

## 4. Case Study Data and Database

### 4.1 Introduction

This chapter describes the assembly of the dataset employed to develop the statistical methodology and models described in Chapter 6. The chapter also describes the database used to store, process and retrieve the data.

### 4.2 Case Studies

Data assembled for the six groups of explanatory variables (attributes) and management performance (outcomes) described in the previous chapter were used to develop the methodology and models of (co-)management performance described in Chapter 6. The data were assembled from case studies of co- or community-managed fisheries or management initiatives undertaken during the last two decades. Many of the case studies, particularly those undertaken under ICLARM's FCMRP, had been structured around the IAD research framework approach (Section 3.1). Others represented research funded by DFID's Fisheries Management Science Programme and the World Bank without reference to the IAD or SL frameworks. Together, these studies documented a total of 119 discrete local management units (VMUs and IMUs – see Section 2.1) or areas under national (government) control among 13 different countries in Africa, Asia and Melanesia (Figure 4.1). The units represented a range of different ecosystems and management arrangements. (Table 4.1). Each management unit was treated as a separate observation for the model development. Further details of each management unit including references are given in Annex III.

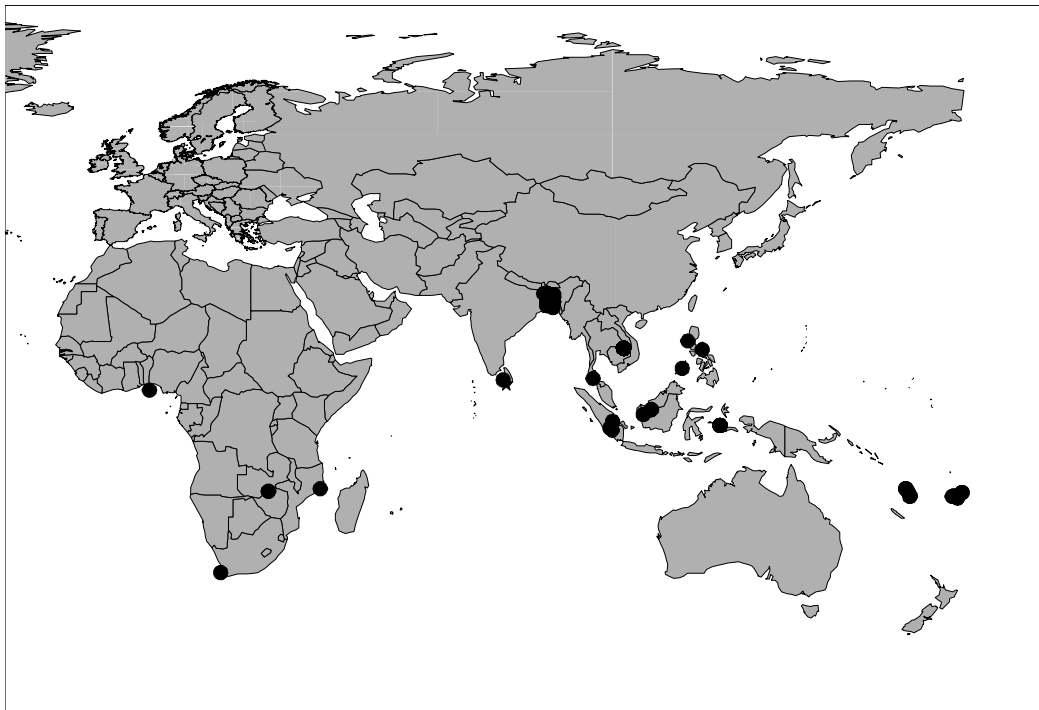


Figure 4.1 Location of management units used for model development

Table 4.1 Summary of the 119 management units (observations) used for model development.

Continent/Region	Country	Ecosystem	Management type	Number of units (observations)
Africa	Cote d'Ivoire	Coastal lagoon	Co-management	1
	Mozambique	Coastal (inshore)	Co-management	1
	South Africa	Estuary	Co-management	1
	Zimbabwe	Lake	Government	1
	Zambia	Lake	Government	1
Asia	Bangladesh	Floodplain-river	Co-management	10
		Beel	Co-management	7
	Indonesia	Lake	Co-management	2
		Fringing reef	Government	2
		Fringing reef	Traditional	4
		Floodplain-river	Government	3
		Floodplain-river	Traditional	4
	Floodplain-river	Co-management	1	
	Laos PDR	Floodplain-river	Co-management	64
	Philippines	Coastal (inshore)	Government	1
		Estuary	Government	1
	Sri Lanka	Fringing reef	Co-management	1
		Estuary	Traditional	1
		Coastal (inshore)	Co-management	1
	Melanesia	Fiji	Fringing reef	Traditional
Vanuatu		Patch reef	Traditional	1
		Fringing reef	Traditional	5

### 4.3 Case Study Profiling

For each management unit, data corresponding to relevant variables were entered into a database (see below). Often data could be simply extracted or calculated from information contained within the text or tables of the source material. Other more qualitative variables had to be 'scored' with ordinal scale measures in a more judicious and subjective manner. Trend variables describing management performance (outcomes) were, in the majority of cases, scored on the basis of the results of interview-based assessments reported in the source material. Where necessary additional sources were used to supplement the study documentation and published material. Data to help estimate indicators of resource resilience (for example, the *weighted mean age of maturity of target species*) were obtained from FishBase. Primary production was estimated from maps produced by the IMCS Ocean Primary Productivity Database (Behrenfeld & Falkowski 1997) on <http://marine.rutgers.edu/opp/Database/DB.html> (Annex IV) and mean annual water temperature from <http://ocg.ori.u-tokyo.ac.jp:81/ocean/atlas/Levitus> (Annex V). The global position of each site was taken from the 'j-sistem' latitude and longitude database available on <http://www.j-sistem.hr/online/srchlalo.htm>.

This variable *profiling* exercise was completed for all 119 discrete management units identified. All sites except those in Cote d'Ivoire and Indonesia were profiled with the help of the researchers responsible for the source material (Table 4.2). Profiling began at the Cape Town workshop and was completed at MRAG, UK and at second informal workshop held at ICLARM headquarters, Penang, Malaysia between 23<sup>rd</sup> March and 5<sup>th</sup> April 2001 involving MRAG, Reading University and ICLARM staff. Wherever possible, completed profiles were returned to the researchers responsible for the source material for checking, validation and comment. All profiles were then finally checked and where necessary, amended by the principle investigator before being entered into the database.

Because of the large numbers of context- and ecosystem-specific variables and limited scope of some studies, not all variables could be assigned values for every management unit identified. The dataset is therefore 'patchy' in many places. The implications of this for the model development are discussed in Chapters 6 and 7. Despite this, almost 20,000 items of data were assembled from the case studies.

### 4.3.1 Problems Encountered During Profiling

The variables and their indicators used for the analysis were selected to capture, as far as possible, the fundamental elements of complex management systems. Providing this is done effectively, any superfluous information forfeited during this data reduction process should not impact on the predictive capacity of models. However, obstacles were encountered during the case study profiling exercise arising from the rigid bounds imposed by some the variable indicators.

Table 4.2 Summary of case study profiling activities.

Continent/Region	Country	Profilers	Location
Africa	Cote d'Ivoire	Ashley Halls, MRAG	London, UK
		Simeão Lopes, IDPPE	Mozambique
	South Africa	Horacio Gervasio, IDPPE	Cape Town, SA
		Ernesto Poiosse, IDPPE	London, UK
		Ashley Halls, MRAG	
	Zimbabwe	Merle Sowman, UCT	Cape Town, SA
		Richard Martin, UCT	London, UK
	Zambia	Ashley Halls, MRAG	
		Isaac Malasha, CASS	CASS, Zimbabwe
		Alexandretta Philomena, CASS	Cape Town, SA
Ashley Halls, MRAG		London, UK	
Asia	Bangladesh	Ben Chanda, FRD	FRD, Zambia
		Cyprian Kapasa, FRD	London, UK
	Indonesia	Godfrey Milindi, FRD	
		Ashley Halls, MRAG	
	Laos PDR	Paul Thompson, ICLARM;	Bangladesh;
		Ashley Halls, MRAG	London, UK
	Philippines	Ashley Halls, MRAG	London, UK
		Ian Baird	Laos PDR,
	Sri Lanka	Ashley Halls, MRAG	Cape Town, SA
		Savitri Abeyasekera	Penang, Malaysia
Thailand	Kuperan Viswanathan	London, UK	
	Ashley Halls, MRAG	Penang, Malaysia	
Melanesia	Fiji	Ashley Halls, MRAG	UK
		Upali Amarasinghe	Kelaniya, Sri Lanka
	Vanuatu	Savitri Abeyasekera	Penang, Malaysia
		Ashley Halls, MRAG	London, UK
Thailand	A, Masae	Songkla, Thailand	
	Ashley Halls, MRAG	London, UK	
Fiji	Jim Anderson	London, UK	
	Vanuatu	Jim Anderson	London, UK
		Ashley Halls, MRAG	

One of the most common problems was the need to assign a single value to inherently multivariate or multi-dimensional variables. For example, the variable *Gear Type* (Group I) allows only one gear to be recorded whilst several gears may be used in the fishery. In this case, the most important gear in terms of catch weight was recorded. This problem could be overcome by adding additional variables to record other important gears in order of importance (eg *Gear Type 1*, *Gear Type 2*, *Gear Type 3*...etc). However, it should be borne in mind that this project was primarily concerned with methodological development rather than developing definitive models of co-management performance and that fitting models with more variables invariably demands larger numbers of observations. Models with a more local focus could be developed to include more context-specific and fewer generally applicable variables.

A similar obstacle was encountered when attempting to score some of the more indiscriminant or general outcome variables. For example, the variable *Compliance with rules and regulations* does not distinguish compliance among specific rules, for example *mesh size regulations* and *gear bans*. In these cases, a judicious approach was adopted taking into consideration the relative importance of each rule or regulation. The same caveats and alternative model solutions to those given above apply.

Most of the explanatory variables describe the current state of the fishery resource and it's associated management institutions and interventions. This time-static focus assumes that the effects of the explanatory variables are manifest in the outcomes almost instantaneously or at least within the period between successive performance evaluations (typically one year). This is likely to be more

valid for fisheries resources with high rates of intrinsic growth (turnover) exploited and managed by responsive stakeholders, than for less responsive resources and stakeholders. The variables: *Period of existence of current operational rules* and *Period of existence of current institutional arrangements* (Group IV) attempt to take account of the effects of historical change.

Even though data reported here were obtained from secondary sources, assigning values to so many variables was very time consuming. Resource demands would be considerable if field-based monitoring and evaluation programmes were employed to generate the data. However, the inclusion of a large number of variables was deemed necessary for the reasons described in Section 3.2.3, and because important variables could not be identified prior to the model development. All *potentially* important variables were therefore included. No information could be obtained for several variables including some of those used to describe the production potential of the resource eg *water transparency (secchi depth)* and *total phosphate concentration*. Other redundant variables are detailed in Annex VI. Variables for which data were readily available and which were found to be statistically significant for determining management performance based upon the models are detailed in Section 6.4.

#### 4.4 The Case Study Database

A relational database 'IMA DATABASE' was built upon a Microsoft Access 97 software platform to store, process and retrieve the data assembled for the 119 management units and 258 variables described above.

The IMA DATABASE comprises 19,750 entries in the following 10 tables:

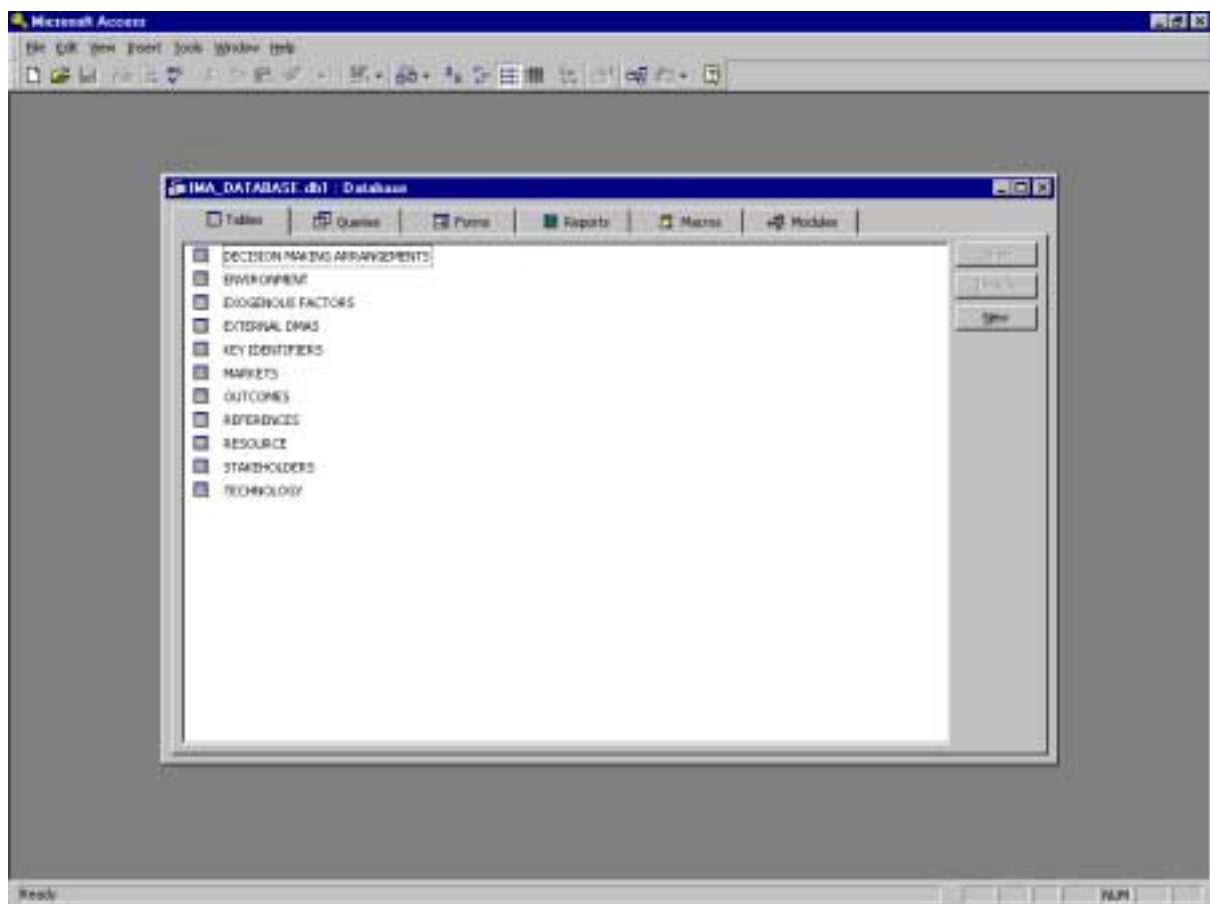


Figure 4.2 The IMA\_DATABASE main menu listing the 10 tables of variables corresponding to the IAD research framework groups of variables.

These tables correspond to the same categories of variables and factors described in Annex II based upon the IAD framework with an additional table (REFERENCES) containing the reference details of the source material.

The data are structured in each table in the standard format (Figure 4.3) with each row (record) containing all the data for a particular management unit. The fields (column headings) correspond to the attributes (variables) measured for each management unit.

ID	NAME	YEAR	TYPE	LATITUDE	LONGITUDE	AREA	VILLAGES	HH	FISHERY	FT
1	Aby Lagam	2001	1	5.02	2.65	424	20		3200	
2	Lake Kariba - Northern Shore	2001	2	-18.5	28.75	500	278		2383	
3	Lake Kariba	2001	2	-18.5	28.75	500	41		1229	
4	Kwinkwidge	2001	1	-16	40	7.5	1	264	700	
5	Oifants River Fishing Community	2001	1	-33.9	18.35	2.4	5	200	65	
6	Negombo Estuary	2001	1	7.2	79.82	5.5	4	165	306	
7	Hang Khone	2001	0	14	106		1	45	45	
8	Hang Sadam	2001	0	14	106		1	90	90	
9	Houa Sadam	2001	0	14	106		1	90	90	
10	Khone Tai	2001	0	14	106		1	110	110	
11	Khone Neua	2001	0	14	106		1	120	120	
12	Don Sahong	2001	0	14	106		1	80	80	
13	Don Sam	2001	0	14	106		1	55	55	
14	Don En	2001	0	14	106		1	45	45	
15	Don Det Oke	2001	0	14	106		1	80	80	
16	Don Det Tek	2001	0	14	106		1	80	80	
17	Deua Neua	2001	0	14	106		1	80	80	
18	Deua Tai	2001	0	14	106		1	80	80	
19	Hang Xang Phai	2001	0	14	106		1	80	80	
20	Don Khemao Noi	2001	0	14	106		1	80	80	
21	Ospara	2001	0	14	106		1	90	90	
22	Tha Pho Neua	2001	0	14	106		1	120	120	
23	Houa Sen	2001	0	14	106		1	80	80	
24	Sen Neua	2001	0	14	106		1	80	80	
25	Hoi Kok	2001	0	14	106		1	100	100	
26	Yeun Khao	2001	0	14	106		1	100	100	
27	Nakasang	2001	0	14	106		1	120	120	
28	Phon Pho	2001	0	14	106		1	100	100	
29	Hat Kiri Khouay	2001	0	14	106		1	110	110	
30	Yeun Khem	2001	0	14	106		1	40	40	
31	Don Xang	2001	0	14	106		1	80	80	

Figure 4.3 The KEY IDENTIFIERS table illustrating the data structure.

Management unit **ID** (serial number) forms the primary key among the tables to query the database or create reports. A number of queries have been constructed containing subsets of the explanatory and dependent for model development based upon the hypothesis matrix.

Detailed descriptions of all the variables (fields) including units of measurement are available within the *design view* of each table as illustrated for the KEY IDENTIFIER table in Figure 4.4 below.

The IMA database is a significant project output. It is freely available at <http://www.fmsp.org.uk/> where it may be periodically updated as further data becomes available:

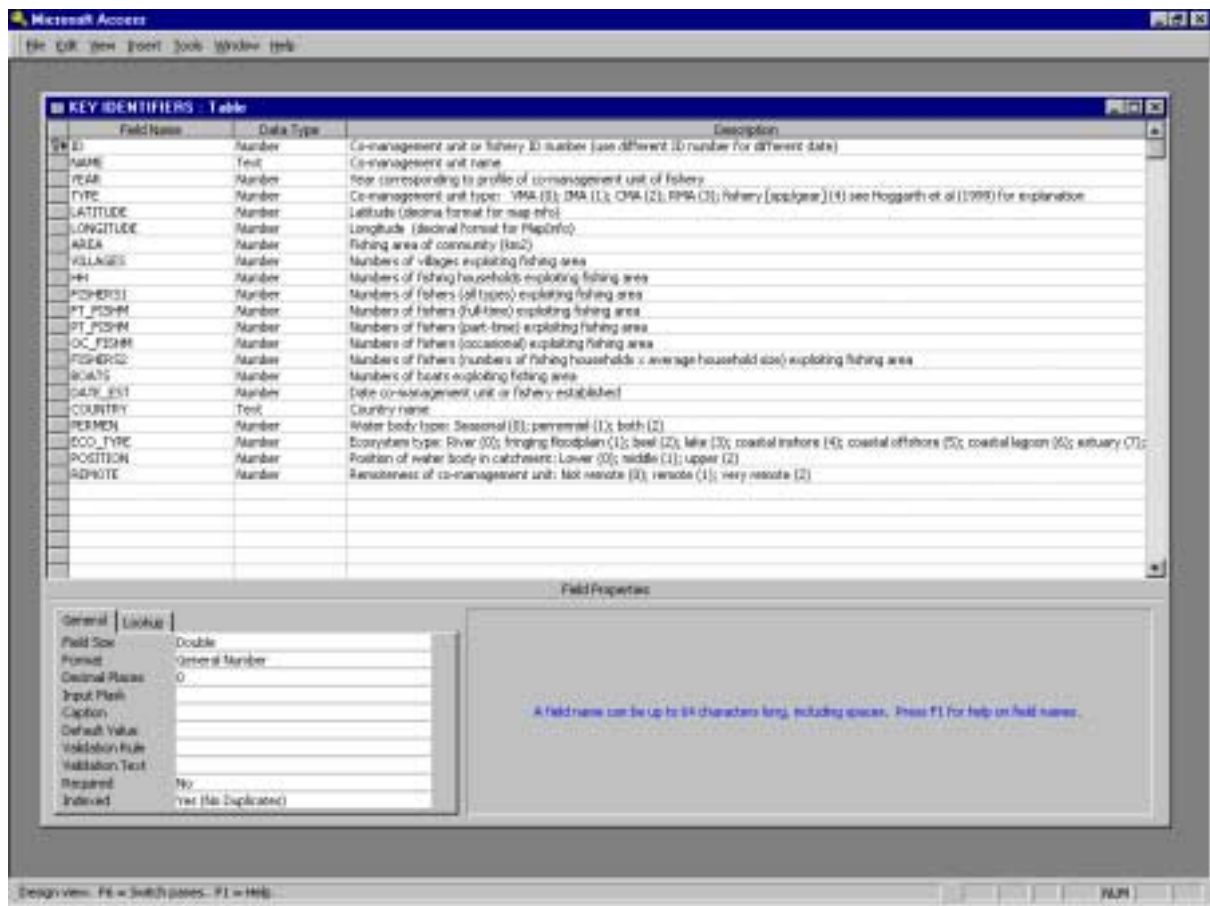


Figure 4.4 Descriptions of the variables belonging to the KEY IDENTIFIERS table shown in the table design view.