



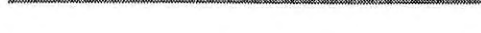


ANNEX 1A Plan of Operation (Monitoring, assessment and countermeasures to marine pollution)

別添 5. PO (第 1 次案)

Out put	Activity (Big item)	Activity (Small item)	Content of Activities						Implementing Organizations	Responsible Organizations		
				1	2	3	4	5				
1. Pilot project to implement a participatory environmental monitoring and feedback program for the RMG to improve the management plan for responsible use of marine tourism sites and ports	1.1 Design of participatory environmental monitoring model for marine tourism sites as a pilot project	1.11 Training of PNG staff in water quality testing	1.11.1 Training in the use of equipment to measure water quality and pollution in ports and bays.									
		1.12 Training of PNG staff in monitoring the physical, chemical and biological changes occurring around marine sites related to human impacts	1.12.1 Training in ecological monitoring and analysis of trends detected in physical, chemical and biological issues.									
		1.13 Determine the level and trends of pollution from sewage and oil release and their relationship to human safety and biodiversity	1.13.1 Training in Data analysis and elaboration of reports with recommended measures to avoid health problems and biodiversity loss									
			1.13.2 Regular Monitoring in the marine tourism sites									
		1.14 Training in presentation of results to communities and establishing mechanisms for gathering discussing pollution abatement strategies	1.14.1 Training in production of material for difusion and communication products to divulgate the results of the monitoring program.									
		1.14b Training in production of Tv & Radio programs	1.14.b.1 Training to improve the quality of the production of material for difusion in radio and Television									
		1.15 Discussion of results of studies in island communities through community workshops and meetings	1.15.1 Preparation of workshops for discussion of results and use of the space provided by the regular meetings of the JMP.									
		1.16 Development of community based countermeasure management plan to reduce the levels of pollution in the marine environment	1.16.1 Develop a good management system based in community commitment to reduce the levels of pollution in the marine environment									
			1.17 Design of participatory monitoring program for pollution in port areas	1.17.1 Establish the school capacity (teacher training) to conduct the student research program for pollution monitoring in local high schools								
		1.17.2 Develop a school student research program for pollution monitoring in local high schools										
	1.17.3 Establish a periodical monitoring program with schools, environmental police, fishermen, and other sectors of the community, to determine the pollution in port areas.											
	1.18 Establish community based g clean beach h program for primary and high schools	1.18.1 Improve the design of the clean beach program to guarantee the active participation of primary and high schools										
		1.18.2 Community based "clean beach" program implemented with regular activities										
	1.2 Develop community stewardship program for coastal and marine areas	1.21 Conduct field trips for high schools to monitor pollution levels in the marine environment	1.21.1 Periodical field trips conducted through the transportable learning resource center to the different sites of the GMR									
			1.22.1 Creation of the citizen group for coordinatng and promoting pollution awareness building at the local level									
		1.22 Establish a citizens group for coordinatng and promoting pollution awareness building at the local level	1.22.1 Communal meetings held by the citizens group to discuss about pollution and coordinate mitigation measures									
			1.23.1 Dessign of the Galapagos "Ranger" program in the high schools									
		1.23 Develop a Galapagos "Ranger" program in the high schools	1.23.2 Implementation of the Program in all the schools of Galapagos									
	1.23.3 Incorporate the work of the Galapagos Scout Group into this activity.											
	1.3 Promote the activities of the community efforts in national and international campaigns		1.31.1 Design of the campaigns & revision of distribution channels									
1.31.2 Production of divulgation material												
1.31.3 Campaign Implemented												

 = staff of Marine Resources unit, Environmental education and Communication
 = staff of Environmental education and Communication
 = staff of Marine Resources Unit
 = Community + staff of Marine Resources unit, Environmental education and Communication
 = citizen groups

ANNEX 1A

Plan of Operation (Provision of community communication and feedback system to improve awareness, education and participation in marine reserve activities)

Out put	Activity (Big item)	Activity (Small item)	Content of Activities	1	2	3	4	5	Implementing Organizations	Responsible Organizations	
2. Implementation of cross-sectoral community communication and feedback system to enhance management and decision making in natural resources and conservation	2.1 Capacity building within island school system	2.12 Training for school teachers in the concepts of RMG conservation and sustainable development	2.12.2 Workshops for the training of school supervisors								
		2.13 Development of Curriculum on sustainable use and practices in RMG and other important sites	2.13.1 Supervision and advise to the process of curriculum reform in Galapagos.								
			2.13.2 Support and implementation of the strategy of Communication, Training and education of the RMG								
			2.13.3 Difusion of the strategy								
		2.14 Improved access to global information related to sustainable development and conservation	2.14.1 Ddesign an internet broadcasting system accessible to local users.								
			2.14.2 Installment & Test of the system (Hardware and Software)								
			2.14.3 Building local capacity for the management and maintenance of the system.								
		2.15 g On the job training h programs for High School students in RMG related careers	2.14.4 Supply the information edited and the audio visual material to be broadcasted.								
			2.15.1 Ddesign the program and the regulation to administer it. Put efforts to integer it to the annual operative plans of the PNG offices of the 4 islands								
			2.15.2 Promote the program into Galapagos and by internet								
	2.2 Regular and timely Information exchange system from PNG to Island communities on RMG	2.16 Training of teachers in relationship building activities to increase harmony between parents, teachers, PNG and CDRS	2.15.3 Implementation of the program								
			2.16.1 This item is a cross activity, therefore, it should be included in all the activities related to education in this component.								
			2.16.2 This item is a cross activity, therefore, it should be included in all the activities related to education in this component.								
		2.17 Creation of an internet culture in the schools, therefore the children will use that tool for research, communication and amusement.	2.17.1 Training of teachers in use of PCs for information searches								
			2.18.1 Park Support for the design of web pages.								
			2.18.2 Preparation of materials by School teachers & students to be included in the web pages.								
		2.18 Raise profile of schools and children conservation activities through school home pages	2.18.3 Follow up to the home page to give the capacity to the school teachers to update them.								
			2.21 Community notice boards set up	2.21.1 Complete the display of community notice boards in all the 4 inhabited islands.							
	2.21.2 Ddesign a system to involucrate different institutions (sectors) to update and post their news and announcements in the Community notice boards.										
	2.21.3 Updating of the Community notice boards										
2.22 News bulletins prepared and distributed by PNG to communities via internet	2.22.1 Ddesign of the bulletin structure and establish the periodicity of updating.										
	2.22.2 Updating of the news bulletin										
2.3 Strengthening the capacity of JMP to improve information flow to members	2.31 Communication skills training	2.23.1 Development of a communication system from representatives to members of the bases									
		2.23.2 Publication of this information in the news bulletins, community notice boards and other means identified by the project program management unit.									
	2.32 Information newsletter is distributed to community	2.32.1 Ddesign of a newsletter									
2.4 base line survey on socio-economic conditions of Galapagos inhabitants	2.32.2 Printing of the newsletter and distribution to the local community and the JMP & AIM										
	MASTER PLAN										

ANNEX 1A

Plan of Operation (Monitoring, assessment and provision of management advice on the effects of oceanographic variability on productivity and recruitment)

Out put	Activity (Big item)	Activity (Small item)	Content of Activities	1	2	3	4	5	Implementing Organizations	Responsible Organizations
3. A precautionary resource management and conservation model that takes into account changes in coastal productivity associated with fluctuations in oceanographic factors	Development of predictive models of coastal productivity changes associated with Cromwell upwelling		1. Japan Long term expert on biological oceanography	█	█	█	█	█		
			2. Japan Long term expert on biological oceanographic coupling	█	█	█	█	█		
			3. Japan Short term expert on plankton surveys and larval analysis	█	█	█	█	█		
			4. Japan short term expert on DNA analysis for stock and species discrimination	█	█	█	█	█		
			5. Japan expert on database modelling and mapping of ocean processes	█	█	█	█	█		
			JOCV to assist with data collection and on sea trips and dive surveys, seabed mapping, species identification and photography	█	█	█	█	█		
			Fitting of equipment for bio-oceanographic survey cruises to Guadeloupe River - Towed ocean profilers/Deck mounted wetlab/Deck mounted winch and other hardware	█	█	█	█	█		
			Acquisition of 25 metre sailing research/training boat (see transportable learning resource centre TLRC-A to be used in all output activities)	█	█	█	█	█		
			1. Oceanographic and biological monitoring surveys in GMR using Guadeloupe River. 3 - two- week surveys per year to monitor currents, CTD, Key indicator plankton	█	█	█	█	█	GNPS	GNPS
			2. Laboratory analysis of survey data	█	█	█	█	█	GNPS	GNPS
	3. Training of counterpart staff in zooplankton analysis of key indicator species - Larval stages of commercial species during dispersal and settlement and their primary food prey using short term experts	█	█	█	█	█	JICA	GNPS		
	4. Training of counterparts in DNA testing to determine stock discrimination in lobster, sea cucumber and other commercially important species	█	█	█	█	█	JICA	GNPS		
	1. Analysis of SEAWIFS satellite imagery to determine macro level areas of chlorophyll production	█	█	█	█	█	CDRS	CDRS		
	2. Ground truthing primary productivity data through water quality sampling program around Isabela (nutrient analysis, chemical analysis etc)- using TLRC-A	█	█	█	█	█	GNPS - CDRS	GNPS		
	3. Diver surveys to map sea bed habitats and correlate settlement and survival with ocean productivity - using TLRC-A	█	█	█	█	█	GNPS			
	4.1 Construction and deployment of collectors for settlement of larvae of lobster and sea cucumber to determine settlement patterns - Pilot project for one year. Use TLRC-A/10 days days per month	█	█	█	█	█	GNPS	GNPS		
	4.2 Routine monitoring of larval settlement in selected sites and zones during times of peak settlement from TLRC-A	█	█	█	█	█	GNPS	GNPS		
	5. 1 Development of models that predict the level of productivity in coastal areas and strength of recruitment for commercial species	█	█	█	█	█				
	5.2 Input data into GMR management plan as part of adaptive management strategy	█	█	█	█	█				
	Improve management and governance of resources	Improve reliability of resource management models by modelling effects environmental fluctuations on productivity, recruitment and stock discrimination	Map out spawning, drift and recruitment processes and couple to zones	Model coupled data data collected from surveys, settlement studies and oceanic variability	█	█	█	█	█	
Set up data base of bio-oceanic data				█	█	█	█	█		
Data input and and display over internet				█	█	█	█	█		
Participation of schools and school leavers in sea based oceanographic monitoring program - "Research is Fun" program to prepare them for work in marine related activities - This work to coordinate with community feedback component	Communication of data to community of resource users	Feedback of information to community. Production of newsletters and community notice boards on results of activity and implications for fishing, income and management - 1 newsletter every month and 1 community notice sheet every 2 weeks. Through JMP		█	█	█	█	█	GNPS	GNPS
			Training of teachers in ship based delivery of training programs	█	█	█	█	█	GNPS	GNPS
			Teacher training curriculum workshop 3 x 1 week workshops per year in three islands	█	█	█	█	█	GNPS	GNPS
Participation of schools and school leavers in sea based oceanographic monitoring program - "Research is Fun" program to prepare them for work in marine related activities - This work to coordinate with community feedback component	Development of boat based training curriculum and projects for schools	Preparation of materials, learning objectives, course curriculum		█	█	█	█	█	GNPS	GNPS
			Delivery of training programs to school children and school leavers	█	█	█	█	█	GNPS	GNPS
Participation of schools and school leavers in sea based oceanographic monitoring program - "Research is Fun" program to prepare them for work in marine related activities - This work to coordinate with community feedback component	Delivery of training programs to school children and school leavers	3 visits to each island per year for 2 weeks of on board training and classroom studies using TLRC-A		█	█	█	█	█	GNPS	GNPS
				█	█	█	█	█	GNPS	GNPS

ANNEX 1A Plan of Operation (Provision of a marine tourism impacts)

Out put	Activity (Big item)	Activity (Small item)	Content of Activities	1	2	3	4	5	Implementing Organizations	Responsible Organizations		
4. To develop a Park Management Plan to monitor the impacts and regulate the carrying capacity of selected marine sites			JICA Long Term expert in Marine Park Management and developing protocols for monitoring and implementing carrying capacity of marine sites and diving skills	█	█							
			JICA Long Term expert in Environmental impact assessment			█	█	█				
			JICA Short Term Expert in Water quality analysis		█							
			JICA Short Term expert in modelling carrying capacity of marine sites									
			JICA short term expert - Marine Biologist with expertise in underwater video analysis of flora and fauna		█							
			JOCV with skills in working with community empowerment									
			JOCV with skills in underwater photography									
	Impact assessment of dive sites	4.1 Design of marine tourism impact assessment monitoring program	4.11 Preparation of work plans							GNPS - CDRS	GNPS	
			4.12 Preparation of survey methodologies							GNPS - CDRS	GNPS	
			4.13 Conduct survey of marine tourism sector		█						GNPS - CDRS	GNPS
			4.14 Set up database for data collection		█						GNPS - CDRS	GNPS
			4.15 Train divers from community in survey techniques		█						GNPS - CDRS	
		4.2 Research monitoring program	4.21 Survey of selected dive sites on 4 month basis - Use TLRC-AI				█	█	█	█	GNPS - CDRS	
			4.22 Survey of selected dive sites, collection of water and tissue samples and CTD - Use TLRC-AI				█	█	█	█	GNPS - CDRS	
			4.23 Survey of dive sites for biological information, flora/fauna, megafauna and population / conditions of seabirds - Use TLRC-AI				█	█	█	█	GNPS - CDRS	
			4.24 Survey of dive sites for amount of garbage and its origins - Use TLRC-AI				█	█	█	█	GNPS - CDRS	
			4.25 Train counterparts in measuring contaminants in water column and tissue samples for Coliform bacteria, hydrocarbon analysis, heavy metals		█						GNPS - CDRS	
			4.26 Train counterparts in marine species identification - 1 week workshop		█							
			4.27 Training counterparts land species and mega fauna identification		█							
			4.28 Training in video survey techniques, underwater camera use		█							
			4.29 Training in presentation of results in workshops		█							
		4.3 Participation of schools in tourism monitoring	4.31 Sail training programs are developed for schools and teachers for marine tourism monitoring									
	4.32 Teaching training workshops in marine curriculum development											
	4.33 School work books and lecture material developed											
	4.34 Delivery of school sail training programs in marine tourism monitoring											
	4.35 Information from monitoring programs integrated into curriculum											
	Develop new rules and protocols for measuring carrying capacity, monitoring tourism impacts and minimizing effects of marine tourism activities	4.4 Develop adaptive management model for marine tourism	4.41 compilation and analysis of data on marine tourism surveys									
			4.42 modelling of data on marine tourism sites, setting criteria for classifying the condition of marine sites									
			4.43 Develop a user friendly manual for managers, park rangers and tour guides on how to monitor tourism impacts									
			4.44 Workshops with JMP and GMR resource users in development of monitoring programs and results of impacts at various zones and tour sites									
4.45 Workshops with JMP and GNPS, tour operators and guides on how the new rules benefit tour operators and GMR												

ANNEX 1A Plan of Operation (Employment diversification and professionalization)

Out put	Activity (Big item)	Activity (Small item)	Content of Activities	1	2	3	4	5	Implementing Organizations	Responsible Organizations	
5 An income diversification strategy and professionalization program for the fishing family workforce to reduce dependency and fishing pressure on heavily exploited resources			JICA Long Term Expert in Community Based Management								
			JICA Long Term Expert in Socio-economics								
			JICA Short term expert in ecotourism promotion								
			JICA Specialist in skills development in Artisanal sector								
			JOCV person who can assist with marketing and promoting handicrafts								
			JOCV person who can assist with handicraft design and development								
			JOCV person with interest in sport fishing								
	5.1 Organizational strengthening of fishing families	5.1.1 Surveys of fishing families	5.1.1.1 Survey design for income and earnings								
			5.1.1.2 Conduct survey of fishing communities								
			5.1.1.3 Economic evaluation of artisanal fisheries								
			5.1.1.4 Economic evaluation of income diversification activities								
		5.1.2 Leadership training in cooperatives	5.1.2.1 Workshops of leadership building capacity to the members of Cooperativas pesqueras of Isabela, San Cristobal and Santa Cruz								
			5.1.2.2 Exchange of experiences of fishermen leaders of Galapagos and Fishermen associates from Costa Rica (or other place with on going JICA's projects)								
			5.1.2.3 Support to the cooperatives in analyzing data collected from PMP Surveys								
		5.1.3 Training in interpretation of RMG laws and forward thinking strategies when exploitation pressure is too high	5.1.3.1 Workshops and training provided to members of fishermen cooperatives & their families in legal advice and the interpretation of the management and legal frame of the GMR								
			5.1.4.1 Design a survey of artisanal fishers to identify specific trains								
		5.1.4 Training in business management skills and sustainable development activities	5.1.4.2 Training in basic skills in accounting to some members of the Cooperatives (popular accounting system)								
			5.1.4.3 Assistance in the development of a mutual fund of the Cooperative (multipurpose: equipment, others)								
			5.1.4.4 Training in creation of microenterprise and mechanisms to access to credits								
			5.1.4.5 Training in planning and project design								
	5.2.1.1 Assessment of the interest of the fishermen group to become eco-tour guides (diving guides) and market study for that activity										
	5.2 Income diversification to reduce pressure during times of resource declines	5.2.1 Professional certification of fishers as Eco-tour guides (This activity has to match with the regulation of Tourism in protected areas by first months of 2003 and depends on the needs and requirements identified by this regulation).	5.2.1.2 Design of courses to fulfill the requirements established by the PNG for the diving guides (Dive master license, Basic knowledge of English, Support of an Diving agency)								
			5.2.1.3 Assessment of the needs of training material of the Cooperatives								
			5.2.1.4 Design, validation and publication of the material								
			5.2.1.5 Workshops of training in which the materials are distributed .								
			5.2.1.6 Evaluation of the training								
			5.2.1.7 Pamphlets for diving tourist and a guide for the management of solid waste and what to do with the garbage. A guide for the governance of Galapagos, and others.								
			5.2.2.1 Survey to identify potential handicraft problems with quality and interest to diversify and value add								
		5.2.2 Training of creation of microenterprise (small bussines)	5.2.2.2 Training in product diversification & quality improvement of handicrafts								
			4.2.2.3 Design and prototype construction of new handicraft products								
5.2.3 Internet Promotion of efforts of island communities to "self regulate" pressures on resources through income		4.2.2.4 Bussines management and client service training									
	5.2.3.1 Ellaboration of periodic articles for the web-newsletter										
	5.2.3.2 Design of promotional material										
	5.2.3.3 Updating system with carnets (duration of 2 years)										

	Title/Abstract	C/P	Relating Org.	Lack of	Other Donation	JICA 協力の可能性	Prior-ity
1	移入種の駆除 モータ、カスカージャ（キニーネの原料）、プランターナ（庭木として導入）の駆除。サンクルス島のように生育するカスカージャは生活史が不明であり、この部分についての研究も必要。	PNG/CDRS	CABI （世界生物コントロール機構）	資金・技術	GEF/UNF	駆除のみであれば JOCV を投入 専門家は CABI にいるとのことなので、日本から行く余地は無しと思慮。	6
2	吸血ハエに関する調査 サンクリストバル島に生育し、バナナについて移入された可能性がある。	PNG/CDRS		資金		可能性は無しと思慮	
3	移入種モニタリングに関するシステムの構築 昆虫のトラップを設置し、常にモニタリングを行う。SESA（検疫機関）はスタッフの能力が低いので研修も必要。	PNG/CDRS/SES A		技術		長期（昆虫生態）と短期の組み合わせ。	1
4	放置された農地の対策 市街地近郊で放置された農地が移入種の温床になっているため、農民へのインセンティブを与える（研修、訓練）。	PNG/CDRS		技術	TNC/SACHA F （興味を示している程度）	農民指導の長期専門家または JOCV を投入	4
5	潜在自然植生の再現と環境教育への利用 放置された農地等での植生復元を、環境教育と組み合わせて行う。（公園外の私有地）	PNG/CDRS		技術		1（簡単）植生復元＋環境教育の事業として JOCV を投入。 2（複雑）ピットフ計画とすると長期＋短期＋ JOCV が必要。科学的な側面は CDRS の全面的なバックアップが必要と思慮。	5
6	植生図の作成 基礎情報としての植生図作り。多くの NGO 等が興味を示すが、結果を持ち帰ってしまうので PNG に根付かない。空軍が来年以降にスペインの援助でガラパゴス全体の白黒航空写真を撮影する予定。移入種のモニタリングにも応用可。	PNG/CDRS	MILITARY (IGM)	資金（機材） ・技術	NGOs	植生図作成のための技術移転。（内容自体はそれほど困難ではない）精度にもよるが、基本的にはフィールド調査が主で航空写真に落とす。地形測量から始めると開発調的査になってしまうので、「特定地域での技術移転」か？ある程度まとまった専門家の投入が必要と思慮。	3
7	GIS の導入とインターネットでの発信 GIS を構築しインターネットで発信する。PNG のスタッフは GIS ソフトは使えるが、そもそもの GIS 化についての技術がない。	PNG/CDRS		資金（機材） ・技術		地形測量や基本情報集めから始めると開発調的査になってしまうので、「特定地域での技術移転」か？ある程度まとまった専門家の投入が必要と思慮。＋機材供与が大	2

	Title/Abstract	C/P	Relating Org.	Lack of	Other Donation	JICA Project Possibility & Input	Prior-ity
1	Extermination of introduced species.	PNG/CDRS	CABI	Money & Technology Transfer	GEF/UNF	Extermination works can be conducted by JOCVs. Because of experts exist in CABI, there is no need for JICA experts.	6
2	Study of bloodsucker fly	PNG/CDRS		Money		Does not fit the JICA scheme.	
3	Development of the introduced species monitoring system	PNG/CDRS/SES A		Technology Transfer		A long term expert of entomology (ecosystem) is required. Short term experts can be considered.	1
4	Countermeasures for uncared agriculture lands	PNG/CDRS		Technology Trancefer	TNC/SACHA F	Guidance on management of uncared for agriculture lands can be conducted by a long term expert and/or JOCVs.	4
5	Restoration of potential natural vegetation and application to environmental education programme.	PNG/CDRS		Technology Trancefer		(Basic) Restoration of vegetation and environment education can be conducted by JOCVs. (advanced) Biotope construction in uncared agriculture lands can be conducted by long & short term experts and JOCVs. Strong scientific supports from PNG and CDRS are necessary.	5
6	Vegetation mapping	PNG/CDRS	MILITARY (IGM)	Money (Equipment) & Technology Trancefer	NGOs	Technology transfer on vegetation mapping by drafting of a specific area of the park. A team of JICA long and short term experts such as mapping, field research and aerial photography is necessary. Geographical survey is not fit the JICA scheme.	3
7	Introduction of GIS and access to map data via Internet	PNG/CDRS		Money (Equipment) & Technology Trancefer		Technology transfer on GIS mapping by drafting of a specific area of the park. A team of JICA long and short term experts such as GIS and information technology and provision of computer facility is necessary. Geographical and basic information survey does not fit the JICA scheme.	2

別添 7. 長期専門家の分野－期待される成果

「コミュニティを基盤とした管理 (Community Based Management) / チーフ・アドバイザー」

成果 2. 自然資源保全に関する管理・意志決定システムを強化するための、地域社会セクター間の意志疎通とフィードバック・システムが構築される。

「フィールド海洋学 (Field oceanographer)」

成果 3. 海洋学的要素の変動に起因する沿岸生産性の変化を考慮した予防的な資源管理と保全モデルが作成される。

「環境教育・社会経済/業務調整 (Curriculum design in environmental education, socio-economics)」

成果 4. 高度利用資源への依存性・漁獲圧を軽減するための、漁家労働力収入多様化戦略と職業訓練プログラムが実施される。

「汚染モニタリング (Pollution Monitoring)」

成果 1. ガラパゴス海洋保護区内海洋観光地、及び港湾部の責任ある利用計画推進のための、参加型環境モニタリングとフィードバック・プログラム実施のためのパイロット・プロジェクトが実施される。

「海洋保護区管理 (Marine Park Management)」

成果 5. 特定の海洋観光地における観光活動による影響のモニタリングと管理のための能力が向上する。

別添 8. 現地で受領したプロジェクト・プロポーザル（抜粋）

なお、1.については、3月7日夜に説明を受け、2.については6日に受領した。

1. INOCAR (Oceanographical Institute) – GNPS

総合的環境管理パイロットプロジェクト

- (1) サイト： 面積が広く、観光スポットが多く、人為的影響が最も少ないイサベラ島
- (2) 目的： 植生・水・土壌へのインパクトについて、ラボでの研究を通して総合的な環境管理を目指す。
- (3) 研究内容： ナマコ・マグロ等の漁獲許容量、エル・ニーニョ現象、気象学的変化、環境修復手法、自然生息地の保護
- (4) ラボ（スタッフ35名が収容可能なドミトリー、多目的ラボ、会議室、講堂、水族館、環境教育センター）
景観を破壊しない、汚水処理施設を併設、代替エネルギー、雨水使用、自然環境と共生、村民の健康に留意、廃棄物処理という点に留意したラボを建設する。
- (5) 小道： プエルト・ビジャミルの湾の半島に観察用の小道をつくる。漁業・観光資源、特殊な海洋生物がサンゴ礁等により外海から守られている。

→フィージビリティ・スタディ、基礎設計に対して財政支援を依頼したい。
テキサス大も好意的な反応

☆INOCAR の組織：Institute Oceanografico（海軍海洋研究所）

設立法により、海洋学研究を実施する機関として定められている。

エクアドル全海域の海図、船舶支援・海上標識を担当している。

IMO、国際水文学機構へ代表を送っている。

海洋学研修船を持ち、20名程度の乗組員がいる。他の機関・大学と共同で南極、南西太平洋で研究している。

機関全体ではスタッフ250名がおり、そのうち、50名が軍人。他は軍の技術者、科学者、スタッフ。全軍人は水文・海洋の専門で、大卒または工学の修士を持っている。

海洋研究を行う実力的な力を持つのが海軍のみであるため、海軍の機関が海洋研究をしている。関心は環境が維持されること、NGOを作る必要があるなら、海軍としては全く問題ない。

☆CDRS との研究面での関係は。

国内、国際のいかなる組織にも Open にしている。

CDRS は高いレベルの研究をしていると評価しており、海洋学的研究面では近海では力を持っているが、沖合の研究は弱い。

☆INOCAR の予算は。

海軍として政府からは、軍人の人件費が出ている。

INOCAR の自己収入として、灯台・ブイの使用料、入港料があり、80%が自己収入。

研究所は軍人が関与しているが平和的な研究活動のみをしている。

研究所の関心事は、ガラパゴスの自然保全に関する研究活動がうまくいくようにということ。

2. サンタクルス島沿海漁業組合（COPROPAG）集荷場建設

1.1 プロジェクト名：サンタクルス島沿海漁業組合集荷場建設

1.2 実施場所：ガラパゴス州サンタクルス島プエルトアヨラ

1.3 プロジェクト概要：第一段階として製氷工場を建設し、その後集荷場を建設する。

1.4 プロジェクト期間：6ヶ月

1.5 要請機関：ガラパゴス沿海漁業組合（本部サンタクルス島）

1.6 責任機関：プロジェクトは PRODEIN が COPROPAG、ガラパゴス国立公園、その他のドナーと協力して実施する。

1.7 実施機関：PRODEIN 代表者一名、アラウカリア代表者一名、組合長及び組合マネジャー、その他のドナー代表各一名による実行委員会を設立する。

1.8 プロジェクトコスト：プロジェクトは現在設計中であり、参考コストは総額 444,000 ドル（設備機械 250,000 USD、施設 80,000 USD、事務機器 20,000 USD、研修 43,600 USD、人件費 50,400 USD）である。

1.9 各機関のインプット：アラウカリアはこのプロジェクトの重要性を認め、必要な設備を提供する旨約束した。又、その他の設備コストには借入金を当てる。又、環境アセスメント、社会経済フィージビリティ調査、製氷工場、集荷場の運営についての技術研修、技術援助、市場調査などは PRODEIN が実施する。その他の支援は INGALA を通じて拠出される。又、村当局が石材を提供する。

重要な協力を行うのは INGALA で、設備機械に関する技術調査のコストを拠出する。この調査は機材の販売店でもある REFRISA という企業が実施する。漁業の最適化プロセスについては、沿海工科大学が COPROPAG との協定に基づいて指導を行う。

1.10 受益者：サンタクルス島の漁民が漁業組合 COPROPAG を通じて受益者となる。組合員は 235 名。ガラパゴスにおける一世帯当たり人数は 4.6 名なので、受益者総数は 1,081 名となる。これらは直接に漁業で生計を立てている人々である。間接受益者としてはガラパゴス島住民全員を挙げることができる。海産物が入手し易くなる、より均衡の取れた食生活ができるようになる、観光業へのサービスが改善される、などの利点が挙げられる。これらのことにより、ガラパゴス諸島の漁民の経済状況が改善され、地域経済の活性化につながる。

2.1 経緯

ガラパゴス諸島の沿海漁船は沿海漁業に従事し、島の沿岸部での漁業に努力を傾注してきた。これは基本的に沖合漁業に従事するための適切な技術を持たず、多額の資本も無く、多量の海産物を消費するような市場もなかったためである。

しかし、水深の浅い沿岸部での漁業にのみ携わるには漁船団は大きくなりすぎていると考えられ、漁船の数に対して労働力不足の状態にある。又、タラは基本的に地元での消費に向けられているが、ナマコやロプスターなど、より高価に販売できる海産物の漁期になると、地元市場へのたらの供給は事実上なくなるなど、漁には変動がある。又、沖合漁業を本格的に行うには地元市場が余りにも小さいと言う問題もある。

漁業活動の集中は漁業努力の拡大をもたらし、ガラパゴス諸島沿岸部の生態系に影響を及ぼしている。又、社会問題の源ともなっており、保護政策を立て、沖合漁業へと多様化を図ることが急がれている。

2.2 根拠

生物学的根拠：様々な魚種の健全な生息数を維持し、その量と生物多様性を維持し、漁獲

量や魚種の多様性が低下して漁業の収益性が維持できなくなることを防ぐ。そのためには漁獲努力の緩和が必要である。

規範上の根拠：ガラパゴス諸島の漁場は、主として2つの規範の対象となっている。一つはゾーニング、つまり、幼生生息地、商業漁業区、観光海域などの地域区分をすることである。もう一つは漁業スケジュールの設定で、禁猟期を設けること、それぞれの魚種について最小サイズの設定である。

経済的根拠：経済的根拠の一つが魚の品質、市場、加工、などで、プロジェクトにより、これらがいずれも改善されることにより、漁業の収益性が高まる。

社会的根拠：ガラパゴス諸島の伝統的活動である漁業セクターのコミュニティーへの参加度を、消費の面に於いても、雇用創出の面に於いても高める。もう一つの社会的根拠は漁業協同組合を計画立案や自己管理の手段として強化することにある。

2.3 戦略

漁場を多様化し、沖合漁業プロジェクトによってマグロ類など新しい魚種を商業漁業の対象とするなど、魚種を増加させて漁業セクターを再編成するため、この集荷場建設プロジェクトは次のような戦略に添って考えられている。

- 漁獲物の加工、保存、流通のためのインフラを整備し、地元市場、観光市場への出荷を調整すると共に、グリーンシールを付けた認証を与えることにより、国内、国際市場への参画を図る。
- 天然資源の持続的利用計画の一環として、有機廃棄物を利用する。
- 漁民が直接流通に携わることにより、沿岸漁業の収益性を高める。
- 商業漁業の対象となる魚種を広げ、生態系ベースを多様化し、漁業努力の分散化を図ることにより、漁業活動を再編成する。

2.4 一般目的

漁獲物の保存、加工、流通のためのインフラ整備を行うことにより、ガラパゴス諸島漁業組合の漁業活動、特に沖合漁業の収益性を高める。

2.5 個別目的

- ガラパゴス諸島の4つの漁業組合（COPRO PAGO、HORIZONTES、COPESAN、COPESPROMAR）の漁獲物に付加価値をつけるためのインフラ整備。
- 上記の4つの漁業組合が小規模企業として運営されるよう、経営能力を高める。管理能力の向上により、漁獲物の流通・販売によって生み出される余剰金を積み立て、組合に漁業セクター改善基金を設立する。
- 経済的・環境的な選択肢として、漁業セクターに沖合漁業の研修を行う。

2.6 プロジェクトの物理的概要

製氷工場、冷蔵室（冷凍室と保存室）、加工室、加工材料の保存倉庫、漁業材料倉庫、管理事務所、展示販売室、社交スペース、更衣室、守衛の宿舎、ガレージ

2.7 活動提案

全プロジェクトの工程を2つの段階に分けて実施する。第一次の段階では製氷工場だけを建設・使用する。しかし、第2段階を含め、全体像を持っていることは重要であり、これをモジュール式に段階を追って実施するべきである。PRODEIN が製氷工場のインフ

ラ施設を負担し、アラウカリアが設備を負担する。

フィージビリティ調査：アラウカリアと漁業協同組合が直ちに、集荷場の加工・保存・流通システムのフィージビリティ調査と建築設計を行い、同時に環境アセスメントを実施する。

研修活動：国立漁業研究所と全国協同組合指導部との間で協定を結び、次のような一般的な方向性の下に研修を実施することが提案されている。

- 協同組合の強化
- 集荷場・製氷工場の経営管理
- 加工、販売、品質管理、その他
- 航海術及び沖合漁業

2.8 期待される成果

- フィージビリティ調査、最終建築設計、環境アセスメント調査の実施
- 製氷工場施設の建設
- 機械設備の据付
- INP、SECAP、エクアドル海軍、全国協同組合指導部との間で協定を結び、研修プログラムを実施する。
- エクアドル海軍 航海機器の使用法
- 全国協同組合指導部 協同組合の運営管理

2.9 成果指標

- 製氷工場の据付、稼動状況
- 協同組合による製氷工場の会社経営状況
- 技術部門、管理部門の研修状況
- 組合の基本精神を十分理解している組合員（数）
- 法的に認められた法務代理業（数）

2.10 技術的指標

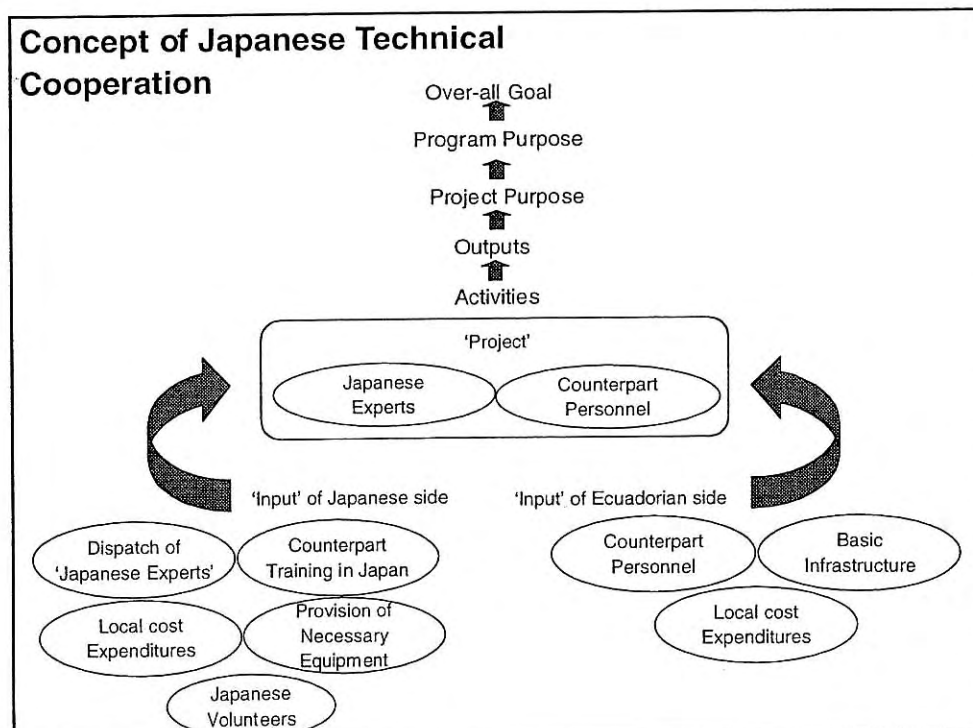
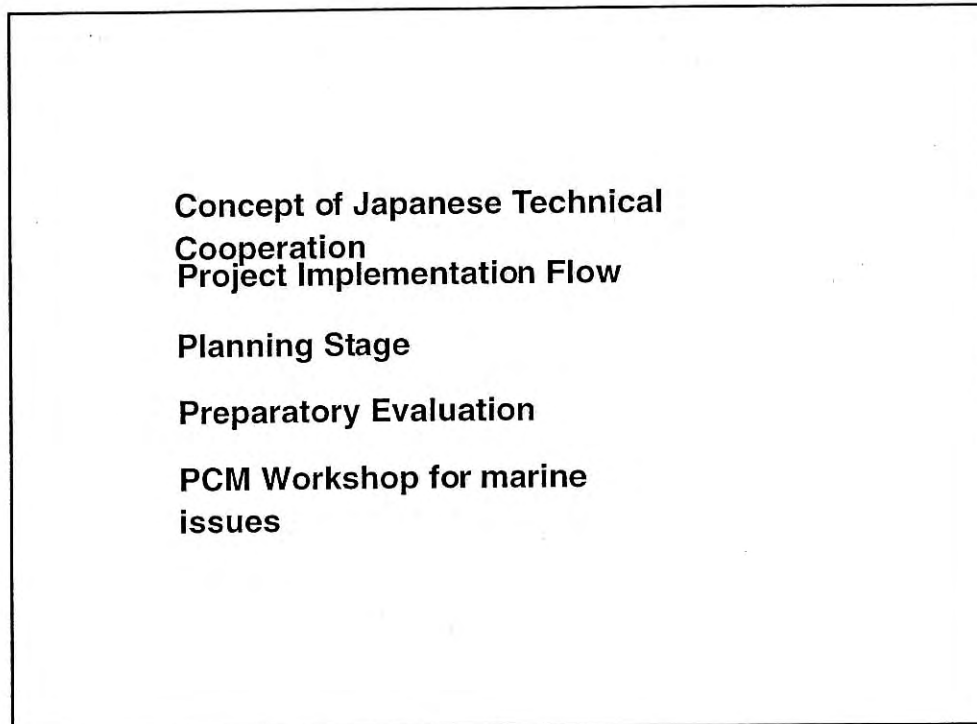
冷凍・冷蔵機器：2,500 ポンド用の冷凍ライン

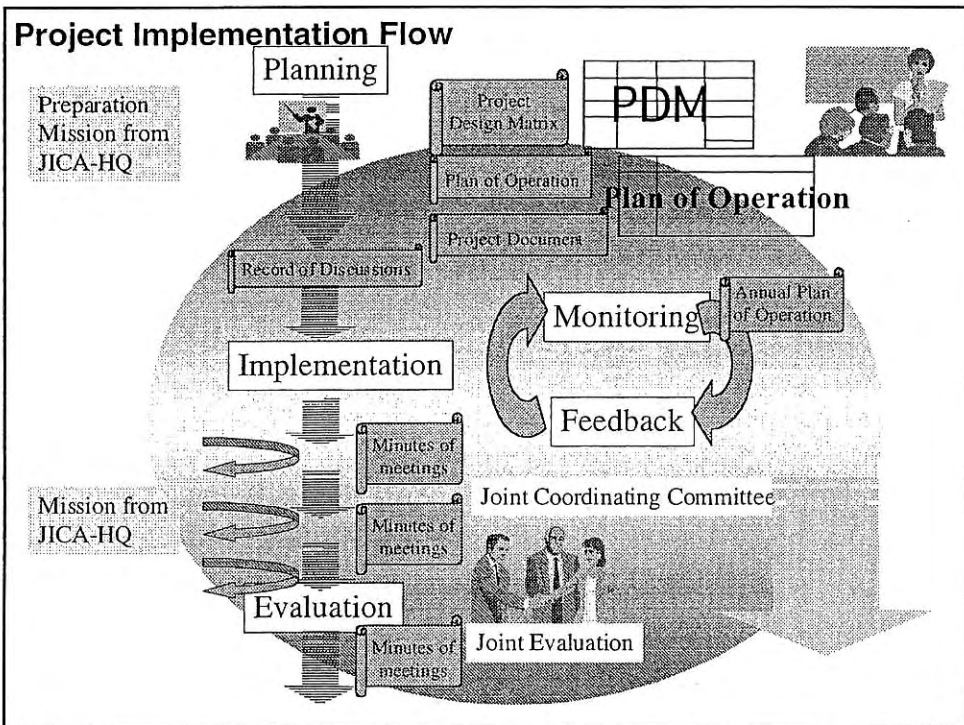
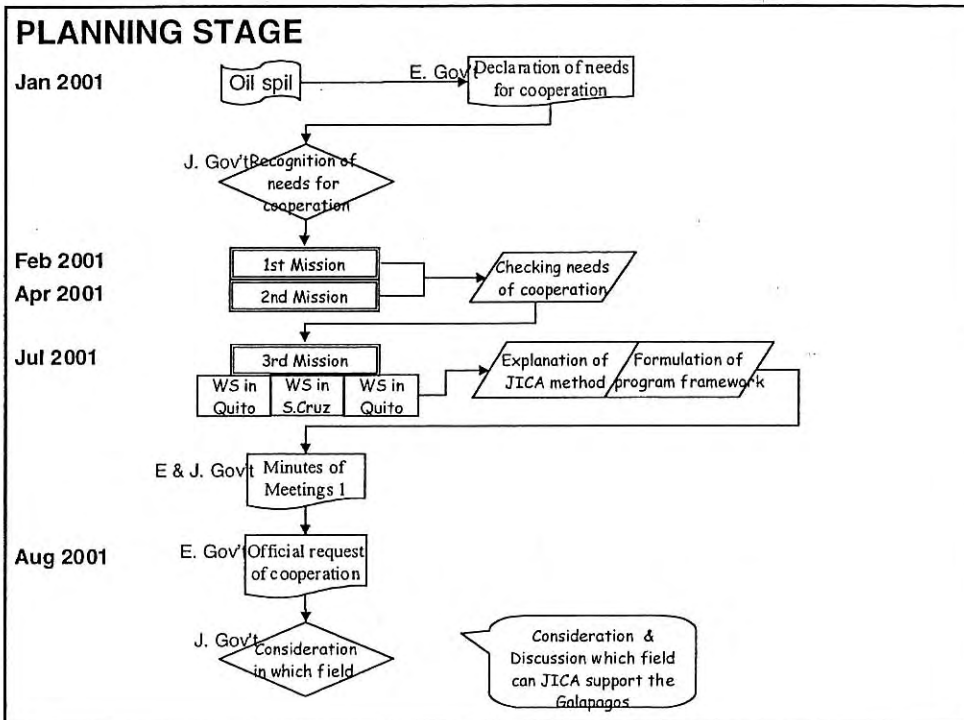
生鮮産品保存機器：冷蔵室 9,000 ポンド用

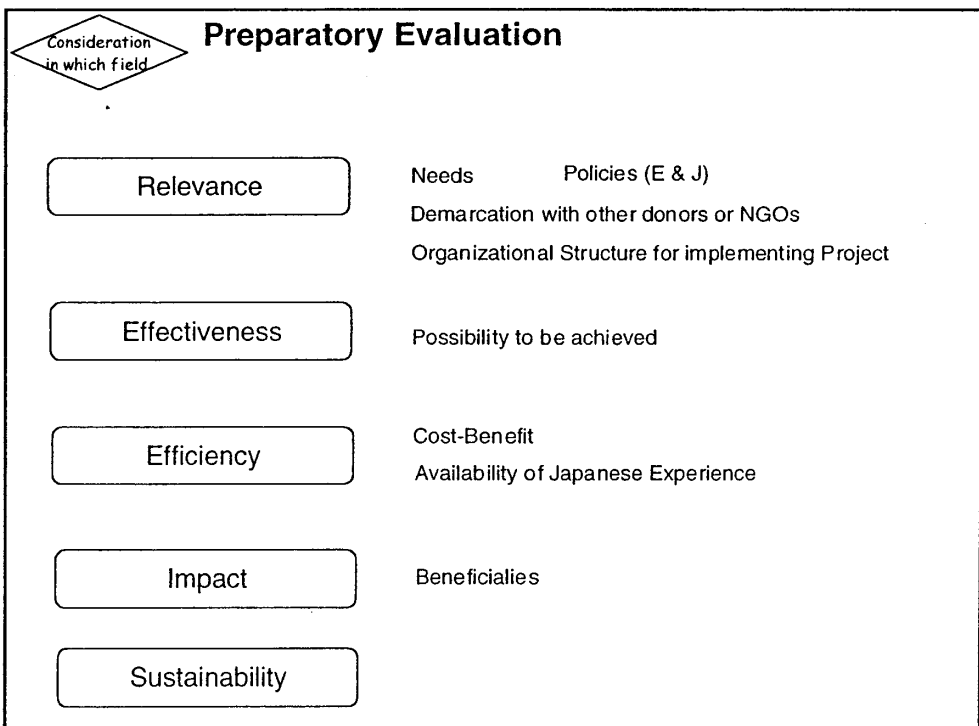
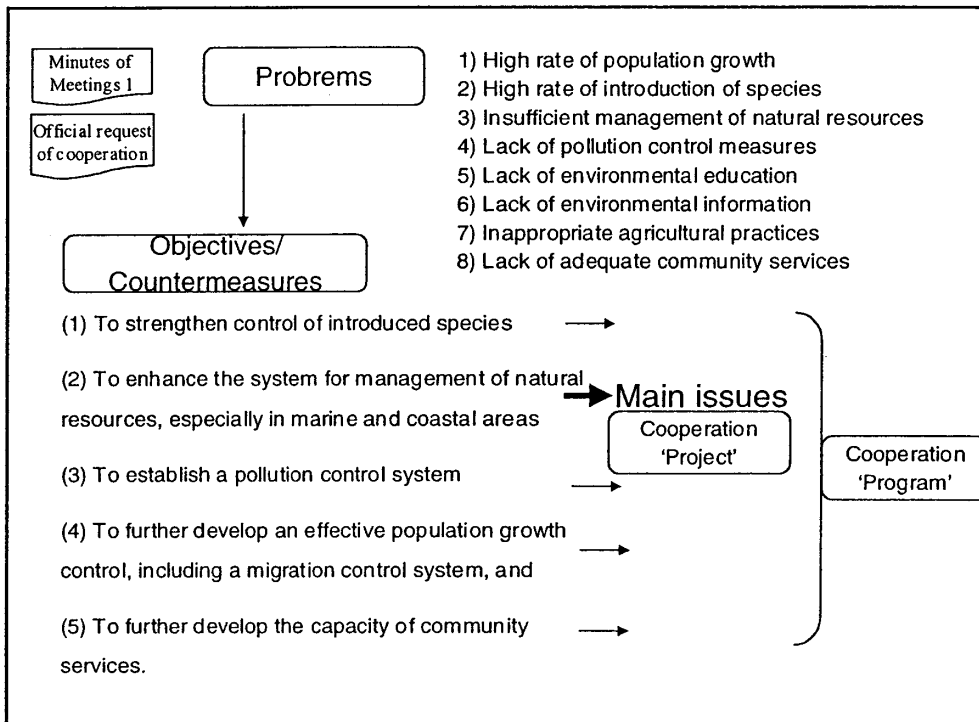
冷凍産品保存室：50,000 ポンド用、20 日分相当

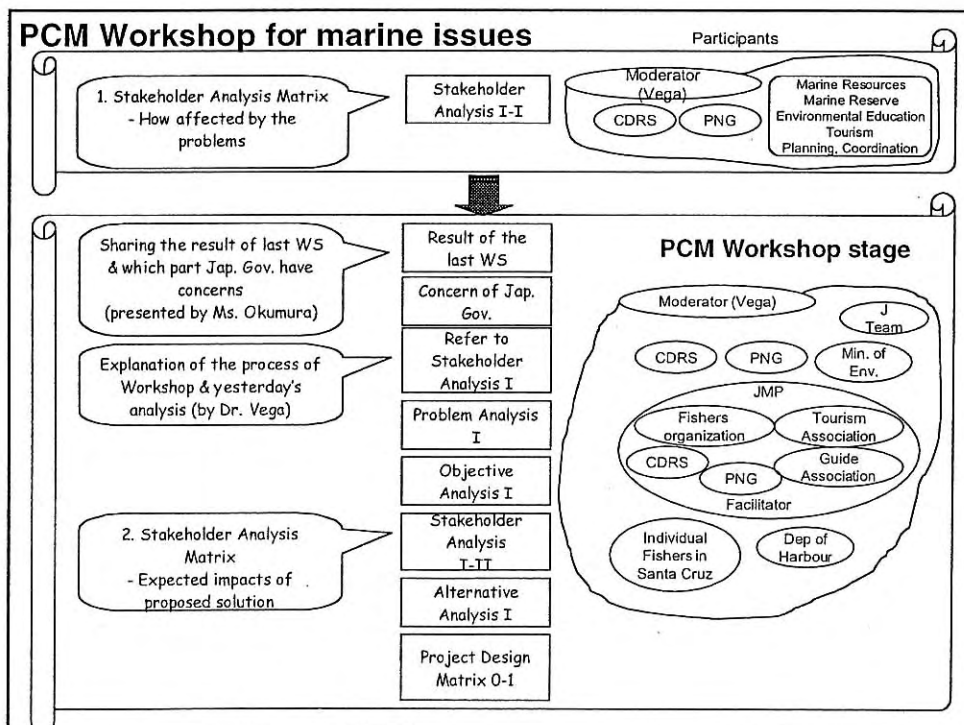
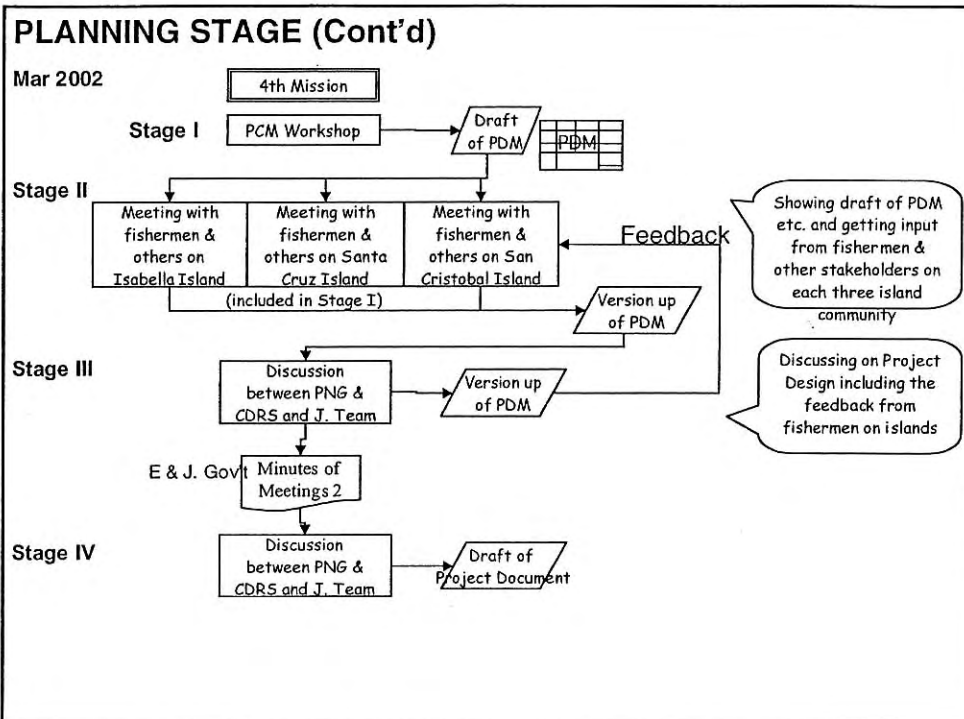
製氷機：34,479 ポンド（船舶用氷 22,096 ポンド、工場用 11,493 ポンド）

別添 9. ワークショップ開始時の説明に使用した資料









別添 10. 問題分析・目的分析を行う上で参考にしたコンセプト

Sustainability issues

The concept of sustainable development

The concept of sustainable development has resulted from perceived inadequacies of earlier models of economic growth and development which did not provide a broad enough base on which to make balanced judgements on the costs and benefits of various policies and tended to focus on short-term gains at the expense of longer-term aspirations.

Sustainable development is simply "development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs" (WCED, 1987). Development in this sense relates to the quality of life and should not be confused with economic growth, although obviously the two are closely linked within our modern world systems. Other definitions and rules for sustainable development elaborate on the above definition in various ways, for example:

Definition from FAO

"The management and conservation of the natural resource base, and the orientation of technological and institutional change in such a manner as to ensure the attainment of continued satisfaction of human needs for present and future generations. Such sustainable development conserves (land,) water, plants and (animal) genetic resources, is environmentally non-degrading, technologically appropriate, economically viable and socially acceptable" (FAO Council, 1988).

The above recognize that sustainability of activities that provide for human well-being, depend on the maintenance of environmental functions. These functions, directly and indirectly, contribute to human welfare. This refers to the capacity of natural processes and their components to provide goods and services, which satisfy human needs.

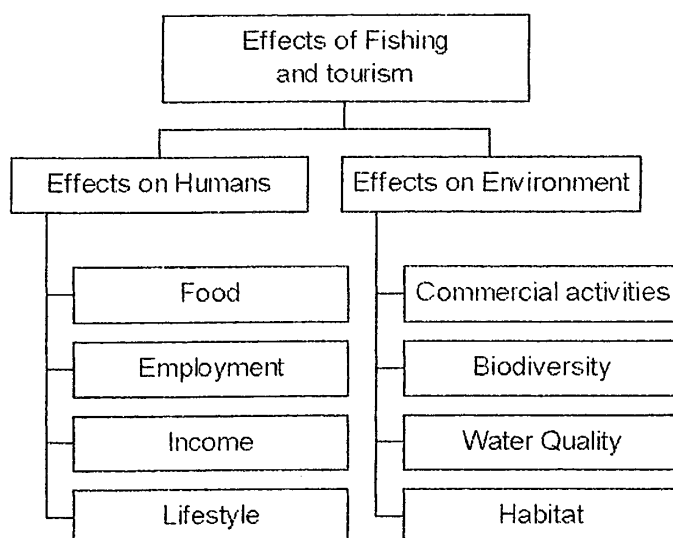
An ecosystems-based view of sustainable development focuses on maintenance of the stability and resilience of the ecosystem. Sustainable development recognizes the interdependencies of human economies with their environment, and highlights the need for scientific understanding of ecosystem functioning and change.

Sustainable development applied to the Galapagos Marine Reserve

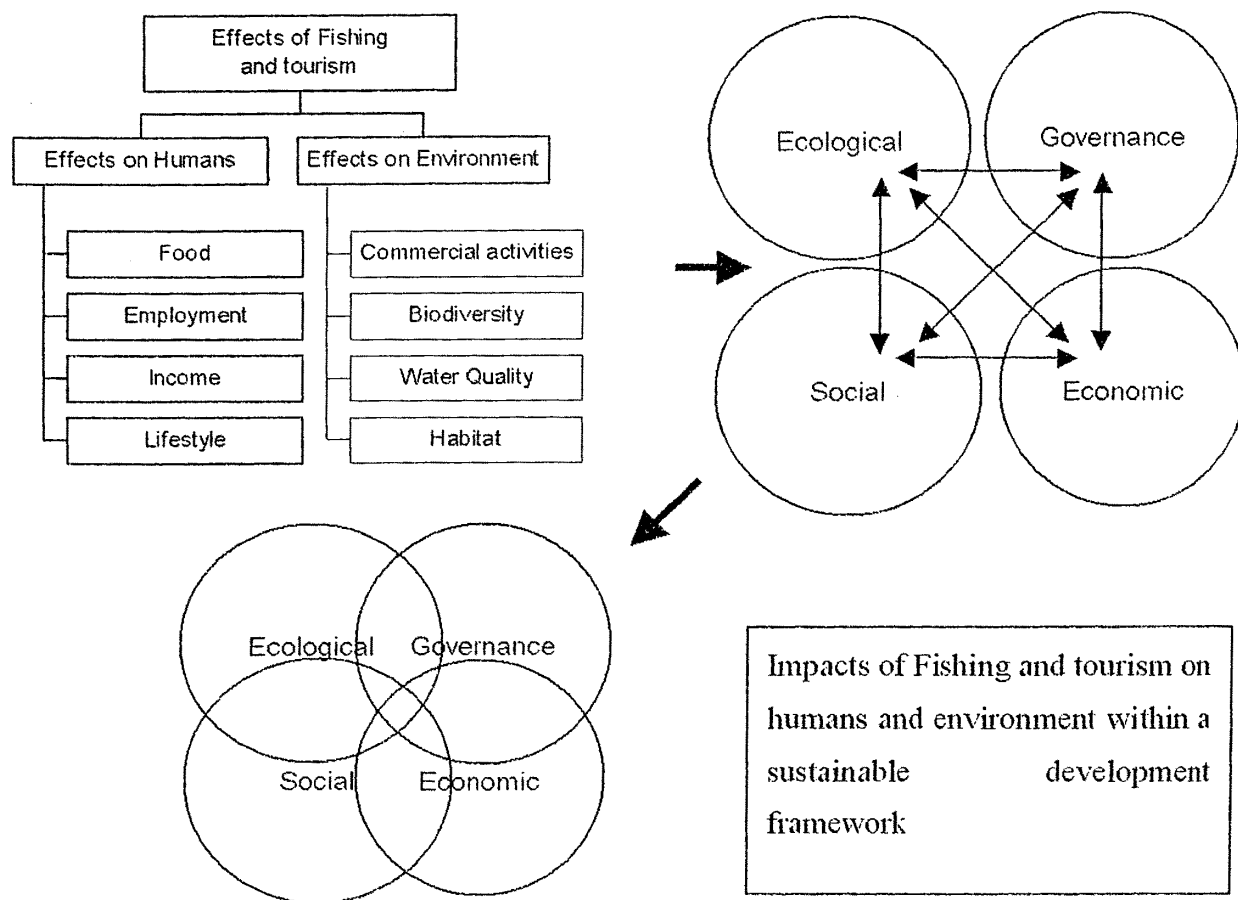
Human-induced changes in ecosystems, including changes caused by fishing and tourism, have the potential to jeopardize the welfare of current and future generations.

Sustainable development of fisheries and tourism requires improved governance and changes in the perspective of stakeholders to focus more on long-term outcomes. This requires:

- Increased awareness of factors beyond the conventional realm of fisheries and tourism management;
- Better integration of fisheries and tourism management into coastal area management;
- Control of land-based activities that degrade the marine environment;
- Stronger control of access to co-resources
- Stronger institutions and legal frameworks;
- Greater participation by all stakeholders in the fisheries management process;
- Improved collection and sharing of information about fisheries and their environment;
- Improved understanding of the socio-economic characteristics of fisheries; tourism sectors
- Stronger systems of monitoring control and enforcement;
- Measures to deal with uncertainty and variability in natural resource and ecosystem dynamics; and
- Strengthening community commitment to responsible use of natural resources.



Hierarchical Framework for Sustainable Development (modified from Chesson and Clayton, 1998)



Examples of indicators that can be used in sustainable development

Dimensions	Indicators
Economic	Harvest - Harvest value Number of tourists - Fisheries contribution to GDP Fisheries exports value (compared with total value of exports) Investment in fishing fleets and processing facilities Investment in tourist boats, hotels, dive equipment etc Taxes and subsidies Employment - Income - Fishery net revenues, tourism net revenues
Social	Employment/participation - Income Indebtedness (loans) Demography Literacy/education Protein/consumption Fishing traditions/culture Gender distribution in decision-making Level of conflict
Ecological	Catch structure - Relative abundance of target species Exploitation rate Direct effects of fishing, tourism on non-exploited species Indirect effects of fishing: trophic structure Direct effects of human activities on habitats - Biodiversity (species)

	Change in area and quality of important or critical habitats due to fishing, tourism, environmental changes Fishing pressure - fished vs. unfished area Tourist pressure – tourist areas vs non tourist zones
Governance	Compliance regime - Property rights Transparency and participation - Capacity to manage

Developing a conceptual framework for fisheries and sustainable development

There are four easily identifiable components that one needs to consider as contributing to sustainability. In a very simple approach, we could describe these as;

Ecological component: This includes the physical environment (habitat and water quality) as well as the species composition and interdependencies that exist in the environment.

Social Component: This includes livelihoods and quality of life of communities

Economic Component: This includes incomes generated from fisheries and tourism

Governance Component: The process by which the decisions are made, how change is implemented and how resources are managed