

## ***Alu toutai - Na laki qoli - Fun or duty:*** **School children's involvement in subsistence fisheries in Tonga and Fiji**

*Mecki Kronen<sup>1</sup>*

### **Introduction**

Subsistence fisheries plays an important role for food safety, social networking and cash income generation in coastal communities in the Pacific. While access to and use of marine resources is equally shared by all members of the community, particular fisheries are often gender specific. Men are more likely to fish during both the day and night, and to target more distant fishing grounds and deeper waters, which requires them to be away for longer periods of time. Men are also more likely to use boat transport. Women, on the other hand, are generally engaged in reef gleaning, targeting invertebrates and less frequently finfish by mostly walking along habitats close to shore (Matthews 2002; Matthews and Oiterong 1995). However, in some Pacific societies (e.g. Fiji), women and men share equitable access to marine resources and fishing techniques (Thompson 1940; Quinn and Davis 1997). Introduction and widespread access to modern fishing tools and gears, and lifestyle changes among Pacific Island communities have also contributed to erode or overrule some of the traditionally defined gender roles in fisheries (Kronen 2002a; Des Rochers 1992; Chapman 1987).

Over the last decade, there has been a growing awareness of gender roles in subsistence and small-scale artisanal fisheries in the Pacific. At the same time, fisheries has also been acknowledged to comprise both finfish and invertebrate harvesting. Research has, and continues to be, undertaken to better understand how traditions and modern society determine today's gender roles, especially women's role in coastal fisheries. Women's fisheries — although subject to constant societal changes — continues to be a complementary activity to household and family chores, particularly child rearing (Tungpalan et al. 1991). As a result, traditionally as well as nowadays, children very often accompany their mothers while fishing. However, little is known about the role children play during such fishing trips, their possible contribution in providing seafood for the family's consumption or even sale. Furthermore, little is known about the extent to which gender specific roles are

imposed on young children, or if they developed at a much later time.

A regional research project<sup>2</sup> aiming at identifying the relationship between use and status of coastal marine resources was undertaken in two Pacific Island countries: Tonga and Fiji. While research on fishing impacts focused on adults (people  $\geq 15$  years of age), the role of children in this context was raised. This paper presents a summary of the results obtained from a study developed to specifically learn more about the degree of children's engagement in fisheries, fishing strategies used, the major purpose of children's fishing, and if there are major differences between boys and girls. This paper discusses the approach used and the reliability of information obtained from children attending primary school.



**Fijian kids playing with their fishing gear**

### **Methods**

The two Pacific Island countries of Tonga and Fiji were selected in order to capture possible differences between Polynesian and Melanesian cultures, respectively. Within each country, three major regions of coastal reef and lagoon communities were chosen. In each region, two communities (assumed to be dependent on coastal fisheries) were surveyed, with one being more traditional

1. Community Fisheries Scientist, Secretariat of the Pacific Community, Reef Fisheries Observatory, BP D5, 98848 Nouméa Cedex, New Caledonia. Email: [MeckiK@spc.int](mailto:MeckiK@spc.int)

2. The DemEcoFish project is funded by the MacArthur Foundation and implemented by the Secretariat of the Pacific Community (SPC)'s Reef Fisheries Observatory in cooperation with the Institut de Recherche pour le Développement (IRD). The project began in 2001.

and the other of a more urbanised character. Geographical isolation and distance from major urban markets were used as proxies for a higher degree of traditional lifestyle.

These selected regions are believed to be comparative in ecological terms, and hence as far as habitats, biodiversity, biomass, and density of fish and invertebrates are concerned.

Fisheries was distinguished into fishing (i.e. fin-fishing) and collecting (i.e. harvesting of invertebrates).

Surveys of children's fishing practices targeted the eldest primary school children in each of the six communities in both countries. Surveyed school locations are shown in Figures 1 and 2.

School children were selected by their headmasters and surveys were implemented with the support and assistance of the teacher. A participatory approach was adopted using scoring and ranking techniques. The same set of questions (Box 1) was used in each class. Although primary school children are supposed to be fluent in English, the local language was used for communication. Translation was performed by the teacher and/or an accompanying extension officer from the country's Fisheries Department.

### Box 1

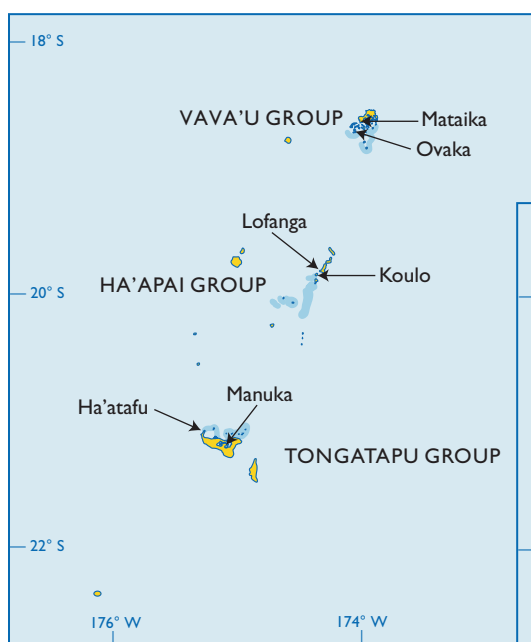
Set of school children survey questions:

1. do you go fishing?
2. do you go collecting/gleaning?
3. how long do you go fishing?
4. how long do you go collecting/gleaning?
5. why do you go fishing?
6. what fishing techniques do you use?
7. what species do you catch?

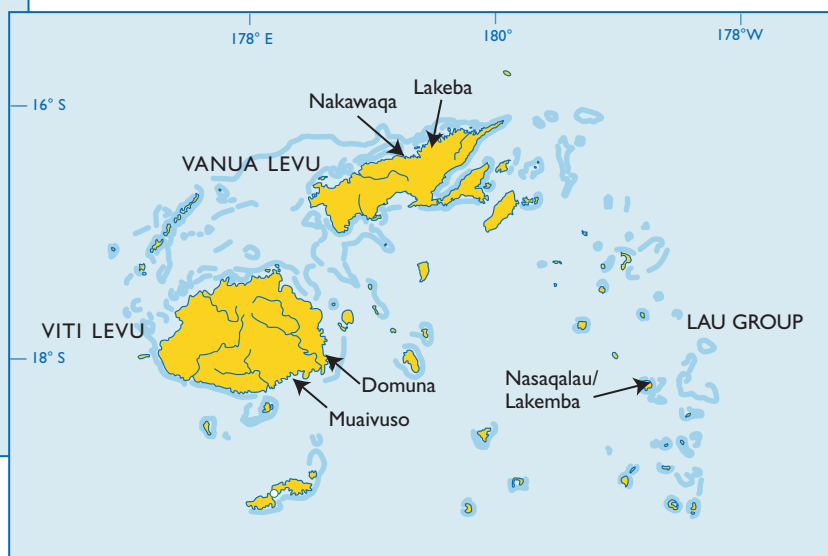
## Results

Average figures (Fig. 3) for all school children surveyed in Tonga and Fiji show that Tongan children harvest more marine resources than Fijian school children. Family consumption is the major purpose for all school children fishing activities, about 25% also catch for sale, and even less to give as gifts. Tongan girls show the highest involvement in the selling and non-monetary exchange of catches.

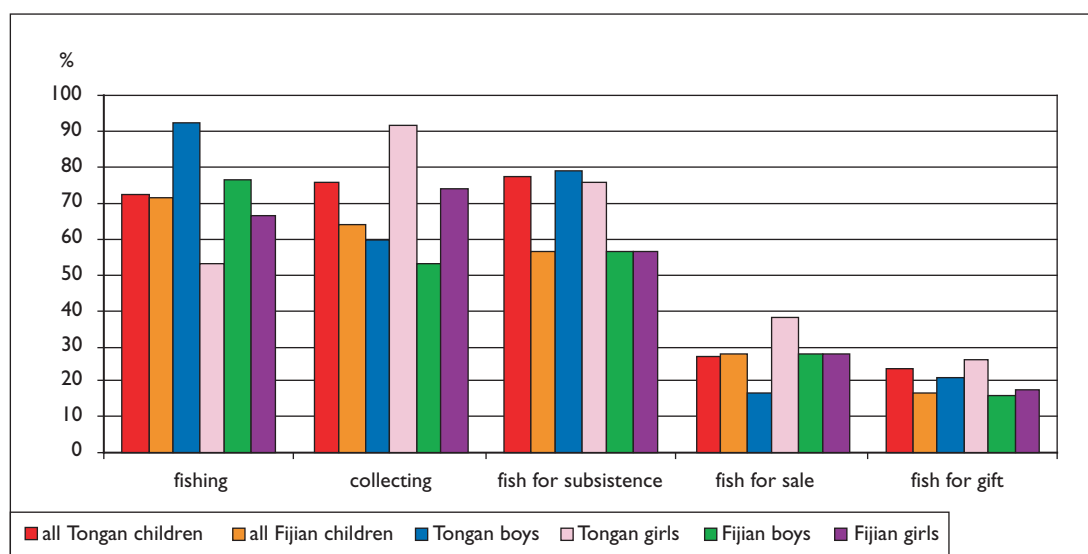
Comparison of fishing and collection trip frequencies reveals slight differences between countries and gender groups (Fig. 4). Patterns of fishing and collecting by Fijian boys are comparative to those of Tongan girls, and Tongan boys fish and collect almost as frequently as Fijian girls. In general, fishing and collection trips take longer for Fijian children, except for similar length of finfishing trips performed by girls from either country (Fig. 5).



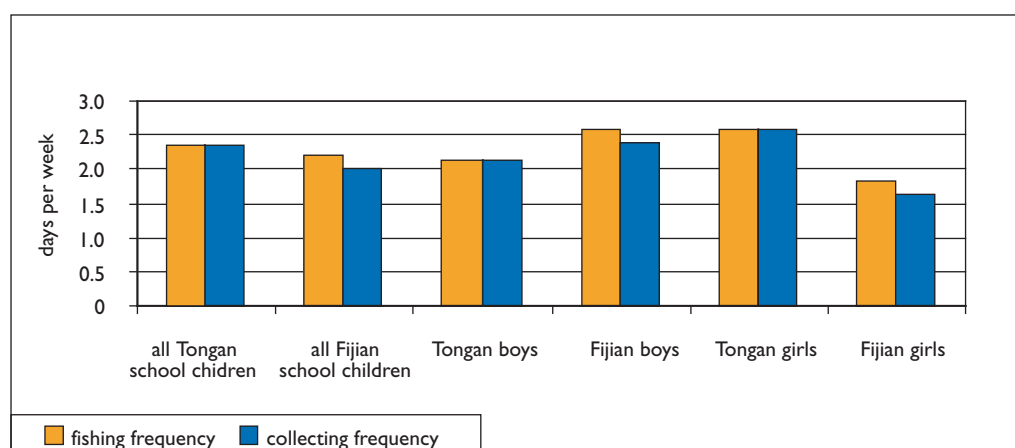
**Figure 1.** Locations of communities and primary schools surveyed in Tonga



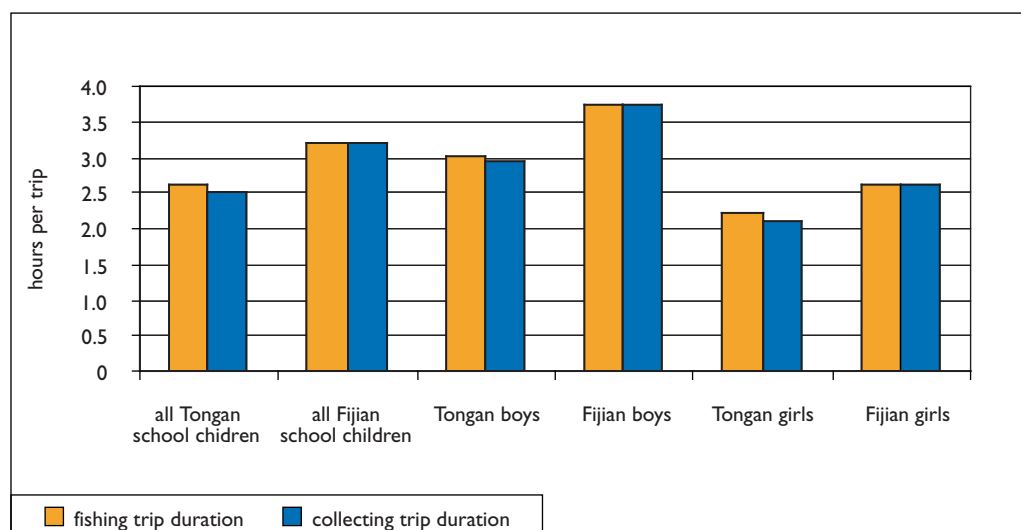
**Figure 2.** Locations of communities and primary schools surveyed in Fiji



**Figure 3. Participation and purpose of school children's fishing activities**  
(all figures are averages for Tonga and Fiji)

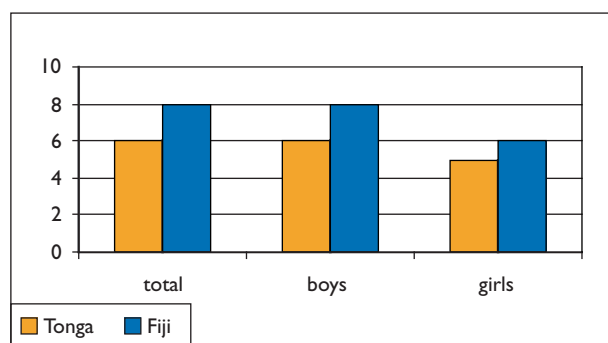


**Figure 4. Frequency of school children's fishing trips**



**Figure 5. Duration of fishing trips for Tonga and Fiji school children**

An assessment of school children's fishing techniques revealed that Fijian boys and girls use more techniques than Tongan school children (Fig. 6). Girls, focusing more on invertebrate collection, vary their techniques less than boys who are engaged in both finfishing and invertebrate harvesting. While the fish species that are frequently caught are much more diverse in Fiji, invertebrate species collected are more numerous in Tonga (Table 1). Patterns of species diversity caught by gender groups are similar for both countries: boys catch more species of fish than girls, and girls harvest more invertebrate species than boys. Lists of species caught by school children from each country and region are provided in Tables 2 and 3.



**Figure 6.** Total number of fishing techniques used by Tongan and Fijian school children

**Table 1.** Number of species harvested by Tongan and Fijian school children

	Tonga			Fiji		
	total	boys	girls	total	boys	girls
# finfish species	11	10	4	13	13	9
# invertebrate species	18	14	18	10	5	10

**Table 2.** Index and frequency (scores) of finfish and invertebrate species frequently caught by Tongan school children

FINFISH		Tongatapu		Ha'apai		Vava'u	
local name	scientific or common name	boys	girls	boys	girls	boys	girls
taa	<i>Sargocentron</i> spp.	0	0	4	1	2	0
humu	<i>Rhinecanthus aculeatus</i>	0	0	3	0	4	0
o	<i>Siganus spinus</i>	1	3	4	1	0	0
lapila	freshwater fish	0	0	0	0	24	0
tanutanu	<i>Lethrinus amboinensis</i>	14	3	0	0	11	0
hapi	<i>Acanthurus guttatus</i>	0	0	0	0	1	0
ngatala	grouper	0	0	0	0	1	0
manini	<i>Acanthurus triostegus</i>	0	0	0	0	1	0
sokisoki	<i>Diodon</i> spp.	0	1	0	0	0	0
kavakava	<i>Therapon jarbua</i>	4	0	0	0	0	0
unomoa	<i>Mugil cephalus cephalus</i>	6	0	0	0	0	0
INVERTEBRATES		Tongatapu		Ha'apai		Vava'u	
local name	scientific or common name	boys	girls	boys	girls	boys	girls
hulihuli	chiton	2	1	3	5	0	0
elili	<i>Turbo</i> spp.	1	3	3	3	1	3
feke	octopus	1	3	2	2	0	0
topulangi	<i>Turbo chrysostomus</i>	0	0	3	5	0	0
matamata	holothurian	0	0	2	2	0	0
ngoua	seahare	0	1	3	1	0	0
mulione	seahare	0	3	3	1	0	0
kaloaa	<i>Anadara</i> spp.	1	13	0	0	0	24
too	<i>Gafrarium</i> spp. ( <i>Timoclea marica</i> )	0	2	0	0	3	13
paka	crab	5	1	0	0	0	0
kevikivi	gastropod	1	3	0	0	0	0
tukumisi	sea urchin	0	15	0	0	0	0
meHINGO	bivalve	0	3	0	0	0	0
loli	holothurian	0	2	0	0	0	0
vasuva	<i>Tridacna</i> spp.	0	1	0	0	0	0
mama	seahare	0	0	0	0	1	5
holokau	n/a	0	0	0	0	1	3
mula	n/a	0	0	0	0	1	3

**Table 3.** Index and frequency of finfish and invertebrate species frequently caught by Fijian school children

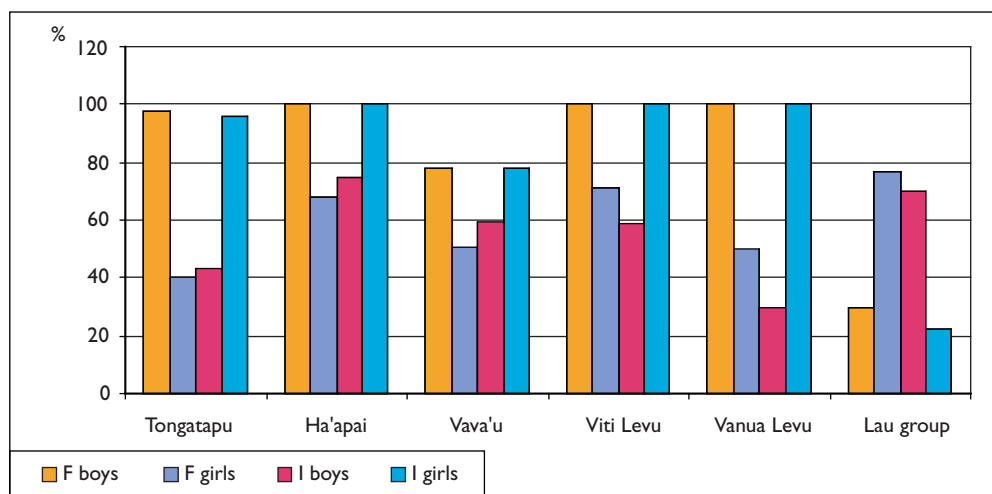
FINFISH		Viti Levu		Vanua Levu		Lau Group	
local name	scientific name	boys	girls	boys	girls	boys	girls
qitawa	<i>Therapon jarbua</i>	0	0	3	0	6	2
kanace (bu)	<i>Valamugil seheli</i>	0	0	10	2	17	7
nuqa	<i>Siganus</i> spp.	4	15	0	0	11	5
kabatia	<i>Lethrinus harak</i>	31	31	12	8	6	6
matumatu	<i>Gerres macrosoma</i>	0	0	0	0	1	9
yawa	<i>Chanos chanos</i>	2	0	0	0	0	0
salala	<i>Rastrelliger</i> spp.	5	5	4	11	0	0
tanabe	<i>Lutjanus fulvus</i>	2	2	5	0	0	0
damu	<i>Lutjanus argentimaculatus</i>	0	2	1	3	0	0
busa	<i>Hemirhamphus</i> spp.	7	0	0	4	0	0
kasala	<i>Epinephelus microdon</i>	0	0	4	0	0	0
donu	<i>Plectropomus leopardus</i>	0	0	2	0	0	0
uluba	n/a	0	0	0	0	4	0
INVERTEBRATES		Viti Levu		Vanua Levu		Lau Group	
local name	scientific or common name	boys	girls	boys	girls	boys	girls
kaikoso	<i>Anadara cornea</i>	5	8	2	12	0	2
gera	gastropod	8	6	0	0	5	3
nama	sea grapes	0	0	26	12	0	4
lumi	seaweed	0	0	0	0	1	1
octopus	octopus	0	1	0	0	0	0
qari	green mangrove crab	0	0	0	1	0	0
lairo	land crab	0	0	0	5	0	0
kuku	mangrove mussel	5	5	0	0	0	0
sici	holothurian	0	3	0	15	0	0
sagosago	holothurian	0	0	0	11	0	0

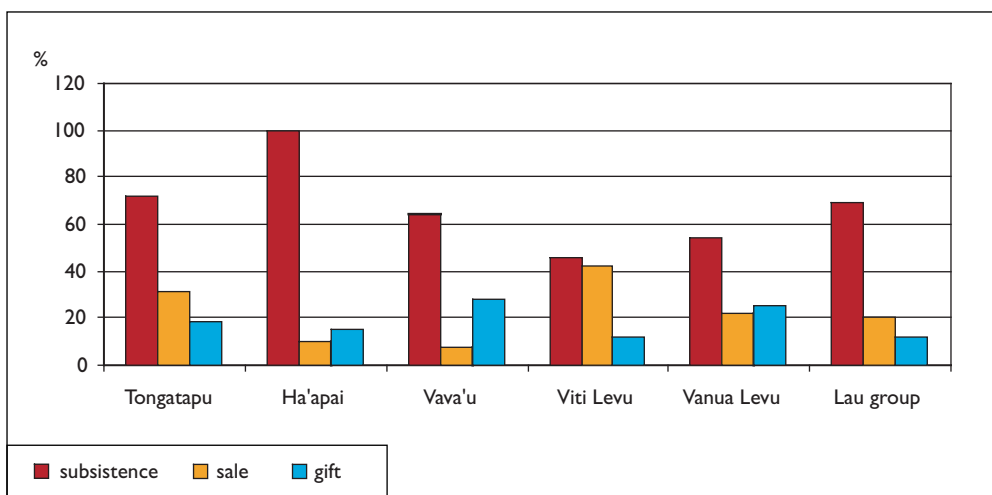
In addition to certain differences between school children's fishing practices in Tonga and Fiji, and between boys and girls, this study also aimed at clarifying whether or not school children's fishing practices varied across different regions in each country.

Figure 7 illustrates commonalities and differences in the proportion of elementary school children who fish. Patterns for finfish and invertebrates harvesting are similar. In Tonga, the lowest involvement of children in fishing is found in Va'au, while

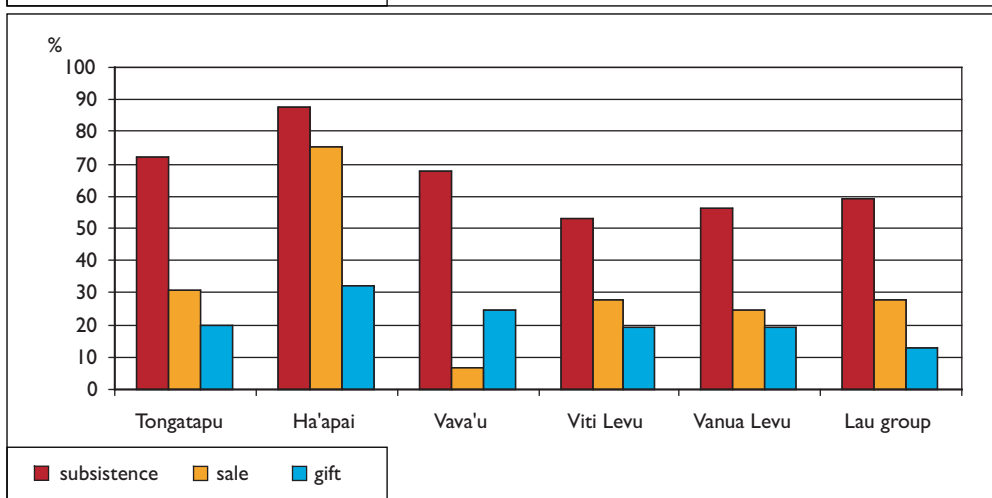
fewer school children fish in Fiji's Lau group. Reasons for fishing seem not to be linked to the overall involvement of children in fishing. Highest commercial contributions in Tonga are from girls from Ha'apai, and to a lesser extent, both boys and girls in Tongatapu. In Fiji, girls contribute slightly more to the selling of catches, although there are only slight differences between boys and girls and between regions, with the highest proportions of sales among school children from Viti Levu (Figs. 8a and 8b).

**Figure 7.**  
Percentage of school children who fish for fish (F) and for invertebrates (I).





**Figure 8a.**  
Reasons why  
Tongan and Fijian  
boys fish



**Figure 8b.**  
Reasons why  
Tongan and Fijian  
girls fish

Frequency and duration of children's fishing and invertebrate collecting trips vary considerably in Tonga. School children from Vava'u go fishing nearly twice as often as school children from Tongatapu and Ha'apai (Fig. 9). In Fiji, children from Viti Levu fish twice as often as those from Vanua Levu and the Lau Group. In both countries, data show that the highest frequencies are combined with the shortest trip durations (Fig. 10).

## Discussion

Field experiences and results from this survey show two major issues. First, the approach taken to investigate school children's participation in fishing rendered useful and reliable data. Second, regardless of gender, elder primary school children (~10 years of age) are actively involved in fisheries for subsistence purposes and, to a certain degree, for income generation.

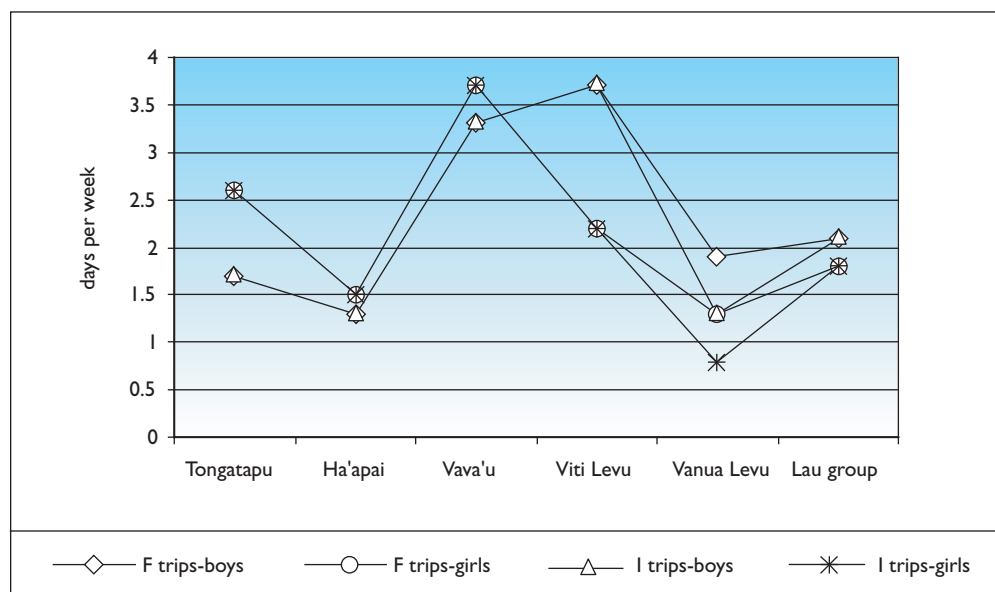
Methodologically, it was found that the success rate of collecting useful and reliable data from primary school children depends mainly on communication. Experiences highlighted that the support of teachers is crucial for effectively communicating

with the students. Ease of participation and children's willingness to provide information depended very much on the explanations, patience and engagement of their respective teacher. Tutors were also useful to question, and thus clarify, unreliable information.

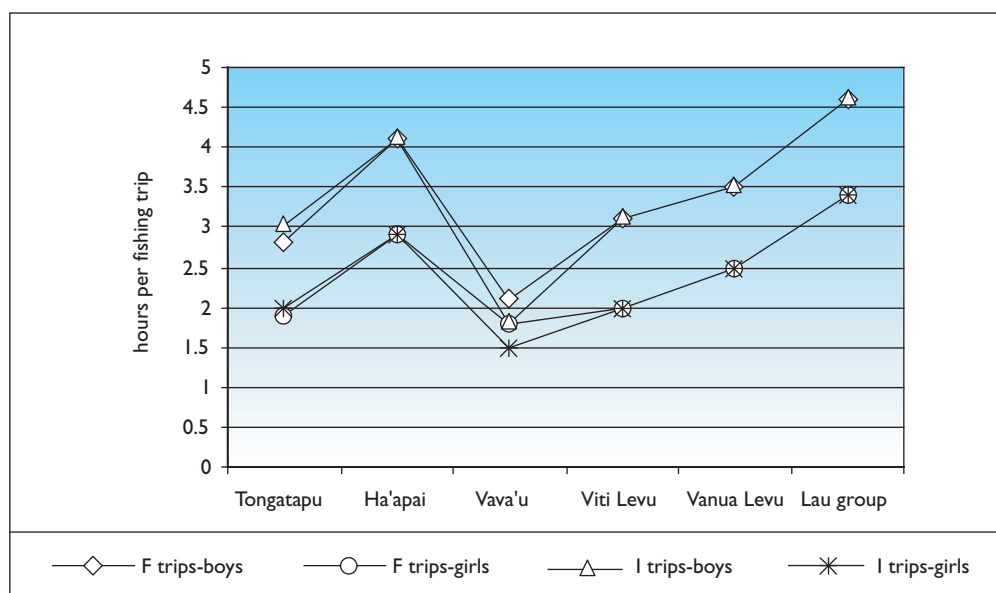
The lively approach using scoring and ranking methods, the short duration of the survey in each class, the limited number of short questions that could be clearly answered were useful in keeping the school children aware, focused and actively participating. These observations are comparable to a case study made with Samoan students to collect subsistence fisheries data (Hosch 2000).

It was also found that school children are less inhibited than adults with their answers. For instance, fish poisoning, a destructive technique that is illegal or "officially" banned, was frankly reported on. Fish poisoning is a traditional technique frequently used, for instance, by some Fijian women (Kronen 2002b). It is also known that this technique is still used by certain fisher groups (Ministry of Fisheries Tonga et al 1996; Des Rochers 1992) and, as shown in the framework of this study,

**Figure 9.**  
Frequency of  
finfishing trips  
(F trips) and  
invertebrate  
collecting trips  
(I trips) of Tongan  
and Fijian school  
children.



**Figure 10.**  
Duration of  
finfishing trips  
(F trips) and  
invertebrate  
collecting trips  
(I trips) of Tongan  
and Fijian school  
children.



passed on to younger generations. However, adult fishers are aware of legal and community rules and restrictions and are therefore likely to suppress any compromising information from fisheries surveys.

The aim of the approach used in this study was to retrieve quantifiable information according to selected key parameters that were assumed useful for assessing children's role in coastal fisheries. Key parameters involved overall participation, fishing strategies, and the range of species frequently caught. Although little has been published on children's fishing activities results contest the general opinion that it is at least difficult to obtain accurate and qualitatively sound data from children as they tend to overestimate dimensions (Hosch 2000).

The results of this study demonstrate that the majority of children are involved in fisheries by the

time they enter elementary school. The level of engagement is not due to gender but reflects the overall dependency on marine resources of the respective communities. This study targeted fishing communities and thus there is a much higher percentage of school children who fish than found on average in the whole of rural Viti Levu (Rawlinson et al. 1994). The fact that school children represent the communities they live in may further explain differences found in the share of children's catch aiming at subsistence or commercial purposes.

Children living in regions where agriculture plays a major role, such as in Vava'u, Tonga and Fiji's Lau Group, are less involved in fisheries. The proportion of the catch sold increases with less distance to major urban markets, and thus an increasing influence on cash based economy. This argument may explain why children living near Fiji's



capital Suva, and Tongan school children living near Nuku'alofa, are more involved in selling their catch than elsewhere.

The different fishing activities of boys and girls support the traditional social roles of women's and men's fisheries. While there are no exclusive fin-fishing or invertebrate fishing group amongst elementary school children, boys are more engaged in finfisheries while girls tend to target invertebrates. Differences between boy's and girl's fishing are more obvious in Tonga than in Fiji. Surprisingly, results suggest that the remoter a community, the more likely that girls are involved in finfisheries, and boys in invertebrate collection, as shown for the more remote areas of Tonga and Fiji, Ha'apai and the Lau Group, respectively.

Substantial variation was found in the frequency of fishing trips, regardless of whether finfishing or collecting invertebrates. Generally, children go fishing on Saturdays when there is no school. Distance to school and fishing grounds also determine whether children are able to fish on school days. This argument supports the high frequency of fishing trips found among children from Vava'u and Viti Levu. In both regions, elementary schools are based at the respective villages, and the distance to the seashore or fishing grounds is short. The relationship between frequency of fishing and distance to fishing grounds also explains why school children who often fish spend less time per trip than those that fish less frequently.

The results of this study indicate that, regardless of gender, children first learn about fishing techniques from their mothers or guardians. It can be assumed that gender roles are not imposed at an early stage but that the degree of exposure to fishing strategies depends on the guardian's skills and knowledge. However, elder primary school children also confirmed that they begin venturing out fishing in small groups of their own. Although not mandatory, boys prefer to do so with other boys, and girls also prefer to stay among themselves. At this age, boys are keen to accompany their fathers on extended fishing trips, including night trips and fishing from boats, lending a hand with gillnetting and spear fishing. Such interest and engagement was also reported but to a much lesser extent from Fijian girls.

The fact that boys are "helpers" rather than fishers on these trips may explain why their contribution is not recognised as a significant input to the catching for sale, and explains the low percentage of boys fishing commercially. Girls, on the other hand, collect invertebrates independently. Thus their contribution to earn cash income is recognised.

This survey did not attempt to quantify school children's fishing. However, information collected gives reason to assume that children around 10 years of age substantially contribute to the family's seafood subsistence needs. It is apparent that school children surveyed in both countries regularly provide seafood, finfish and/or invertebrates, for weekend consumption. Observations made in a remote fishing community in Vanuatu support these assumptions (SPC's PROCFish/C socioeconomic field survey). School children in Malakula Province fish for their lunch in the early morning before school starts; the surplus catch contributes to the family's meals. Although not documented, it is commonly known that at the beginning of each school semester, Fijian children help their mothers to raise the school fees by selling fish and invertebrates along the roadside.

## Conclusions

While this study does not claim to be exhaustive, results suggest that children play a certain role in rural fisheries that is apparently neglected by most fisheries surveys. Data collected does not allow to quantify catch rates and volumes, however, data on the regularity and frequency of fishing trips suggest that school children may cover a significant proportion of at least the family's seafood consumption at the weekend.

Findings indicate that participation and fishing strategies employed by children follow the patterns of their respective community. Gender roles were found not to be imposed at an early stage, but presumably a product of socialisation within the community they live.

This study highlights the need to further research the role of Pacific Island children in coastal fisheries, including quantification of catch and assessment of productivity. Further, such knowledge may help to target children at the appropriate age to get informed and actively involved in the equitable and sustainable use of marine resources.

## Acknowledgements

This article would have not been possible without the kind support and cooperation of the Tongan Ministry of Fisheries, and the Fisheries Division of the Fijian Ministry of Agriculture, Fisheries and Forestry. My appreciation is due to 'Ulunga Fa'anunu, Acting Secretary Fisheries, 'Apisake Soakai, Deputy Secretary Fisheries, and Siola'a Malimali, Officer in Charge, as well as Malakai Tuilua, Acting Director Fisheries and Stanley Qalovaki, Acting Senior Research Officer for Tonga and Fiji Fisheries respectively.



Special thanks are due to the headmasters and teachers of the participating schools and classes who have, with great enthusiasm, approved and supported the implementation of the survey: GPS Kanokupolu Primary School in Ha'atafu, GPS Vanutoka Primary School in Manuka, GPS Primary School in Mataika and Ovaka, and GPS Primary School in Koulo. The Uluiqalau District School at Vakano, Lakemba with Headmaster Kameli Vuiyasawa, Namuka District School at Lakeba with Headmaster Joeli Wesele, Mali District School with Headmaster Lawrence Nikotemo, Waiqanake District School with Headmaster Anare Tawake, and Kaba Fijian School at Dromuna with Headmaster (acting) Paula Daunivalu.

The greatest credit, however, goes to all Tongan and Fijian school children, girls and boys of classes 7 and 8, who not only participated in the survey, but shared their fishing knowledge and experiences.

I also thank the MacArthur Foundation for providing the necessary funding, and the Secretariat of the Pacific Community for supporting the implementation of this study.

## References

- Chapman M.D. 1987. Women's fishing in Oceania. *Human Ecology* 15(3):267–288.
- Des Rochers K. 1992. Women's fishing on Kosrae: A description of past and present methods. *Micronesica* 25:1–22.
- Hosch G. 2000. The use of students in surveying subsistence fisheries – a Pacific Island case study. FAO Fisheries Circular No. 962. Food and Agricultural Organization of the United Nations, Sub-Regional Office for the Pacific Islands, Rome.
- Kronen M. 2002a. Women's fishing in Tonga: Case studies from Ha'apai and Vava'u islands. SPC Women in Fisheries Information Bulletin 11:17–22.
- Kronen M. 2002b. The Lakemba art of *vono*. SPC Women in Fisheries Information Bulletin 11:33–4.
- Matthews E. 2002. Integrating women's subsistence fishing into Pacific fisheries and conservation programmes. SPC Women in Fisheries Information Bulletin 11:13–14.
- Matthews E. and Oiterong E. 1995. Marine species collected by women in Palau, Micronesia. *Micronesica* 28(1):77–90.
- Ministry of Fisheries, Japan International Cooperation Volunteers (JOVC) and Japan International Cooperation Agency (JICA) 1996. Integrated fisheries survey report. Tonga.
- Quinn N.J. and Davis M.T. 1997. The productivity and public health considerations of the urban women's daytime subsistence fishery off Suva Peninsula, Fiji. *South Pacific Journal of Natural Sciences* 15:63–92.
- Rawlinson N.J.F., Milton D.A., Blaber S.J.M., Sesewa A. and Sharma S.P. 1994. A survey of the subsistence and artisanal fisheries in rural areas of Viti Levu, Fiji. Fisheries Division, Ministry of Agriculture, Forestry and Fisheries, Suva, Fiji; Division of Fisheries, CSIRO, Cleveland, Australia.
- Thompson L. 1940. Southern Lau: Fiji: An ethnography. Bernice P. Bishop Museum Bulletin 162, Honolulu, Hawaii.
- Tuara P.N. 1995. The role of women in the management of Pacific Island inshore fisheries. FFA/SPC Workshop on the management of South Pacific inshore fisheries, Noumea, New Caledonia, 16 June–7 July 1995.
- Tungpalan M.T.V., Mangahas M.F. and Palis M.P.E. 1991. Women in fishing villages: Roles and potential for coastal resources management. p. 237–243. In: Chou L.M., Chua T.E., Khoo H.W., Lim P.E., Paw J.N., Silvestre G.T., Valencia M.J., White A.T. and Wong P.K. (eds.). Towards an integrated management of tropical coastal resources. ICLARM Conference Proceedings 22. National University of Singapore, National Science and Technology Board, Singapore, and International Center for Living Aquatic Resources Management, Philippines.



Harvesting *nama*  
(seaweed)



Selling a fish  
bundle at the Suva  
market, Fiji