

Impacts of the 1998 Coral Bleaching Event on Tourism in El Nido, Philippines

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Executive Summary



Severe coral bleaching during the summer of 1998 has led to 30-50% coral mortality in the Philippine town of El Nido (Bacuit Bay) on the island of Palawan. Given the importance of tourism in this area, the logical question arises what the impact is of bleaching on tourism. Therefore, this study aimed to assess the economic tourism losses of the 1998 bleaching episode and subsequent coral mortality. In the El Nido area, diving and snorkelling are the main outdoors activities of the nearly 17,000 tourists who visit the area annually. Bacuit Bay covers about 120 km² and along with its outer shelf includes 14 islands. El Nido has two major resorts (Lagen - see picture- and Miniloc), as well as two small resorts and a fair number of cottages in the town proper.

This study is based on both questionnaire surveys and secondary data sources. Surveys solicited opinions of tourists in El Nido, both in town and at the resorts. The surveys asked, among others, questions related to the willingness-to-pay for improvement in reef quality. The questionnaire was filled out by 58 tourists in the summer of 2000. Unfortunately, tourism arrivals were low in this period due to the Mindanao hostage crisis. A dozen key informants were interviewed as well, such as dive instructors, resort managers and cottage owners. They were asked for their perceptions of reef quality and tourist satisfaction. The secondary data sources are the official tourism statistics of El Nido and the Province of Palawan. These data were revised given severe underreporting by cottage owners for tax collection reasons.

The survey revealed that there are two quite distinct groups of tourists in El Nido, each roughly 50% of the total. The first group are backpackers, typically Europeans, but also some Filipinos and other Asians. They arrive by bus or boat and often stay in the cottages in El Nido proper. They do some snorkelling, boat tours, nature walks, etc. in the area as part of a larger trip to the Philippines. The other group are resort tourists, who often fly into El Nido, and come for a luxurious diving or honeymoon or relax holiday. They either stay solely in El Nido or combine this trip with diving elsewhere in Palawan. For both groups combined, most foreign tourists come from Europe (37%), followed by Japan (15%), South Korea (9%) and USA (9%). Local Filipino tourists comprise a sizeable 24% of the total (See Table 1).

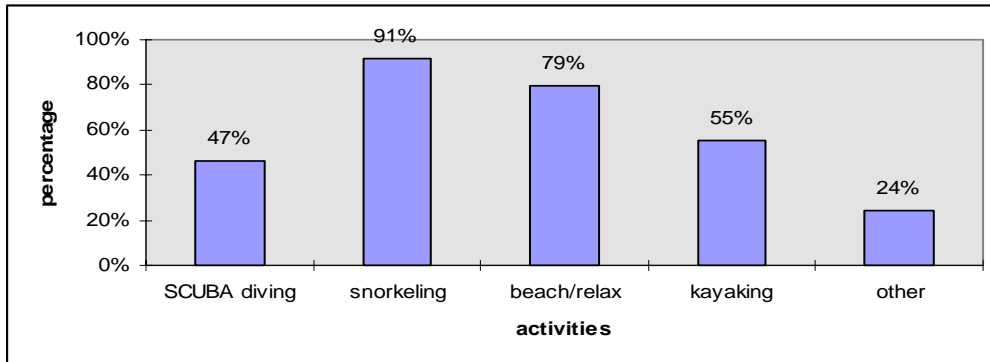
Table 1: Number of Tourists by Country of Origin and Type of Accommodation in El Nido - 1999 data

	Europe	Japan	Korea	Philippines	USA	Others	Total
cottages	4728	193	193	1598	675	620	8005
resorts	1363	2331	1368	2413	804	328	8607
total	6091	2524	1561	4011	1479	948	16612
% of total	37%	15%	9%	24%	9%	6%	100%

Tourists can also be distinguished by purpose of visit. The three main categories are: (i) divers; (ii) honeymooners; and (iii) general eco-tourists/relaxers. The survey found that the daily activities of these three groups in El Nido are mostly sea-related, as is clear from Figure 1. This shows that the four activities 'diving', 'snorkelling', 'kayaking'

and general 'beach/relax' are the most common ones. Note that 47% of the interviewees mentioned 'diving' as one of the activities. For most tourists, their dive was the shallow trial dive carried out on a one-to-one basis with an instructor. Only 18% of tourists interviewed had a diving certificate and dived more than once, while only 4% of tourists interviewed did more than 5 dives.

Figure 1: Activities undertaken by tourists in El Nido - multiple activities possible (sample size: 58)



Whether divers or not, most tourists coming to El Nido have a clear interest in the marine environment. Only 5% of the interviewees said they found "marine life" not important. At the same time, the general awareness of coral bleaching was found to be low. Only 44% of tourists in the sample were aware of the 1998 coral bleaching event. Especially the South Koreans and Filipinos in the sample had little knowledge of coral bleaching (31% and 20%).

El Nido has boomed as tourism destination in the last decade. Although no precise data on tourism arrivals are available for the mid-eighties, it is estimated that the total number of visitors was roughly 6000, with 25% budget tourists and 75% resort tourists. Budget tourism has increased fivefold since 1985 to 8005 in 1999. Resort tourism has roughly doubled since the mid eighties to 8607 in 1999. In the last years, occupancy rates of the cottages has been close to 100% in the peak season and roughly one-third in the low season.

From key informants interviews, it appears that bleaching has not impacted budget tourist arrivals. The only loss is that fewer budget tourists dive during their stay and make fewer dives. At the resorts, the situation is much worse. The resorts used to cater to the exclusive high-end of the dive market and Bacuit Bay was advertised as a pristine diving area. Over the last years, it has lost this image, due to reef degradation. According to key informants, this degradation is the result of the following four factors ranked according to perceived importance: (i) coral bleaching (El Niño); (ii) 1998 typhoon (also linked to El Niño), (iii) destructive fishing; (iv) tourism damage (anchoring; trampling on reefs by divers; etc.). According to one key informant, around 80% of resort guests were divers in the mid 1980s. Currently, the percentage divers is estimated at roughly 10%. The resorts have shifted in the meantime towards 'honeymooners', who now form over 50% of arrivals in the resorts, and other groups. The low occupancy rates suggest that the 'lost' divers are a true loss to the resorts.

Table 2 presents estimates of bleaching-related losses in El Nido. For these estimates, two scenarios are presented. One in which the losses are temporary and gradually disappear over a 10 year period, concurrent with coral recovery. The second scenario assumes no significant recovery of the ecosystem and permanent losses. The net present value of the losses is calculated with discount rates of both 3% and 9% per year. Total losses of value added in present value terms are estimated to be between US\$15.0 and 27.0 million depending on the discount rate. If the losses are temporary, the totals would drop to US\$ 6.0 to 7.4 million.

Table 2: Loss in Net Revenue to the Philippine Economy due to Coral Bleaching in El Nido
(in Net Present Value (NPV) in '000 US\$ over the period 2000-2025)

	Annual Loss to Local Economy	NPV Permanent	NPV Permanent	NPV Temporary	NPV Temporary
		3% discount rate	9% discount rate	3% discount rate	9% discount rate
budget tourists	10	179	99	49	40
resort tourists	1500	26,815	14,893	7,349	5971
total losses	1510	26,994	14,992	7398	6010

Besides financial losses to the local economies, coral bleaching can also affect tourists' holiday satisfaction and thereby create a loss in their welfare. To assess this, tourists were asked to express their willingness to pay for 'better reef quality', based on photos shown. The specific question was how much tourists were willing to pay extra to go to hypothetical remote areas on Palawan where reefs were not affected by coral bleaching and which were, in all other respects, the same.

Figure 2: Willingness to Pay for better reef quality in Bacuit Bay (El Nido)

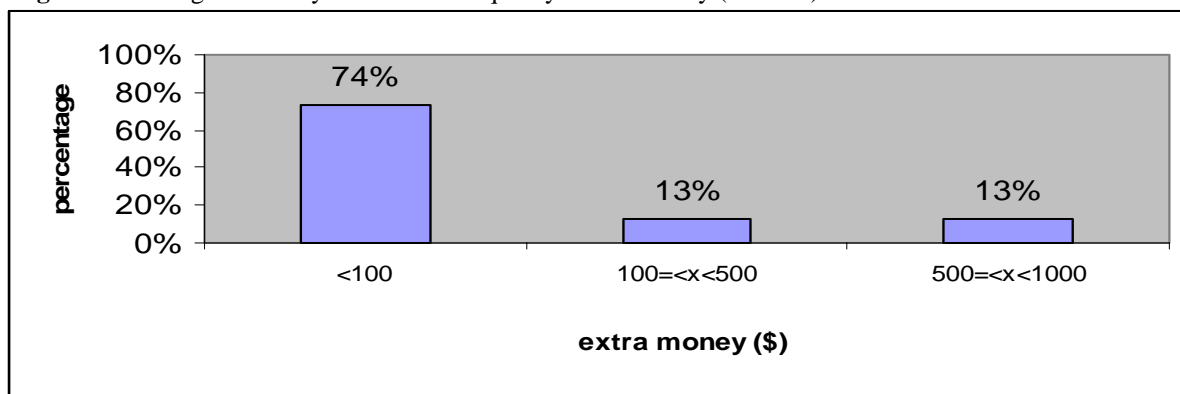


Figure 2 shows the distribution of this willingness to pay (WTP) with a mean number of US\$ 88.5. Divers were prepared to pay considerably more than snorkellers: the mean WTP for divers was US\$ 202 and for snorkellers US\$ 26. This corresponds with a total WTP of US\$ 1.5 million per year. The results, again with two scenarios and two discount rates, are presented in Table 3.

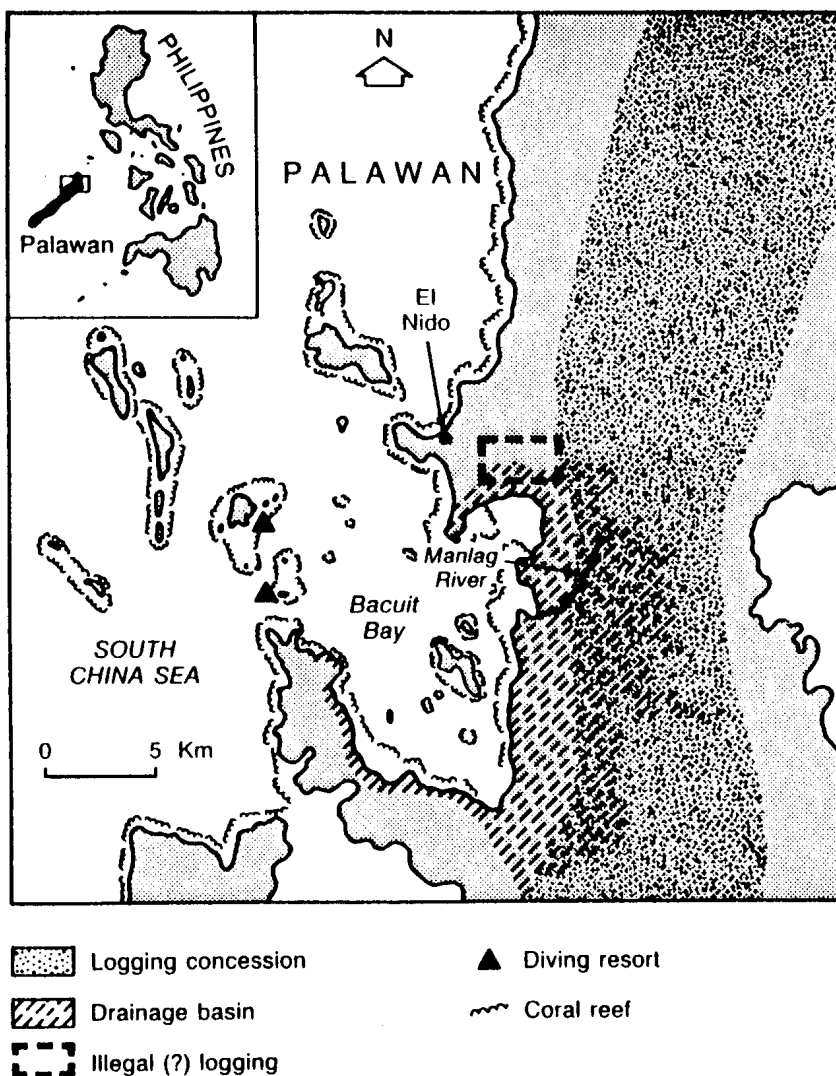
Table 3: Total Loss in Welfare of Tourists due to Coral Bleaching in El Nido
(in Net Present Value (NPV) in '000 US\$ over the period 2000-2025)

	WTP per individual	Annual Loss in Welfare	NPV Permanent	NPV Permanent	NPV Temporary	NPV Temporary
	in US\$		3% discount rate	9% discount rate	3% discount rate	9% discount rate
divers	US\$ 202	1,191	21,288	11,823	5,834	4,740
snorkellers	US\$ 26	278	4,976	2,764	1,364	1,108
total losses	US\$ 88.5	1,469	26,263	14,587	7,198	5,848

1. Introduction

In 1998, the Indo-Pacific ocean witnessed the most extensive coral bleaching event in recorded history (Wilkinson et al. 1999). Some areas, like the Maldives and Palau were especially hard hit with recorded coral mortality of 90% in some places. Given high poverty levels in most coastal areas with coral reefs, the socio-economic impacts of reef degradation are a major international concern. Overfishing is already a major threat and the coral bleaching effect could worsen this. Diving and other coastal tourism are also an important income generating activity, for instance in the Maldives where 45% of GNP stems directly and indirectly from tourism revenues. Furthermore, the land area around the Indo-Pacific ocean is prone to seasonal cyclones and coral reefs form natural barriers to protect the coastline from erosion. In the light of these possible impacts, management of areas with bleached reef is a major concern (Westmacott et al. 2000-b).

Figure 3 Site map of El Nido (based on Hodgson and Dixon, 1988)



Given this dependency on the goods and services that the coral reef ecosystem provides to hundreds of millions of people around the Indo-Pacific Ocean, the impacts of massive coral bleaching on the people in this region is likely to be severe. Data presented in Westmacott et al. (2000-a) suggest that for the Indian Ocean, the cumulative losses over a 20 year time period in net present value terms are between

US\$ 600 million (optimistic scenario) and 8,000 million (pessimistic scenario). In the pessimistic scenario, the total damages over a 20 year time period are primarily from coastal erosion (US\$ 2.2 billion), tourism losses (US\$ 3.3 billion) and fishery losses (1.4 billion US\$). In the optimistic scenario the losses are still considerable stemming mainly from losses in tourism (US\$ 0.5 billion).

The severity of the 1998 bleaching event in the Philippines prompted USAID to command a study on both the bio-physical as well as the socio-economic aspects of coral bleaching in selected sites in the Philippines. This report presents the results of the study on tourism impacts of coral bleaching in El Nido¹. This study is linked to a study in Bolinao on the fisheries impacts of coral bleaching, as well as bio-physical studies on live coral cover and underwater fish-census in various locations in the Philippines (xxxx). This tourism study builds on the studies carried out on the Maldives (Cesar et al, 2000) and in Mombasa and Zanzibar (Westmacott et al, 2000-c), also on the tourism costs of coral bleaching.

This study has been carried out with field data from the Philippine town of El Nido (Bacuit Bay) on the island of Palawan (see Figure 3). Palawan is a narrow island, 425 km long and 12,000 km² in area, located in the Southwest of the Philippines. Northern Palawan is still relatively inaccessible and has been the least affected by development. The study site, El Nido, is located near the Northwest tip of Palawan. Bacuit Bay covers about 120 km² and along with its outer shelf includes 14 islands. In the El Nido area, diving and snorkelling are the main outdoors activities of the nearly 17,000 tourists² who visited the area in 1999. El Nido has two major resorts (Lagen and Miniloc), as well as two small resorts and a fair number of cottages in the town proper. For a description of tourism in the area, see ENREP et al. (1999), NIPAP (1997) and JICA/DOT (1997).

Expressing losses from ecosystem degradation in monetary terms is becoming a more and more accepted and is considered to strengthen the political interest in natural resource degradation and management. A recent compilation of studies focuses mainly on economic costs and benefits of coral reef degradation is an example of this trend (Cesar, 2000). A recent study for the Philippines using a similar questionnaire based on internet-responses is Mamiit & Fransisco (2000).

The paper is structured as follows. In section 2, the research methods are described, followed in section 3 with a description of the results of the tourist survey. Section 4 describes the results from the key informants interviews. Section 5 gives the financial and economic analysis, and Section 6 gives a quick summary and recommendations.

¹ El Nido is well known in the environmental economics literature for the pioneering field work that Hodgson & Dixon (1988) have done there showing the trade-off between on-land logging activities and impacted diving tourism and fisheries. That study, demonstrating that the overall economic benefits from logging were smaller than from a logging ban contributed to the provincial government's decision to withdraw the logging licence in El Nido. Recently, one of the authors, Greg Hodgson, visited the site again and found that tourism had developed even more than anticipated. Fisheries, on the other hand, was suffering from overfishing. This was not foreseen when the study was conducted in the mid-eighties (Hodgson & Dixon, 2000).

² The data are calculated by the author based on local tourism statistics and interviews with cottage owners.

2. Methods

This study is based on both questionnaire surveys and secondary data sources. Two types of surveys were carried out: (i) one for tourists in El Nido, both in town, at the resorts and at the airport (departing tourists only); and (ii) one for key informants such as dive instructors, resort managers and cottage owners. The tourist questionnaire was filled out by 58 tourists, in two separate weeks in the period June-September 2000. This number is relatively low, but due to the Mindanao hostage crisis, there were no more tourists present in the area during this low season period.

The questionnaire was translated into German, French, Italian and Japanese, based on experiences in the Maldives with similar questionnaires. Especially the economics questions appeared to be difficult to understand in a foreign language and non-response rates in pre-tests were consequently high in an earlier try-out in the Maldives (Cesar et al, 2000). The english version of the questionnaire is presented in Annex 1. The surveys of tourists asked, among others, questions related to the willingness-to-pay for improvement in reef quality, interest in the environment, knowledge about coral bleaching, and basic background questions (nationality, age, education, sex, etc.).

Around a dozen key informants were interviewed in the same period. Key informants interviews geared towards obtaining information on trends in coral cover and mortality (dive instructors) as well as tourism trends and tourist satisfaction (dive instructors, cottage owners and resort managers). In the absence of official long term data on tourism arrivals and coral cover, key informants interview may be the only way to obtain such information.

The secondary data sources are the official tourism statistics of El Nido and the Province of Palawan, as well as a number of consulting reports on El Nido and Palawan. The tourism statistics were analysed and revised based on observed severe underreporting by the cottage owners. For tax reasons, cottage owners report very low occupancy rates to the local tourism office. The real occupancy rates were calculated, based on interviews with cottage owners using triangularisation techniques.

The statistical analysis of the questionnaires and key informants interviews were kept simple, using mainly descriptive statistics. Given the small sample size, more sophisticated multivariate techniques on the willingness-to-pay question, as presented Mamiit & Francisco (2000), were not used. The economic valuation estimates used standard net present value techniques with a range of discount rates to calculate both financial and economic costs (Westmacott et al, 2000-c; Cesar et al, 2000). Valuation was based on straightforward loss in added value over time in present value terms, following the formula. :

$$NPV = \sum_{i=1}^{20} \frac{value_i}{(1 + discount_rate)^i} \quad (1)$$

Most of the input parameters for the cost calculations were derived from the key informants surveys, as well as from secondary literature for El Nido. Benefit transfer were used when local information was not available (Barton, 1994).

3. Results Descriptive Statistics of Surveyed Tourists

General characteristics of tourists in El Nido There are two quite distinct groups of tourists in El Nido, presented in Table 4. The first group are tourists staying in the cottages (8005 in 1999). They are often backpackers on a shoe-string budget, typically Europeans, but also some Filipinos and other Asians. They arrive by bus or boat. Typically, they stay in the cottages and other lodging in El Nido proper and do some snorkelling, boat tours, nature walks, etc. in the area as part of a larger holiday in the Philippines.

The other group are the resort tourists (8607 in 1999). They often fly into El Nido, and come for a luxurious diving or honeymoon or relax holiday. They either stay solely in El Nido or combine this trip with diving in other parts of Palawan. This group spends easily US\$ 150-250 per day for accommodation, food and other expenditures.

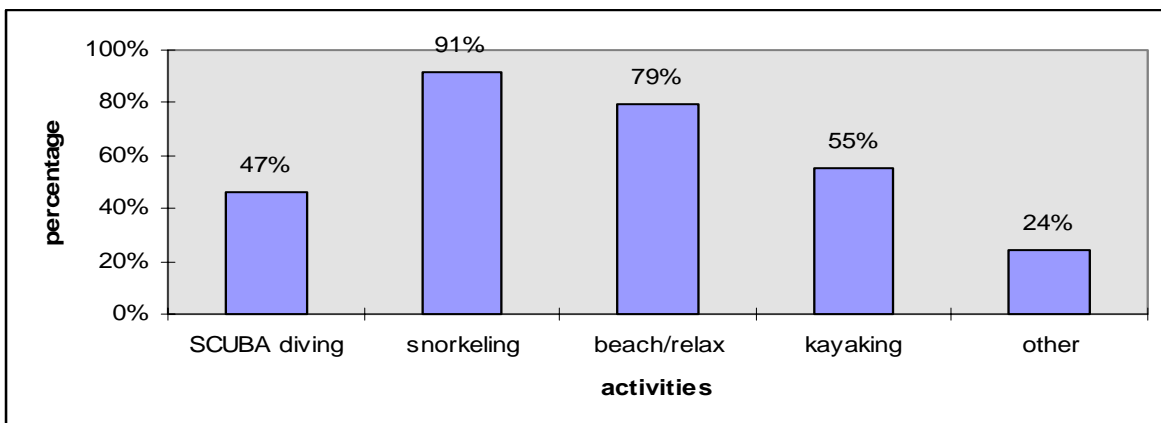
For both groups combined, most foreign tourists come from Europe (37%), followed by Japan (15%), South Korea (9%) and USA (9%). Local Filipino tourists comprise a sizeable 24% of the total. These percentages are roughly in line with the survey sample. The figures in Table 4 are based on official local tourism statistics (Anonymous, 1996, 1997, 1998, 1999, 2000; Department of Tourism, 2000), complemented with the author's own estimates for cottage tourism where official statistics show an underreporting of total tourist arrivals for tax purposes.

Table 4: Number of Tourists by Country of Origin and Type of Accommodation in El Nido ('99 data)

	Europe	Japan	Korea	Philippines	USA	Others	Total
cottages	4728	193	193	1598	675	620	8005
resorts	1363	2331	1368	2413	804	328	8607
total	6091	2524	1561	4011	1479	948	16612
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Tourists can also be distinguished by purpose of visit. The three main categories are: (i) divers; (ii) honeymooners; and (iii) general eco-tourists/relaxers. The survey found that the daily activities of these three groups in El Nido are mostly sea-related, as is clear from Figure 4. This shows that the four activities 'diving', 'snorkelling', 'kayaking' and general 'beach/relax' are the most common ones. Note that 47% of the interviewees mentioned 'diving' as one of the activities. For most tourists, their dive was the shallow trial dive carried out on a one-to-one basis with an instructor. The dive licensing organisation PADI offers this option for people who have never dived before.

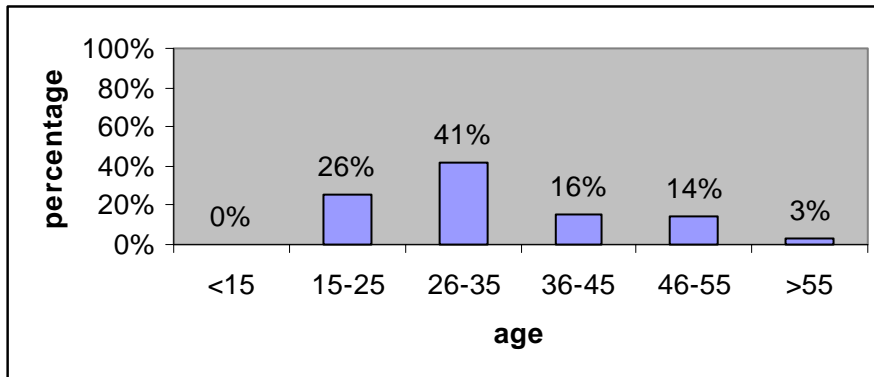
Figure 4: Activities undertaken by tourists in El Nido - multiple activities possible (sample size: 58)



Only 18% of tourists interviewed had a diving certificate and dived more than once, while only 4% of tourists interviewed did more than 5 dives. Based on key informant interviews, it appears that the percentage tourists that come specifically to El Nido for diving has dropped considerably over time, from over 50% in the late 1980s to around 10% currently. The reason most frequently mentioned is the deterioration of the coral reef ecosystem over the last years.

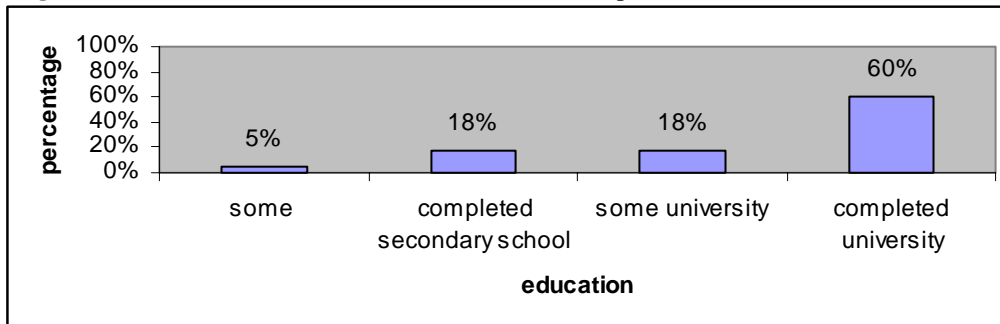
Other interesting descriptive statistics on the sample are, among others the age structure. Most tourists interviewed are relatively young as shown in Figure 5: 41% of tourists in the sample fell in the range of 26-35 years, with 26% younger than 26. This age structure can be attributed to the high number of backpackers and honeymooners in the tourist population.

Figure 5: Age distribution of tourists in El Nido (sample size: 58)



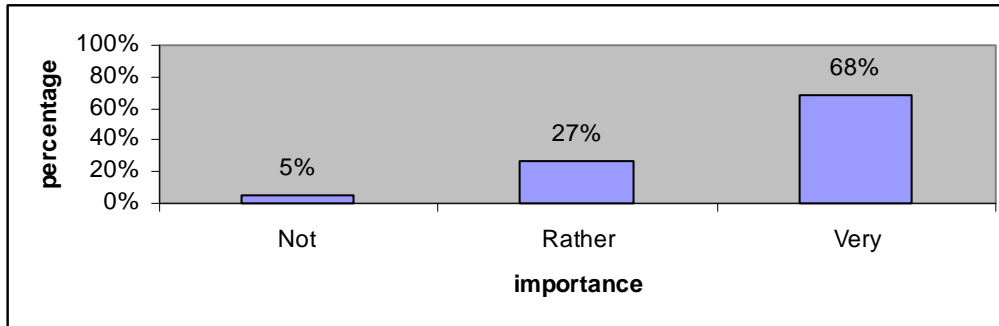
A last surprising feature is the high number of graduates in the sample: 60% of tourists has a completed university degree, while only 23% only had completed secondary school education (see Figure 6).

Figure 6: Level of Education of tourists in El Nido (sample size: 58)



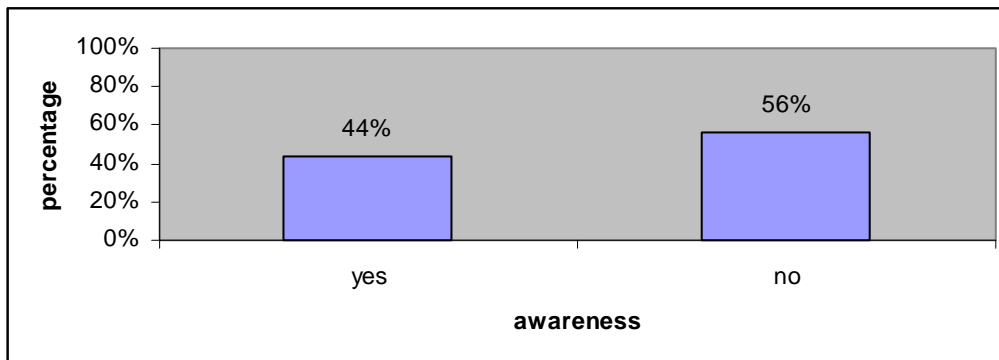
Knowledge of marine environment Whether divers or not, most tourists coming to El Nido have a clear interest in the marine environment. Only 5% of the interviewees said they found “marine life” not important, while 27% found this “rather important” and 68% found it “very important” (Figure 7).

Figure 7: Importance attached to ‘marine life’ in El Nido survey (sample size: 58)



At the same time, the general awareness of coral bleaching was found to be rather low. Only 44% of tourists in the sample were aware of the 1998 coral bleaching event (Figure 8). This is in line with results from the Maldives where a similar questionnaire was carried out in 1999 and 2000 (Cesar et al. 2000). Especially the South Koreans and Filipinos in the sample had little knowledge of coral bleaching (awareness was 31% and 20% respectively). For the South Koreans, this might be due to language problems. For the Filipinos, this number is strikingly low given the considerable attention to the bleaching event in the media.

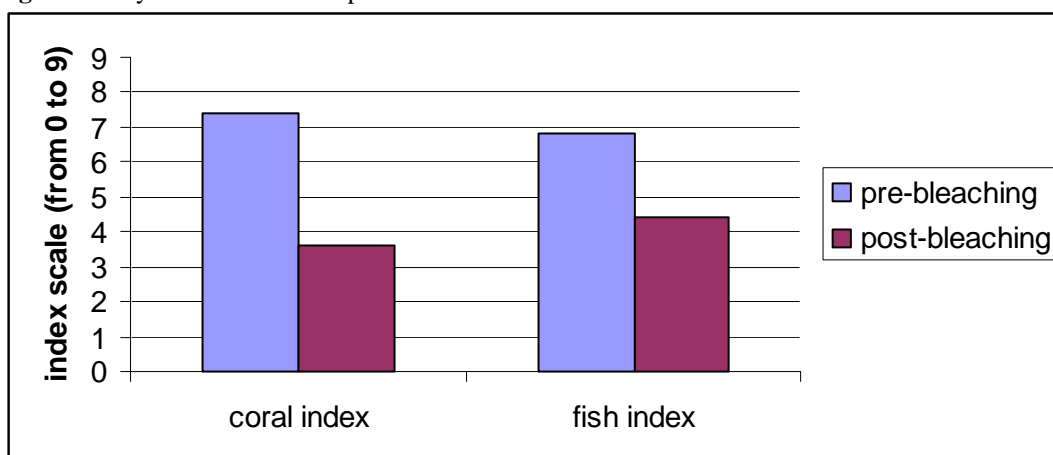
Figure 8: Level of Awareness of Coral Bleaching among tourists in El Nido (sample size: 58)



4. Results – Key Informants Interviews

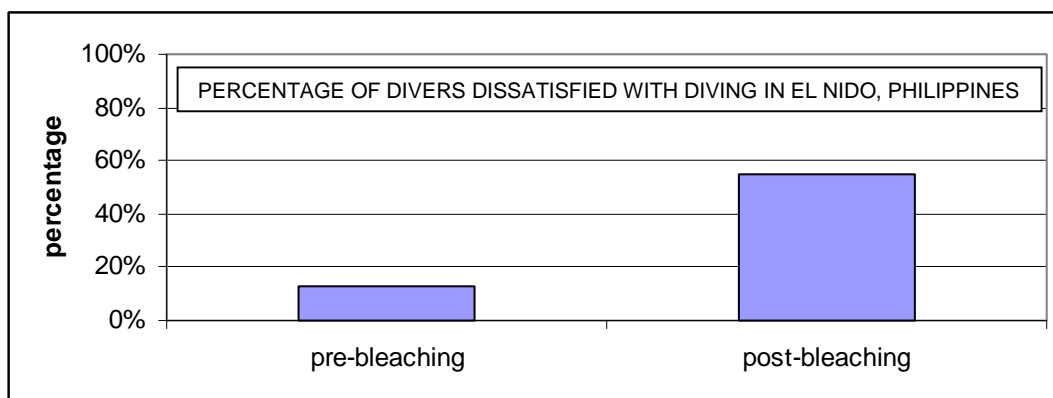
A dozen key informants in El Nido, among them dive instructors and resort managers were asked about trends in corals, fish and threats. The specific question for coral and a composite fish index was “On a scale from 0 to 9, how would you rank the corals/fish in El Nido pre-1998 bleaching and post-1998 bleaching”. The answers, presented in Figure 9, showed a clear trend and remarkably little variance among the key informants. Pre-bleaching, corals were given an average rank of 7.4 with a range of 6.5 to 8.5, while fish was given an average of 6.8 with a range of 6 to 7.5. Post-bleaching, the averages dropped to 3.6 and 4.4 respectively with ranges of 2.5 to 4.5 and 3 to 5.5 respectively. This showed a very clear deterioration in the perceived quality and quantity of corals and fish.

Figure 9: Key Informants' Perception of Trends in Coral and Fish Index



Next, the key informants were asked about the perceived trends in divers' dissatisfaction. The specific question was: "What was, in your view, the percentage of divers disappointed about their diving experience before and after the 1998 bleaching event". The results show also a very clear trend, as shown in Figure 10. According to one key informant, currently 100% of divers are dissatisfied, compared to 0% before the bleaching event.

Figure 10: Key Informants' Perception of Trends in Divers' Dissatisfaction



Finally, key informants were asked about the key threats in El Nido. Seven possible threats were given: (i) the 1998 bleaching event; (ii) the 1998 typhoon; (iii) anchor damage, (iv) destructive fishing; (v) siltation; (vi) damage by snorkellers and divers; (vii) others. Again, there was remarkable similarity in the answers of the key informants, with 67% mentioning the 1998 bleaching event as the most important threat (see Table 5). Interestingly, the 1998 typhoon was mentioned by 50% of respondents as the second most important threat, and by 17% as the most important threat. This typhoon, in late 1998 is also linked to El Niño.

Table 5: Key Informants' Perception of Ranking of Threats

	1st place	2nd place	3rd place	not mentioned
Bleaching	67%	33%	0%	0%
Typhoon	17%	50%	17%	17%
Destr. Fishing	17%	0%	50%	33%
anchoring	0%	0%	17%	83%
Others	0%	17%	0%	83%

5. Financial and Economic Analysis

Losses in Tourism Revenues: To estimate the losses incurred by the tourism industry in El Nido, general trends in tourism arrivals are analysed first. As discussed before, there are two types of tourists: (i) budget tourists staying in El Nido town; and (ii) resort guests. Though no precise data on tourism arrivals are available for the mid-eighties, it is estimated that the total number of visitors was roughly 6000, with 25% budget tourists and 75% resort tourists³. Budget tourism has increased fivefold since 1985 to 8005 in 1999. This is also illustrated by the number of guest houses and cottages: in 1986 there were 3 guest houses in town, while currently this number is close to 20. Resort tourism has roughly doubled since the mid eighties to 8607. The first four months of 2000 witnessed a considerable increase with 16%, partly due to strong marketing efforts by the resorts. However, due to the hostage crisis in Mindanao, tourism arrivals have dropped considerably since April 2000.

In the last years, occupancy rates of the cottages has been close to 100% in the peak season and roughly one-third in the low season. From key informants interviews, it appears that El Niño and other types of reef degradation has not impacted budget tourist arrivals. The only loss is that fewer budget tourists than before actually dive during their stay. And those who dive make fewer dives than previously. From the roughly 20 good dive spots available in Bacuit Bay in the 1980s, less than half a dozen are worth visiting at the moment. Based on key informant interviews, this loss is estimated at 500 dives per year with an average price of US\$ 25. This loss leads to a considerable loss in profits, estimated at US\$ 10,000 per year⁴. At the local level, a large multiplier effect is present for additional income. Hence, we assume that losses to the local economy are double the losses in profits, or US\$ 20,000.

At the resorts, the situation is much worse. The resorts used to cater to the exclusive high-end of the dive market and Bacuit Bay was advertised as a pristine diving area. Over the last years, it has lost this image, due to the degradation of its reefs. According to key informants, this degradation is the result of the following four factors ranked according to perceived importance: (i) coral bleaching (El Niño); (ii) 1998 typhoon (also linked to El Niño), (iii) destructive fishing practices; (iv) tourism damage (anchoring; trampling on reefs by divers and snorkellers; etc.). In the mid 1980s, most resort guests were divers. Currently, the percentage real divers is estimated at roughly 10%, based on our sample and key informants interviews. The resorts have shifted in the meantime towards other market segments, such as the 'honeymooners'. Currently, more than half of the tourists visiting the luxury resort of Miniloc are Korean and Japanese honeymooners, who typically come for a 3-4 day visit. Nevertheless, the low occupancy rates suggest that the 'lost' divers are a true loss to the resorts. We estimate that the true loss is roughly 4000 guest per year with a loss in net revenue of US\$ 2 million⁵. As most of the labour is local and a considerable amount of other expenses are also bought within the Philippines, we assume a multiplier effect of 50% (*cf.* Cesar, 1996), bringing the total annual losses at US\$ 3 million.

Whether the tourism loss is temporary or permanent remains to be seen. Here, two scenarios are worked out. One in which the losses are temporary and gradually disappear over a 10 year period, concurrent with coral recovery. The second scenario assumes no significant recovery of the ecosystem and losses are

³ This estimate is based on Hodgson & Dixon (1988) and on key informants interviews during the survey.

⁴ The variable costs of these 'lost' dives is relatively low (mainly diesel and some hired manpower), and therefore, the loss in profit is estimated to be 80% of the gross revenues.

⁵ The net revenue loss is based on 4000 guests each staying on average 4 days and spending roughly US\$ 200 in Miniloc and Lagen. The additional costs of additional 4000 guests is low, because little extra staff and food is needed compared to the current low occupancy situation. We therefore assume that the additional net revenues are 67% of gross revenues.

permanent. The net present value of the losses is calculated with two discount rates, a low one of 3% and a high one of 9% per year. It is not clear which part of the losses are due to the 1998 El Niño event, as the trends already started beforehand, as observed by Hodgson & Dixon (2000). At the same time, key informants indicated that the 1998 El Niño event, through coral bleaching and the typhoon were the two major causes of reef degradation in the last decade. We therefore assume that 50% of the losses are attributable to El Niño, or US\$ 1.5 million for the resorts and US\$ 10,000 for the local dive industry. The results are presented in Table 6. Total losses of value added in present value terms would be between US\$15.0 and 27.0 million depending on the discount rate. If the losses are temporary, the totals drop to US\$ 6.0 to 7.4 million.

Table 6: Loss in Net Revenue to the Philippine Economy due to Coral Bleaching in El Nido (in Net Present Value (NPV) in '000 US\$ over the period 2000-2025)

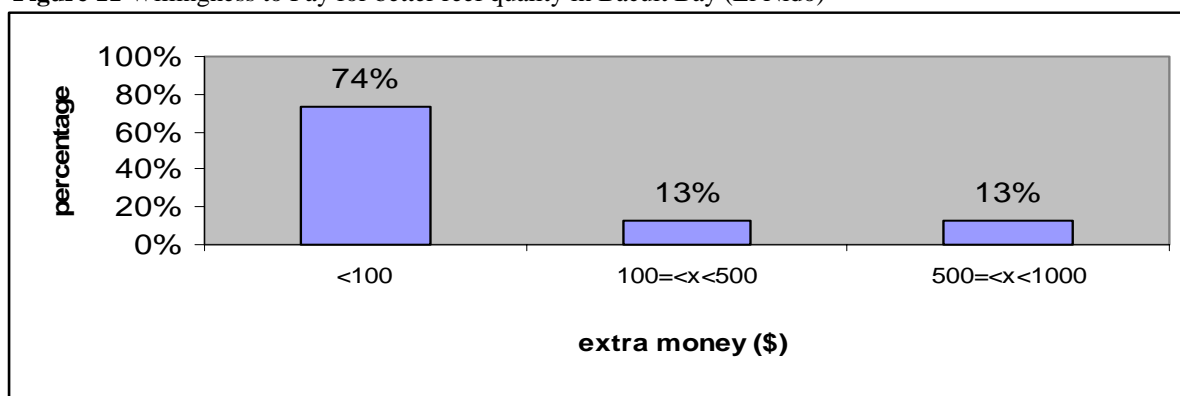
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budget tourists	10	179	99	49	40
resort tourists	1500	26,815	14,893	7,349	5971
total losses	1510	26,994	14,992	7398	6010

Welfare losses from divers: Besides financial losses to the local economies, coral bleaching can also affect tourists' holiday satisfaction and thereby create a loss in their welfare. In order to calculate these welfare losses, the surveys in El Nido focused on tourists' willingness to pay for 'better reef quality'. For this reason, two pictures were shown, based on the experience and pre-testing results in the Maldives (Cesar et al., 2000). The first picture shows a reef with greatly reduced live coral cover (current situation). The second picture represents a reef with high live coral cover (pre-bleaching situation). Fish abundance is the same in both pictures.

The specific question was how much tourists were willing to pay extra to travel to hypothetical remote areas on Palawan where reefs were not affected by coral bleaching and which were, in all other respects, the same (see Annex 1 for a the questionnaire survey).

Figure 11 shows the distribution of this willingness to pay (WTP) with a mean number of US\$ 88.5. Divers were prepared to pay considerably more than snorkellers: the mean WTP for divers was US\$ 202 and for snorkellers US\$ 26. This corresponds with a total WTP of US\$ 1.5 million per year.

Figure 11 Willingness to Pay for better reef quality in Bacuit Bay (El Nido)



To estimate the net present value of the WTP over time, we assume as before two scenarios, one with permanent reef deterioration and one with a temporary decline. Both scenarios use a discount rate of 3% and 9%. The results are presented in Table 7.

Table 7: Total Loss in Welfare of Tourists due to Coral Bleaching in El Nido
(in Net Present Value (NPV) in '000 US\$ over the period 2000-2025)

	WTP per individual	Annual Loss in Welfare	NPV Permanent	NPV Permanent	NPV Temporary	NPV Temporary
	<i>in US\$</i>		<i>3% discount rate</i>	<i>9% discount rate</i>	<i>3% discount rate</i>	<i>9% discount rate</i>
divers	US\$ 202	1,191	21,288	11,823	5,834	4,740
snorkellers	US\$ 26	278	4,976	2,764	1,364	1,108
total losses	US\$ 88.5	1,469	26,263	14,587	7,198	5,848

6. Conclusions and Recommendations

This paper has assessed the economic tourism losses of the 1998 coral bleaching episode and subsequent coral mortality in El Nido, the Philippines. The annual losses to the local economy were shown to be significant, roughly US\$ 1.5 million per year. Besides, welfare losses in terms of willingness to pay of individuals visiting El Nido was estimated at an additional US\$ 1.5 million. This shows the considerable negative impacts that reef degradation can have in an area with previously world-class diving opportunities.

Future research should focus on the specific attributes that divers and other tourists are looking for in their holiday experience. This would enable marine park management as well as resort management to target possible interventions to mitigate any potential losses due to coral bleaching and other forms of reef degradation. Also, additional similar studies on reef valuation in the Philippines and elsewhere would be very helpful to allow comparison of the results and an analysis of more general trends.

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ANNEX I: SURVEY FOR TOURISTS IN EL NIDO

GENERAL QUESTIONS

1. a) Nationality: _____ b) Permanent Residence: _____
2. Sex: (please tick) Male Female
3. In which of the following age group do you fall? (please tick)
- | | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Below 15 | 15-25 | 26-35 | 36-45 | 46-55 | Over 55 |
4. What is the length of your holiday in El Nido? Days
5. What did you like most about your holidays in El Nido (**tick only one box**)?
- | | |
|--------------------------|------------------------------|
| <input type="checkbox"/> | sand and sea |
| <input type="checkbox"/> | sun and nice weather |
| <input type="checkbox"/> | the food |
| <input type="checkbox"/> | the coral reefs and its fish |
| <input type="checkbox"/> | relaxation |
| <input type="checkbox"/> | others, namely _____ |
6. What was the most disappointing part of your holiday in El Nido (**tick only one box**)?
- | | |
|--------------------------|---|
| <input type="checkbox"/> | the fact that the food and beverages were expensive |
| <input type="checkbox"/> | the weather (humidity, clouds, etc.) |
| <input type="checkbox"/> | the fact that a lot of the corals were dead |
| <input type="checkbox"/> | the fact that there were few or no big fish left in the water (overfishing) |
| <input type="checkbox"/> | the accommodation |
| <input type="checkbox"/> | others, namely |
7. How important was “marine life” (fish, corals, turtles etc.) for you when you decided to come to El Nido? (please tick)
- | | |
|--------------------------|--|
| <input type="checkbox"/> | Not important; Major reasons for coming were sun, solitude, etc. (please continue with qu. <u>19</u>) |
| <input type="checkbox"/> | Rather important (please continue with question <u>8</u>) |
| <input type="checkbox"/> | Very important (please continue with question <u>8</u>) |
8. How did you enjoy marine life?
- | | |
|--------------------------|---|
| <input type="checkbox"/> | Mainly by diving (please continue with question <u>9</u>) |
| <input type="checkbox"/> | Mainly by snorkeling (please continue with question <u>12</u>) |
9. How much diving experience do you have?
- | | |
|--------------------------|---|
| <input type="checkbox"/> | I just finished my diving course. |
| <input type="checkbox"/> | I have done less than 10 dives before I came to El Nido |
| <input type="checkbox"/> | I have done more than 10 dives before I came to El Nido |
10. Which diving certificate do you have (e.g. PADI open water)? _____
11. How many dives did you do in El Nido during this visit?

12. In order of importance which of the below characteristics do you find the most and least important when diving/snorkeling. Please start to mark (1) for the most important and end with (6) for the least important:

- Wilderness feeling
- Variety of fish
- Variety of corals
- Visibility
- Overall condition of the reefs
- Adventure/Extreme

13. Is your visit to El Nido part of a larger trip to Palawan or the Philippines? Yes _____
No _____

CORAL BLEACHING

In the summer of 1998, the Indian-Pacific Ocean suffered from extensive coral bleaching due to high water temperatures. It is estimated that about 30-50% of the corals around El Nido were affected due to this event. However there are signs that some recovery is underway.

14. Were you aware of coral bleaching before you came to El Nido this year? *(please tick)*

- Yes No

15. Was this your first diving/ snorkeling trip in El Nido?

- Yes *(please turn to question 16)*
- No. If not, how many times have you been here before? *turn to question 17)*

16. Was diving/ snorkeling as good as you expected?

- Yes, it was very good *(please continue with question 18)*
- Yes, but I had lowered my expectations because of coral bleaching *(go to question 18)*
- No: the abundance and variety of fish was disappointing *(please continue with question 18)*
- No: diving/ snorkeling was not as good as I expected because of coral bleaching.
(please continue with question 18)

17. Was diving/ snorkeling as good as before?

- Yes, it was very good *(please continue with question 18)*
- Yes, but I had lowered my expectations because of coral bleaching *(go to question 18)*
- No: the abundance and variety of fish was disappointing *(please continue with question 18)*
- No: diving/ snorkeling was not as good as I expected because of coral bleaching
(please continue with question 18)

18. Pictures A and C show reefs in El Nido.

a. What do you think of the corals in Picture A? Are they:

- alive

- partly dead
- all dead
- unknown

b) Looking at Picture A and C, which of the two coral reefs do you prefer?

- picture A *(please continue with question 19)*
- picture C *(please continue with question 18 c)*
- the same/ no opinion *(please continue with question 19)*

c) [only for those who preferred Picture C in question 18b] Assume that areas like C in El Nido are further away and more costly to visit. How much extra money are you prepared to pay per holiday to El Nido to experience these better reefs, assuming the fish abundance is the same?

US\$

GENERAL QUESTIONS

19. Education? *(please tick)*

- Some Secondary education/ High School
- Completed Secondary education/ High School
- Some University or College/ Technical School
- Completed University

20. We would like to know your approximate annual income (after taxes)? *(please tick)*

- Below US\$ 10,000
- US\$ 10,000 - 19,999
- US\$ 20,000 - 29,999
- US\$ 30,000 - 49,999
- US\$ 50,000 - 74,999
- US\$ 75,000 - 99,999
- Over US\$ 100,000

21. Would you like to visit El Nido again?

a) Yes

b) If no, why not? _____

c) Would you recommend El Nido to your family or friends? Yes No

22. While in El Nido, which type of accommodation did you use?

- cottage
- resort, Name of the resort:
- other, namely

23. Which activities did you do during your trip? *(multiple responses)*

- SCUBA diving
- Snorkeling
- Beach/Relax
- Hiking
- Kayaking
- Mountain biking

Thank you for your time and co-operation

Photo A



Photo B



Photo C

