2,071	2,326	3,292	40.4%
Dourado	270	507	616	504	550	6.8%
Manacapuru						
Frigopesca	-	-	-	1,773	1,189	14.6%
Sta. Maria	-	-	-	1,146	1,213	14.9%
Itacoatiara						
Rio Mar	633	964	389	719	868	10.6%
Parintines						
Coopesca	150	88	-	-	1	0.0%
Teixeira	58	140	141	183	4	0.1%
Labrea						
Solapesca	318	174	17	6	3	0.0%
Total	5,648	5,848	4,368	7,616	8,149	*100.0%*

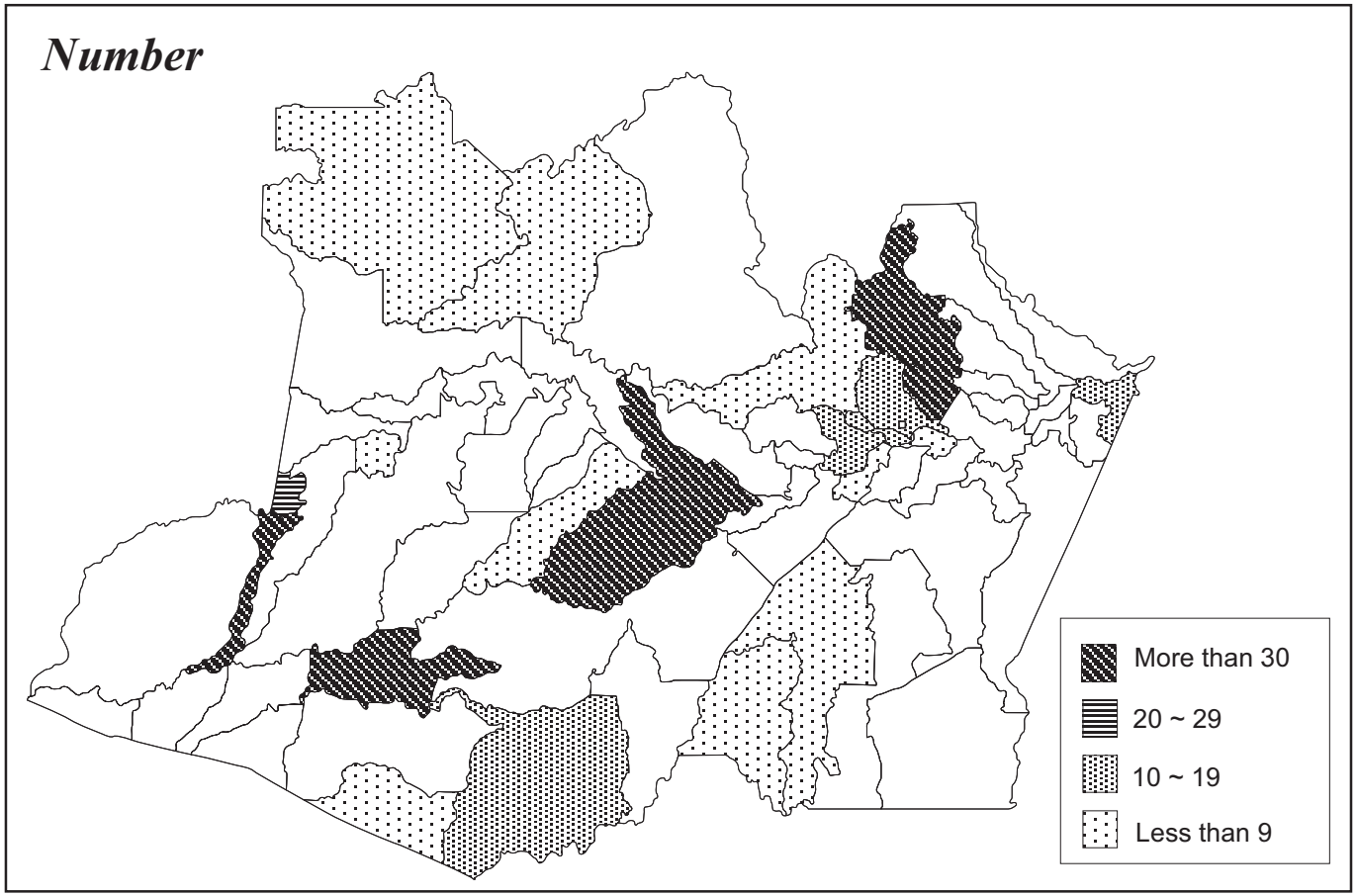
Source: DFA-AM

付属資料 5.5.4-3 アマゾナス州における製品別及び魚種別冷凍魚生産量 (1994-1998年)

Unit: ton

	1994	1995	1996	1997	1998	% in 1998
Whole fishes	749	2,147	739	1,450	434	5.30%
Characiformes	666	467	685	1,244	292	
Siluriformes	7	1,542	0	-	35	
Perciformes	51	122	50	183	107	
Osteoglossiformes	24	16	4	24	-	
Clupeiformes	1	-	-	-	-	
Without gut	4,031	3,192	2,964	5,861	7,467	91.60%
Characiforms	225	134	43	178	20	
Siluriformes	3,505	2,961	2,894	5,531	7,362	
Perciformes	199	50	26	152	86	
Osteoglossiformes	103	47	-	0	-	
Cut in pieces	12	73	286	23	17	0.20%
Characiforms	9	15	2	-	-	
Siluriformes	1	58	284	23	17	
Osteoglossiformes	2	0	-	-	-	
Fillet	829	428	379	282	230	2.80%
Characiforms	-	-	1	-	-	
Siluriformes	623	425	286	274	202	
Perciformes	57	2	92	8	27	
Osteoglossiformes	149	-	-	-	2	
Others	27	9	-	-	-	
Total	5,648	5,848	4,368	7,616	8,149	100.00%

Source: DFA-AM, Setor de inspecao de produto de origem animal (1994-1998)



Source : IDAM

付属資料 5.5.5-1 アマゾナス州における水産業従事者分布図

付属資料 5.5.5-2　養殖ライセンス及び環境ライセンスの取得価格

1) Aquaculture License

Aquaculture license is issued by DPA of MAA. Without this license, fish farmers cannot sell the products.

Table　Aquaculture license fee table

Semi-intensive and intensive system		Extensive system	
Area category (ha)	Fee (R$/year)	Area category (ha)	Fee (R$/year)
<2	free	<2	free
2-10	137	2-50	137
10-30	165	50-100	165
30-50	214	100-200	214
50-100	300	200<	278
100<	420		

Source: Cadastro Nacional de Atenidades Pesqueires, Manual de Procedimentos, 1999, DPA, MAA

2) Environmental Licenses

Environmental licenses (LP, LI and LO) are issued by IPAAM of State Government. Without these license, aquaculture facilities cannot be developed and operated.

Value of license (VL) in unit of fiscal reference (UFIR; 1 UFIR = R$ 1.0641 in 2001) is calculated based on the following formula.

a. Extensive/semi-intensive system　VL (for LP, LI and LO) = UA x CL
b. Intensive system　VL (for LP, LI and LO) = UA x CL x FC1
c. Super-intensive system　VL (for LP, LI and LO) = UA x CL x FC2

Remarks:
LP: Preliminary license　UA: Area used
LI: Installation license　CL: Coefficients of licensing
LO: Operation license　FC: Condition factor, FC1=2.51, FC2=5.02

Relations between UA and CL are given by the following table.

Size category	Area of development (A: ha)		Coefficients of Licensing (CL)		
	Extensive/Semi-intensive (Pollutant potential: Medium)	Intensive Super-intensive (Pollutant potential: High)	LP	LI	LO
Small	< 10	< 5	23.74	31.65	42.98
Medium	10-25	5-20	27.13	36.17	49.39
Large	25 - 40	20-35	30.52	40.69	55.8
Exceptional	40<	35<	33.91	45.21	64.1

Definitions are as follows:

Useful Area – means the area in hectare, effectively utilized by activity, including the flooded area and facilities (office, circulation area, of stocking,etc.).

Extensive – is characterized by the population and repopulation of lakes and ponds, at this system fishes survive with the natural food occurring in their own aquatic environment, there is no zoo-technical management at the rearing and the productivity is low.

Semi-intensive – is characterized by introduction of some inputs of the zoo-technical management means. Grow-out culture is carried out in fishponds in which water is fertilized and controlled of inflow and outflow.

Intensive – is characterized by the total control of environmental and limnological conditions, with the maximization of the productivity, using the artificial food, associated by the using of fertilizers and correctives at the fishponds and nursery.

Super-intensive- is characterized by fish culture at high density, in tanks and net cages, with intensive circulation of water, forced aeration and control of physical factors and chemicals of the water, associated to complete feeding, in order to increase productivity of the system.

付属資料 5.6.6-1　アマゾナス州における冷凍加工魚の輸出 (1994-1998年)

	1994		1995		1996		1997		1998	
	Quantity (tons)	Value ('000US$)	Quantity (tons)	Value ('000US$)	Quantity (tons)	Value ('000US$)	Quantity (tons)	Value ('000US$)	Quantity (tons)	Value ('000US$)
FRIUBA, Iranduba	***542.9***	***1,819.1***	***394.1***	***993.9***	***285.8***	***1,261.7***	***89.7***	***458.6***	**-**	**-**
For USA	542.3	1,817.4	187.7	458.8	285.8	1,261.7	89.7	458.6	-	-
Whole fishes										
Piramutaba	21.8	45.6	-	-	-	-	-	-	-	-
Piranha	0.1	0.3	-	-	-	-	-	-	-	-
Without gut										
Piramutaba	16.3	34.2	-	-	-	-	-	-	-	-
Cut in pieces										
Piramutaba	-	-	73.5	146.6	208.7	751.7	-	-	-	-
Fillet										
Pirarucu	35.1	280.7	-	-	-	bb	-	-	-	-
Piramutaba	403.1	1,272.9	-	-	12.7	83.7	-	-	-	-
Mapara	52.8	126.6	114.3	312.2	55.1	364.2	89.7	458.6	-	-
Tucunare	13.1	57.2	-	-	9.4	62.1	-	-	-	-
For Europ	0.5	1.7	206.3	535.2	-	-	-	-	-	-
Fillet										
Mapara	0.5	1.7	206.3	535.2	-	-	-	-	-	-
RIO AMAZONAS, Manaus	**-**	**-**	**-**	**-**	***14.8***	***59.3***	**-**	**-**	**-**	**-**
For USA										
Without gut										
Dourado	-	-	-	-	2.0	5.4	-	-	-	-
Surubim	-	-	-	-	7.8	28.9	-	-	-	-
Tambaqui	-	-	-	-	5.0	25.0	-	-	-	-
Total	**542.9**	**1,819.1**	**394.1**	**993.9**	**300.6**	**1,321.0**	**89.7**	**458.6**	**-**	**-**

Source: DFA-AM

付属資料 5.6.6-2　川岸コミュニティーにおける最嗜好及び嫌う魚種

Subregion	Preference		Rejection	
	Species group	%	Species group	%
Pesqueiro (Manacapuru)	Tambaqui	46.9	Bacu	96.3
	Tucunaré	40.0	Sarapo	80.0
	Pacu	23.8	Piracatinga	31.9
	Pirarucu	18.8	Traira	30.0
	Curimatã	15.6	Pacamon	26.3
	Cuiu	14.4	Mandubé	18.8
	Ruelo	9.4	Piranha	16.9
Paciência (Iranduba)	Curimatã	36.2	Bacu	50.4
	Tucunaré	30.7	Pacamon	37.0
	Tambaqui	27.6	Jiju	20.5
	Pacu	22.1	Pirarara	16.5
	Bodó	18.1	Mandubé	13.4
	Pirarucu	11.0	Piracatinga	9.5
	Pescada	9.5	Piranha	9.5
Aruanã (Manaquiri)	Tambaqui	14.1	Jiju	12.1
	Tucunaré	10.4	Bacu	10.3
	Pirarucu	7.1	Traira	5.3
	Cuiu	7.0	Piracatinga	4.7
	Curimatã	6.2	Barba-chata	2.9
	Pacu	5.0	Pacamon	2.0
	Jaraqui	2.6	Sarapó	1.8
Marimba (Careiro da Varzea)	Tucunaré	71.1	Bacu	75.8
	Curimatã	32.0	Traira	15.2
	Pacu	26.4	Surubim	11.9
	Cuiu	17.7	Piranha	9.6
	Ruelo	12.8	Bodó	7.2
	Surubim	11.6	Cuiu	5.8
	Aruanã	9.0	Mapará	5.6

Source: Batista et al. (1998)

付属資料 5.7.2-1　優先候補野菜の1ha当たりの推定作物収支

Description	Unit	Unit Cost	Cabbage Varzea Quantity	Cabbage Varzea Value	Green Pepper Varzea Quantity	Green Pepper Varzea Value	Cucumber Verzea Quantity	Cucumber Verzea Value	Leaf Cabbage Verzea Quantity	Leaf Cabbage Verzea Value	Coriander Varzea Quantity	Coriander Varzea Value	Spring Onion Verzea Quantity	Spring Onion Verzea Value	Lettuce Varzea Quantity	Lettuce Varzea Value	Watermelon Verzea Quantity	Watermelon Verzea Value
Yield	t/h		12		12		20			22,000	pac	18,000	pac	18,000	plt	62,000	fruits	3,000
Price	R$/t			300		500		300			pac	0.3	pac	0.2		0.1		0.5
										0.15								
Gross Revenue	R$/ha			3,600		6,000		6,000		4,125		5,400		3,600		6,200		1,500
Inputs																		
1. Seed Material	kg	-	0.25	92	0.3	360	2	920	0.25	124	9	1,728	0.8	755	0.5	201	1	390
2. Fertilizer																		
Am.Sulphate	kg			0		0						0				0		
Urea	kg	0.7	300	210	300	210			300	210	100	70	500	350	100	70		
NPK (4-14-8)	kg	0.7					200	140									50	35
TSP	kg			0		0						0				0		
MP (K2O)	kg			0		0						0				0		
Organic matter	kg			0		0						0				0		
3. Agrochemicals																		
Borax	kg	5	10	50														
Insecticide	lit	20	2	40	4	80	3	60	2	40	2	40			1	20	2	40
Fungicides	kg	20		0	5	100	2	40									2	40
Weedicides	lit			0														
Fixation	lit	20	0.5	10	2	40	1	20	0.5	10					0.2	4	1	20
4. Machinery																		
2W.Tractor	ha			0		0		0		0		0		0		0		0
Sprayer	md			0		0		0		0		0		0		0		0
Thresher	md			0		0		0		0		0		0		0		0
5. Labour																		
Preparatory Work																		
1) Land Clearing	md	10	20	200	20	200	20	200	20	200	20	200	20	200	20	200	20	200
2) Nursery Pr.Seeding	md	10		0		0		0		0		0		0		0		0
3) Seedling preparation	md	10	5	50	5	50			5	50		0	15	150	15	150		0
4) Land Prepn.	md	10	20	200	20	200	20	200	20	200	20	200	20	200	20	200	7	70
5) Fertilization to hole	md	10								0		0		0		0		0
6) Seeding	md	10								0	5	50		0		0		0
7) Trans plant/Plantg.	md	10	5	50	10	100	5	50	5	50		0	16	160	16	160	2	20
Management Work																		
4) Fertilg.	md	10	10	100	10	100	8	80	10	100	5	50	6	60	5	50	5	50
5) Disbudding	md	10	0	0	5	50	18	180		0		0		0		0		0
6) Thinning	md										5	50		0		0		0
7) P/D Contl.	md	10	10	100	20	200	10	100	10	100		0		0	10	100	8	80
8) Weeding/Earth	md	10	10	100	30	300	12	120	20	200	10	100	10	100	10	100	8	80
9) Irrign.	md	10	30	300	30	300	20	200	30	300	15	150	20	200	18	180		0
10) Watching	md	10	0	0		0		0		0		0		0		0		0
11) Harvestg.	md	10	30	300	40	400	50	500	30	300	30	300	20	200	20	200	40	400
12) Processing	md	10	0	0		0		0		0		0		0		0		0
13) Pac./Trans.	md	10	0	0		0		0		0		0		0		0		0
Total*1	md	10	140	1400	190	1900	163	1630	150	1,500	110	1100	127	1,270	134	1,340	90	900
6. Miscelaneous/matelials				740		1,108		1,287		788		734		746		700		503
Cost of Production	R$/ha			2,542		3,798		4,097		2,672		3,672		3,121		2,335		1,928
Net Revenue	R$/ha			1,058		2,202		1,903		1,453		1,728		479		3,866		-428
(Rounded)	R$/ha			1,100		2,200		1,900		1,500		1,700		500		3,900		-400
per labor unit	R$/labor			8		12		12		10		15		4		29		-4

Source: IDAM, EMBRAPA, JICA RRAQS, Interview Survey, FELTRIN

付属資料 5.7.4-1　小規模農家における月当たりの漁業日数

	Flood season					Dry season				
	Seldom	1-5 days	6-15 days	more than 16 days	Total	Seldom	1-5 days	6-15 days	more than 16 days	Total
Iranduba										
Costa do Iranduba	4	3	7	16	30	4	7	10	9	30
	13%	10%	23%	53%	100%		23%	33%	30%	100%
S.José/ S. Francisco	8	1	5	16	30	7	3	12	8	30
	27%	3%	17%	53%	100%		10%	40%	27%	100%
Jandira	9	8	6	7	30	12	8	7	3	30
	30%	27%	20%	23%	100%		27%	23%	10%	100%
Sub-total	**21**	**12**	**18**	**39**	**90**	**23**	**18**	**29**	**20**	**90**
	23%	**13%**	**20%**	**43%**	**100%**	**26%**	**20%**	**32%**	**22%**	**100%**
Itacoatiara										
Santo Antonio	15	7	7	1	30	11	10	6	3	30
	50%	23%	23%	3%	100%	37%	33%	20%	10%	100%
S. Coração	17	3	6	4	30	14	7	3	6	30
	57%	10%	20%	13%	100%	47%	23%	10%	20%	100%
São João	1	0	9	20	30	3	2	11	14	30
	3%	0%	30%	67%	100%	10%	7%	37%	47%	100%
Sub-total	**33**	**10**	**22**	**25**	**90**	**28**	**19**	**20**	**23**	**90**
	37%	**11%**	**24%**	**28%**	**100%**	**31%**	**21%**	**22%**	**26%**	**100%**
Maués										
Pupunhal	4	5	2	18	29	4	5	8	12	29
	14%	17%	7%	62%	100%		17%	28%	41%	100%
P. Alegre	2	4	7	17	30	2	6	8	14	30
	7%	13%	23%	57%	100%		20%	27%	47%	100%
N. S.de Nazaré	1	2	5	23	31	1	4	9	17	31
	3%	6%	16%	74%	100%		13%	29%	55%	100%
Sub-total	**7**	**11**	**14**	**58**	**90**	**7**	**15**	**25**	**43**	**90**
	8%	**12%**	**16%**	**64%**	**100%**	**8%**	**17%**	**28%**	**48%**	**100%**
Total										
	61	**33**	**54**	**122**	**270**	**58**	**52**	**74**	**86**	**270**
	23%	**12%**	**20%**	**45%**	**100%**	**21%**	**19%**	**27%**	**32%**	**100%**

Source: RRA/QS, JICA Study Team, 2000

付属資料 5.7.4-2　イランドゥバ及びマナカプルにおける漁業･養殖業に関する補足的聞き取り調査のレビュー

	No. of family			Agriculture land area (ha)	Income (R$/month)	Fish consumption		Contribution of family fishing and aquaculture to fish consumption (%)	Possession of fishing boat or canoe			No. of fishing day (days/week)		Fish catch (kg/day)		Possession of potential area for aquaculture		Interest on aquaculture		Remarks
									Yes		No									
	Adult	Chird	Total			per week (kg/week /family)	per capita (g/day /peson)		with motor	without motor		Flood season	Dry season	Flood season	Dry season	Yes	No	Yes	No	
1. Higher income group (N = 9)																				
	2	3	5	24	2000	2	57	100	bbb			1	1	5	30	(fish pond under construction)				Mechanical engineer
	5	0	5	10	800	9	257	0			x	0.2	0.2	10	20	x		x		Medium-scale farmer in terra ferme
	2	4	6	32.5	1000	5	119	100		x		3	2	30	50	x			x	Medium-scale farmer in terra ferme
	2	1	3	n.a.	1000	6	286	5			x	-	-	-	-	(already developed for fish pond)				Medeum-scale fish farmer (*)
	2	3	5	46	3000	6	171	100	x			6	6	400	400	(already developed for fish pond)				Owner of restaurant, fishing boat and fish farm
	6	2	8	12	1500	12	214	100	x			6	6	200	360	x		x		Fishing boat owner
	3	3	6	0	1500	12	286	100	x			7	7	200	150		x		x	Fishing boat owner
	8	3	11	10	5000	15	195	0	x			-	-	n.a.	n.a.		x		x	Fishing boat owner
	3	1	4	45	6000	20	714	100	x			7	7	120	180	x		x		Fishing boat owner
Ave.	3.7	2.2	5.9	22.4	2422	9.7	255.5	67.2						230.0	272.5					
														(average of 4 boat owners)						
2. Small-scale farmers (N = 11)																				
	1	0	1	n.a.	150	2	286	0			x	-	-	-	-		x	x		Worker of fish farm
	4	0	4	53.5	150	2	71	100			x	-	-	-	-	(already developed for fish pond)				having barragen
	4	0	4	60	200	2	71	0			x	-	-	-	-	(already developed for fish pond)				having barragen but not operated now
	1	0	1	30	300	3.5	500	100			x	7	7	0.5	0.5	(already developed for fish pond)				Charcol producer who have barragen
	3	2	5	43	200	9	257	25		x		0.2	0.2	3	4		x		x	Small-scale farmer in terra ferme
	5	3	8	25	200	16	286	50	x			1	1	4	30	x		x		Worker of agriculture farm
	2	3	5	n.a.	250	14	400	100	x			7	7	6	10	x			x	Small-scale farmer and fisherman (*)
	2	2	4	8	250	4	143	100		x		2	2	2	2	x		x		Small-scale farmer in varzea
	2	0	2	47	350	2	143	50		x		n.a.	n.a.	10	10	x		x		Small-scale farmer in varzea
	6	1	7	39	350	4	82	100	x			3	1	4	30	x		x		Small-scale farmer in varzea
	6	0	6	2.5	500	12	286	0			x	-	-	-	-	x		x		Medium-scale farmer in terra ferme
Ave.	3.3	1.0	4.3	34.2	264	6.4	229.5	56.8				3.4	3.0	4.2	12.4					
												(average of 7 families that go fishing)								
3. Fishermen (N = 14)																				
	4	1	5	0	180	10	286	100	x			4	4	40	80		x	x		living in Iranduba town
	2	1	3	0	200	10	476	100	x			7	7	25	75		x	x		living in Iranduba town
	4	3	7	0	200	15	306	100	x			7	7	40	75		x	x		living in Iranduba town
	2	1	3	0	200	12	571	100		x		5	5	25	40		x	x		living in Iranduba town
	2	0	2	8	200	10	714	100	x			6	6	20	70		x	x		living in Iranduba town
	10	2	12	1.6	250	20	238	100	x			5	5	30	50	x		x		living in Iranduba town
	6	2	8	0	250	15	268	60		x		7	7	30	60		x	x		living in Iranduba town
	3	4	7	0	300	15	306	100	x			6	6	10	20		x		x	living in Iranduba town
	3	0	3	30	300	15	714	100	x			7	7	60	80	x		x		living in Iranduba town
	5	0	5	0	300	8	229	80	x			5	5	30	50		x	x		living in Iranduba town
	7	5	12	15	350	20	238	100	x			7	7	40	70	x			x	living in Iranduba town
	7	0	7	3	400	10	204	100	x			6	6	20	45		x			Fisherman in varzea
	8	4	12	n.a.	500	10	119	100		x		4	3	40	80		x		x	living in Iranduba town
	3	3	6	0	500	40	952	100		x		5	5	50	80		x		x	living in Iranduba town
Ave.	4.7	1.9	6.6	4.4	295	15.0	401.6	95.7				5.8	5.7	32.9	62.5					

Remarks: n.a.: not available, (*): person of Manacapuru

付属資料 5.7.4-3　イランドゥバ及びマナカプルにおける養殖活動状況

Income (R$/month)	Contribution of aquaculture to cash income (%)			Period of operation (year)	Facility				Initial investment (R$ '000)	Fund source		Species cultured						Source of fish fry			Approximate productivity (ton/ha/yr)	Remarks
					Barragen		Earthen pond															
	<20%	20-50%	50-80%		No	Area (ha)	No	Area (ha)		Own fund	Bank credit	Tambaqui	Matrincha	Pirarucu	Surubim	Jaraqui	Others	IDAM	Private hatchery	Capture from wild		
1. Phase I study																						
n.a.			x	6	3	3.8	6	0.6	n.a.	-		x		x		x		x		x	0.9	worker of fish farm
n.a.		x		6	2	3.0	1	0.2	n.a.	x		x	x				x	x		x	n.a.	Medium-scale fish farmer
n.a.	x			2	2	5.0	16	8.0	1200	x	x	x		x				x	x	x	n.a.	IDAM-assisted fish farm (MP)
2. Phase II study																						
150	x			10	1	0.5			5	x		x				x	x	x		x	n.a.	small-scale farmer
200	x			3	1	0.4			2	x		x						x			Failure	Small-scale farmer
300	x			3	1	0.3			3	x		x					x			x	Failure	Charcol producer
150			x	4	1	1.5			n.a.	-						x				x	n.a.	worker of fish farm
1000			x	16	1	4.0	4	2.2	100	x		x		x					x		2.0	Medium-scale fish farmer (MP)
3000	x			6	3	2.8			50	x		x	x	x		x	x	x			3.8	Owner of restaurant, fishing boat and fish farm
					1	3.0			30		* 1)	(under construction)									-	

Source: Field Survey by JICA Study Team

Remarks: n.a.: not available, (MP): person of Manacapuru

*1) accredited but canceled thereafter (see, text)

付属資料 6.1.1-1　熱帯果樹における過去の文献及び研究 (1/6)

N.	AUTHOR	TITLE	CODE
1.	Camera, Valdemir of Araújo; Oliveira, Elisiana Pereira de	The community of Collembola (Hexapoda) in the sitemas Agroforestry in small farmers' area in the area of Manacapuru-AM.	**BIA**
2. **3.**	Melo, José Teodoro of; Guimarães, Daniel Pereira Oliveira, Elisiana Pereira de	The culture of guariroba (Syagrus oleracea Becc.) in Agroforestry systems in the Cerrado's areas. The diversity of the mesofauna of the soil in systems Agroforestry in areas of Manacapuru.	**SEV** **BIA**
4.	Braga, Márcio da Silva Regallo; Müller, Manfred Willy	The importance of the *arboreto* and a methodological proposal for his organization and maintenance.	**ASY**
5.	Arco-Verde, Marcelo Francia; Schwengber, Dalton Roberto; Xaud, Haron Magalhães	Chemical alterations of the soil after the implantation of Agroforestry systems in the state of Roraima.	**SOF**
6.	Moreira, Marcos Antonio Barbosa; Schwengber, Dalton Roberto; Arco-Verde, Marcelo Francia; Wandelli, Elisa	Analysis of the soil's macro-fauna as bio-indicator sustainability in different uses of the land in Roraima, Brazil.	**BIA**
7.	Wandelli, Elisa Vieira; Souza, Maria do Perpétuo Socorro	Analysis of the sustainability of agi-forest systems in the Amazonas state through his floristic diversity.	**SOE**
8.	Venturin, Nelson; Macedo, Renato Luiz Grisi; Pereira, Ailton Vitor; Pereira, Elaine Botelho Carvalho; Gomes, Jozébio Esteves	Analysis of Agroforestry compatibility of the permanent mixed-crops with *Arabic Coffea* L. (coffee tree) and *Hevea brasiliensis* Muell arg. (seringueira)	**SEV** **ASY**
9.	Wandelli, Elisa V.; Fernandes, Erick C. M.; Perin, Rogério; Sousa, Silas Garcia A. de; Matos, João C. de Souza; Tapia-Coral, Sandra; Gallardo-Ordinola, Jorge Luis H.	Biophysical aspects of the recovery areas of degraded pastures, through Agroforestry systems.	**BIG**
10.	Lunz, Aureny Maria Pereira; Franke, Idésio Luis	Structural and functional aspects of Agroforestry backyard in a community of Occidental Brazilian Amazon.	**ASY**
11.	Neves, Edinelson José Maciel; Reissmann, Carlos Bruno; Dünisch, Oliver; Bellote, Antonio Francisco Jurado	Nutritional aspects of *Ceiba pentandra* (L.) Gaertn and *Virola surinamensis* (List.) Warb: the Amazonian species with potential for Agroforestry systems.	**SEV**
12.	Magalhães, João Avelar; Costa, Newton de Lucena; Tonwsend, Claudio Ramalho; Pereira, Ricardo Gomes de Araújo.	Evaluation of arboreous and shrubby vegetables of multiple proposes in Rondônia.	**SEV**
13.	Amaral, Emanuel Ferreira do; Lima, Márcio Venicio de Oliveira; Ludewigs, Thomas; Andrade, Alcimar do Carmo; Bardales, Nilson Gomes; Meneses Filho, Luis Carlos de L.; Recco, Roger Daniel; Melo, Antonio W. Flores de; Amaral, Eufran Ferreira	Evaluation of the effect of the phosphated fertilizing in the distribution of the radicular system of the "Ingá-de-macaco" (*Inga coreacea*), "Ingá-mirim" (*Inga fagifolia*) and "Ingá-de-metro" (*Inga edulis*) cultivated in alleys in the Acre state.	**SOF**
14.	Figueiredo, Neizia Nunes; Macêdo, Jeferson Luis V. de; Cravo, Manoel da Silva	Evaluation of the nutricional condition of the cupuaçu tree (Theobroma grandiflorum (Wild. former Spreg.) Schum.) in an Agroforestry system, in Central Amazon.	**SEV**
15.	Passos, Carlos Alberto Moraies; Gonçalves [1], Maria Rosa; Peres Filho, Otávio; Miyakawa, Yugo Marcelo	Evaluation of the method Taungya with Tectona grandis in the municipality of Cáceres, Mato Grosso State.	**ASY**
16.	Recco, Roger Daniel; Amaral, Eufran Ferreira do; Pinto, Ermilson Maciel; Melo, Antonio W. Flores de	Evaluation of the organic carbon's level in tropical soils, submitted to planting of Agroforestry systems in different ages, in the Western Amazon.	**SOF**

付属資料 6.1.1-1　熱帯果樹における過去の文献及び研究 (2/6)

17.	Thomazini, Marcilio José; Costa, Charles Rodrigues da	Evaluation of larvae's population of "drill of fruits" (Conotrachelus humeropictus Field) of cupuaçu trees, component of Agroforestry systems.	**SOC**
18.	Arco-verde, Marcelo Francia; Schwengber, Dalton Roberto; Duarte, Otoniel Ribeiro; Lucas, José Gilmar dos Santos	Silvicultural evaluation of the "chestnut-of-brazil" (*Bertholletia excelsa*) and "cupiúba" (*Goupia glabra*) in Agroforestry systems, in Roraima State.	**SEV**
19.	Valeri, Sérgio Valiengo; Menezes, José Maria Thomaz	Bio-diversity and potentiality of Agroforestry systems in the area of Jaboticabal, São Paulo State.	**ASY**
20.	Cruz, Eniel David; Carvalho, José Edmar Urano de	Biometry of fruits and germination of tauari seeds (*Couratari stellata* A. C. Sm–Lecythidaceae).	**BIV**
21.	Welch, Steven A.; Riha, Susan H.; Fernandes, Erick C.M.; Wandelli, Elisa V.; Rondon, Marco A.	Capture of water and light resources for Agroforestry systems, implanted in areas of degraded pastures, of Western Amazonian.	**BIA**
22.	Falcao, Newton Paulo de Souza	Characterizations of some soils' chemical properties under systems Agroforestry in the municipality of Manacapuru, Amazonas.	**SOF**
23.	Santos, Eyde Cristianne Saraiva dos	Characterization of backyards in communities of River Solimões, Municipality of Manacapuru, Amazonas State, Brazil.	**SOV**
24.	Caliri, Guilherme José Abtibol; Azevedo, Celso Paulo de; Rossi, Luiz Marcelo Brum; Leeuwen, Johannes van; Sousa, Nelcimar Reis de; Gomes, João Batista Moreira	Characterization of the sumaúma (*Ceiba pentandra*) growth under several planting conditions in the Central Amazonian.	**SOV**
25.	Rodrigues, Maria do Rosário Lobato; Santos, Jackson de Araújo dos; Barcelos, Edson	Carbon and nitrogen in the aerial biomass of "dendê" palm oil cultivation in Yellow Latossolo, in the Western Amazonian.	**SOF**
26.	Tapia-Coral, Sandra C.; Luizão, Flávio J.; Wandelli, Elisa; Sarrazin, Max; Chaves, Edivaldo; Fernandes, E. C. M.	Carbon and nutrients in the sedan chair layers in Agroforestry systems, in Central Amazonian.	**SOF**
27.	Leite, Angela M. C.; Pérez, Eduardo Lleras; Campelo, Fabiana Rocha; Ribeiro, Maura Regina; Silva, Caio Carlos da	Checklist of the amazon species of agronomic interests – Part 1.	**BIV**
28.	Mitja, Danielle; Leeuwen, Johannes Van; Mota, Maria do Socorro Souza da; Gomes, João Batista Moreira	Lianas on the capoeiras: a threat for the Agroforestry systems (Manacapuru, Amazon State, Brazil).	**BIV**
29.	Oliveira, Arlem Nascimento de; Oliveira, Luiz Antonio de	"Microrizica" Colonization in Agroforestry systems with cupuaçu and guaraná in an Acid Latossolo and with low fertility of Central Amazon.	**BIV**
30.	Franke, Idésio Luis; Miranda, Elias Melo de; Valentim, Judson Ferreira	Behaviors of arboreal species with multiple use for Agroforestry systems, in Acre State.	**SEV**
31.	Costa, Newton de Lucena; Townsend, Claudio Ramalho; Magalhães, João Avelar; Pereira, Ricardo Gomes de Araújo	Behaviors of forrageous vegetable crop under shady of adult seringal.	**SEV**
32.	Meirelles, Paulo Roberto de Lima; Mochiutti, Sillas	Behaviors of forrageous vegetable crop under shady of "taxi-branco" (S. paniculatum Vogel).	**SEV**
33.	Silva, José Ferreira; Coutinho, Enilton Fick; Cravo, Manoel da Silva; Atroc, André; Ribeiro, José Ribamar Cavalcante	Echo-physiologic behavior of guarana clones in two agricultural systems in the Amazonian.	**SEV**
34.	Schwengber, Dalton Roberto; Arco-Verde, Marcelo Francia; Duarte, Otoniel Ribeiro ; Xaud, Haron Abraim Magalhães	Initial behavior of wood species and vegetable crop in agriculture-silvi-pastoral system in "cerrado" ecosystem, in Roraima	**SEV**

付属資料 6.1.1-1　熱帯果樹における過去の文献及び研究 (3/6)

35.	Sousa, Gladys Ferreira de; Oliveira, Luiz Antonio de; Silva, José Ferreira da Moreira, Adônis	Floristic composition of invading plants in Agroforestry systems with cupuaçu tree, at the municipality of Presidente Figueiredo, Amazon State.	**BIV**
36.	Sousa, Nelcimar Reis de; Moreira, Adônis	Macro and micro-nutritious concentration of twelve vegetable species, cultivated in Agroforestry system	**SOF**
37.	Melo, Antonio Willian Flores de; Amaral, Eufran Ferreira do; Lunz, Aureny Maria P.; Pereira, João Batista Martiniano	Correlation of fisiografic parameters with the ideal tenors of nutrients in Projeto Reca, Nova Califórnia, Rondônia	**SOF**
38.	Miller, Robert P.; Nair, P. K. R.	Growth of fruits in ambient of "roça" and "aldeia": a study with indigenous communities Parakanã in the southeast of Pará.	**SOV**
39.	Franklin, Elizabeth; Morais, José Wellington	Density and biomass of soil mesofauna in primary forest, second growth and polyculture in central Amazonas.	**BIV**
40.	Martins, Emerson Gonçalves; Neves, Edinelson; Ferreira, Carlos Alberto; Shimizu, Jarbas Yukio	Deposition of sarpler and nutrients in settlements of grevílea (silk oak) of different origins in the Southwest of Paraná	**SEV**
41.	Freitas, João da Luz	Acting of a model of Agroforestry system for the estuary várzeas, of the municipality of Marzagão – Amapá.	**SEV**
42.	Radomski, Maria Izabel; Steenbock, Walter; Baggio, Amilton João; Soares, Arnaldo de Oliveira; Battistelli, Deyse A.	Developments of Agroforestry systems seeking to the production of medicinal plants.	**ASY**
43.	Macedo, Renato Luis Grisi; Venturim, Nelson; Gomes, Jozébio Esteves; Lima, Elisete Maialu Giacomim; Dantas, Frederico Wesley Figueiredo	Gowth dynamic of *Bertholletia excelsa* Humb et Bompl (castanheira-do-brasil) and establishment of clones of *Hevea brasiliensis* Muell Arg. (seringueira) introduced in Agroforestry system at Lavras – Minas Gerais.	**BIV**
44.	Campos, Carla Eloiza Bavose; Lehmann, Johannes; Macêdo, Jeferson Luis V. de; Silva Junior, José Pereira da	Phosphorus dynamic in the soil under the cupuaçu (Theobroma grandiflorum) and urucum (Bixa orellana) in an Agroforestry system in the Central Amazonian.	**SOF**
45.	Mota, Maria do socorro Souza da; Lehmann, Johannes; Schroth, Götz; Silva Junior, José Pereira da	Dynamics of nutrients in a yellow Latossolo, in an Agroforestry system, at Central Amazonian.	**SOF**
46.	Amaral, Emanuel Ferreira do; Lima, Márcio Venicio de Oliveira; Ludewigs, Thomas; Andrade, Alcimar do Carmo; Bardales, Nilson Gomes; Meneses Filho, Luis Carlos de Lima; Recco, Roger Daniel; Melo, Antonio Willian Flores de; Amaral, Eufran Ferreira do	Distribution of systems radiculares of "Ingá-de-macaco" (*Inga coreacea*), "Ingá-mirim" (*Inga fagifolia*) and "Ingá-de-metro" (*Inga edulis*), cultivated in alleys on an Yellow plinthic Argissolo, at Acre State.	**BIV**
47.	Queiroz, José Antonio Leite de; Mochiutti, Sillas	Forest diversity in Agroforestry systems with açai tree in the Amazon Estuary.	**BIV**
48.	Alves, Raimundo Nonato Brabo; Rodrigues, João Elias Lopes F.; Silva, José Francisco de Assis Feliciano da	Diversification and intercalation of cultures in Agroforestry system, in the family agricultural of the Municipality of Ponta de Pedras – Pará	**BIA**
49.	Hayek, Tânia; Franklin, Elizabeth Nazaré; Morais, José Wellington de; Woas, Steffen	Dynamic and succession of Acari (ACARI: ORIBATIDA) on decomposing leaf litter in primary forest, second growth and polyculture in Central Amazon region.	**BIA**
50.	Morais, José Wellington de; Franklin, Elizabeth Nazaré; Luizão, Flávio	Dynamics of mesofauna colinization on decomposing leaf in primary forest, secondary forest and polyculture systems in Central Amazonia.	**BIA**
51.	Souza, Alexandre Dias de; Ludewigs, Thomas; Meneses-Filho, Luis Carlos de Lima; Brilhante, Nilson Alves; Oliveira, Aluildo Costa de	Effect of the use of the taboca for protection in the cupuaçu planting (Theobroma grandiflorum) and pupunha (Bactris gasipaes).	**ASY**
52.	Araujo, Edson Alves de; Lani, João Luiz; Amaral, Eufran Ferreira do	Effects of the dynamics of use of the land on the stocks of carbon and nutritious in a YELLOW ARGISSOLO in Occidental Amazon.	**SOF**

付属資料 6.1.1-1　熱帯果樹における過去の文献及び研究 (4/6)

53.	Gomes, João Batista Moreira; Van Leeuwen, Johannes; Ferreira, Sidney A. N.	Fruitful species of várzea and igapó for associated cultivation of tambaqui creation, matrinxã and turtle.	**ASY**
54.	Townsend, Claudio Ramalho; Magalhães, João Avelar; Costa,Newton de Lucena; Pereira, Ricardo Gomes de Araujo; Pequeno, Petrus Luiz de Luna	Establishment of *Acacia angustissima* in pastures of Brachiaria brizantha cv. Marandu.	**SEV**
55.	Mochiutti, Silas; Meirelles, Paulo Roberto de Lima	Establishment of eucalyptus clones in pastures at areas of cerrado, in Amapá.	**SEV**
56.	Silva, Alexandre Souza e; Barbosa, Antenor Pereira; Azevedo, Celso Paulo de; Murioka, Kikue	Estimate of dry biomass of the trunk of jatobá (Hymenae courbaril L.) planted in two types of ambient, in Central Amazon.	**SEV**
57.	McCaffery, Karen A.; Fernandes, Erick C. M.; Wandelli, Elisa V.; Rondon, Marco A.	Stocks of carbon and nutritious in Agroforestry systems implanted in areas of degraded pastures of Occidental Amazon.	**SEF**
58.	Bacelar, Christinny Giselly; Pessoni, Luiz Alberto	Population structures of the tucumã (*Astrocaryum aculeatum* Meyer) at Ecological Station of Maracá – RR.	**BIV**
59.	Campanha, Mônica Matoso; Freitas, Gilberto B. de; Santos, Ricardo Henrique Silva; Martinez, Herminia E. P.; Garcia, Silvana Lages Ribeiro	Study of the vegetative development of coffee plants (*Coffea arabica* L.) in Agroforestry system and in single cultivation.	**SEV**
60.	Araujo, Edson Alves de; Alechandre, Andrea Silva; Paiva, Maria do Socorro	Preliminary studies about occurrence of spontaneous plants in two Agroforestry systems in the state of Acre.	**BIV**
61.	Meneses-Filho, Luis Carlos de Lima; Ludewigs, Thomas; Cavalcante, Maria Ivanilde; Peneireiro, Fabiana Mongeli; Souza, Alexandre Dias de; Brilhante, Nilson Alves; Oliveira, Aluildo Costa de; Queiroz, João Bosco Nogueira de; Gonçalo, Edivaldo Nunes	Quantitative study about the biomass of eight species of arboreal vegetables for using as Agroforestry components– Final Results.	**SEV**
62.	Schroth, Götz; D'Angelo, Sammya Agra	Exotic timber tree species – a threat to native biodiversity or an additional production option for Amazonian agroforesters? The case of African mahogany (*Khaya* spp.)	**BIV**
63.	Uguen, Katell Franklin, Elizabeth	Fast decomposition of peach palm (*Bactris gasipaes*) residues in an agroforestry system and a monoculture.	**SEV**
64.	Dinkelmeyer, H.; Lehmann, J.; Kaiser, K.; Teixeira, W. G.; Renck, A.; Zech, W.	Fate of applied N fertilizer in mixed cropping systems in the central Amazon.	**SOF**
65.	Dünisch, Oliver; Gasparotto, Luadir; Azevedo, Celso Paulo Neves, Edinelson M.; Bauch, J.	High quality timber production in mixed plantations of the Amazon.	**ASY**
66.	Cavalcanti, Nilton de Brito; Resende, Geraldo Milanez de; Brito, Luiza Teixeira de Lima	Imbu tree (*Spondias tuberosa* Arr. Cam.): Alternative for agroforestry systems in the semi-arid of Northeast.	**SEV**
67.	Oliveira, Arlem Nascimento de; Oliveira, Luiz Antonio de	Influence of the colonization for fungus *micorrízicos arbusculares* (FMA) in the absorption of nutrients for the cupuaçu and guarana in a Agroforestry System of Amazon.	**SOF**
68.	Queiroz, Juliete M. T.; Ackerman, Ilse A.; Wandelli, Elisa V.; Rondon, Marco A.	Influence of the cupinzeiros (termitary) presence in the biomass of the vegetation on degraded pasture, secondary forest and agroforestry system.	**BIA**
69.	Moraes, Cássia Regina de Almeida; Bernardes, Marcos da Silveira; Castro, Paulo Roberto de Camargo; Macêdo, eferson Luis Vasconcelos de	Influence of the solar radiation over the *perfilhos* (sprouting) amount and the production of pupunha palm hearts in agroforestry systems in Amazon.	**ECO** **SEV**
70.	Rodrigues, João Elias L. Fernandes; Müller, Carlos Hans; Alves, Raimundo Nonato Brabo; Silva, José Francisco de Assis F. da	Influence of NPK levels in the production of pupunha palm heart (*Bactris gasipaes* H.B.K.) cultivated in Yellow Latossolo in the northeast of Paraná.	**SOF**

付属資料 6.1.1-1　熱帯果樹における過去の文献及び研究 (5/6)

71.	Guimarães, Daniel Pereira; Melo, José Teodoro de; Amabile, Renato Fernando	Influence of the Agroforestry systems and of the soil texture over the productivity of the associated cultures.	**ASY**
72.	Macedo, Renato Luis Grisi; Venturin, Nelson; Gomes, Jozébio Esteves; Dantas, Frederico Wesley Figueiredo; Lima, Elisete Maialu Giacomim	Introduction and establishment of associated Agroforestry with Tectona grandis L.f. (teak) with Arabic Coffea (coffee) in Lavras–Minas Gerais.	**ASY**
73.	Gehring, Christoph Vlek, Paul L. G.; Souza, Luiz Augusto Gomes of	Vegetables of *similar liana´s* habit: key importance for the biological nitrogen fixation in the initial secondary succession?	**ASY**
74.	Souza, Mylene Dutra Barbosa de; Silva, José Ferreira da; Souza, Luciana Souza de Aguiar; Sousa, Gladys Ferreira de Fernandes, Erick C. M.	Researches about weeds in agroforestry systems in the municipal district of President Figueiredo, Amazon State.	**BIV**
75.	Souza, Luciana Souza de Aguiar e; Silva, José Ferreira da; Souza, Mylene Dutra Barbosa de	Researches about weeds in the cupuaçu cultures and pupunha on mono-cultivation and on agro-system, in Amazon.	**BIV**
76.	Franke,I.L.	Research of "mulateiro" population (*Calycophyllum spruceanum)* on pasture in Acre.	**BIV**
77.	Costa,J.R.	Tucumã *(Astrocaryum aculeatum* G.F.W.Meyer): an agroforestal potential specie for *terra firme* in the Amazon State-Brasil.	**ASY**
78.	Chagas Jr,A. Oliveira,L.A Willerding,A. Hara,F.A S	Occurrence Phosphate Solubilized bacterium (BSF) on roots of plants on Agroforestal System in rural property of Manaus-Amazonas.	**BIV**
79.	Moura,J.I.L Leite,J.B.V.	Occurrence of diseases at the coconut tree (*Cocos nucifera)* cultivated on agroforestal systems at the south region of Bahia	**PDC**
80.	Cardoso,M.O. Xavier,J.J.B. Almeida,E.F. Antonio,I.C.	Development of sweet potato cultivar with potential of utilization in diversified system at the conditions of two soils of *terra firme* of the Amazon.	**SEV**
81.	Barbosa,A.P. Morais,J.W. Nascimento,C.S.	Potential of extractives forestall species of plantation for using at insecticides.	**BIV**
82.	Sousa,G.F. Oliveira,L.A Souza,A G C Moreira,A	Production and Growth of cupuaçuzeiro on agroforestal system at the Municipality of Presidente Figueiredo, Amazon State.	**SES**
83.	G.-Ordinola,L.H Luizão,F.J. Wandelli,E. Fernandes,E.	Production and quality of litter on agroforestall system at Central Amazonian.	**SOF**
84.	Meirelles,P.R.L Mochiutti,S.	Production of forage plants of cultivated gramineous under shading of taxi-branco.(*Sclerolobium paniculatum Vogel)*	**SEV**
85.	Gomes,J.B.M. Oliveira,L.A Leeuwen,J.Van	Productivity and economical revenue of *Pupunheira* associated with some semi perene species in SAFs at the region of Manaus-AM.	**SEV**
86.	Muroya,K. Sampaio,P.T.B. Azevedo,C.P. Silva,A S.	Vegetative propagation of samaúma *(Ceiba pentandra(*L.)Gaertn) by the stakes method.	**ASY**
87.	Azevedo,C.P. Caliri,G.J.A Dunisch,O. Rossi,L.M.B.	Quality of samaúma *(Ceiba pentandra)* wood planted in ecosystem of *várzea* and *terra firme* and in different system of plantation.	**SEV**
88.	Lima,H.V. Oliveira,T.S.	Quality of the soil at system of organic and conventional cotton cultivation at the Municipality of Tauá-CE.	**SOF**
89.	Luizão,F.J. Luizão,R.C.C. Desjardins,T.	Quality of the soil under agroforestall system installed at áreas of Forest and Capoeira at Central Amazônia.	**SOF**

付属資料 6.1.1-1　熱帯果樹における過去の文献及び研究 (6/6)

90.	Souza,A D. Leite,A P. Rodrigues,F.Q.	Quantity and concentration of biomass nutrients of eight arboreous leguminous species for utilization as agroforestal components.	**SOF**
91.	Costa,N.L. Townsend,C.R. Magalhães,J.A	Answer of gramineous forage plants under the shading by eucalyptus	**SEV**
92.	Paulino,V.T. Costa,N.L. Costa,R.S.	Answer of *Sesbania sesban* to inoculation of arbuscular micorriza and fertilization with rock phosphate	**SOF**
93.	Paulino,V.T. Costa,N.L. Costa,R.S.	Answer of *Sesbania sesban* to inoculation of arbuscular micorriza.	**SOF**
94.	Magalhães,J.A Costa,N.L. Townsend,C.R. Pereira,R.G.A	Selection of leguminous forest plant for utilization on pasture and agroforestall system.	**ASY**
95. **96.**	Rodrigues,V.G. Castilla,C. Costa,R.S.C. Palm,C. Santos,E.M.R Franklin,E N.	Absorption of carbon on agroforestall system with coffee in Rondonia. Short-term dynamics of litter in secondary forest in Central Amazon Region Soil Invertebrate.	**SOF** **SOF**
97.	Matta,F.R. Passos,C.A M.	Agrisilvicultural system with angico (*Anadenanthera falcata),*cumbaru *(Dipteryx alata),* banana *(Musa sp.)* and manioc *(Manihot esculente)* at the cuiabana declivity, Mato Grosso State.	**ASY**
98.	Leite,J.B.V. Moura,J.I.L.	Agroforestall system of the giant coconut tree (*Cocos nucifera* L.) with the cupuaçuzeiro (*Theobroma grandiflorum)* at the cocoa region in Bahia.	**SEV** **ASY**
99. **100.**	Pereira,J.P. Androcioli,[a] Leal,A C. Muller,C.H. Carvalho,J.E.U Nascimento,M.O Kato,A K	Agroforestall system with seringueira (*Hevea brasiliensis* M.Arg.) at the northwest of the State of Paraná. System of association involving the cupuaçuzeiro *(Theobroma grandiflorum)* as major culture.	**ASY** **ASY**
101.	Townsend,C.R. Magalhães,J.A Costa,N.L.	Environmental temperature under different silvipastoril system in Presidente Médice,Rondonia	**ECO**
102.	Amaral,E F Brown, I F. Melo,A W F	Tenor of potassium into a chrono sequence with the agroforestal system in Occidental Amazonian.	**SOF**
103.	Souza,A D. Michellotti,F. Nascimento,R.T. Oliveira,R.S.	Taboca using: a technological alternative for implantation of IAPs-Islands of Big Productivity at Resex – Extractive Reserve of Chico Mendes.	**ASY**
104.	Garnica,A M	Utilization of the forest to diminish the proliferation of black sigatoka*(Mycosphaerella fijensis)* at the cultivtion of banana (*(Musa AAB,Simmonds)* at the production of the rural economy of Colombia.	**ASY** **PDC**
105.	Mitja,D. Costa,J.R. Da	Spontaneous Vegetation and seed bank of four agroforestall system in small properties (Manacapuru,Amazon,Brasil)	**BIV**
106.	Ferraz,P.A Souza, A D Oliveira,R.S.	Modular nursery: an alternative for seedlings production at the extractive reserves.	**ASY**

付属資料 6.1.2-1　ガラナ生産に関する主要研究または参考文献(1/3)

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付属資料 6.1.5-1　種子生産に関する重要基本事項のレビュー

1)　Summary of reproductive biology of target species

	Age and size at first maturity			Fecundity	Spawning season	Source
	Age	Size				
		Length	Weight			
Tambaqui	4 yrs	50-56cm	6kg (< 5kg in captivity)	± 1 million	Early flood season (Dec-Feb)	Ruffino and Isaac (1995) IDAM Balbina Hatchery
Pirarucu	4-5 yrs	170 cm	40-45kg	0.05-0.5 million (about 5,000 eggs per spawning)	Nov.-Jan. (Tefe) Jan.-Mar. (Santarem)	Workshop Pirarucu (2000)
Surubim	3 yrs	-	6kg	0.5-1 million (0.1 million/kg of female)	Early flood season (Oct-May)	Projecto Pacu
Matrincha	2 yrs	45cm	1.5kg	0.5-1 million	Late dry season (Oct-Dec)	IDAM Balbina Hatchery
Jaraqui	2 yrs	25 cm	0.5 kg	0.2 million	Early flood season (Dec-Feb)	

2)　Outline of seed production procedures of tambaque

Stages	Rearing facilities	Duration	Remarks
1. Broodstock management	Earthen ponds		0.5 kg of fish/m^2
2. Hormon injection	Small tank	12-15 hrs	Use of gonadotropins such as pituitary gland and HCG.
3. Artificial fertilization			Amount of eggs: 10-20% of female body weight
4. Incubation of eggs	Conical incubation tank (200l.)	14-16 hrs.	2 g or 3000 eggs/liter of tank water, Hatching rate: 80-90%
5. Rearing of yolk-sac larvae	Small tank or earthen pond	4-6 days	
6. Nursery culture of post larvae	Earthen pond	1 month	Natural zooplankton as food of larvae shall be propagated by giving fertilizer.　Stocking density: 200-500 larvae/m^2, Survival rate: about 20%
7. Harvest and shipping of larvae			

Source:　Lima and Gouldring (1997), IDAM Barbina Hatchery

3)　Present availability of fish fry for aquaculture

Species	Origin	Size	Price (R$/fry)	Production capacity
Tambaqui	IDAM Balbina Hatchery	4-5 cm	0.06	1.0 million
	Private hatcheries in AM	2 cm	0.06-0.08	
	- do -	4-5 cm	0.15-0.20	
	- do -	10-12 cm	0.30	
Matrincha	IDAM Balbina Hatchery	4-5 cm	0.10	0.1 million
	Private hatcheries in AM	4-5 cm	0.20	
	Wild-caught in AM	4-5 cm	0.10	
	Project Pacu　in MS	3-4 cm	0.35	2.5 million
Pirarucu	Ecopexie in AM	25 cm	30.00	
	Wild-caught in AM	25 cm	10.00	
	Project Arapaima in PA	15 cm	45.00	US$20 for export
Surubim	Project Pacu　in MS	6-8 cm	1.00	1.25 million in total
	- do -	9-12 cm	1.50	
	- do -	13-15cm	2.00	
Jaraqui	Wild-caught in AM	3-4 cm	0.02	

AM: Amazonas State, MS: Mato Grosso do Sur State, PA: Para State

付属資料 6.1.6-1　調査対象作物の主な農産物加工企業の概要

Company	Description	Products	Distribution	Features	Needs
Agrofrut (Urucura, AM) Mr. Manoel Braga Paes Ph: 571-1110	Specialty guarana cooperative (buy 40T seed/yr)	Guarana grain and high quality powder	Export 5T powder to Italy; 35T grain sold to Ambev and Recofarme	Export demand is doubling every yr (Italian customer pays 12R/kg for seeds); Farmers achieve high quality through uniform harvesting and roasting techniques	Training in business mgmt., accounting, quality control; Int'l marketing skills; - English/Italian language skills; May expand into fruit pulp business
Fazenda Bom Viver (Maues) Mr. Abraham Levy Ph: 542-1318	Small guarana processor and trader; buys 20-30T/yr	Guarana grain, powder, syrup, bars; Mirata syrup; sells "kit" with both syrups and guarana powder (good for 10 servings)	100% Amazonas	Guarana purchases are declining; processed products are well known only locally; not a serious processor	Improve quality of packaging and labeling; Regional marketing; Wants Maues lab to certify guarana purity
AgroRisa (Maues) Mr. Rivaldo goncalves de Araujo Ph: 9984-5463	Medium-size guarana trader, processor, exporter	Mainly powder, also syrup and bars; Makes high quality powder from Satere Indian guarana for export	Exports 5-10T powder to Italy; most other products sold within Amazonas or Mato Grosso	Has developed close relationship with Satere Indian tribe and Italian importers (they pay 50-100R/kg for powder); Has high quality packaging and labeling; exhibits in int'l food fairs	Wants to expand export business; Looking for business partners (Agrofrut?)
Guaran'apis (Itubera, BA) Dr. Luciano Orrico de Araujo Ph: 073-256-2370	Medium-large guarana processor; Has nationally recognized product lines (Arrebite ,Rio Amazonas, Ligante, Enerbite)	Export quality powder; Concentrated energy drinks based on guarana and other natural extracts such as marapuama, ginger, catuaba, honey, and vitamins C and E; energy capsules based on guarana and vitamins	Sells high quality powder to Europe (Spain, Switzerland); All other drink products well distributed throughout Brazil; Quantities not known but yearly seed requirement is >50T	Have their own guarana farm for 50% of their needs; pay other suppliers a premium for high quality seeds; Processing plant is modern and well managed; food safety principles are in place; Packaging is high quality	Expansion of factory to meet rising demand; training of staff in food safety principles; development of new product lines; food technology support to achieve higher production efficiency
Frutyba (Itubera, BA) Fax: 073-256-2479	Small guarana processor with export capacity	Powder, syrup, and concentrated energy drinks; Powder for export is instant powder mixed with catuaba, ginger, and muirapuama	50% sold in Rio and Sao Paolo, 40% in other States, 10% exported to Italy and USA; buys an estimated 20T of seed	Very high quality packaging and labeling; is one of few processors of INSTANT guarana powder; has s	Assistance with export documentation; food safety training for staff; marketing assistance; English language assistance
Guarana Emporium (Botafogo, BA) Mr. Jose Marcos Fochi Ph: 021-2869161	Medium size guarana processor and leading trader; products have trade name "Guarana Emporium"	Sell seeds to Marubeni and Nestle; sell extract and powder to regional and int'l markets; buy 200T seeds/yr, process 50-80T	Many years experience selling Bahia guarana to Rio and Sao Paolo traders; processed products sold all over Brazil; some experience selling to USA and Portugal	Have considerable trading experience with contacts in Bahia, Amazonas, Rio, and S.Paolo; processed products are high quality; have internet marketing, also exhibit in int'l fairs	Despite their sophistication and high product quality, are having difficulty maintaining export sales; exports peaked 3 yrs ago and have been declining; need marketing and promotion support abroad
CAMTA-Mixed Agric. Coop. Of Tome Acu (Para) Mr. Hitoshi Saiki Ph: 091-734-1319	Large size cooperative which produces and processes tropical fruits;	Produce 2000T frozen fruit pulp, mainly cupuacu, maracuja, acai	Sell to distributors in Para, Maranhao, Tocantins, Goiania, Minas Gerais, and Brasilia; sell to food companies in Rio and S. Paolo	Have doubled their sales since 1997; success is mainly due to high quality pasteurized product, and ability to process over 10 kinds of fruits; have highly effective distribution network	Need assistance in food safety and good manufacturing practices; Have hired marketing assistant to find export markets, but want more help in finding European buyers
SUCASA (Castanhal, PA)	Large fruit processing company with significant marketing and export experience	10 kinds of frozen fruit pulp (acai, acerola, pineapple, graviola, murici, cupuacu, etc.) for local markets – new export contract for 20T to France; 16T/mo. concentrated juice (acerola, maracuja) export to Europe	Demonstrated success for pulp in Brazil markets (Belem, Rio, Sao Paolo) and juice in Europe markets (France, Spain); now trying to market new energy drink (acai + guarana) in USA	Success due to very high quality from pasteurization and much attention to food hygiene; started by successful selling to important Brazilian firms (Yakult, Citrovita, Rio Dourado), then moved to export markets	Seeking more financing from BASA for expansion and equipment upgrades; already invested several million in labs alone; operating only at 50% capacity; need to make deals in Portugal and Italy for juices

Source: Personal interviews with the enterprises, May- July 2001

付属資料 6.1.6-2　ガラナ、野菜及び熱帯果樹の加工･流通･マーケティングにおける研究及び出版物(1/3)

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付属資料 7.1.5-1　ブラジル 27 州の養殖水産業の比較.

Region and State	Basic data gathered from each state						Analysis		
	Production (ton)		Number of producers		Total area (ha)		Average pond area (ha/producer)	Productivity per ha (ton/ha)	Productivity per producer (ton/prod.)
North Region	**4,752**	**4.1 %**	**4,319**	**4.4 %**	**3,014**	**3.8 %**	**0.70**	**1.58**	**1.1**
Rondonia	1,412		646		404		0.63	3.50	2.2
Acré	900		2,500		1,411		0.56	0.64	0.4
Amazonas	814		222		183		0.82	4.45	3.7
	(For justification of data of the Amazonas State, see text)								
Pará	803		449		502		1.12	1.60	1.8
Roraima	600		300		373		1.24	1.61	2.0
Tocantins	153		91		70		0.77	2.19	1.7
Amapá	70		111		71		0.64	0.99	0.6
Northeast Region	**26,420**	**22.9 %**	**5,067**	**5.1 %**	**20,951**	**26.6 %**	**4.13**	**1.26**	**5.2**
Bahia	8,070		4,318		15,195		3.52	0.53	1.9
Ceará	7,257		158		1,059		6.70	6.85	45.9
Rio Grande do Sul	4,304		65		1,388		21.35	3.10	66.2
Pernambuco	1,910		65		599		9.22	3.19	29.4
Sergipe	1,703		177		420		2.37	4.05	9.6
Piauí	1,496		130		1,520		11.69	0.98	11.5
Paraíba	1,166		21		434		20.67	2.69	55.5
Maranhão	409		87		294		3.38	1.39	4.7
Alagoas	105		46		42		0.91	2.50	2.3
Central-West Reasion	**5,792**	**5.0 %**	**1,795**	**1.8 %**	**2,099**	**2.7 %**	**1.17**	**2.76**	**3.2**
Goiás	3,442		675		642		0.95	5.36	5.1
Mato Grosso do Sul	1,500		421		863		2.05	1.74	3.6
Mato Grosso	634		525		535		1.02	1.19	1.2
Brasília	216		174		59		0.34	3.66	1.2
Southeast Region	**21,800**	**18.9 %**	**17,804**	**18.0 %**	**5,588**	**7.1 %**	**0.31**	**3.90**	**1.2**
São Paulo	15,830		5,827		2,661		0.46	5.95	2.7
Rio de Janeiro	4,500		335		984		2.94	4.57	13.4
Espirito Santo	970		1,242		710		0.57	1.37	0.8
Minas Gerais	500		10,400		1,233		0.12	0.41	0.0
South Region	**56,635**	**49.1 %**	**69,672**	**70.6 %**	**47,142**	**59.8 %**	**0.68**	**1.20**	**0.8**
Santa Catarina	22,650		23,244		11,303		0.49	2.00	1.0
Rio Grande do Sul	17,448		24,381		27,676		1.14	0.63	0.7
Paraná	16,537		22,047		8,163		0.37	2.03	0.8
Total	**115,399**	**100.0 %**	**98,657**	**100.0 %**	**78,794**	**100.0 %**	**0.80**	**1.46**	**1.2**

Source: Valenti, W. C. (ed.) Aquicultura no Brasil, Ministerio da Ciencia e Technologia, Brasilia, 2000

付属資料 7.1.5-2　水産養殖業に関する写真

F-1　Project Pacu 社によるスルビンのレースウェイ育成システム

F-2　Agropeixe 社による養殖池開発

F-3　Amazonas Ecopexie 社によるふ化場施設を搭載した特殊船

F-4　左図の内部

F-5　Amazonas Ecopexie 社によるイランドゥバのピラルク網いけす養殖

F-6　EMBRAPA によるイランドゥバ、アリアンジンヨ湖の小規模網いけす

F-7　イタコアティアラ、ウルブ川の民間網いけす

F-8　マナウス、ウラケクアラの民間網いけす

付属資料 7.1.5-3　マト･グロッソ州パイロット養殖場におけるスルビン養殖の財務分析

Basic condition

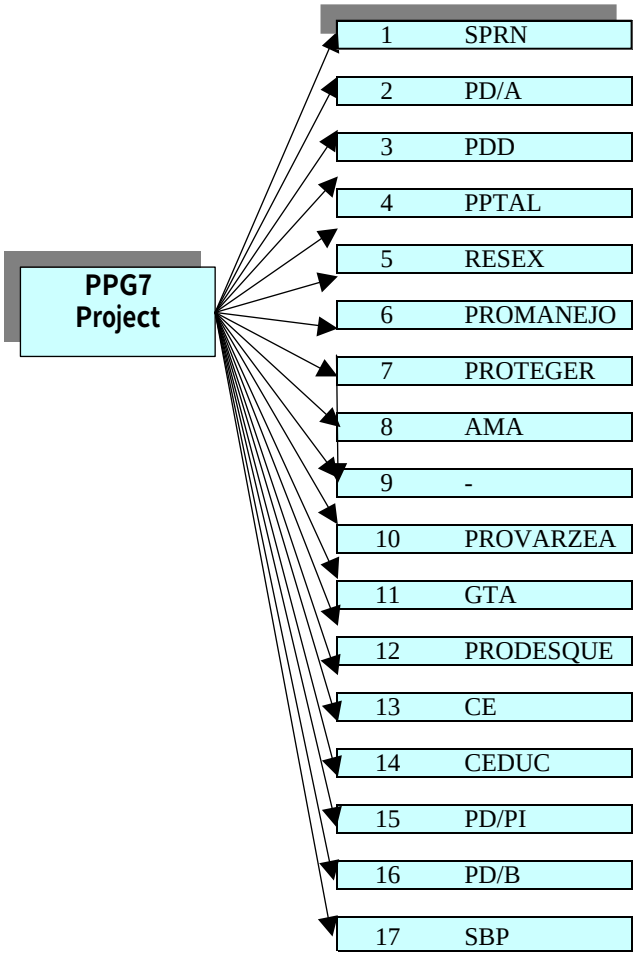
1) Fish fry of	13-15	cm is stocked
at a density of	0.3	individuals/m^2.
2) Fish are harvested after	14	months of culture period
at size of	3	kg in body weight
with survival rate of	85	%
and food conversion rate of	2	: 1.
3) Total area	3	ha.

	Quantity		Unit price			Total	
Operation cost							
Fish fry	9,000	fry	2	R$/fry	*1)	R$ 18,000	
Artificial feed (P: 40%)	45.9	ton	1.08	R$/kg		R$ 49,572	
Labor	14	M/M	277	R$/M/M	*2)	R$ 3,875	
Harvest and transportation	23.0	ton	400	R$/ton	*3)	R$ 9,180	
Others (electricity, chemicals and other consumable)						R$ 14,289	*4)
Sub-total						R$ 94,916	
Depreciation							
Facility (ponds)						R$ 1,600	*5)
Equipment (pumps, net, aerator, etc)						R$ 2,000	
Sub-total						R$ 3,600	
Marketing tax						R$ 19,278	*6)
Total cost						R$ 117,794	
Revenue							
Sales of surbim (3 kg size)	23.0	ton	7	R$/kg		R$ 160,650	
(Productivity:	7.7	ton/ha/production cycle)					
Profit during one production cycle						R$ 42,856	
			Profit per month			R$ 3,061	

Source: Interview to Agropexie LTDA (2000)

Remarks

1) Current price at Projeto Pacu
2) R$250/month + 10.7% of social security
3) Fish are transported alive by truck with container for live fish.
4) 20% of the above total
5) Construction cost of pond is estimated to be R$ 8,000/ha. Repayment period is set for 15 years. Therefore, R$ 8,000/15yr x 3 ha = R$ 1,600.
6) 12% of selling price



Natural Resources Policy Subprogram (EEZ projects)

Demonstration Projects Subprogram

Science Centers and Directed Research Subprogram

Indigenous Land Projects

Extractive Reserves Projects

Forest Resource Management Project

Fire Prevention, Mobilization and Training Project

Monitoring and Analysis Project

Support of the Brazilian Coordination of the Pilot Program

Floodplain Resources Management

Support of the NGO Networks

Fire and Deforestation Control Projects

Ecological Corridors Projects : Not started

Environmental Education

Demonstrative Projects Indigenous Peoples : Next program

Municipal Demonstration Projects

Sustainable Business Practices : Not started

Note:

Details of each project refer to Annex 5.3.4-1

アマゾナス州
環境調和型地域住民生計向上計画調査

国際協力事業団 (JICA)

付属資料 7.5.1-1

PPG7プロジェクトのコンポーネント

付属資料 8.4.3-1　アマゾナス州 Frigorificos 社の冷凍魚生産及び輸出量 (調査対象魚種に限る) (1994-1998 年)

Unit: ton

		1994	1995	1996	1997	1998
Production for domestic market						
Pirarucu	Whole fish	24	7	-	-	-
	Without gut	103	47	-	-	-
	Cut in pieces	2	0	-	-	-
	Fillet	149	-	-	-	-
	Salted	53	34	3	-	-
	Total	***331***	***89***	***3***	-	-
Surubim	Without gut	965	643	682	958	553
	Cut in pieces	0	2	4	2	5
	Fillet	-	4	12	20	2
	Total	***965***	***648***	***698***	***980***	***560***
Tambaqui	Whole fish	8	12	3	36	12
	Without gut	131	107	42	106	18
	Cut in pieces	9	15	2	-	-
	Fillet	-	-	1	-	-
	Others	-	9	-	-	-
	Total	***148***	***143***	***48***	***142***	***29***
Matrinchã	Whole fish	70	2	155	-	-
	Without gut	4	1	1	-	-
	Total	***74***	***3***	***155***	-	-
Jaraqui	Whole fish	158	10	146	45	15
	Without gut	24	-	-	2	-
	Total	***182***	***10***	***146***	***47***	***15***
International export						
Pirarucu	Fillet	35	-	-	-	-
Surubim	without gut	-	-	8	-	-
Tambaqui	without gut	-	-	5	-	-

Source: DFA-AM, Setor de inspecao de produto de origem animal (1994-1998)

付属資料 10.2.5-1　さらなる検討が必要な水産関連プロジェクトの概要

Project components		Outline of activities	Considerable effects	Implementing agency	Remarks
1) Fishery resource management					
	Base-line study	- Topographic survey - Basic biological survey - Socio-economic survey	- Site selection - Preparation of overall project plan	IBAMA, INPA	
	Procurement of necessary equipment	- GIS system - Communication system - Equipment for aquatic environment survey - Equipment for fishery activity monitoring - Improvement of measures to access local communities	- Baseline study and monitoring can be implemented effectively	IBAMA,INPA	
	Support to organization of target fishermen and their education	- Explanation on necessity and scope of project - Dissemination of basic knowledge on fishery resource management	- Fishermen understand scope of project and are going to participate in the project.	IDAM, Municipal government	Effects shall be disseminated among all the member of fishery colonia.
	Strengthening of law enforcement activity	- Training of fishermen's group - Linkage with police patrol system - Objective application of law and regulation	- Decrease of illegal fishing	IBAMA	
	Monitoring	- Monitoring of fish catch - Survey on fishery socio-economy	- Identification of problems	DPA	
	Evaluation of resource condition	- Analysis of all the above results and compilation - Implementation of seminar	- Preparation of fishing ground utilization map - Calculation of allowable catch amount - Propose sustainable fishing system	IBAMA, DPA	
	Introduction of resource enhancement measures	- Examination of effective close season and sanctuary - Seed release program	- Realize rehabilitation of fishery resources	INPA、IDAM	
2) Fish marketing and processing					
	Survey on demand and supply balance of fishes in Amazonas State and Manaus	- Review of existing references - Field survey and analysis	- Clarify problems about fish demand and supply balance	DPA, IBAMA FUA, SUFRAMA, SEBRE, FEPESCA	Coordination of implementing agency will be necessary.
	Improvement of fish unloading and relevant facilities (fishing port)	- Improvement of fish unloading places - Improvement of communication system - Examination of fishing control system - Construction of temporary stocking facilities	- Effective utilization of unloaded fishes	SUFRAMA, FEPESCA, SEBRE	
	Development of fish processing techniques	- Examination of fish species as alternative processing materials - Examination about necessary facilities	- Improvement of value of fishery project	INPA, EMBRAPA	
	Improvement of fish quality	- Increase of ice plants Improvement of post-harvest treatment	- Improvement of freshness	INPA, IDAM, SUFRAMA	

付属資料 12.4.1-1 IDAM漁業専門家の必要人数に関する予備的検討

No.	Location of local units	Covering area	Present number			Required number		
			Graduated	Non-graduated	Total	Graduated	Non-graduated	Total
Head quarters		All the State	2 *1)	-	2	4	-	4
IDAM Balbina Hatchery		All the State	1	-	1	3	2	5
Existing local units								
1	Apui	Apui, Novo Aripuanã - part	-	-	-	1	-	1
2	Autazes	Autazes	-	-	-	-	-	-
3	Barreirinha	Barreirinha	-	-	-	-	-	-
4	Boa Vista do Ramos	Boa Vista do Ramos	-	-	-	-	-	-
5	Boca do Acre	Boca do Acre, Pauini	-	-	-	1	-	1
6	Borba	Borba	-	-	-	-	-	-
7	Carauari	Carauari, Itamarati - parte	-	-	-	1	-	1
8	Careiro da Várzea	Careiro da Várzea	-	-	-	-	-	-
9	Careiro Castanho	Careiro Castanho, Manaquiri - parte	-	-	-	-	-	-
10	Coari	Coari	1	1	2	1	1	2
11	Eirunepé	Eirunepé, Itamarati - parte	-	-	-	1	-	1
12	Envira	Envira	-	-	-	-	-	-
13	Guajrá	Guajará, Ipixuna	-	-	-	-	-	-
14	Humaitá	Humaitá, Manicoré - parte, Canutama - parte	-	-	-	-	-	-
15	Iranduba	Iranduba, Manaquiri - parte	-	-	-	1	1	2
16	Itacoatiara	Itacoatiara, Urucurituba	-	-	-	1	1	2
17	Lábrea	Lábrea, Canutama - parte, Tapau	-	-	-	-	-	-
18	Manacapuru	Manacapuru, Caapiranga, Novo Airão, Anam	-	-	-	1	1	2
19	Manaus	Manaus	2	-	2	3	2	5
20	Manicoré	Manicoré, Novo Aripuanã - parte	-	-	-	-	-	-
21	Maués	Maués	-	-	-	1	-	1
22	Nhamundá	Nhamundá	-	-	-	-	-	-
23	Parintins	Parintins	1	-	1	1	-	1
24	Presidente Figueiredo	Presidente Figueiredo	-	-	-	1	-	1
25	Rio Preto da Eva	Rio Preto da Eva	1	-	1	2	-	2
26	Silves	Silves, Itapiranga - parte	-	-	-	-	-	-
27	Tabatinga	Tabatinga, Atalaia do Norte, Benjamin Constan	-	-	-	2	1	3
28	Tefé	Tefé, Alvarães, Uarini, Japurá,Maraã - part	-	-	-	1	1	2
29	Urucará	Urucará, São Sebastião do Uatumã, Itapiranga - parte	-	-	-	-	-	-
Proposed new unit								
	Sao Gabriel da Cachoeira		-	-	-	1	-	1
	Total		**8**	**1**	**9**	**27**	**10**	**37**

Remarks: *1) One of them takes leave for 2 years now for post-graduate study.

付属資料 12.4.2-1　養殖施設の特定化と建設費用

1) Barragem (dam ponds)

	Small-scale barragem	Medium-scale barragem
Expected dam water area	0.2 ha	1 ha
Flow volume of spring water	5l./sec	50l./sec
Specifications		
Dyke length	20 m	70 m
Dyke hight	3 m	4 m
Dyke width	3 m (upper) 15 m (bottom)	6 m (upper) 26 m (bottom)
Sluice gate	no (overflow)	yes
Construction	mainly by family labor	use of heavy duty machinary
Approximate construction cos	R$ 2,200	R$ 25,000
Payback period	10 years	15 years
Salvage value	30%	10%
Deprecition cost	R$ 154 /year	R$ 1,500 /year
	R$ 13 /month	R$ 125 /month

2) Net cages

	Small-scale cage	Medium-scale cage	Midium-scale cage
Specifications			
Material	Carbonsteel-epoxy coating (local, Manaus)	Carbonsteel-epoxy coating (local, Manaus)	Reinforced plastics (local, Sao Paulo)
Demension	2 x 2 x 2 m	5x5x2.5 m	ϕ5m x 2m
Effective water volume	$7m^3$	$50m^3$	$35\ m^3$
Mesh size	2.5 cm	2.5 cm	2.5 cm
Construction	mainly by beneficiaries	mainly by beneficiaries	mainly by beneficiaries
Approximate material cost			
Cage material	R$ 400	R$ 4,000	R$ 3,000
Associate materials	20% of the above	20% of the above	40% of the above
Total	R$ 480	R$ 4,800	R$ 4,200
Depreciation period	5 years	10 years	10 years
Salvage value	0%	10%	10%
Deprecition cost	R$ 96 /year/cage	R$ 432 /year/cage	R$ 378 /year/cage
	R$ 8.0 /month/cage	R$ 36 /month/cage	R$ 32 /month/cage

付属資料 12.4.2-2　家族漁業に係る費用及び便益の検討 (1) ダム池養殖 (バハージェン)

		Tambaqui		Matricnha		Pirarucu	
		Small-scale	Medium-scale	Small-scale	Medium-scale	Small-scale	Medium-scale
Rearing conditions							
Area	ha	0.2	1.0	0.2	1.0	0.2	1.0
water depth	m	1.0-1.2	1.5-1.8	1.0-1.2	1.5-1.8	1.0-1.2	1.5-1.8
Additonal labor	person	0.0	0.5	0.0	0.5	0.0	0.5
Size of fish fry		3-4 cm		3-4 cm		30 cm<	
Stocking densigy	fry/ha	3,000	3,000	5,000	5,000	250	500
Grow-out period	month	18		8		24	
Size at harvest	kg/fish	2.0	2.5	0.8	1.0	20	20
Survival rate	%	85		85		95	
Kind of food		Pellet		Pellet		Trash fish	
Feeding rate (feed/fish)		1.0	1.5	1.1	1.4	4.0	5.0
Fish to be harvested	ton/harvest	1.02	6.38	0.68	4.25	0.95	9.50
Productivity per harvest	ton/ha/harvest	5.10	6.38	3.40	4.25	4.75	9.50
Productivity per year	ton/ha/year	3.40	4.25	5.10	6.38	2.38	4.75
Productivity per family	ton/year/family	0.68	4.25	1.02	6.38	0.48	4.75
Basis of cost and revenue estimation							
Fish fry	R$/fry	0.08		0.12		20	
Feed	R$/kg	0.65		0.65		0.15	
Fertilizer etc.	R$/ha/year	750	1000	750	1000	750	1000
Labor	R$/month	180					
Harvest and marketing	R$/ton	80					
Depreciation of faciliy	R$/year	154	1500	154	1500	154	1500
Depreciation of equipment (20% of above)		31	300	31	300	31	300
Maintenance	R$/ha/year	800					
Environmental license	R$/ha/year	50					
Selling price of fish	R$/kg	3.0	3.3	2.2	2.5	3.5	3.5
Cost calculation per rearing cycle							
Fish fry	R$	48	240	120	600	1,000	10,000
Feed	R$	663	6,216	486	3,868	570	7,125
Fertilizer etc.	R$	225	1,500	100	667	300	2,000
Labor	R$	0	1,620	0	720	0	2,160
Harvest and marketing	R$	82	510	54	340	76	760
Depreciation of faciliy	R$	231	2,250	103	1,000	308	3,000
Depreciation of equipment (20% of above)		46	450	21	200	62	600
Maintenance	R$	240	1,200	107	533	320	1,600
Environmental license	R$	15	75	7	33	20	100
Total	R$	1,550	14,061	997	7,961	2,656	27,345
Gross revenue per rearing cycle	R$	3,060	21,038	1,496	10,625	3,325	33,250
Crude profit							
per harvest (per rearing cycle)	R$	1,510	6,977	499	2,664	669	5,905
per year	R$	1,007	4,651	748	3,996	335	2,953
per month	R$	84	388	62	333	28	246

付属資料 12.4.2-3　家族漁業に係る費用及び便益の検討　(2) 網いけす養殖

		Tambaqui		Matricnha		Pirarucu	
		Small-scale	Medium-scale	Small-scale	Medium-scale	Small-scale	Medium-scale
Rearing conditions							
Demension		2 x 2 x 2 m	5 x 5 x 5 m	2 x 2 x 2 m	5 x 5 x 5 m	2 x 2 x 2 m	5 x 5 x 5 m
Useful Area	m^2/cage	16	100	16	100	16	100
Effective volume	m^3/cage	7.0	50.0	7.0	50.0	7.0	50.0
Number of cages		4	2	4	2	4	2
Additonal labor	person	0.0	0.5	0.0	0.5	0.0	0.5
Size of fish fry		about 8 cm		about 8 cm		15 cm	15 cm
Stocking densigy	fry/m^3	20	30	40	60	50	5
Grow-out period	month	18		8		3	18
Size at harvest	kg/fish	2.5		1.0		0.5	12
Survival rate	%	85		85		95	90
Kind of food		Pellet		Pellet		Trash fish	
Feeding rate (feed/fish)		2.0		1.8		5.0	8.0
Fish to be harvested	ton/harvest	1.2	6.4	1.0	5.1	0.7	5.4
Productivity per harvest	kg/m^3/harvest	42.5	63.8	34.0	51.0	23.8	54.0
Productivity per year	kg/m^3/year	28.3	42.5	51.0	76.5	95.0	36.0
Productivity per family	ton/year/family	0.79	4.3	1.4	7.7	2.7	3.6
Basis of cost and revenue estimation							
Fish fry	R$/fry	0.20		0.25		15	15
Feed	R$/kg	0.80		0.80		0.15	0.15
Fertilizer etc.	R$/$m^3$/year	0					
Labor	R$/month	180					
Harvest and marketing	R$/ton	80					
Depreciation of faciliy	R$/cage/year	96	432	96	432	432	432
Depreciation of equipment (20% of above)		19	86	19	86	86	86
Maintenance (5% of cage price)	R$/cage/year	18	200	18	200	200	200
Environmental license (LO)	R$/ha/year	216					
Selling price of fish	R$/kg	3.3		2.5		40.0	3.5
Cost estimate per rearing cycle							
Fish fry	R$	112	600	280	1,500	21,000	7,500
Feed	R$	1,904	10,200	1,371	7,344	499	6,480
Fertilizer etc.	R$	0					
Labor	R$	0	1,620	0	720	0	1,620
Harvest and marketing	R$	95	510	76	408	53	432
Depreciation of faciliy	R$	576	1,296	256	576	432	1,296
Depreciation of equipment (20% of above)		115	259	51	115	86	259
Maintenance	R$	110	600	49	267	200	600
Environmental license	R$	2	6	1	3	0	6
Total	R$	2,914	15,092	2,084	10,933	22,271	18,194
Gross revenue per rearing cycle	R$	3,927	21,038	2,380	12,750	26,600	18,900
Crude profit							
per harvest (per rearing cycle)	R$	1,013	5,946	296	1,817	4,329	706
per year	R$	675	3,964	444	2,726	17,317	471
per month	R$	56	330	37	227	1,443	39

付属資料 12.4.3-1　湖牧場プロジェクトの候補地面積及び潜在的受益者数の概算

Candidate sites	Community around lakes		Rough estimation of water area	Remarks
	Number	Population		
1. Iranduba				
Islands having varzea lakes				
Ilna Paciencia	3	450	80	
Ilna Muratu	1	125	20	
Ilna Jacurutu	2	285	20	
Ilna Maria Antonia	1	80	few	
Ilna Baixio	2	400	20	Lake size is measured by C.Lima of INPA
Ilna Machantaria	6	1,100	50	
Sub-total	15	2,440	190	
Varzea lakes				
Lago do Iranduba	1	300	50	
Lago do Ariauzinho	1	110	25	Lake size is measured by C.Lima of INPA
Lago do Limao	1	1,600	30	Open lake
Lago do Caldeirao	4	525	25	
Lago do Ubim	1	150	30	A part of lake is
Lago do Catalao	1	300	20	
Lago do Ariau	1	75	10	
Lago do Cacau Pirera	1	305	10	
Lago do Santo Antonio	1	125	5	
Lago do Teste	1	220	10	
Lago do Guedes	1	275	15	
Lago do Janauari	1	105	10	
Sub-total	15	4,090	240	
Total	30	6,530	430	
2. Itacoatiara				
Islands having varzea lakes				
Ilha do Risco	9	834	50	
Ilha do Soriano	3	340	30	
Ilha Beija Flor	2	205	5	
Ilha Grande	1	94	5	
Ilha da Trindade	1	76	25	
Ilha do Januario	1	250	N.A.	Unidentified on the map
Ilha do Bom Planalto	1	105	N.A.	
Ilha da Maquila	1	77	N.A.	
Ilha de Fatima/Acacy	1	248	N.A.	
Ilha do Cumaru	2	282	N.A.	
Sub-total	22	2,511	200	
Varzea lakes				
Lago do Araca	1	196	10	Communities organized
Lago do Serpa	2	158	15	Communities organized
Lago do Canacai	2	372	10	Communities organized, a part of lake is measured.
Lago do Maguaca	1	157	5	
Lago do Mutuca	1	348	60	
Lago do Moura	2	236	25	
Lago do Batista	1	748	40	
Other about 20 lakes	27	3,320	N.A.	Unidentified on the map
Sub-total	37	5,535	420	
Total	59	8,046	620	
3. Maues				
Lago Grande	2	250	180	
Lago Castanhal/P.Uraria Cima	3	360	30	
Other 6 lakes	6	1,000	200	Mostly open type lakes
Total	11	1,610	410	
Grand total	100	16,186	1,460	

Remarks

*1) Water areas in which seed release program will be applied are roughly estimated by using map

付属資料 13.1.4-1　対象3郡における養殖開発プログラム開始後の段階的効果

1) Number of beneficiaries (family fish farmers) Unit: family

	5 years	10 years	20 years
(% of project influence)	(10-20%)	(50%)	(80%)
Aquaculture			
Barragem	60	200	330
Net cage	60	330	530
Lake ranching	260	1,300	2,000
Total	380	1,830	2,860

2) Development area Unit: ha

	5 years	10 years	20 years
Aquaculture			
Barragem	6	20	33
Net cage	0.12	0.66	1.06
Lake ranching	150	750	1,200
Total	156	771	1,234

3) Production Unit: ton/year

	5 years	10 years	20 years
Aquaculture			
Barragem	7	71	157
Net cage	7	118	252
Lake ranching	0	0	0
Total	14	189	409

Assumptions

1) Rearing facilities

		Small-scale	Medium-
Barragem			
	Area (ha)	0.2	1.0
	Number per family	1	1
Net cage			
	Demension	2 x 2 x 2 m	5 x 5 x 5 m
	Useful area (m^2/cage)	16	100
	Effective volume (m^3/cage)	7.0	50.0
	Number of cages per family	4	2

2) Ratio of family fish farmers

	Small-scale	Medium-scale
Barragem	90%	10%
Net cage	90%	10%

3) Productivity (ton/year/family)

		Small-scale	Medium-scale
Aquaculture *1)			
	Barragem	0.85	5.95
	Net cage	1.11	5.95
Lake ranching		0.087	

Remarks: *1): Average of tambaqui and matrincha culture is used.

4) % of fish farms or lake communicties which start production

5 years	10 years	20 years
20%	60%	80%

付属資料 13.1.4-2　対象3郡における養殖開発プログラムに必要となる稚魚数

Unit: individual

		5 years	10 years	20 years
Aquaculture				
	Barragem	68,040	226,800	374,220
	Net cage	72,360	397,980	639,180
Lake ranching		150,000	750,000	1,200,000
Total		290,400	1,374,780	2,213,400

Assumptions

1) Stocking density of fish fry

		Small-scale	Medium-scale
Aquaculture *1)			
	Barragem (fry/ha)	4000	4500
	Net cage (fry/m^3)	30	45
Lake ranching (fry/ha)*2)		1000	

Remarks: *1): Average of tambaqui and matrincha is used.

*2) Only tambaqui

2) For other assumptions, see Table .

調査対象地域に係るブラジル国の準拠すべき主な法体系

No.	名称	内容	番号	年度
1	Environmental law (Gov't law)	EIA	No.001	1986
2	Environmental law (Gov't law)	環境ライセンスシステム	No.1532	1982
3	Environmental law (Gov't law)	環境ライセンスシステム	No.1642	1984
4	Environmental law (Gov't law)	環境ライセンスシステム	No.8821	1985
5	Environmental law (Gov't law)	水質環境基準	CONAMA20	1976
6	Federal forest law	森林の管理法	No.44他	
7	Federal forest law	環境保全制度	No.519	1965
8	IBAMA ministry law	土地管理法	No.48	1995
9	Indigenous people's law	先住民法	No.6001	1973
10	Amazonas State Law	漁業に係る禁止事項	No.16	1999
11	Amazonas State Law	漁業に係る禁止事項	N0.18	1999
12	Amazonas State Law	漁業に係る禁止事項	N0.19	1999
13	Amazonas State Law	漁業に係る禁止事項	N0.20-N	1999
14	Amazonas State Law	漁業に係る禁止事項	No.21-N	1999
15	Amazonas State Law	漁業に係る禁止事項	No.9.605	1998
16	Amazonas State Law	漁業に係る禁止事項	No.3.179	1999