



Indonesia: Integrated Assessment of the Poverty Reduction Strategy Paper

*With a case study on
sustainable fishery initiatives*

Preface

I am pleased with the completion of the Integrated Assessment of Indonesia's Poverty Reduction Strategy Paper (PRSP). The assessment is the product of a two-year long collaborative process, during which the team discussed ideas, and suggestions from various sources and incorporated many into this strategic document. The involvement of so many parties in the assessment process, from both government and non-government institutions, and at central and regional levels, showed immense strength of participation. I hope that all segments of society now feel a clear sense of ownership and will commit towards effective implementation of the proposed action plan.

The Government of Indonesia has taken several measures to reduce the numbers of the poor. All programmes had been targeted to strengthen rural-urban economic linkages. However, there is growing concern that earlier poverty efforts, policies and programmes had been unable to achieve their expected outcomes. The reason, I believe, is because earlier efforts had failed to take into account degrading environmental conditions and diminishing natural resources, which should have warranted changes in the patterns of production and consumption.

To answer the challenge of effective programmes, the Government of Indonesia decided to apply Integrated Assessment and Planning (IAP) to the Indonesian National PRSP 2005-2015, an important document that underlines Indonesia's commitment to combat poverty while mainstreaming sustainable development principles. There was hope that the PRSP would integrate all the main areas of economic development, social and environmental considerations. This assessment is just one of the initiatives to improve the welfare of poor Indonesians. Indonesia's environment is indeed crucial - it supports the livelihoods of the poor, and so there is cause to ensure the sustainability of the benefits generated. In addition, integrated assessment has introduced a new paradigm in poverty reduction - a participatory approach, moved forward through mutual consensus and commitment from related parties.

I extend my sincere gratitude and appreciation to all parties for the assistance, contribution, hard work, and dedication in the accomplishment of this document. The networks of expertise and stakeholders created by the process should be maintained and developed to ensure success of its initiatives.

Ministry of State for National Development Planning/ National Development Planning Agency
Deputy for Environment and Natural Resource Affairs

Bemby Uripto

Acronyms and abbreviations

BAPPENAS	Badan Perencanaan dan Pembangunan Nasional/ The Indonesian National Planning Development Agency
BNF	Bahtera Nusantara Foundation
CCIF	Conservation and Community Investment Forum
CII	Conservation International Indonesia
GBHN	Guidelines of National Policy
GDP	Gross domestic product
GEF	Global Environment Facility
GRDP	Gross regional domestic product
IAP	Integrated assessment and planning
IDT	Inpres Desa Tertinggal/Programme
IMA	International Marine Alliance
IMF	International Monetary Fund
KLH	Kementrian Lingkungan Hidup/ Ministry of Environment
KLF	Key ministerial planning documents
KPK	Komite Penanggulangan Kemiskinan/ Poverty Reduction Committee
MAC	Marine Aquarium Council
MAMTI	Marine Aquarium Market Transformation Initiative
NGO	Non-governmental organization
PHKA	The government agency Forest Protection and Nature Conservation
PPAs	Participatory Poverty Assessments
PPK	Programme Pengembangan Kecamatan/ Subdistrict Assistant Project
PROPENAS	The Indonesian National Development Planning Document
PRSP	Poverty Reduction Strategy Paper (Indonesia)
R&D	Research & Development
SDPK	A local poverty reduction strategy paper

UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
WWF	World Wildlife Fund

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At UNEP, the project was initiated and under the overall supervision of Hussein Abaza. Maria Cecilia Pineda and Fulai Sheng coordinated this project and provided technical support. Desiree Leon facilitated the processing of the report for editing and typesetting. Rahila Mughal provided administrative support for the project.

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United Nations Environment Programme

The United Nations Environment Programme (UNEP) is the overall coordinating environmental organization of the United Nations system. Its mission is to provide leadership and encourage partnerships in caring for the environment, by inspiring, informing, and enabling nations and people to improve their quality of life without compromising that of future generations. In accordance with its mandate, UNEP works to observe, monitor, and assess the state of the global environment; improve the scientific understanding of how environmental change occurs; and in turn, determine how such change can be managed by action-oriented national policies and international agreements. UNEP's capacity building work thus centres on helping countries strengthen environmental management in diverse areas, which include freshwater and land resource management; the conservation and sustainable use of biodiversity, marine and coastal ecosystem management; and cleaner industrial production and eco-efficiency, among many others.

UNEP, headquartered in Nairobi, Kenya, marked its first 30 years of service in 2002. During this time, in partnership with a global array of collaborating organizations, UNEP achieved major advances in the development of international environmental policy and law, environmental monitoring and assessment, and our understanding of the science of global change. This work also supports the successful development and implementation of the world's major environmental conventions. In parallel, UNEP administers several multilateral environmental agreements (MEAs), including the Vienna Convention's Montreal Protocol on Substances that Deplete the Ozone Layer, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (SBC), the Convention on Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (Rotterdam Convention, PIC), the Cartagena Protocol on Biosafety to the Convention on Biological Diversity, and the Stockholm Convention on Persistent Organic Pollutants (POPs).

Division of Technology, Industry and Economics

The mission of the Division of Technology, Industry and Economics (DTIE) is to encourage decision makers in government, local authorities and industry to develop and adopt policies, strategies, and practices that are cleaner and safer, make efficient use of natural resources, ensure environmentally sound management of chemicals, and reduce pollution and risks for humans and the environment. In addition, it seeks to enable implementation of conventions and international agreements and encourage the internalization of environmental costs. UNEP DTIE's strategy in carrying out these objectives is to influence decision-making through partnerships with other international organizations, governmental authorities, business and industry, and NGOs; facilitate knowledge management through networks; support implementation of conventions; and work closely with UNEP regional offices. The Division, with its Director and Division Office in Paris, consists of one centre and five branches located in Paris, Geneva and Osaka.

Economics and Trade Branch

The Economics and Trade Branch (ETB) is one of the five branches of DTIE. Its mission is to enhance the capacities of developing countries and transition economies to integrate environmental considerations into development planning and macroeconomic policies, including trade policies. ETB helps countries develop and use integrated assessment and incentive tools for achieving poverty reduction and sustainable development. The Branch further works to improve our understanding of environmental, social, and economic effects of trade liberalization and the effects of environmental policies on trade, and works to strengthen coherence between Multilateral Environmental Agreements and the World Trade Organization. ETB also helps enhance the role of the financial sector in moving towards sustainability. Through its finance initiatives, ETB also helps enhance the role of the financial sector in moving towards sustainability.

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Table of contents

Preface	i
Acronyms and abbreviations	iii
Acknowledgements	v
United Nations Environment Programme	vii
Table of contents	ix
List of tables	x
1. Introduction	1
1.1 About the report	1
1.2 About the project	1
2. Poverty and poverty reduction efforts	3
2.1 Poverty	3
2.2 Evolution of poverty reduction efforts	4
2.2.1 Basic-needs approach	4
2.2.2 Empowerment approach	4
2.2.3 Rights-based approach	5
2.2.4 Evaluation of past efforts	5
3. Indonesia's poverty reduction strategy paper	7
3.1 Introduction	7
3.2 IAP review of the PRSP process	8
3.3 Policy issues	10

4. Conclusions and recommendations	13
4.1 Previous fishing practices	21
4.1.1 Environmental impact	22
4.1.2 Social and poverty implications	23
4.2 The sustainable fisheries management initiative	23
4.2.1 Environmental implications	23
4.2.2 Economic implications	23
4.2.3 Social implications	24
4.3 Lessons learned	24
Appendix A: A case study of Les Village in Bali	15
5. Scaling up to the district level	25
5.1 Expansion of sustainable harvesting system	26
5.2 Transformation of the business model	27
5.3 Ecosystem rehabilitation	28
5.4 Government-sponsored capacity building, reasearch and development	29
5.5 Comparison of the three situations	32
6. Case study findings	35
6.1 Conclusions	35
6.2 Recommendations	35
Annex 1: Project development group and structure	37
References	38

List of tables

Table 1: Indonesia's rural-urban poverty levels	3
Table 2: Goods and other benefits from a coral reef ecosystem	20
Table 3: The state of coral reef in Buleleng Regency, 2001	22
Table 4: Price differences in ornamental fish chain	27
Table 5: Summary of components and impacts of a scale-up initiative	30
Table 6: Environmental and socio-economic indicators of initiative	33

1. Introduction

1.1 About the report

This report describes the results of a UNEP-sponsored project in Integrated Assessment and Planning (IAP) of Indonesia's national poverty reduction strategy. It aims to facilitate discussions among major stakeholders on integrating the environment into poverty reduction efforts. The targeted audience includes the Government of Indonesia at both central and local levels, local communities, NGOs, civil society and development partners.

There are four chapters in this report. Chapter 1 provides the background of this IAP project, its objectives, and the process of project implementation. Chapter 2 provides a brief introduction to Indonesia's poverty situation. Chapter 3 describes the planning process of Indonesia's Poverty Reduction Strategy Paper (PRSP) and presents an assessment of both process and content. Chapter 4 proposes follow-up activities and reflects on the IAP project experience. Appendix A is a case study evaluating an initiative directed at transforming destructive fishing practices in Les Village, Bali.

1.2 About the project

In mid 2003, UNEP invited the Government of Indonesia to submit a project proposal to apply integrated assessment to a priority public policy. The Indonesian National Planning Development Agency (BAPPENAS) identified the Poverty Reduction Strategy Paper (PRSP) 2005-2015 to be the subject for such an assessment. The PRSP was selected because the Indonesian National Development Planning Document (PROPENAS) 2000-2004 included combating poverty as one of its top priorities along with mainstreaming of sustainable development principles. Given this priority, the Government was required to formulate a comprehensive long-term strategy, which arrived in the form of the PRSP. By targeting the PRSP for an integrated assessment, BAPPENAS hoped that there would be integration of environmental and natural resource considerations.

The IAP project originally aimed to develop a set of concepts, mechanisms, strategies and action plans to integrate environmental and trade issues into the PRSP. However, this was heavily modified since by the time the IAP project was underway in early 2004, the PRSP was already in the final stages of completion. It was not realistic for the IAP team to conduct a complete assessment of the PRSP and develop the guidelines with the time available. To make up for the lack of full engagement with the PRSP process, the project placed added emphasis on a local-level case study. The objective of the case study was to illustrate how the IAP approach could feed into the local-level PRSP processes as well as at the national level in the future.

BAPPENAS designated an NGO, Conservation International Indonesia (CII), as the national institution to coordinate the project. BAPPENAS and the Ministry of the Environment (KLH) were close partners. The IAP team developed a three-tiered structure of the project development group (see Annex 1). The following activities were planned:

- **Weekly meetings.** From February to September 2004, weekly meetings of the technical and writing teams accomplished the following: development of a project workplan and design; evaluation of the draft PRSP documents; engagement with stakeholder groups on environmental aspects of the PRSP; and outlining of project recommendations.
- **PRSP public meetings.** When the first draft of the Indonesia PRSP was made public in May 2004, the IAP team was active in discussion forums held to evaluate work done and provide recommendations and feedback.
- **Steering Committee meeting.** The Steering Committee first met on 11 May 2004 and made several key decisions including: providing comments on the project's background paper; inclusion of one KLH staff in the writing team; and agreement on the modality of the project and the format and content of the First National Workshop. The Steering Committee was made up of representatives of the following agencies: CII, BAPPENAS, KLH, Ministry of Forestry, Ministry of Industry and Trade, Ministry of Home Affairs and Autonomous Regions, Ministry of Labour and Transmigration, Ministry of Foreign Affairs, and UNDP Indonesia.
- **First National Workshop.** The First National Workshop was held on 25 May 2004 and was attended by 70-80 people from both central and local government (including Jambi, West Sumatra, Mandailing Natal and Kapuas Hilir); NGOs (World Wild Fund for Nature, The Nature Conservancy, Wildlife Conservation Society, BirdLife, Wetland International, Yayasan Kehati, Pelangi Indonesia, Flora and Fauna International, Conservation International, Walhi, Telapak, Warsi and Konphalindo); the private sector (Rio Tinto, BP Indonesia, UNOCAL, Jamu Sido Muncul, Freeport Indonesia, ForesTrade Indonesia and Indonesia Business Chamber-KADIN); and academia (Prof Herman Haeruman, Dr Setijati D. Sastrapradja, Prof. Moh. Askin, Prof. Daniel Murdiyarso and Dr Hariadi Kartodihardjo). The Workshop was held to evaluate basic principles of sustainable development and ways to integrate them into the PRSP.
- **Meeting with UNEP.** A meeting with UNEP experts was held the day after the First National Workshop to revisit the methodology and workplan. An agreement was reached to highlight the "process" aspect of the PRSP formulation.
- **Involvement in the finalization of the PRSP document.** The final drafting of the PRSP document began in August 2004. Two members of the IAP Team (Indra Darmawan and Lydia Napitupulu) were also members of the PRSP drafting team and participated actively in the process.
- **Regional consultation workshop.** A regional workshop was conducted with stakeholders in Buleleng Regency (Bali Province) in December 2004. The Regional Government provided input on their regional sustainable development plan. A trip was taken to the Les Village and other surrounding villages. The IAP team met with local government officials, local fishermen, dive operators as well as the local community.

2. Poverty and poverty reduction efforts

2.1 Poverty

Between 1970 and 1997 Indonesia achieved an average economic growth of 5 per cent and reduced its poverty from 40 per cent to about 11 per cent of the population.¹ During the financial crisis in 1997, however, the poverty level jumped to almost a quarter of Indonesians at 24.2 per cent after the GDP fell 13 per cent. This indicated the vulnerability of much of the population nominally above the poverty level.

Measures taken to alleviate poverty reduced the absolute number of the poor from 47.9 million in 1999 to 37.4 million in 2003, or 17.4 per cent of the population (KP 2004). Most of the Indonesian poor live in rural areas (see Table 1), with agriculture as the main source of livelihood.

When using a global measure of poverty, such as per capita income of US\$1 a day, the percentage of the poor in Indonesia was estimated to be 7.4 per cent of the total population in 2003. Should the benchmark be raised to US\$2 a day, more than half of the Indonesian population (about 53.4 per cent) could be considered poor. Indicators such as the Poverty Gap Index and the Distributional Severity Index can also provide information about the severity and extent of poverty in Indonesia. Relative poverty measures such as the Gini coefficient also reveal the gap between the rich and the poor in this country at both national and local levels.

Table 1: Indonesia's rural-urban poverty levels.

Year	Numbers below the poverty level			% of total population
	Rural (million people)	Urban (million people)	Rural and urban (million people)	
1990	9.4	17.8	27.2	15.1
1996	7.2	15.3	22.5	11.3
1999	15.6	32.3	47.9	23.4
2002	25.1	13.3	38.4	18.2
2003	25.1	12.2	37.3	17.4

Source: KPK 2004b

¹ Estimated based on calorie intake of 2,100 kcal/capita/day, as calculated by the Indonesian Central Agency for Statistics.

2.2 Evolution of poverty reduction efforts

The approach to poverty reduction strategy has evolved since the 1970s. Change was driven not only by internal dynamics but also foreign factors such as the International Monetary Fund (IMF) and foreign investors. A history of poverty reduction and its evolution and impact on the environment follows:

2.2.1 Basic-needs approach

Indonesia in the 1970s adopted the needs-based approach to alleviate poverty. This was reflected by the establishment of the poverty line at 2100 calories of intake per capita per day. It defined the five main basic needs for people to survive and live in dignity as food, health, water and sanitation, education, and shelter. The approach aimed to eradicate hunger, disease and illiteracy despite scarce resources by targeting the poorest 40 per cent of the population. It addressed the issue of poverty rather than income levels.

The basic needs approach was chosen to establish a basic level of social services to sustain the livelihoods of the poor. One of the key assumptions was that the government had the political will to raise the resources needed to maintain social welfare for the poorest people. Besides finance, the government had to offer a vision and build capacity for the public to participate in social development efforts.²

In Indonesia, this needs-based approach caused considerable issues as it tended to ignore the complexity of poverty, which was the result of poor human resources, lack of social infrastructure and problems in natural resource management. Furthermore, some development actors believed that success could only come about through the people's own efforts and participation.

2.2.2 Empowerment approach

Two decades after applying the need-based approach, the Guidelines of National Policy (GBHN) 1993 transformed development with a new empowerment approach. The GBHN recommended developing human resources simultaneously with the economy.

A critical aspect of the empowerment agenda was to reduce inequality by broadening human capabilities through universal basic education, health care and social protection. It also sought distribution of tangible assets such as land or access to capital. Inequality, as the approach understood it, often prevented the poor from taking advantage of economic opportunities, which limited societal benefit from growth and therefore the effectiveness of development efforts. Empowerment also meant more participatory and bottom-up development objectives, aimed to enhance policy effectiveness at the local level in terms of design, implementation and outcomes.³ It stressed inducements to improve performance of public and private providers and the power of the state to transform rules and enforce accountability. It was an approach that concentrated on improving governance as well as innovation and experimentation by both public and private actors to develop pro-poor institutional mechanisms.⁴

A programme widely known as IDT (Inpres Desa Tertinggal) was launched in 1994. IDT encouraged local people to initiate efforts to handle their own poverty problem. Self-reliant people's organizations working on local socio-cultural conditions, known as *pokmas* (people's groups), was established to manage grants of between Rp 20 million and Rp 60 million to the villages deemed to have been left behind by the development process.⁵ The funds were disbursed together with adequate facilities and technical assistance to boost economic activities of the poor.

² Heinonen, T *et al.*, 2000.

³ The World Bank, 2002

⁴ *idem*

⁵ Safotru. M and Rafael, E.B, 2002

Although on paper the approach was a great opportunity, the actual implementation was beset by difficulties such as leadership problems. The village leaders were dominant in the organization of the *Pokmas*. A programme designed to empower the local people did not trickle the power of decision down to the people. The *pokmas* was formed only for the project and once it was over, they were also terminated.⁶

2.2.3 Rights-based approach

The national PRSP indicated a shift from empowerment to a rights-based approach. The initiator argued that this approach was mandated by the Constitutional Law 1945, which in Article 28H paid great attention to basic human rights, i.e. right to food, right to education, and right to healthy environment.

The rights-based approach to development sets the realization of human rights as the objective of development. The normative justification is that rights put values, moral dimensions and politics at the very heart of development practices. By stipulating an internationally agreed set of norms, backed by national law, the approach provides a stronger basis for citizen to make claims on the states and hold states to account. Furthermore, the approach sets out a vision and invokes the international apparatus of human rights accountability to support the development action.

While the needs-based approach focused on securing additional resources for marginalized groups, the rights-based approach calls for existing resources to be shared more equitably, making the process explicitly political. Needs can be met out of charitable intentions, but rights are based on legal obligation.⁷

2.2.4 Evaluation of past efforts

When the economic crisis occurred in 1997, it was apparent that the poor were particularly hard hit. Measures were implemented including the Social Safety Net programme. Based on a critical evaluation by the IAP team, it was found that:

- Programmes directed at poor people were of two types: programmes carried out by sectoral agencies such as the health and education ministries; and special programmes that were multi-sectoral and regional/national in scale.
- Policies considered only one aspect of poverty reduction, i.e. household consumption. Such an approach did not fully comprehend the multi-dimensional problems faced by the poor and missed out on the root causes of poverty. The use of one poverty indicator (such as calorie intake) did not truly reflect the level of poverty within communities and could not anticipate shifts in poverty due to economic crisis.
- Poverty reduction programmes and policies were not process-oriented. There was a lack of participation by stakeholders. In this case the most important stakeholders were the poor themselves, but they were not consulted in programme planning, development, implementation and monitoring. As a result, ownership was low for the programmes and projects.
- There were minimal coordination and linkages amongst programmes. For example, the links between poverty and the state of the environment were not examined.

⁶ *idem*

⁷ Nyambu-Musembi, C and Andrea C, 2004

3. Indonesia's poverty reduction strategy paper

3.1 Introduction

Indonesia's PRSP was developed by the Poverty Reduction Committee (Komite Penanggulangan Kemiskinan or KPK), formed in 2001 through a presidential decree. The objectives of the PRSP were as follows:

- Providing guidelines for the government, private sector and community in the roles of stakeholders to reduce poverty, at central as well as regional levels.
- Implementing a new paradigm in poverty reduction, i.e. a participatory approach forged through mutual consensus and commitment from inter-related parties, to begin from strategy formulation.
- Showing Indonesia's commitment to the global poverty reduction movement.

The timeframe given to complete the PRSP was until May 2004. But the development of the PRSP proved to be a dynamic process, requiring considerable time and committed support from all stakeholders. Such support could only be guaranteed through consultations with all relevant parties. The original deadline, therefore, was changed to September 2004. At the same time, a new agency, BAPPENAS, was designated to take over from the Coordinating Ministry for People's Welfare to draft the PRSP. This institutional change accompanied the shift in the PRSP's approach from economic orientation to a rights-based framework.

Before the changes, the PRSP had two objectives in poverty reduction, which are increasing the income of poor people and reducing the burden of expenditures for basic needs. This approach was to be implemented through four broad initiatives, or pillars:

- **Opportunity creation.** The establishment of employment or entrepreneurial opportunities for the poor.
- **Community empowerment.** The strengthening of community institutions to improve access to information for the poor and enable them to participate in formal decision-making processes.
- **Capacity building.** The enhancement of abilities through investment in health, education and training for the purpose of becoming more productive.
- **Social protection.** The creation of social insurance, social support or assistance, and social savings mechanisms and programmes, and the promotion of traditional social safety nets.

In addition to the four pillars, the PRSP also endeavored to integrate gender, governance, decentralization and environmental initiatives into the strategy. This involved: the identification of specific poverty-related issues; evaluation of past policies and programmes pertaining to these issues; a vision statement of goals;

recommendations for policies and programmes; and exploration of a monitoring and evaluation system.

To address the matter of past strategy failures, a new “paradigm” of poverty reduction effort was offered with the new draft of PRSP to include the following elements:

- Socially-inclusive
- Both growth and equity-oriented
- People-centred
- Role of government as facilitator rather than provider
- Decentralized
- Bureaucratically less rigid
- Democratic
- Combination of both “top-down” and “bottom-up” decision-making processes
- Environmentally responsible
- Sensitive to gender aspects
- Uses a regional approach.

Based on the new paradigm, the initial framework was also augmented with a new focus on the “policy environment” confronting the poor. In addition, policy evaluation based on policy impact on the income and expenditure of the poor was deemed to be too “economic-oriented” and so was not extensively used in the new approach.

3.2 IAP review of the PRSP process

Administratively, the Coordinating Ministry for People’s Welfare was a legitimate and logical choice to drive the PRSP process. However, the Ministry was new at that time and understaffed. The problem of staffing was overcome to a certain extent by hiring consultants who provided technical assistance.

The IAP assessment showed that, in general, key authorities at both central and local levels were informed of the drafting process of the PRSP. Representatives of key stakeholders were also widely informed of the process. The planning was transparent and the key elements were laid out in an interim PRSP document that was widely circulated at the central level.⁸ Moreover, brochures on the topic of the PRSP were also circulated. Meanwhile, consultative meetings were held several times at the central and regional levels and a website of the activity was put up.⁹ Key authorities and stakeholders were thus given a channel to participate, both formally and informally, in the process.

The development of the PRSP also took into account poverty alleviation projects already implemented or underway, such as IDT, Programme Pengembangan Kecamatan or PPK (a *kecamatan* or subdistrict assistance project), and other nation-wide safety net programmes. Several evaluation exercises were also specially commissioned to inform the PRSP process, including a review of several important recent participatory poverty assessments (PPAs), a participatory poverty mapping, and a study on land tenure issues.¹⁰ Of these, the PPAs were seen as a proxy mechanism for “voices of the poor”. Their findings were incorporated into the PRSP process to reflect the interests of the poor and various dimensions of poverty, and as such, the PRSP was expected to reveal notable new aspects, such as marginalization of those in poverty.

⁸ It was unclear how widely the earlier PRSP document was circulated at the regional or local levels.

⁹ The project information can be assessed at: www.BAPPENAS.go.id

¹⁰ The PPA review was undertaken by SMERU Research Institute and focused initially on five studies on the poor’s perspectives on poverty. The participatory poverty mapping was conducted by the URDI. The study on land tenure was conducted by the Institute for Economic and Social Research.

A systematic assessment of environmental aspects of poverty reduction strategies had never been done in Indonesia at the national level before the PRSP. The development of poverty reduction strategies had traditionally been the responsibility of the stakeholders within the “welfare sectors”, i.e. health, education and public works. During the process of this PRSP development, the inclusion of the wider stakeholders such as environmental NGOs, gender groups and other sectoral agencies made its scope much broader than other previous poverty reduction strategies.

Despite the above strengths, weaknesses and gaps were also identified by the IAP team, especially in the policy planning and development process:

1. Although fragments of the planning process were presented, the overall PRSP process was not clear. For example, while input from stakeholders was sought, how this input was used to draft the PRSP remained obscure, as well as to what extent the comments were reflected. A related weakness in the environmental dimension was that the PRSP drafting team did not have anyone with an environmental background. It was, therefore, difficult for the PRSP team to truly integrate recommendations that were “environmental” in nature. When environmental recommendations were sought, the team requested the information to come in the form of a written “end-product” that could be easily added to the text but not integrated.
2. One of the most frequently voiced concerns during PRSP development was that the position and function of the PRSP in the hierarchy of government strategies were unclear, at both central and local levels.¹¹ For example, there was already a strategic plan called *Renstra* that would address poverty and was managed by the Coordinating Ministry for People’s Welfare. The PRSP’s relative importance to this strategic plan was unclear and this could prove highly confusing to local government with multiple sources of initiatives. Another related issue was that the PRSP process did not take into account key documents such as the Agenda 21 (which covered sustainable development initiatives in sectors such as tourism, housing, mining and energy) and key ministerial planning documents such as KLF’s Strategic Plan.
3. During development of the PRSP, dialogue was not geared towards understanding how stakeholders could have different roles in PRSP or contribute to the process. Stakeholders were, therefore, confused about how the PRSP would be beneficial to their own agenda or guide their own strategies. By the finalization stage of the PRSP itself, the designation of roles had become an arbitrary decision. Regional stakeholders were even less clear of what was expected of them.
4. Although efforts were made to inform and involve key authorities and stakeholders, participation was also lacking from Ministries that had small poverty-reduction portfolios (so-called “technical” ministries), notably the agriculture, forestry, marine affairs and fisheries, mining and energy, and environment Ministries. Additionally, it was not clear how Ministries concerned with industry, trade and finance could be involved in the substantive aspects. The strategic planning document would, therefore, most likely fail to secure commitment from these important institutions.
5. Finally, although efforts were made to seek the involvement of NGOs and others working directly with the poor and marginalized groups, the stakeholders were mostly represented only by proxy (i.e. by results from studies). Outreach to the general public was also limited.

¹¹ Later it was declared that the PRSP would form part of the national Medium-term Development Programme for 2005-2009.

3.3 Policy issues

On the positive side, the strength of PRSP's first formal public draft circulated in May 2004 was in recommending a shift of the development paradigm to reflect a pro-poor stance. In addition, the PRSP framework was clear and transparent. Showing that the PRSP could incorporate all three of economic, social and environmental pillars, new important themes such as the environment and natural resource were thus included. The PRSP in fact recognized the rights to environment and natural resources as two of ten basic rights for people to survive and live in dignity. It outlined a set of focused policies to:

- Improve the fair and sustainable access of the poor to use and manage natural resources and environment
- Empower the role of civil society and local or traditional organizations
- Improve the poor's capacity to manage natural resources and environment
- Promote social protection for poor communities from natural disasters
- Enhance global partnership through better networks

On this first draft of the PRSP document, however, the IAP team made some observations. The document:

- Narrowly focused on only key social and economic sustainability issues (such as the distributive impact of development strategies) and their related trends and current status. There was, in contrast, little mention of the principles related to sustainable management of the environment and the use of natural resources. Key environmental trends and statuses were not recognized and explicitly stated except for issues related to access to land. The spatial and temporal aspects of resource depletion were not addressed either, a situation that could lead to inappropriate targeting and sequencing of poverty reduction efforts. Additionally, economic strategies dominated poverty alleviation efforts, which could lead to increased pressure on the environment.¹²
- Did not address the trade-offs among the various sectoral priorities and needs, some of which were not necessarily oriented toward the poor. Additionally, procedures for defining activities and priorities were not so much non-transparent as non-existent.
- Lacked real mechanisms to integrate environmental and natural resource dimensions into PRSP. To be sure, the document's accommodation of a specific section on the environment and natural resources did present an opportunity for sustainability principles. Due to the lack of wider participation of the most relevant authorities and stakeholders in this field, however, any recommended strategy, programme or action was likely to generate criticism and even non-compliance.
- Lacked delegation of authority and division of labour during implementation. It was not clear which agencies would be responsible for implementing the strategy and how the wider public could use the PRSP document. In spite of the lack of key participation from the Ministries, the PRSP still sought to prescribe measures for them, which could create an uncertain response.

¹²An example would be the proposal to provide additional assistance in the form of equipment to poor fishing communities. Given that many fishing grounds in Indonesian were overfished, such a strategy would only cause faster depletion.

- Did not clearly delineate how the strategy would build on previous and current poverty reduction strategies. Planned actions were simply crafted around each Ministry's existing poverty reduction programmes, which might not have been the most useful of programmes. For example, instead of emphasizing an economic assistance programme for poor coastal inhabitants by the Ministry of Marine Affairs and Fisheries, the action plan took a closer look at the more strategic aspect, that of continuous expansion of the fishery given the diminishing stock. The pro-poor stance of the PRSP should have provided an opportunity for a critical evaluation of such assistance plans.

Realizing the scale of criticisms directed at the first draft of the PRSP and the limited time available to address the weaknesses, the government decided to delay finalization and change the agency responsible for drafting it.¹³ The PRSP process was extended to the end of September 2004, and the ownership shifted to BAPPENAS under the Directorate for Sectoral and Regional Development Cooperation. In this case, the new team determined that a different framework would be needed for the PRSP and later came up with a rights-based approach in place of the "four pillars" approach previously used. Within this framework, the issue of environmental and natural resource management was addressed. Additionally, the new team came up with a more comprehensive format for the formulation of the action plans. The new format involved breaking the actions down year by year, supported by indications of regulatory, facilitation, and funding requirements. The articulation of roles was also provided in the new format.

The shift in gears for the PRSP at this late stage of its formulation, while not necessarily inferior to the previous approach, did not undergo a similar consultative process deserving of a strategy of this scale. In fact, preparation and analysis were made over a short period of several weeks by a limited group of people. While information had already been collected for analysis, a more thoughtful manner of policy reformation would have been more preferable.

The IAP team did consider this an opportunity to continue influencing the process. However, given the limited time and scope of the PRSP extension, the team was realistic in prioritizing its recommendations for the PRSP. The IAP team's approach thus relied on the results from previous policy and programme evaluations and priorities. The team contributed three distinct messages to the formulation of the final PRSP document:

- Rapid natural resource depletion and environmental degradation are currently undergoing in Indonesia, impacting the poor most severely. Macroeconomic policies and poverty reduction strategies, therefore, should not lead to a situation of "business as usual" since further environmental degradation will hurt the poor and increase poverty. Rather, environmental rehabilitation and protection should be integrated in any poverty reduction strategy.
- The strategy must implement a pro-poor stance in natural resource and environmental management, to ensure the rights of the poor and their access to social and economic capital.
- It is important for national poverty strategies to learn from site-level models that demonstrate successful integration of economic, social, and environmental considerations in poverty reduction efforts.

¹³ Through a decree by the Minister for National Economic Planning/BAPPENAS.

4. Conclusions and recommendations

1. Integrating sustainable development principles, and especially environmental sustainability considerations, and poverty reduction is very difficult since many of the linkages between environmental, social and economic spheres are still in early stages of research and therefore not readily available for programming and action planning purposes.
2. The importance of involving sectoral agencies cannot be understated since many environmental sustainability principles have to be adopted by them. To make the effort manageable, key sectors must be identified to facilitate maximum impact on poverty reduction. A look into the poverty profile of a region or nation should be enough to provide indications of the key sectors.
3. The guiding questions and tools developed for the IAP approach were useful for comprehensive planning and formulation of strategies. The challenge for the Indonesia project was to encourage their widespread use when the PRSP planning process was approaching the final stages.
4. There is great interest on the part of the local governments to make local poverty reduction strategies. Several local governments (about one in ten) in Indonesia are in various stages of developing their own PRSPs. Expectations were that there are several models in development, including: PRSPs initiated by local governments and facilitated by agencies such as international donors or university groups; PRSPs initiated by donors or other agencies; and made-to-order PRSP documents written by local consultants and funded by local governments. The IAP will be especially useful to those local governments that earnestly desire a hands-on approach to PRSP development.
5. The IAP project also exposed the constant problem of data availability. The linkages between poverty reduction and environmental quality need to be substantiated with data that show the benefits of environmental services to the poor and the distribution of benefits due to current development activities (infrastructure building or fostering of a certain industry, for example). Such data is not readily available.
6. Many groups have an interest in the content of the PRSP so sustainability must compete with other issues such as gender equality, regional autonomy and pro-poor budgeting. An effort to integrate sustainability concerns into other issues may not be always workable since each lobby group will usually have developed its own priorities and it will not be practical for an IAP team to be involved in many groups.
7. It is clear that the environment was “mainstreamed” into the PRSP formulation process. In this respect, the goals of the project, which are to enhance understanding of the linkages between trade, environment and poverty alleviation; enhance national institutional and human capacities for undertaking strategic integrated assessment and planning for sustainable development; enhance national coordination among

the government institutions involved in the project; and enhance capability of policy-makers to design and implement comprehensive policies and measures for sustainable development, have been met.

8. PRSP was a moving target, which was started much in advance of the IAP. It experienced shifting focus, lack of environmental expertise, and failure to engage the technical sector (forestry, fishery, and mining and energy, for example). Understanding of sustainable development principles also widely varied among stakeholders. Although IAP guidelines were useful in evaluating the PRSP in a systematic manner, project teams in the future will need to ensure adequate understanding of the substance and process of the policy to which IAP is applied. The PRSP was not a suitable target, it was later found, as it meant “entering the fray” at the final stages of its development. In addition, the case study which follows lacked clearly defined objectives and was not therefore of the quality expected. However, the IAP team found the project highly useful in exploring the local linkages between poverty and sustainability issues.
9. The IAP team was able to contribute to the PRSP on issues of natural resources and the environment. The specific involvement included substantive wording on the rights of communities to the access and management of natural resources, needed regulatory oversight and the roles of the government, NGOs and private sector. The IAP team helped introduce a specific section declaring the right of the poor to the environment and access to natural resources which included related action plans, targets and monitoring plans.
10. The project brought together economists, development specialists, biologists and forestry experts in a small and effective team. It was a “training ground” to integrate key environmental topics into the overall process of poverty alleviation. Internally, it was a challenge to align concepts and visions from the different disciplines and institutions. Then the team’s efforts had to be communicated to a wide group of stakeholders. The IAP team also worked well with the PRSP drafting team, due to the strong technical leadership and history of cooperation in environmental matters.
11. Development of a good research approach and data collection plan had somewhat languished with the focus on influencing the PRSP development. The project operations were not amenable to research but more geared towards participation in policymaking. A better approach to data collection and analysis would require a team of dedicated scientists or researchers implementing a research agenda on behalf of the IAP team.
12. Site-specific interventions often worked much better than macro solutions since they could be adapted to local situations. While there was some efficiency in implementing large-scale programmes, it had been demonstrated that modifications were needed, and there was a high risk of failure. Site-specific interventions relying on local initiative can work and be cost-effective.
13. The conventional wisdom of a centrally-led (or macro) solution has led to the development of talent at the central or headquarters of related organizations (government or non-governmental). Site-level solutions will mean that local offices also need strong technical expertise, especially in areas for which the locality has particular problems.
14. Since externalities were experienced first hand at site level, launching environmental sustainability locally became easier as the negative consequences were an incentive to change. When official data on the linkages between development action and environmental impact were not available on the macro scale, interviews at the site level often brought telling results.

15. Business-orientated solutions were more effective than conventional project-based interventions for poverty alleviation and conservation.

Appendix A: A case study of Les Village in Bali

1. Ornamental fish trade

The market for aquarium fish, corals and other biota (collectively known as “ornamentals”) is global. In Germany, maintaining a marine aquarium is the second most popular hobby after reading. Many Western countries in fact show high demand for ornamentals especially during winter time when outdoor activity is curtailed. Such high demand is fuelling the extraction of aquarium fish and corals from places where traditionally they are available in abundance, such as Indonesia. Between 2002 and 2004, Indonesia proved to be one of the world’s largest suppliers to the aquarium trade business, along with the Philippines (Arsonetri, undated).

Indonesia, with its 5,000-km long archipelago, has the world’s largest coral reef system straddling an estimated 50,000 km², or around 18 per cent of the world’s total reef resources (ReefCheck, 2005). It has been estimated that Indonesia could supply, in a sustainable fashion, 60 per cent of the total world supply of ornamentals. Currently it is only supplying only 6 per cent. Even Singapore has a higher share of the world market, although it imports 90 per cent of its ornamental fish from Indonesia. In stony corals, however, Indonesia was the world’s largest exporter in 2001 (Brucker, 2001).

To take advantage of this international demand on the most favourable terms, some unsustainable practices are practised in Indonesia, including the use of potassium and cyanide to catch fish. Such methods are not sustainable for at least the following reasons:

- Potassium and cyanide destroy the coral reefs and other non-targeted species, and thus the habitats of the ornamentals.
- They also result in inferior quality of catch, since the poisoned fish are weaker and less likely to survive handling and transport.
- They are dangerous for the fishers (poisoning) and with the addition of primitive equipment and improper diving methods, pose high health risks.

In Indonesia, ornamental fish trading is centred in Jakarta and Bali, from where fish and other biota are exported due to the availability of direct flights to destinations in North America and Europe (Terangi, 2005). Bali is the largest exporting port for ornamental fish and also exports a lot of corals even though the Jakarta airport is the only one authorized by CITES (Anon, 2001). Bali in fact does have the largest concentration of exporters, numbering between 30 and 60 outfits, of which half are registered in Bali and the other half are branch offices.

2. The site of the case study

Buleleng Regency is located in the north-western part of the island of Bali. It consists of nine Sub-regencies and 127 villages in an area a quarter of the size of Bali. The shoreline of Buleleng is relatively extensive at 144 km in length. In 2003, there were 6,523 fishermen (Statistics Buleleng, 2004).

Between 1989 and 1996, the Buleleng Regency experienced relatively brisk economic growth of 6 to 7.5 per cent annually. In 1997, at the onset of the financial crisis, growth slowed. The recession set in in 1998. Since then, the local economy has rebounded. The mainstays of Buleleng economic life are agriculture, trade, hotel and restaurant sectors, which contributed significantly to gross regional domestic product (GRDP) in 2002. Agriculture also contributed significantly to foreign exchange earnings with coffee and vanilla the main exportables and sources of work opportunities.

Buleleng Regency has some of the poorest people in Bali. In 2002, the per capita income of Buleleng in nominal terms was Rp 4.78 million (US\$526), much lower than the provincial average income of Rp 7.15 million (US\$787). In real terms (taking into account the effects of inflation), the provincial average income per capita was Rp 2.49 million (US\$274) whereas the Buleleng average was only Rp 1.77 million (US\$195).¹⁴

As a whole, the situation of the poor in Buleleng was not improving during the period of study. In 1999, for example, the Gini coefficient was 0.20. It rose to 0.23 in 2001, showing a rising income gap. In 2001, the poorest 40 per cent of the population earned only 25.97 per cent of Buleleng's income, compared to 27.50 per cent in 1999.

The Buleleng Regency was chosen for the case study on the basis of the following criteria: receptiveness of the local government to integrated assessment, their interest in preparing a local poverty reduction strategy paper (SDPK), a high incidence of poverty, and environmental and international trade relevance. Within the Buleleng Regency, Les Village in the Tejakula Subdistrict was the focus of the case study. An integrated poverty reduction strategy implemented by this village over the last ten years was the subject of the assessment.

Tejakula Subdistrict lies at the eastern tip of Buleleng Regency, and it has 19 km of coastline. Its near-shore coast is significantly covered by coral. Of the nine coastal villages in Tejakula, only one, Les Village, has no resort development. Les Village is 90 km north of Denpasar, the capital of Bali. It has more than 7,000 people, 1500 of whom work as fishermen, either full time (around 60 per cent) or part time. Its coastline is about 2 km long. More than 650 boats have been registered in Tejakula, but only three have inboard engines; the others are non-engined and out-board powered boats. Les Village has 75 households mostly involved in catching ornamentals.

Aquarium fishing as a means of livelihood began in the early 1980's when fishers from Les Dusun, a hamlet within Les Village¹⁵, started to catch aquarium fish to augment their income from pelagic fish and octopuses. Initial contact was made with aquarium fish exporters in Denpasar by a small group of fishers. Others soon followed suit amid new orders for ornamental fish pouring in. Within a short period of time, the village chief had 50 fishers working for him. Each fisher used mask and snorkel to dive and a floating tire was used to store caught fish and provide oxygen. Cyanide was also used.

In 1982, there was only a single local collector with three to five fishermen working under him in Tejakula. This grew to two collectors and 26 fishers by 1986. By 1990, there were 12 local collectors employing 200 fishers and operating boats with 15 tonnes of capacity able to travel to off-shore waters. Conflict between employees of local resorts and the ornamental fishers however were frequent. The resorts had been marketing the reefs as snorkelling attractions for tourists.

¹⁴ The GRDP growth for Bali in 2002 was very slight, while Buleleng's grew 8.2 per cent.

¹⁵ In Bali, the village is defined in two ways. The *adat* village is the traditional grouping of villagers bound by family and locality, whereas the administrative village is a governmental division for the purpose of public administration.

Ornamentals had taken over as the main source of livelihood in Tejakula. The switching from pelagic fishery to ornamental fishing was due partly to the overfishing situation in northern Bali, making it harder for fishermen to catch enough market fish, and also due to the higher returns available from the new trade. Beginning as a sideline, ornamental fishing soon attracted most fishers at Les Village as a full-time activity, but because cyanide was used, coral reefs were being destroyed and fishes were becoming harder to catch closer to the village. Fishermen soon had to travel further and further away to catch enough fish of good value¹⁶, even as far away as Sulawesi and Kalimantan. The amount of fishing time was increasing, along with its health risks from exposure to greater and greater amounts of cyanide.¹⁷ The number of diving-related injuries also increased, and deaths resulted.¹⁸

3. An integrated initiative

The Bahtera Nusantara Foundation (BNF) first introduced to the fishers of Les Village in 2001 the idea of using nets to catch ornamental fish. BNF was established in September 2000, with the aim of conserving coastal resources and achieving sustainable development. It is based out of Denpasar.

Prior to teaching the fishers, BNF conducted an investigative assessment of destructive fishing practices in all of the coastal villages in Bali, followed by a mapping of the condition of the coral reef. Data showed that destructive fishing practices were prevalent in almost all near-shore reef ecosystems in Bali, including many sites on the northern coast. Not only was this causing a major decline in the reef ecosystem that fishers depend upon, the practice was threatening the tourism industry as well.

BNF resolved to implement a programme at Les Village with the objective of transforming the way fish was caught and distribute the benefits between fishers and exporters more equitably. Intervention began in 2001 with the fishers being introduced to better methods of catching ornamental fish using nets and handling catch. For the next two years, the fishers of Les Village familiarized themselves with this new technique that did not use cyanide. BNF provided training and learning materials (both print and audio-visual material) to simplify training, and also the services of an expert. Mostly, however, the fishers learnt on their own, and rapidly adapted. They also disseminated to peers.

In Southeast Asia, the method of using nets started in the Philippines and was followed by Sulawesi, Java and Bali areas of Indonesia. Ironically, this was also how the use of cyanide spread. By the end of 2002, almost all of ornamental fishers in Les Village had stopped using cyanide and switched to nets. These fishers were even adept at catching fish species known to be hard to snare, such as angel fishes. They demonstrated that using nets did not reduce the number of fish caught. In fact all varieties, even the most difficult to catch, proved collectable.

Les Village fishers were also taught how to dive more safely using decompression techniques. Fishers were known to suffer from diving-related illnesses such as decompression sickness, which often led to disability and death. At Les Village, a professional dive instructor volunteered to share his techniques with the fishers.

¹⁶ Some of the long-distance travel could be explained by bigger boats and more equipments being used, hence more fish had to be caught to obtain a profit.

¹⁷ Some travel time is saved on big boats since they can stay out overnight.

¹⁸ A former cyanide fisher based in Gilimanuk at the western end of Bali admitted he lost 27 men in a period of two years.

By 2005, the Mina Bakti Soansari group of ornamental fishers was formed by the villagers with 98 members. The aims of the group were to: (a) increase the price of ornamentals for the fishers; (b) improve the welfare of fishers; (c) help enforce the legitimacy of fishing for ornamentals; and (d) to protect the coral reef of the village. The group and BNF decided to form a limited liability company, called PT Bahtera Lestari, with the purpose of exporting ornamentals directly. In this way, fishers would be able to reap full benefits of their labour. Its registered owners are the ornamental fisher group Mina Bakti Soansari, the *adat* village, the administrative village¹⁹, local village businessmen, and BNF. The business was careful to take advantage of local advantages such as a coastal site with an interesting reef formation located in Bali, and human resources skilled at catching ornamental fish and knowledgeable about the coral reef ecosystem.

In this way, the fishery reform at Les Village was concerned with not just with changing the method of resource extraction, but also the whole business model. However, one thing has been particularly elusive so far, which is raising the price of ornamental fish for fishers. To achieve this the group has identified a need for more widespread awareness on the part of the collectors and hobbyists about the quality of fish, and especially to look out for ornamental fish not caught by cyanide or potassium. It is felt that only with higher appreciation for quality on the part of the buyers would higher prices for fishers become a reality. Such appreciation will most certainly need to be built by an international campaign, which makes it an enormous task beyond one organization, especially a small one such as BNF or even the Les Village group.

Another current challenge is how the initiative at Les Village can be recognized nationally. Even though cyanide is no longer used by the village's fishers, local government of a neighbouring Regency are reluctant to let them fish in their waters.²⁰

In nearby Gerokgak District, collector groups have been established in Pejarakan and Sumber Kima. Ten collectors from Les and Tembok, Tejakula District, conducted the first-ever training on the use of nets for fishing for Pejarakan fishers. The 45 local collectors attending the event were initially skeptical but after practising building a barrier net and using a fishing net, they realized it was not as difficult as they imagined. Six of the trainers also provided training to 25 fishermen from Sumber Kima (MAC, 2004).

The people involved in the initiative were mostly local NGO staff and ornamental fishers themselves. Other people assisted the programme, some on a *pro bono* basis (as volunteers), such as professional divers who taught fishers safer diving methods. Other environmental activists (mostly those who worked in the area of coastal conservation) also provided administrative and technical assistance. As the intervention became better known, people from Central Government started paying attention and government officials started to visit the area, some providing access to financing and additional technical assistance.

One fairly prominent actor that did not participate was the local/Regency level government. It was constrained mainly due to lack of competence. Local government did not sufficiently value technical expertise and experience when placing its employees. Even today, the local government still does not fully understand this intervention and does not see the need to support these efforts.

There were certainly ways to involve local officials, but in the context of this particular intervention, it was seen more as a burden than beneficial. The conventional wisdom is that the government is better equipped technically-wise than the public, but this was not the case here.

¹⁹ The boundaries of the *adat* village and administrative village may overlap but more often they do not.

²⁰ Since fishing for ornamental fish has been identified with the use of cyanide for many years, many people, including conservation practitioners, doubted that it could be done without cyanide.

Prior to the IAP project, analysis of the initiative focused on the process of transformation in fishing methods from destructive and unsustainable to methods of sustainability. These analyses were qualitative in nature and based on historical narratives of fishing methods and impact on the fishers as described by them. Some of the work done stressed the institutional structures of the initiatives with the objective of replicating them elsewhere, such as those by WWF Indonesia, Telapak, Marine Aquarium Council (MAC) and others.

The IAP project attempted to identify the environmental and social effects of the intervention, but assessing the potential impact of the initiative was not easy since there was a large deficit in ecological and socio-economic baseline data available. What was available was overwhelmingly business-oriented, i.e. the size of the assets, volume of traded goods, profitability of the company, and diversification of revenue sources.

Major stakeholders in this project were: BNF, the fishermen group Mina Bakti Soansari, village groups and other entrepreneurs. The fishermen through their group Mina Bakti Soansari own the largest stake in the exporting company and have the greatest bargaining power of all.

4. Assessment

There are many anthropogenic activities that influence the condition of the reef, such as agriculture, physical construction, fishing and tourism. Naturally-occurring phenomena also affect the overall state of the reef. Aspects of reef condition include coral and fish biodiversity, coral cover, reproductive capacity, coral resilience, algae cover, fish stocks and other biotas. In turn, the condition of the reef affects future anthropogenic activities and has socio-economic consequences. Table 2 gives a summary of reef-related benefits (Moberg and Folke, 1999).

Table 2: Goods and other benefits from a coral reef ecosystem

Goods		Ecological services				
Renewable resources	Mining of reefs	Physical structure services	Biotic services (within ecosystem)	Biotic services (between ecosystem)	Bio-geochemical services	Social and cultural services
Sea food products	Coral blocks, rubble/sand for building	Shoreline protection	Maintenance of biodiversity and a genetic library	Biological support through 'mobile links'	Nitrogen fixation	Support of recreation
Raw materials for medicines	Raw materials for lime and cement production	Building up of land	Regulation of ecosystem processes and functions	Export of organic production to pelagic food webs	Co ² /Ca budget control	Aesthetic value and artistic aspiration
Other raw materials (e.g. seaweed)	Mineral oil and gas	Promoting growth of mangroves and seagrass beds	Biological maintenance of resilience		Waste assimilation	Sustaining the livelihood of communities
Curios and jewelry		Generation of coral sand				Support of cultural, religious and spiritual values
Live fish and coral for the aquarium trade						

Source: Reproduced from Moberg and Fole, 1999

The integrated assessment of the intervention attempted to draw out the positive linkages among the reef, fish stocks, improved economic and trade opportunities, poverty reduction and social cohesion. The assessment considered three scenarios. The first is the situation ten years ago before the intervention. The second is post intervention. The third is a projection of the intervention scaled up to district level. In each scenario, the environmental and social implications were assessed.

The assessment methods based primarily on the recollection and perception of fishers with analysis by observers. Quantitative data including fish trading volumes and profitability of the exporting company were used. It is impossible to determine the full range of economic implications but some of the impacts could be examined.

4.1 Previous fishing practices

During the early years of catching ornamentals in the 1980s, Les Village fishermen had actually used nets before being introduced to cyanide by ornamental fishers from the Philippines. Fishers would dive to depths of eight to ten metres to squirt cyanide on a localized area of the reef to stun fish hiding inside. The fish lost consciousness and were easy to collect.

The harvesting of ornamentals was aided by surface air pumped through a hose to the diving fishers. Since air compressors were expensive, many fishers made do with large inflated tires to store their air supply. This was risky as the fishers were prone to decompression sickness leading to light deafness, complete paralysis or even death²¹ (Wocaksono *et al.*, 2001). A fisher would use up to 50 g of cyanide a day, with up to 2.5 kg of the poison used by each group, enough to destroy 1,250 m² of reef (Asonetri, undated).

In addition to being harmful, this method was also inefficient. Up to 30 per cent of fish exposed to cyanide died before collection and more succumbed during transport and handling, partly due to decompression sickness. Fishermen also collected both stony and soft corals which destroyed fish habitats and contributed to long term decimation of fish stocks. The practice of removing live stony coral was also inefficient. Fishers often dug up 1 m² of reef to harvest 0.01 m² of stony coral, half of which would then die before reaching holding sites. In essence, fishing practices ten years ago were largely unsustainable, inefficient and wasteful.

The marketing chain for ornamentals also heavily profited exporters at the expense of fishers, who bore all the risk but collected only a very small percentage of the profit. Fish were caught and sold to a local, village-level, collector who in turn resold to district level collectors. The end of the chain was the exporters who delivered the ornamentals to overseas markets, where most ornamentals collected in Indonesia were sent. Fishers and local collectors had no influence on the prices they were paid and did not share in profits from the world market, which could be up to ten times their original fee.

Larges-scale collectors and especially exporters were also disconnected from the fishers, so the plight of the fishers and the condition of the reef did not concern them. The local government also did not pay particular attention aside from issuing exporting licenses.

²¹ Personal communication with Minabakti fishermen, December 2004.

4.1.1 Environmental impact

Prior to the arrival of BNF, there was no data on the condition of the reef ecosystem, but it was believed in 2001 that the condition of the live coral at most sites in Buleleng was a matter of concern. In fact, the situation was so dire that several sites were graded “poor” for live coral cover (see Table 3). Fishers found that some fish species had completely disappeared.

Table 3: The state of coral reef in Buleleng Regency, 2001

Location	Percentage of live coral cover (%)		Criteria
	At 3-5 m	At 7-10 m	
1. Sambirenteng 1	16.74	15.70	Poor
2. Sambirenteng 2	25.38	20.98	Poor
3. Penuktukan	16.58	40.54	Moderate
4. Anturan	7.17	20.44	Poor
5. Kampung Baru	16.78	0.00	Poor
6. Pemuteran	38.44	23.52	Moderate
7. Sumber Kima	11.32	25.56	Poor
8. Menjangan Station	24.08	0.00	Poor
9. Menjangan Shelter	13.42	9.32	Poor
10. Menjangan Garden Eel	23.42	12.60	Poor
11. Menjangan Mangrove	64.80	31.38	Moderate
12. Batu Licin	7.30	34.32	Poor

Source: Status Lingkungan Hidup Bali 2001

The use of cyanide was not only destroying the coral reef ecosystem, but was also cutting into the numbers, variety and quality of ornamentals. Fish stunned with poison were more prone to illnesses and had a high rate of mortality. Since local fishing grounds were being depleted, fishers had to travel further to catch fish, which required more time and equipment but brought no additional profit. The near-shore reef of Tejakula was important not only to fishers, but also the tourism and mariculture industries (which reared seaweed, grouper and pearls). Therefore the economic value of the coral reef ecosystem was high but had to be distributed and sensibly managed among several stakeholders.

The length of Bali’s coastline was 584.5 km² according to the latest estimate published in the Status of Bali in 2002. The data indicated that around 12 per cent of the coastline was experiencing erosion, an increase of 5 km from 1997. The erosion affected not only the reef but also recreation areas, roads, agriculture, homes, offices and places of religious worship.

Systematic studies of the economic loss from unsustainable fishing practices in Indonesia are rare. But according to one study in 1999, cyanide fishing had yielded a net present private benefit of about US\$40,870 per km² a year over a period of 25 years, while incurring corresponding costs of US\$40,800 in lost tourism and US\$58,300 in deteriorated fishery. It was also estimated that 1 km² of healthy coral reef in Indonesia had a value of US\$12,000 a year in fisheries production (Cesar, 1996).

4.1.2 Social and poverty implications

Destructive fishing practices of the Les Village ornamental fishers did not at all contribute to the well-being of the fishers. A select group of people enjoyed a better livelihood working as local collectors, but they had the capital. The lives of the majority were not improved. They also felt hard done by as they could not influence the price of the fish they collected, unlike fishers of edible and pelagic fish. Furthermore, ornamental fishers were illegally fishing with cyanide and faced jail terms if arrested. Their health risks were also higher from the use of the poison and poor diving techniques.

4.2 The sustainable fisheries management initiative

Poverty reduction measures that take into account the economic, social and environmental specifics of an area are more likely to be successful and sustainable. Les Village is a case in point. The first step taken towards sustainable use was the adoption of a new method of catching fish that promised the same amount of catch for the same level of effort but without cyanide. A specially constructed barrier net that appeared invisible to fish, a decompression bucket and safer diving techniques are additions to the villagers' equipment. First the barrier net is spread over a small parcel of reef. Fish are herded towards the net and then captured via a smaller mesh scoop. Fish are then put into the decompression bucket which is brought up to the surface slowly allowing fish to adjust to falling environmental pressure. Fishers also now use simple air regulators and an air compressor, allowing longer and deeper dives.

4.2.1 Environmental implications

Fishers were taught to manage and plan their catch to ensure that they did not overfish a certain species, did not harvest immature fish and allowed the fish stock to recover. They also participated in a collection area management plan to record all species of fish caught and their numbers, which aided in monitoring the fish population. The condition of the reef was also surveyed periodically. The improved working environment for Les Village fishers has encouraged them to engage in coral farming, which involves placing small coral pieces usually of the *Acropora* species to grow on a platform on the ocean floor. It required the cooperation of fishers to implement this initiative as the young corals require cleaning of sediment a few times a week. Such activity further strengthened the fishers' commitment to environmental conservation and rehabilitation. It was also found that fish congregated around the transplanted coral and some smaller species are known to hide in the small tubes to which the corals are tied.

These measures have resulted in a recovery of the reef ecosystem. More than 200 species of fish can today be seen in the waters off Les Village, including cardinal fishes, damsel fishes, angel fishes, wrasses and blennies. One fish which disappeared for a period after 1985, the blue-ringed surgeon fish, has made a comeback in the thousands.

The environmental benefits of the intervention have been confirmed by ReefCheck (accessible at: www.reefcheck.org) using scientific methods of monitoring and assessing reef conditions. Information on fish populations and habitats can be gathered from the farmers' collection area management plan. A stock assessment study will give conclusive evidence of reef improvement.

4.2.2 Economic implications

Coral breeding has become a tourist attraction for guests at the nearby resorts. Local resort management have also felt the need to support Les Village fishers since it is in their interest that there is no return to cyanide. Tourists were sent by the resorts to Les Village and occasionally dive equipment and free tank refills were arranged for special activities, such as the celebration dive on Indonesia's Independence Day in August 2005. Les Village fishers have indicated that they would like to build basic accommodations for tourists who liked

to dive. Additional income generated from the reef ecosystem means the fishers have additional incentive to ensure a healthy reef ecosystem. Another initiative is the “adopt-a-coral” programme, where for the fee of Rp 165,000, a coral structure can be adopted for the fishers to take care of. A few corporate sponsors including two luxury hotels in Bali have adopted whole tables of corals for breeding purposes. Also, visual inspections of the coral farm site in December 2004 and August 2005 indicated improvements in the size of coral transplants and abundance of fish.

The combination of catching fish with nets and coral breeding has led to greater ornamental fish production and more species exported. This has in turn resulted in better performance of the fishers’ exporting company and also more income.

4.2.3 Social implications

The activities of Les village ornamental fishers have been noticed by many people in the diving community and by other marine conservation activists. Officials with the Central Government, including the Ministry for Marine Affairs and Fisheries, have visited the village. The village also earned an award as a “conservation village”, a source of pride for the fishers. Since they no longer engage in cyanide fishing, they no longer face the threat of legal action, and they also enjoy better relationships with surrounding resorts than previously.

4.3 Lessons learned

The initial objective of the initiative, which was to transform the way fish was caught, has been reached. The second objective of creating a more equitable system of benefit sharing has been achieved by creating an exporting company owned by the fishers themselves. However, the price of their fish in foreign markets has not grown as there is still insufficient appreciation of the better quality of their fish, which can be overcome with the development of a fish certification system.

The success of this initiative also has to do with Bali’s strong link to traditional keepers of law (the *pecalang*). The *pecalang* can conduct monitoring and patrolling to uphold most laws in a cost effective way. The *pecalang* is involved in all major events in Bali, including supporting the security system against potential terrorists, safeguarding elections, and patrolling around marine conservation areas. Support from the police and the justice system, especially involving trespass by non-Balinese is still needed, but the key to effective and non-costly law enforcement in Bali is the adoption of laws into the traditional system. This involves the support of local villagers. When cyanide fishers abounded, it was difficult to achieve this. But as in the case of Les Village, since the fishers themselves were committed to sustainable fishing, there was public support.

There are other insightful lessons from the case study of Les Village which can provide valuable input into the development of other initiatives, including:

- There is a need to simplify the facilitation and management of natural resources by the community.
- Capacity building is needed to manage resources effectively.
- Central and local government policies and regulations must protect communities’ access to resources and must be implemented in a consistent manner.
- Communities need marketing support.
- Division of labour amongst the government, NGOs and the private sector can be effective to manage natural resources.

5. Scaling up to the district level

Although Les Village provided an example of how trade and poverty reduction could benefit from improved resource management, local development plans did not usually take this into consideration. Some reasons for the lack of local government involvement are:

1. Local government staff did not keep up with the latest information in their technical field, or in this case, fisheries. Even if they did, it was overwhelmingly concentrated on aquaculture issues, rather than aspects of wild fish capture and management.
2. Some staff did not have the relevant technical background or the competence that would be useful for this particular intervention.
3. Local government did not see any benefits to be had from the intervention. They remained passive. They were pleased if efforts by NGOs could become a success, but would not take the blame if they fail.
4. Lack of competence was a factor, since there did not seem to be a role they could play to add value.
5. Local government staff did not sufficiently take into account technical expertise or experience when placing people in various positions. Thus the staff of the local fisheries service, for example, could not offer much in terms of technical assistance because they themselves lacked expertise.

Given the relative success in Les Village with a fishery that achieved bottom line environmental, economic and social improvements, the logical next step would be an expansion and/or duplication of the initiative. In fact, there was desire expressed to build on this model.²² Given that the immediate on-the-ground need was for reduced uses of cyanide, critical components of a scaled-up project would be:

1. Expansion of sustainable harvesting system
2. Transformation of the business model
3. Implementation of a reef rehabilitation scheme
4. Government-sponsored capacity building, research and development.

To describe what the expansion of the initiative would look like at the district and regency level, the IAP team used available secondary and primary data, and if the data was not available for the area in question, the team searched for data and estimates from other similar sites (through the benefit transfer approach).

²²A consortium of organizations embarking on an intervention in the Philippines and aiming to transform the ornamental fishery industry. This project, the Philippines and Indonesian Marine Aquarium Market Transformation Initiative (MAMTI), differed somewhat in that it focused on a process of certification as an incentive to implement sustainable harvesting of marine ornamentals (GEF, 2004).

5.1 Expansion of sustainable harvesting system

Currently the most viable method to catch ornamental fish in a sustainable way is to use the combination of nets, scoop and decompression bucket. In the future, other methods may become viable including captive breeding of ornamental fish species by fishermen.

Sustainable harvesting methods eschew the use of cyanide and reduce the impact on the reef, such as decreasing coral cover and higher mortality rates of biota. A healthier reef ecosystem also results in higher yields.²³ Data on the total coral cover for Buleleng Regency was not available. An estimate of coral cover in the whole of West Bali National Park would be 430 ha of reef-flat and 380 ha of reef-edge with abundant coral, totalling 810 ha of reef and 60 km of coastline at high tide (WWF, 2003). By extrapolation, the reef area of Buleleng Regency that could recover from cyanide use would be approximately 19.4 km².

Sustainable methods have led to improved fishery yield. From studies, 86 per cent of fish caught in 2004 were pelagic, of which the top four in volume were Indian oil sardinella (*Sardinella longiceps*), skipjack tuna (*Katsuwonnus pelamis*), flying fish (*Cysselurus spp*), and lemadang. A total of 27 types of fish were caught in 2004. Fish categorized as “reef fish” were less than one per cent. At 8,979 tonnes, fish weight caught in 2004 was already at 72 per cent of the maximum sustainable harvest of 12,523 tonnes.

It was estimated by BNF that if the size of coral cover in Buleleng Regency (19.4 km²) improved into fair condition, given the estimated sustainable yield of between 15-20 tonnes/km²/year from a reef in such a condition, the sustainable harvest of reef fish in Buleleng should be about 291-388 tonnes/year, much higher than current yields of 43.8 tonnes (6-9 times higher, in fact). Also, the types of fish more closely dependant on the coral reef ecosystem and were therefore more likely to be found at a reef in fair condition. Examples such as grouper and squid were higher in value, estimated at US\$1,500 per tonne and US\$2,000 per tonne respectively, compared to the total average value of US\$629 per tonne for 2004’s total production. Given the price per tonne and average yields of 15-20 tonne/ km²/year for a fair condition reef, the value of the annual catch would now be US\$22,500-US\$40,000 per km² per year.

This site-model analysis predicted that a better quality of reef ecosystem contributes to both higher total yields in terms of volume and value, as well as higher average unit value of yields. Spill-over gains (i.e. improved yields seen also in non-reef fisheries) were also expected.

Moreover, sustainable harvesting methods were likely to cut operating costs of fishers over the long run, once the initial investment had been made. With the exception of cyanide, much of the equipment were transferable. The cost-conscious fisher needed to only invest in new nets. Moreover, he no longer had to pay bribes to know the timing of patrols, an out of the pocket expense which could amount to hundreds of thousand rupiah per fishing group. Additional costs also included jail time and bribes to be released.

Another advantage of the sustainable harvesting method was the decreased mortality rate of fish caught, which meant less waste in the form of dead fish and other biota, thus maximizing fishers’ income for a set catch level and reducing the pressure on the reef ecosystem. With cyanide use, between 5 and 75 per cent of fish caught die within hours of capture, and between 20 and 50 per cent following that. Importers in the US reported that 30-50 per cent of aquarium fish imported from Southeast Asia died shortly after arrival (CCIF, undated). Only 50 per cent of all fish caught this way could be expected to reach the exporter and only 40 per cent were expected to be sold to the final consumers.

²³ Assuming that everything else, including the level of effort, stays the same.

The alternative of net use has seen mortality rates of between 10-40 per cent achieved upon arrival at exporting facilities (Schmidt and Kunzmann, 2005).²⁴ Reducing the mortality rate by half doubled the net revenue of fishers. Even a reduction of 5 per cent mortality could improve revenues by 25 per cent.

In 2005, for example, the total amount of fish exported from Bali between January and August was 8,822,077 fish valued at \$3,222,908 FOB (Fishery Service Bali Province, 2005). If half of the fish had been caught using cyanide, up to 3.2 million fish would have been wasted. If fish mortality could be reduced by as little as 10 per cent, around 400,000 fish more would be exported. Every stakeholder along the marketing chain would benefit including fishers.

Sustainable harvesting methods also improved the social standing of ornamental fishers by changing their image as law-breakers, and enhanced their capacity as role models and fisher-consultants, though these impacts were less quantifiable. For instance former cyanide fishers such as those in Les Village have reported that the psychological burden and the social stigma of being law-breakers were heavy. One cyanide fisher mentioned that his enthusiasm for catching ornamental fish the sustainable way only grew during the four months he was in jail.

With the cessation of cyanide use, conflicts between fishers and other reef beneficiaries such as the tourism workers and mariculturists have been lessened.

5.2 Transformation of the business model

Several studies established that fishers received only a small fraction of the final price of ornamental commodities. It was not uncommon that fishers only received one per cent or less of the retail price of ornamental fish and the reasons for this included low bargaining power on the part of fishers; abundant sources of supply and limited number of buyers; low capture and handling quality; and significant information asymmetry. If fishers could earn a higher proportion of the industry value-added, then there would be more incentive to ensure the long-term viability of the resource stock. It is pertinent that a new business model that puts fishers at the centre of the ornamental trade is established. The BNF model did this by partnering the Les Village fisher group to operate a business. Other models may also be viable.

An example provided by CCIF revealed the price for an ordinary clownfish (subfamily *Amphiprioninae*) at various points on the marketing chain (see Table 4):

Table 4: Price differences in ornamental fish chain

Marketing Chain	Fisherman	Local collector	Exporter	Importer	Retail
Revenue per clownfish	Rp 1,000	Rp 2,000	Rp 7,200	Rp 40,000	Rp 94,000

Source: Author's analysis

²⁴ Using samples of fish shipments from East Java, South Sulawesi and Bali. Schmidt and Kunzmann (2005) showed that the reason behind the high level of mortality despite good holding facilities was that many fish and biotas were not suitable for the ornamental fish trade.

From the Table, the fishermen received only 14 per cent of the export price. With a total export value of US\$3,222,908 for the 3.2 million fish caught in 2005 up to August, only US\$447,624 would go to the fishers. Assuming that each fishing trip returned with 500-1000 fish, the gross revenue per trip would be between US\$25 and US\$50. Split three ways, since three people made up a fishing group, the income per fisher would be only US\$8-US\$17 per trip. Acting collectively as a local collector supplying exporters, fishers could, from the Table, earn a gross income of US\$56 to US\$119 per fishing trip.

The cost of the initial investment into sustainable fishing methods was estimated to be US\$2,500 per cooperative (GEF, 2004). With a cooperative of 100 members, each member need only contribute US\$25, which can be recouped after three fishing trips.

The cost of developing a sustainable ornamental fisher group

It is difficult to gauge the accomplishments and future trends of a conservation initiative such as the one at Les Village since there was no systematic baseline information for pre-existing conditions, whether ecological or socio-economic. What existed were anecdotal information such as the reappearance of some fish species, the visible improvement in the coral condition and others.

What will it take to mount a similar programme elsewhere? BNF staff indicated that they needed US\$50,000 to implement a multi-year initiative like the one at Les Village but scaled up to include all fishers in East Java. Fishers in East Java are estimated to be responsible for 30 per cent of all cyanide fishing in Indonesia. With one million dollars, BNF was confident that a similar business model could be replicated in five key Indonesia regions and reduce cyanide fishing by 70 per cent. The sum mentioned was but a fraction of the cost of large loan-financed projects currently carried out to conserve coral reefs.

Source: Arsonetri, via personal communication, 2005

5.3 Ecosystem rehabilitation

In the last five years, rehabilitation of reef ecosystems through active measures has undergone rapid progress. The measures included traditional placement of fish shelters and the use of low level electric currents to induce reef-building. The method at Les Village involved a labour-intensive method of coral breeding. Benefits included faster recovery of ecosystems and a supply of coral that could be sustainably harvested.

Indonesia is the number one exporter of live corals in the world, exporting an estimated 200,000 and 800,000 pieces of live coral in 1992 and 1999 respectively. Active breeding efforts can aid in fulfilling the demand for live soft and hard (or stony) corals. In 2003, exports of live coral were 3,208 tonnes, valued at US\$1,529,773 or about \$477 per tonne, according to the Ministry of Marine Affairs and Fisheries. Other sources noted that aquarium coral were sold for US\$7,000 per tonne, while coral harvested to make lime for construction were sold for US\$60 per tonne (GEF, 2004). The price of stony corals was Rp 500 to Rp 2,000 a piece for local collectors which were then sold to exporters for US\$5 (GEF, 2004).

Clearly there is a market to be filled for live coral, and a sustainable way to go about it is coral breeding. Perhaps the main barrier for coral breeding is the length of time it takes for the coral to grow, which is between six months and three years to reach a size suitable for trading.

5.4 Government-sponsored capacity building, research and development

The Les Village achieved transformation without the involvement of the Government, either central or local. However, the IAP team concurred that a scaled-up initiative (see Table 1) would benefit from official help, from the local government in particular. The extent of the expertise needed should be determined with industry players (fishermen, NGOs facilitating them, middlemen, exporters and retailers) but one governmental specialist in ornamental fishery at regency level may be necessary. The responsibilities of this expert include data collection of ornamental fishery (including catch volume, composition, cycle, marketing chain and the socio-economic aspects of the industry), duties in advocacy and a role as an intermediary with law enforcement personnel. This specialist may be a civil service staff of Buleleng Fishery Service or Environmental Management Service.

Other roles the government could play include research and development (R&D) in ornamental fishing technology and/or equipment. The alternative technique to using cyanide was by using a combination of barrier net and scoop, but research may indicate that other methods are just as effective. Additionally, the nets required to implement the barrier and scoop method were expensive since they had to be imported. An alternative focus of R&D can include packaging, transporting and equipment. A summary of the benefits of a scaled-up activity is summarized (see Table 5):

Table 5: Summary of components and impacts of a scaled-up initiative

Components of scaled-up initiative	Impacts
<p>A. Expansion of sustainable harvesting system</p>	<ol style="list-style-type: none"> 1. Reef ecosystem improvement and higher yields <ul style="list-style-type: none"> • Coral cover improvements for 19.4 km² of coral from previously mostly poor condition. • Fishery yield improvement from 43.8 tonnes/year of reef fish to 291-399 tonnes/year; total value increases to US\$22,500-US\$40,000 per km²/yr. Yields of other pelagic and demersal fishery improves. 2. Decrease in operating cost. Decreased spending on bribes and decreased opportunity cost of wasted time (jail time, idle time due to patrolling activities, etc). 3. Decrease in fish mortality. More fish reach final consumers; previously only 40% fish caught survive. Every 10% reduction in mortality rate can save more than 400,000 fish going to waste, and optimize the income of fishers involved by US\$20,000. 4. Improved social standing and reduced social conflict.
<p>B. Transformation of the business model</p>	<ol style="list-style-type: none"> 1. Improved income through both higher income per unit and higher total yields. Higher ornamental fish value goes to fisher, from 14% to at least 28%; average gross income increases from US\$8-US\$17/person/trip to US\$16-US\$34/person/trip through collective effort. If fishers act as their own exporter then gross income can be as high as US\$56-US\$119/person/trip.
<p>C. Coral reef rehabilitation and breeding</p>	<ol style="list-style-type: none"> 1. Enhanced reef ecosystem. 2. Sustainable income for live coral harvesting. Net present value income of about US\$1,000 for one year of breeding 1,000 pieces of live coral to reach exportable size.

Source: Author's analysis

The total number of ornamental fishers who could benefit from a scaled up initiative in Buleleng Regency itself is unknown. Given that there are seven out of nine Subdistricts in the Regency with direct access to the sea, an estimate of the total number of ornamental fishers would be between 1,100-1,600, or around 17-25 per cent of 6,523 fishermen (Statistics Buleleng, 2004).

With higher incomes, the ornamental fishing industry may attract more people to become fishers. In the 1990s, fishers switched from catching edible fish to collecting ornamentals, for example. Fishing is a growing occupation in Buleleng Regency. Between 1999 and 2003, the number of fishers increased by 30 per cent (Statistics Buleleng, 2004). However, as long as sustainable catching methods yield higher ecological, economic and social returns, new entrants can be relatively easily directed to the right methods. Furthermore, new entrants who still think of using cyanide will be discouraged.

Loss of revenues on the part of middlemen and exporters is an unlikely concern given that the market for ornamental fish is still growing. The market can accommodate more players, and in the long term lower costs due to competition among suppliers may spur market expansion.

On the matter of scaling up the initiative, the district government had not shown itself to be competent in issues of ornamental fishery. It is unclear that it will be the best agency to encourage district-wide adoption of sustainable fishing. New government regulations may also impose additional costs on an infant industry. Ideally, a university group should lead the advocacy and adoption of similar interventions, in collaboration with NGOs and community groups. Some in academia have already been involved in an *ad hoc* basis.

The experience at Les Village has helped promote similar activities elsewhere in Bali. So far, these promotions have not been as similarly successful. Among the interventions modelled after Les Village's experience was then carried out in Pejarakan Village, located on the periphery of the marine conservation area of the West Bali National Park. This is the most advanced and similar model, and there are also some lessons to be learned from the experience.

The introduction of a new technique, for example, was more likely to succeed if the fishers themselves promote it. Les Village fishers for example had trained their counterparts from other areas in the new method. Another lesson was that the demonstration of the advantages of the new method must be clear. In this case, the advantages were reduced costs, increased revenues, less time and lower risks. Since the initial investment required some outlay of capital in nets²⁵ and other equipment, some financial assistance in addition to training was required.

On the matter of benefits, the cessation of cyanide fishing in Buleleng waters should result in a better environment, decreased social conflict (horizontal and vertical), and increased well-being. Buleleng Regency had the only national park in Bali and one of the longest coastlines in the province but tourism was still relatively undeveloped. The improvement of the reef ecosystem should bring in more divers and snorkellers through word of mouth. Other fishers such as pelagic fishers, aquaculturists and mariculturists were also benefiting. A more detailed feasibility study of benefits is needed to estimate the likely impact of eliminating cyanide from ornamental fishing practices. Full realization will only be in the long run since the reef ecosystem will take years to recover.

²⁵ The new nets must be imported. It requires a level of quality not found in Indonesia. With currency depreciation of the Rupiah, the nets are becoming more expensive.

Given the scale of the support given to Les Village fishers and their organization, a scale-up to the district level may not be a viable option at the moment. An international organization was facilitating a similar initiative in Pejarakan Village, west of Les. However the initiative appeared to have stalled.

BNF's approach had always been to prepare fishers themselves to be business orientated. A business plan was developed first. Costs were kept low through the use of simple equipment. Volunteers were relied on in place of paid experts. Financial support to the fishers' group were turned into assets as far as possible. The adat village, administrative village and local entrepreneurs were involved from the beginning and had ownership feelings about the venture. BNF expressed the refrain that it would take five years to determine if the initiative had been a success. The founding members of the Foundation were also employees of conservation organizations including major NGOs and ensured that not only their knowledge and experience in conservation were tapped but also their ability to be cost effective.

5.5 Comparison of the three situations

A summarized comparison of environmental and socio-economic impacts of pre-initiative and post-initiative fishing, and scaled up initiative, is as follows (see Table 6):

Table 6: Environmental and socio-economic indicators of initiative

Indicators	Before the initiative	After the initiative	Scaling up the initiative
Environmental			
Cyanide use	Almost all fishers use cyanide.	No fishers use cyanide.	No fishers use cyanide.
Coral reef diversity	Decrease	Increase	Increase
Coral reef cover	Decrease	Increase	Increase
Ornamental fish diversity	Decrease	Increase	Increase
Ornamental fish stock	Decrease	Increase	Increase
Energy use and cost	High since fishers must travel long distances to catch fish.	Lower since trip frequency and distance travelled decrease.	Lower since frequency and distance travelled decrease. Lower pollution level.
Fish mortality	High	Low	Low
Human health	Fishers face high health risks from exposure to cyanide and from unsafe diving.	Fishers face less health risks; families face less risk of losing a breadwinner.	Fishers face less risks; families face less risk of losing a breadwinner
Socioeconomic			
Volume of trade in ornamental fish and other biota	Uncertain since fishers do not work based on purchase order.	Increase; fishers only catch what is being ordered.	Increase; fish caught only based on order.
Price of ornamentals at the fishermen level (i.e. farm gate price)	Small percentage of retail value	Higher	Higher. Fishers can afford better schooling and health care for children.
Expansion of revenue source	Fishers do not have alternative livelihood.	Fishers have other sources of income related to the quality of the coral reef ecosystem: coral farm and tourism. This strengthens fishers' ties to a good reef ecosystem.	Fishers have other sources of income related to the quality of the coral reef ecosystem. Strengthens fishers' ties to a good reef ecosystem, and enabling professional mobility.
Conflict	Fishers in conflict with resorts and face risk of imprisonment due to destructive fishing.	Fishers not in conflict with resort and do not face risks of imprisonment due to destructive fishing.	Fishers not in conflict with tourism industry and do not face risks of imprisonment due to destructive fishing. Potential for significantly less law enforcement effort.
Social status	Ornamental fishers have pariah status.	Ornamental fishers become pioneering and recognized for their achievements. Increased self confidence.	Ornamental fishers positively recognized for their achievements. Increased self confidence.

Source: Author's analysis

6. Case study findings

6.1 Conclusions

The Les Village initiative had been assessed to have failings, including the lack of attention and support by the local government. The local government seemed to have no inkling of what was achieved by the villagers, though the project flourished despite the lack of official facilitation. This demonstrates that communities may have technical capabilities that even the government lacks, and therefore government intervention is not necessary.

The lack of capacity in an important local sector meant that the local government only paid attention to the sectors it did understand, which unfortunately did not have strong linkages to the poor. This seemed to exacerbate the case of persistent poverty in the area. Market mechanisms have allowed the villagers to take advantage of international demand for local products. To be able to take advantage of this demand, and the premium price that comes along with the sustainable harvesting method, villagers will need a certain level of institutional support and cooperation from other stakeholders in the live fish trade. Without the larger enabling environment, including regulatory support in the form of a sustainable harvesting certification system, villagers will find it harder to grow their income and put distance between themselves and poverty.

6.2 Recommendations

A number of measures would be useful to further strengthen the positive outcomes resulting from the intervention:

1. **Differentiating between cyanide-caught and net-caught fish.** At the moment, visual inspection is inadequate to determine if a fish is caught with cyanide or net. Hence it is difficult to obtain higher prices for the healthier net-caught fish. One solution is certification. An organization has approached Les Village to certify their fish. However the process may not be rigorous. A test of certified ornamental fish in the Philippines, for example, showed that up to 47 per cent of them had traces of cyanide. Inspection, close monitoring and testing of fish and fishers are needed.
2. **Customer education.** Demand-side changes are necessary. Customers must know enough to buy ornamentals that are cyanide-free. An international promotion will need significant funding and is most suited to international organizations with understanding of global networks and mass communication channels.²
3. **Fishing tenure.** The merit of fishers having a secure tenure over their fishing grounds lies in greater ease of implementing conservation rules. It has been shown for example that fishing for ornamentals is not compatible with tourist snorkellers and divers. Les Village fishers are lucky in that the nearest resort is 15 minutes away and they are thus able to manage their coastline resources without much interference.

At the time of writing, the IAP team was developing a guideline document as part of a series of “how to” documents outlining the process of developing a local PRSP. This guideline document would be provided to local government agencies following a workshop to review the final document. There would also be a process to refine and finalize the guidelines through small discussion groups and email networking. In addition, the IAP team planned to conduct integrated assessments of local PRSPs with Bahtera Nusantara and Minabakti Soansari groups when funding permitted.

BAPPENAS is expected to facilitate engagement and interaction among the stakeholders and especially with the Ministries. CII will facilitate engagements with local NGOs and the Fishery Service Buleleng. KLH will include ornamental fishery in its monitoring programme. UNEP could support a study on Indonesia ornamental fishing with the focus on valuation of ecological, social and economic benefits from adopting sustainable catching methods.

Annex 1: Project development group and structure

Steering

Committee:

Chairman	Deputy for Natural Resources and Environment, BAPPENAS
Vice Chairman	Deputy for Environmental Policy and Institutions, Ministry of Environment

Members	<ol style="list-style-type: none"> 1. Expert Staff on Partnership, Ministry of Forestry 2. Direktur Konservasi Kawasan, Ditjen PHKA, Departemen Kehutanan 3. Kepala Pusat Penelitian dan Pengembangan Sumber Daya Wilayah dan Lingkungan Hidup pada Badan Penelitian dan Pengembangan Industri (BPPIP), Departemen Perindustrian dan Perdagangan 4. Direktur Kereseragaman Pembangunan Daerah, Ditjen Pembangunan Daerah, Departemen Dalam Negeri 5. Kepala Biro Administrasi Perencanaan dan Kerjasama Luar Negeri, Kementrian Lingkungan Hidup 6. Kepala Biro Perencanaan, Departemen Tenaga Kerja dan Transmigrasi 7. Direktur Pembangunan Ekonomi dan Lingkungan PBB, Departemen Luar Negeri 8. Direktur Kerjasama Pembangunan Sektoral dan Daerah, BAPPENAS 9. Dr. Jatna Supriatna, Executive Director, Conservation International Indonesia (CII) 10. Dr. Budhi Sayoko, Environment Program Coordinator, UNDP
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Technical Team

Chair	Dr. Agus Prabowo, Direktur Pengendalian Sumber Daya Alam dan Lingkungan Hidup, BAPPENAS
Vice Chair	Drs. Karliansyah, Asisten Deputi Urusan Kordinasi Kebijakan, Kementrian Lingkungan Hidup
Secretary	Dr. Didy Wuryanto, Terrestrial Program Director, CII

Executive Team

Chair	Dr. Indra Darmawan, BAPPENAS
Vice Chair	Dr. Barita Manullang, CII
Secretary	Hermawan Wijayanto, CII
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Meetings and discussions:

Discussion with members of the Mina Bakti Soansari fishermen group. 14 December 2004.

Series of discussion with members and advisory personnel of Bahtera Nusantara Foundation, 12-15 December 2005.

Meeting with stakeholders at Buleleng Government office, 13 December 2004.

Visit to Les Village, 17 August 2005.

Meeting with Bahtera Nusantara Foundation staff, 6 September 2005.

Web resources:

www.terangi.or.id, the website of Terumbu Karang Indonesia or Terangi (Indonesia Coral Reefs).

www.reefcheck.org, the website of ReefCheck, a global periodic and standardized monitoring of the world's coral reef ecosystem.

www.aquariumcouncil.org, the website of Marine Aquarium Council, which, among other activities, organizes certification of wholesalers and suppliers of ornamental fish.

www.marine.org, the website of International Marine Alliance (IMA) and international NGOs working in the area of sustainable ornamental fish policy and advocacy.

www.balidiving.com, the website of Bali Diving academy, which coordinates the coral adoption programme at Les Village.

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