Monetary and non-monetary values of small-scale fisheries in Pacific Island countries

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Introduction

Many coastal communities in Pacific Island countries (PICs) are highly dependent on coral reefs, which sustain their subsistence and small-scale fisheries (SSFs). PICs rely on subsistence and SSFs for food production, income and livelihood, and the fisheries represent a resource critical to the economic health of coastal communities.

There is a growing awareness that the region’s reef resources are under stress and that fishery production is drastically declining. This is impacting the major stakeholders – those people whose livelihoods depend directly on the harvesting, processing and sale of reef resources (Whittingham et al. 2003) – but may also have far-reaching regional and international consequences (Burke et al. 2002). SSFs in the Pacific involve a large number of stakeholders and, thus, there is a range of values and benefits to consider. Identification and determination of values and benefits at the various scales involved are crucial to the development of much-needed equitable and sustainable management strategies and in the identification of useful performance indicators (Ahmed et al. 2004).

In determining the overall value of subsistence fisheries and SSFs, the range and scale of associated benefits must be considered, as well as the fact that many benefits accrue outside the market economy. Value is a pluralistic concept (Moran and Pearce 1999; Korovulavula 2005) with a wide range of interpretations. Social and cultural values are often non-market values (i.e. unpriced), and may vary substantially depending on the perceptions of different stakeholders. Because subsistence fisheries and SSFs in the Pacific fall mostly under the informal sector, the monetary values of many activities and transactions may not be incorporated into national cash economy accounts.

SSFs suffer from a lack of political attention, which is typical for informal sectors. The absence of detailed records on volumes landed, the lack of or incomplete knowledge regarding costs, prices and benefits, and the absence of mechanisms to take into account unpriced (non-monetary) benefits make it difficult to gain political momentum and support for fisheries management. Policies are often economically driven, and where SSFs are insignificant contributors to GDP, they are largely overlooked.

Some of these constraints are reflected in PICs’ projected fisheries production figures from the late 1990s (Table 1). According to these calculations, SSFs play only a minor role. From a total annual fisheries production of 731,641mt, 12.5% and 5.3% were accounted for by subsistence and coastal commercial landings, respectively. Figures also highlight that the value accounted for by SSFs is usually considered much lower than that of larger-scale commercial fishing operations.

This paper is not exhaustive, nor does it offer solutions for how to measure all economic contributions possibly made by SSFs. However, it does show possible variations in the prevalence and interaction of non-monetary and monetary values of SSFs in PICs at different scales in order to highlight the economic significance of SSFs. It also illustrates the limitations of using simple economic tools to approximate monetary values at the microeconomic level (households and rural communities). The case studies presented are based on observations made and data collected in the framework of an ongoing European Union (EU) funded regional project (PROCFish-C).

1. Community Fisheries Scientist, Reef Fisheries Observatory, SPC, Noumea, New Caledonia
2. The term ‘small-scale fisheries’ is used in this paper to include (mostly) traditional fisheries involving fishing households (as opposed to commercial companies), relatively small amounts of capital and energy, relatively small fishing vessels (if any), short fishing trips close to shore, fishing mainly for local consumption or the next larger market (Garcia; FAO Fisheries Glossary).
3. The coastal component of the EU-funded Pacific Islands Regional Oceanic and Coastal Fisheries Development Programme (PROCFish-C) is implemented (beginning in mid-2002) by SPC’s Coastal Fisheries Programme. Its major objectives are to i) contribute to improving coastal fisheries management in Pacific Island countries through the provision of a database on the current status of resources and their user level, ii) assess possible relationships and dynamics between resources and users, and iii) identify proxies or indicators as fisheries management tools.
Monetary value – the Niue case study

Niuean people have widely adopted a Westernised cash economy. Cost of living is comparatively high by PIC standards. To date, reef and pelagic fishing in Niue is mainly non-commercial. A commercial SSF does serve the local market, but generally combines lifestyle and commercial objectives. Major fishing gear and techniques include local bamboo or sport rods (targeting reef fish), sink lines, trolling, and to a lesser extent longlines (for deep-bottom and pelagic fishing). Transport includes walking on the reef, non-motorised canoes and motorised boats.

Although fish remain a preferred food, fishing is not a major source of income for Niueans. Fishing strategies are not meant to maximise catch volume, and fishing is often restricted by unfavourable weather and sea conditions. Although fish are still widely distributed on a non-monetary basis, people feel that the market demand exceeds supply, in particular for certain reef and deep-bottom fish. The high local fish prices are not surprising in light of the high labour costs and high cost of living. The question of which factors determine the value of SSF products remains, however. That is, to what degree are high production costs, low productivity and market forces (i.e. measurable monetary costs) responsible, and do perceived values also play a role?

Three major types of fishing were identified during a questionnaire survey conducted in Niue in May–June 2005. Average data were used to model:
- fishing with rods from the reef top by walking only (‘Walking’ in Table 2);
- deep-bottom fishing and/or the use of fishing rods and handlines from non-motorised canoes (‘Canoe 1a’ and ‘1b’); and
- using motorised boat transport for deep-water and pelagic fishing (‘Motorised boat transport 2a’ and ‘2b’).

Two options have been modelled for both canoe and motorised fishing so as to take into account variations in labour costs (duration of fishing trips), productivity (average catch) and investment costs (mainly determined by boat length and outboard engine) in the case of motorised fishing.

Annual costs (Table 2) were calculated using the annuity method for the three fishing operations, each performing 96 fishing trips per year. All costs have been converted from NZ dollars into US dollars (USD: exchange rate 0.688634). A discount rate of 15% has been applied to all costs.
A comparison of three different SSFs showed that production costs range between USD 1.10 and 4.90 (NZD 1.60–7.12) per kg of fish caught. These costs compare with local prices ranging from 5.50 USD/kg (8.00 NZD/kg) for pelagic fish upon landing (head, tail off and gutted) to, on average, 10.30 USD/kg (15.00 NZD/kg) for reef and deep-bottom fish (at the local market). This indicates that the net producer surplus for reef and deep-bottom fish significantly exceeds local market value, while for pelagic fish species the net producer surplus is significantly less.

This case study shows that the low-investment and least-risk fishing option (walking), which is adopted by most Niuean fishers, is not economically attractive. However, fishing is part of the local lifestyle, and thus leisure time spent fishing is an added non-monetary value and labour is not a perceived cost. This conclusion is supported by the significant differences between prices paid for different species groups (i.e. on average 5.50 USD/kg [8.00 NZD/kg] for pelagic and 10.30 USD/kg [15.00 NZD/kg]) for reef and deep-bottom fish. The varying level of prices for the different fish are indicative of food preferences (and thus perceived values), because they cannot be conclusively explained by variations in production costs. Also, the discounted fuel prices that are applied exclusively to the commercial export-oriented longline fishery, and not to local SSF operations, do not explain any of the disparities emerging from the calculations. The local market potential is very limited given the small resident population (about 1500 people) and the common practice of non-monetary catch distribution. Thus, market mechanisms can be excluded as a major factor in explaining the local price difference between pelagic, reef and deep-bottom fish.

Interestingly, this case study also shows that the local valuation of fish contrasts with standard economic approaches, which widely disregard SSF production and typically allocate higher values to pelagic rather than coastal SSFs. This observation suggests that previous national account figures may have underestimated the value of Niue’s SSFs, as they either applied an average price regardless of which type of fish was considered (Dalzell et al. 1996), or applied a much lower price for coastal catches than was used for oceanic catches.

With respect to fisheries management, the Niuean case study illustrates that:

- although Niuean people do not depend on SSFs for food or income, fishing and fresh fish remain an integral component of their lifestyle;
- Niueans’ culturally determined preferences and values are reflected in the local market prices, and the generally much higher prices paid for reef and deep-bottom fish (wahoo may be an exemption); and
- demand for fish, and thus fishing pressure, may be driven by cultural forces, thus bypass-
ing or challenging the promotion of alterna-
tives for income generation and/or food secu-
rity, which are often cited as fisheries manage-
ment options when seeking to divert fishing pressure elsewhere.

Non-monetary values – the Vanuatu case study

The Vanuatu case study highlights the ambivalence of mixing and comparing traditional values with Western market-
ing systems for SSF valuation. The ‘farm gate price’ (FGP), which refers to the price received by the fisher excluding any marketing costs (e.g. transport, labour, market charges), is often used for national-level accounting of the price value of fish sourced from SSFs. This approach was used to compare the degree to which priced and non-priced values apply, and to identify possible reasons for any differences.

The case study includes three coastal communities: Pau-
ngis on Vanuatu’s main island of Efate (population 390); Moso, representing a community on a small island off Efate (population 187); and the island of Uliveo (population 1016), in the remote Maskelyne Archipelago. In addition we have added prices at the next market cen-
tres, i.e. Port Vila for the two Efate communities, and Nor-
sup, Lakatoro for the Maskelyne people (Table 3).

The substantial variations in local FGP and consumer prices (Table 3) do not show a conclusive pattern of present prices and hence monetary value of fish across the three selected communities and their local and closest regional market places in Vanuatu. Trends do emerge, however, when comparing the remote-
ness of the community, based on the distance and transport connections to the nearest urban centre. The more remote the site (Uliveo is the most remote), the higher the per capita consumption of fresh fish (Figure 1) but the lower its monetary price (Figure 2).

Table 3. Comparison of the farm gate price (FGP), local traders’ price and consumer prices for five Vanuatu communities

<table>
<thead>
<tr>
<th>Community</th>
<th>FGP for local community (USD/kg)</th>
<th>Local price paid by traders (USD/kg)</th>
<th>Price paid by consumers (USD/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paunangisu</td>
<td>1.65</td>
<td>2.29</td>
<td></td>
</tr>
<tr>
<td>Moso</td>
<td>1.99</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Port Vila</td>
<td>2.51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uliveo</td>
<td>0.61</td>
<td>1.74</td>
<td></td>
</tr>
<tr>
<td>Norsup, Lakatoro</td>
<td>1.74</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Exchange rate Vanuatu vatu (VUV) to USD: 0.0091617

Figure 1. Average annual fresh and canned fish per capita consumption (kg/year) for three Vanuatu communities

Figure 2. Local prices (USD/kg) for fresh fish and canned fish for three Vanuatu communities
In contrast, canned fish consumption is lowest in the most remote community, and the per kg price for canned fish always substantially exceeds the FGP for reef fish.

Remoteness can also be defined by market access, which is supported by the fact that Uliveo has the smallest proportion of households that depend on fisheries as a primary source of income (Figure 3). However, in terms of the number of people involved in fisheries, Uliveo scores the highest (Figure 4). Thus, it is not surprising that 100% of households in Uliveo reported that they consume fish caught by a household member (Figure 5).

Through this comparison, Uliveo emerges as a highly subsistence-oriented community, which is supported by its low average household expenditure level (Figure 6).

Despite differences in local FGPs, income and dependency on fisheries as a food source, a high proportion of fish exchanges in all three communities are still non-monetary; the differences in the percentages shown in Figure 7 is not easily associated with the remoteness of the community or ease of market access.

The community of Paunangisu has the easiest access to the country’s main market in Port Vila. In addition, a local shop buys and sells fish. The community has generally adopted the wholesale price paid by the local shop to fishers; when fish are sold by fishers directly to community members, the same price is charged. The higher retail selling price at the local shop is paid mostly by people from neighbouring villages, but also applies to customers from Paunangisu (Table 3).

There is no local shop or trader available for Moso’s fish landings, and the only market opportunity is in Port Vila. The FGP in Moso is 20% above that of Paunangisu. Due to the off-island location of Moso village and lack of any cooling facilities, the average cost of taking fish to market, including transport (boat and road), ice blocks and market fees, amounted to USD13.10 per return trip. By com-
comparison a return trip, including longer road transport and market fees but no cost for ice (due to the shorter connection), totals USD9.16 for a fisher from Paunangisu.

Selling fish at the Port Vila market (where a higher price can be charged), and taking into account only transport and market fees but no additional labour costs, requires that over 20 kg be marketed at one time by Moso fishers (Figure 8) and over 10 kg by Paunangisu fishers (Figure 9). Given that local fisheries are small-scale (i.e. a typical catch will on average be no more than about 10 kg), this option is economically not viable. In fact, the bias between the market price in Port Vila and transport costs alone suggests that, even at the country’s major market, reef fish are widely underpriced. This situation may, however, be determined by low purchasing power rather than any inherent lack of value for local reef fish resources.

In the case of Uliveo, a marketing alternative exists in the form of a trade boat that makes regular monthly visits. The average FGP of 1.74 USD/kg paid to fishers is 2.8 times higher than what is paid by community members. However, this income opportunity has not altered the fact that fish basically remain a low-priced commodity among Uliveo’s people.

In summary, the Vanuatu case study shows that:
- substantial variations in local FGPs and consumer prices are not necessarily conclusive, if production and, in particular, transport costs are taken into account;
- data suggest that the more remote the community, the higher the per capita consumption of fresh fish and the lower its monetary value;
- the non-monetary exchange of fish among community members cannot be easily explained by the remoteness of the community or ease of access to a market;
- observations suggest that the factors considered do not fully explain the degree to which monetary and non-monetary values are exercised at the community level and
- any of the monetary values considered fail to reflect the perceived and de facto values of SSFs at the rural community level, in terms of their contribution to maintaining and enforcing social institutions, food security, networking, social insurance and social cohesion.

The great variation in FGPs and their failure to accurately account for perceived but non-monetary values have prompted efforts to use ‘substitutional cost’ as an approximate measure. Canned fish is commonly consumed; compared with other protein prod-
ucts, it is a low-cost protein substitute for fresh fish in PICs.

The total amount of fish (predominantly reef fish) consumed in each of the three Vanuatu communities and in Niue has been calculated, and its monetary value expressed in local FGP and its replacement cost in local canned fish price (net weight) for the corresponding caloric value.

Figure 10 shows that although total consumption figures vary considerably, value expressed in canned fish equivalents always exceeds the value in local FGP in Vanuatu. In Niue, however, the opposite is true, as the local FGP for fresh fish indicates an even higher value than that paid for the high-priced canned fish.

Although local canned fish prices vary across countries as they reflect various taxation, transport and marketing costs, this comparison nevertheless shows that the use of a simple replacement cost – such as canned fish – will presumably still under-represent the true monetary value of SSF products by not reflecting their true and perceived social and cultural values. This is particularly of interest when import substitution is used to estimate the contribution of SSFs to the national economy.

Discussion

In the past, Pacific traditional systems and values were geared to subsistence living by small self-sufficient groups (Crocombe 2001). From the time of colonisation, monetisation was seen as a necessary prerequisite to economic growth. The Western cash-based economic system has increasingly penetrated the entire lifestyle of rural traditional communities throughout the region.

Commercialisation and monetisation of formerly local, mainly subsistence, reciprocal exchange or barter economies have linked them with external markets and prompted three major consequences. First, external incentives lead to changes in perceived resource values by local communities, and these changes may result in the introduction of individual profits at the expense of local social equity (Ruddle 1993). Second, external factors may be internalised by the local community authorities, which can weaken traditional values and may result in the breakdown of traditional management systems. Third, although the cash-based economic system is regarded as a major accelerator of the degradation of coastal marine resources due to increased fishing pressure and non-sustainable fishing strategies, it has nevertheless not succeeded in completely replacing the traditional, non-monetary and barter economic system.

At present there is a mixed or intermingled system of monetary and non-monetary fisheries product marketing and exchange practices in PICs, which may explain why SSF resources are often economically undervalued by rural communities. It may also be a possible explanation as to why the economic performance of SSFs is regularly underestimated (if not ignored) in national accounts (Ram-Bidesi 1997; FAO Fisheries Glossary).

As the case studies show, monetary values may vary considerably due to the different scales of the fisheries, their production costs and the degree to which marketing mechanisms apply, as well as food preferences and the willingness (and ability) to pay.
The usefulness of using the society’s perceived value (also referred to as the willingness to pay principle; Freeman 1993) in the framework of PICs may be limited. This principle requires not only recognition of the resource’s intrinsic value, but also the ability to pay on the part of the society concerned. While their comparatively high standard of living allows, for instance, the Niuean community to apply the principle, it will be difficult, if not impossible, for most rural coastal communities and many Pacific Island societies, whose livelihoods are predominantly subsistence oriented.

Some of the fundamental mechanisms of the socio-institutional dynamics of SSFs, including their contributions to food security and their position within and relationship to the multiple activities of rural and micro-level (household and local) economies, remain poorly understood (Staples et al. 2004).

The fact that the adequate valuation of SSFs and their products is one of the necessary requirements to improve fisheries management underlines the concern that fishery authorities have with the ‘undervaluation’ of fishery products in the domestic (and foreign) market. The observations presented in this paper support the arguments that call for simple but effective tools to sensibly value SSFs at different scales, to equip strategic planners and fisheries managers, and to defend the corresponding policies and obtain financial support from all levels involved.

Some of the possible approaches to approximate the value of SSFs and their products in PICs have been tested. However, the approaches applied – annual cost, farm gate pricing, and substitutional cost – did not render the desired outcome. As shown in both studies, but in particular in the Vanuatu case study, social values are decisive but do not correspond to the underlying concepts of the simple techniques applied here (i.e. measurable transactions that also include mechanisms leading to an observed change in the price or quantity of the resources traded). Consequently, as argued by Costanza (1999), the observed market prices are not only inadequate measures of the social value of ocean assets, but also generally inadequate to value SSFs in PICs.

Valuation of SSFs and their products in PICs will contribute to a better understanding of fisheries and fishers’ motivations and perceptions from a social and economic perspective. Clearly, fishing management recommendations should not be made without regard to the social values and livelihood of fishers and their communities (Kesteven 1996; García 2005). It is possible that a quantitative approach derived from environmental economics, which includes the valuation of non-market benefits, could be adopted to assess the total economic value of SSFs in PICs. Such an approach, as discussed by Korovulavula (2005) in the framework of a socioeconomic valuation of biodiversity, takes into account:

- direct and indirect use values: in the context of SSFs, direct values are catch and other measurable uses of the coastal fisheries system, while indirect values comprise the environmental and ecological functions and benefits provided by the coastal marine system;
- option values: these are values perceived by the people in terms of their ability to use the resource at present and in the future, including use options that may go beyond SSFs; and
- non-use values comprising existence and bequest values (Richards and Davies 1999; Campbell and Brown 2003): in our context, this comprises the continuous existence of the coastal fisheries system and its value for future generations.

Such a non-market valuation approach must also aim at the development of a way to standardise values in monetary terms so as to account for a number of values associated with SSFs in PICs, including:

- nutritional security, stability within the rural environment, and protection against external economic variations, which, in conjunction with the larger non-monetary sector, help provide an important fall-back position for PICs (Ram-Bidesi 1997); and
- social institutions that are supported by SSFs and that lead to more equitable distribution and thus reduce the need for an external or governmental social welfare system. These institutions are also regarded as one of the most effective mechanisms (if not the most effective) to mitigate user conflicts and to implement viable fisheries management actions.

Nevertheless, it should also be borne in mind that the greater the monetisation of SSFs, the more likely it is that pressure on fishery resources will increase. Thus, the behaviour of local people may change towards less favourable conservation methods (Kramer and van Schaik 1997; Holt 2005). As a result, fisheries management must aim to stimulate people’s perception and willingness to modify their behaviour to ensure resource conservation under the new situation (Vickers 1994).

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