Socioeconomic survey on the Marine Environment, Pollution, and Village Adaptive Capacity

Vatia, Aunu'u and Faga'alu Villages
Survey Results
October and November 2014

Socioeconomic survey on the Marine Environment, Pollution and Village Adaptive Capacity Vatia, Aunu'u and Faga'alu Villages Survey Results – October and November 2014

June 12, 2015
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1.0 Introduction

Purpose

During October and November, 2014 socioeconomic resident surveys were conducted in three villages on Tutuila Island, American Samoa. The purpose of the survey was to gain a better understanding regarding:

* Community use of and reliance on marine resources
* Community responses to natural resource management efforts
* Issues of pollution and trash
* Preliminary indicators of village adaptive capacity and community resilience

The research was supported by the National Oceanic and Atmospheric Administration's Coral Reef Conservation Program (NOAA CRCP), conducted through San Diego State University, in collaboration with local natural resource agencies.

2.0 Methods

Three villages were included in the sample: Vatia, Aunu'u and Faga'alu (Fig. 2-1). The target sample size was calculated from the total number of households in each of the three villages, with a 95% confidence level and 5% confidence interval. This resulted in a target sample size of 80 households in Vatia, 68 in Aunu'u, and 130 in Faga'alu. The final total sample was 272, which gives the combined results a confidence level of 95% and a confidence interval of 3%. Surveys were conducted in 92 of 100 households in Vatia (2.9% confidence interval); 68 of 79 households in Aunu'u (4.5% confidence interval); and 118 of 195 households in Faga'alu (5.7% confidence interval).

Mayors of the villages included in the target sample were informed prior to the survey taking place in their village. Stacey Kilarski, an experienced researcher with prior field experience leading survey efforts in American Samoa, was contracted as field supervisor for the survey implementation. Stacey recruited a local survey team from territorial agencies and trained them in survey administration and protocol prior to the initiation of the surveys. The majority of the team had prior experience conducting village-based surveys, and team members without prior experience were paired with experienced surveyors on their first day in the field to provide them with additional training.

Figure 2-1. Village locations included in survey sample.

Surveys were conducted as household surveys, referring to everyone who lives under one roof. Households were selected opportunistically, as a lack of addresses, un-inhabited buildings, and hazards such has vicious dogs in some parts of the villages made random sampling unsafe and impractical. Respondents were asked to respond not just for themselves, but for their entire household. Interviews were conducted in-person in each village on weekday afternoons and on Saturdays. The survey team made efforts to conduct the survey with someone who might be considered a head of the household (or knowledgeable about total household activities). No names or personally identifiable information was collected during the surveys.

3.0 Results

The results from the survey are divided by each village: Vatia, Aunuu, and Faga'alu in the following sections. Summary results and cross-tab analyses for each village are included.

4.0 Vatia

4.1 Demographics

Figures 4-1 through 4-4 present the results from the demographic survey questions in the 2015 survey of Vatia. Gender distribution is displayed in Figure 2; 54% female and 43% male[1]. Age distribution is shown in Figure 4-2. The two most common age bins are 18-29 and 40-49 years old (31.5% and 27.2%, respectively). The small resident population over the age of 70 is not well represented in our sample as elderly residents are generally less accessible for in-person surveys due to personal health reasons or the physical exertion required. The number of people in households in Vatia range from 2 to 19, with an average household size of 6.3 people (Fig. 4-3). Of the three races/ethnicities of survey respondents in Vatia, all are some or part Samoan (100%; Fig. 4-4). The other ethnicities represented are Tongan (2.2%) and Tokelau (1.1%). Annual income of survey respondents in Vatia is shown in Figure 4-5. Of those who responded (4 no response), 39.8% have an annual income of $10-19,999. Annual income of under $10,000 was represented by 31.8% of respondents. Annual incomes of $49-49,999 and more than $50,000 were equally represented by 1.1% of respondents.

[1] The remaining 2% is "no answer," which can attributed to fa'afafine, which are a third-gendered people in Samoan culture or no response from respondent.

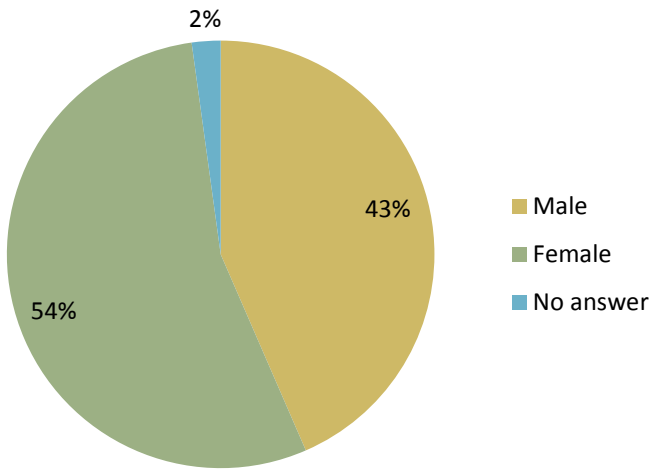

Figure 4-1 Gender distribution in survey sample of Vatia.

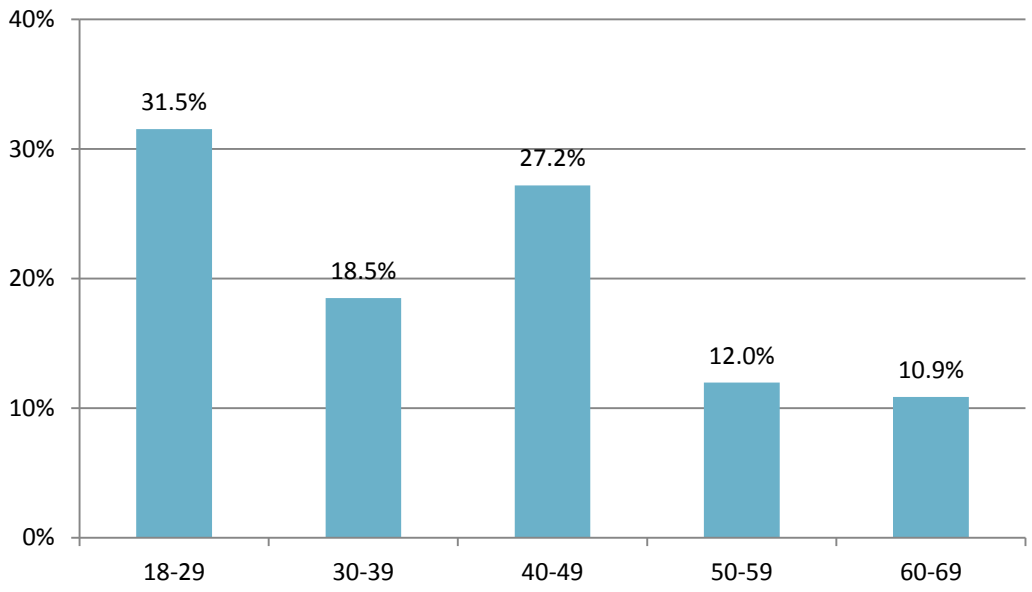

Figure 4-2. Age distribution in sample of Vatia.

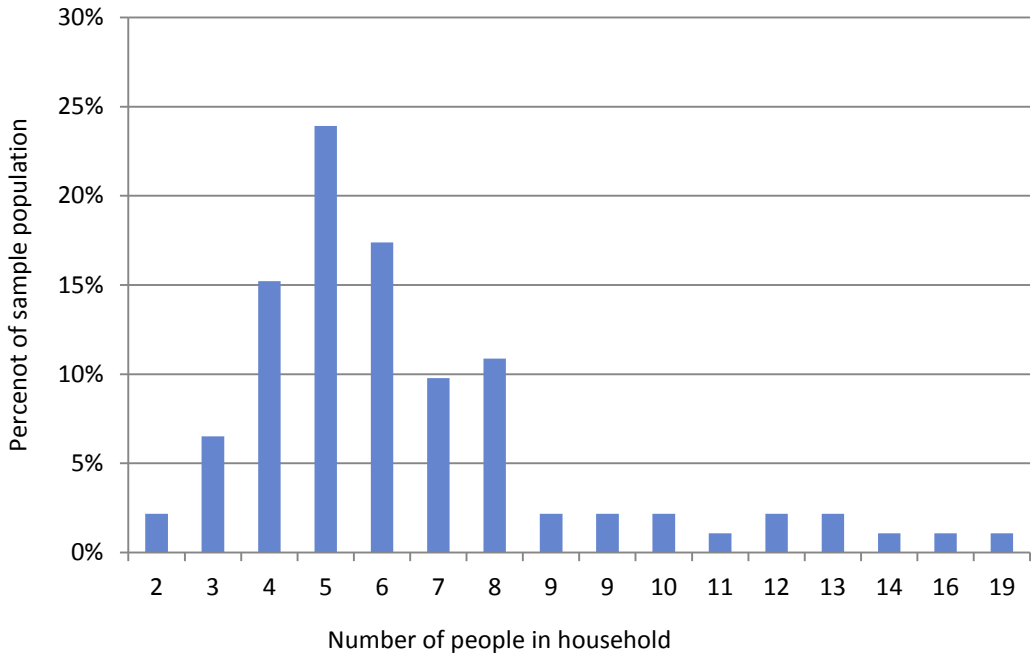

Figure 4-3. Number of people in households in Vatia.

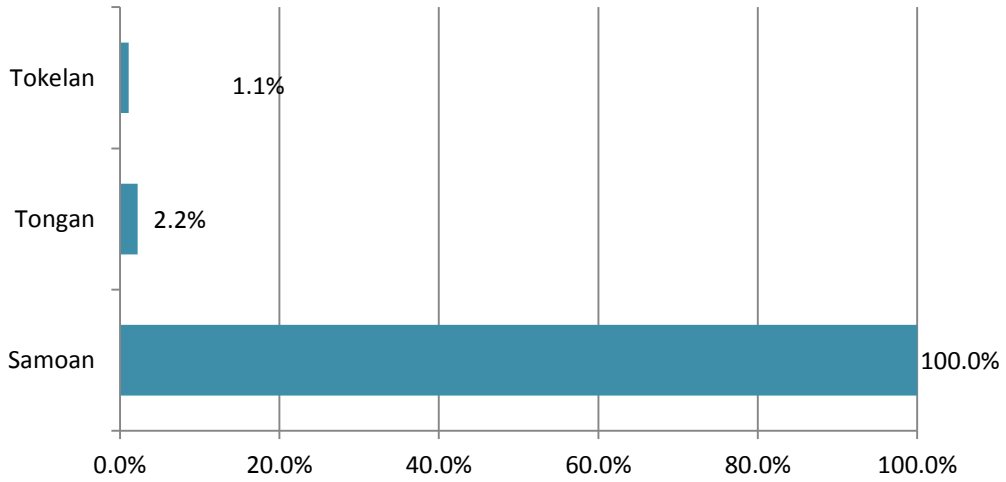

Figure 4-4. Race/ethnicity among survey respondents in Vatia.

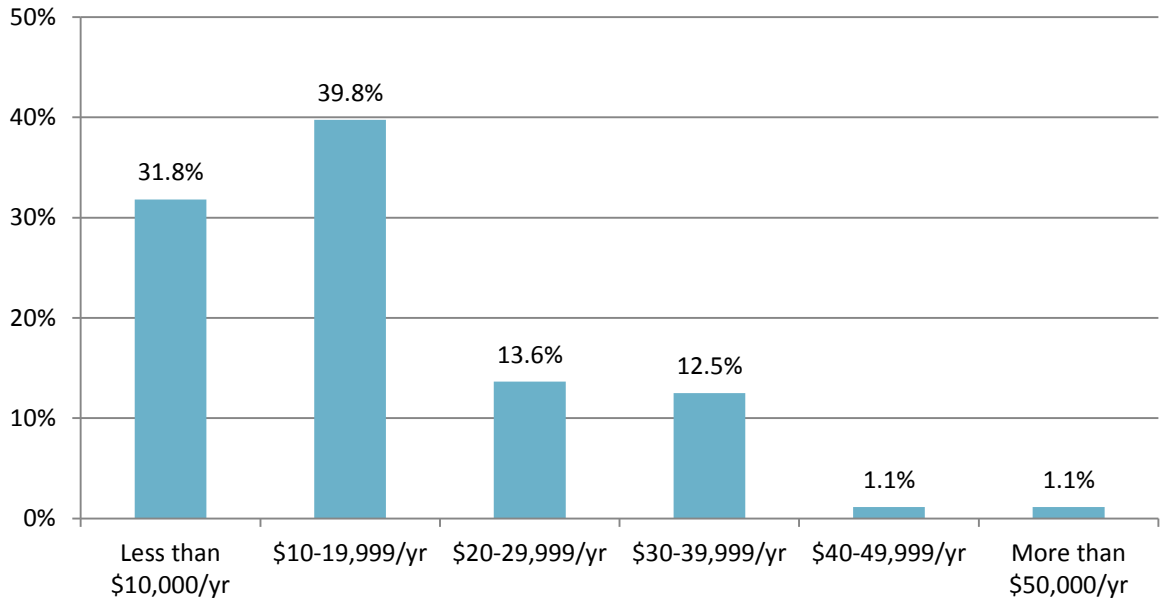

Figure 4-5. Annual income of survey respondents in Vatia.

4.2 Community Groups

Figures 4-6 and 4-7, below presents the results from the survey question pertaining to community group involvement and participation. Nearly all respondents (93%) belong to church and over half (62%) belong to youth groups (Fig 7). Other groups represented include choir, Sunday school and canoe club. Figure 8 presents the percent of people in Vatia belonging to different numbers of community groups. Few (1.1%) people belong to no community groups. Most people belong to either one group (33.7%) or two groups (34.8%).

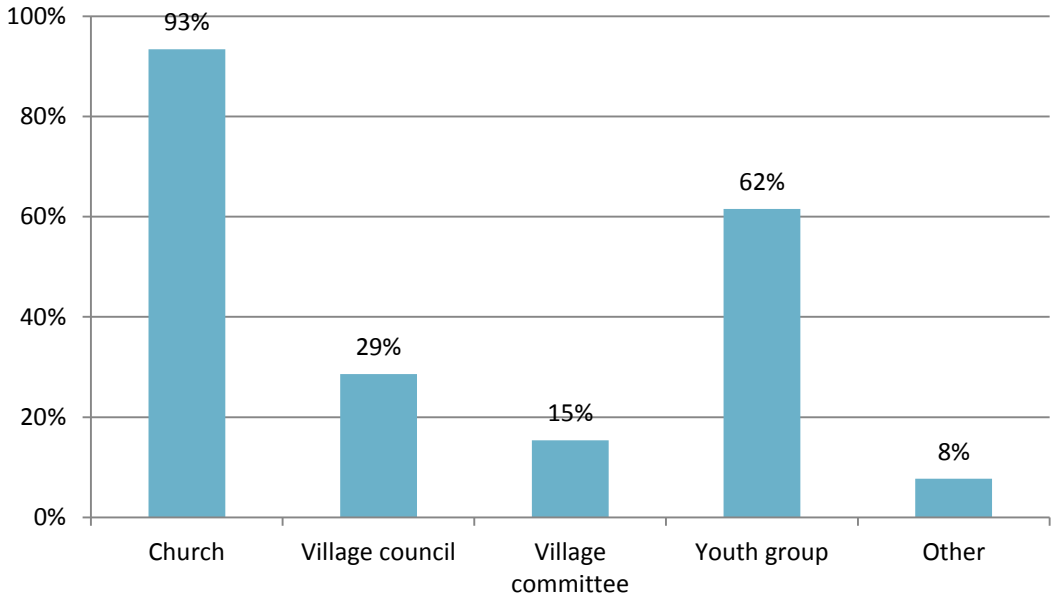

Figure 4-6. Household membership in community groups in Vatia.

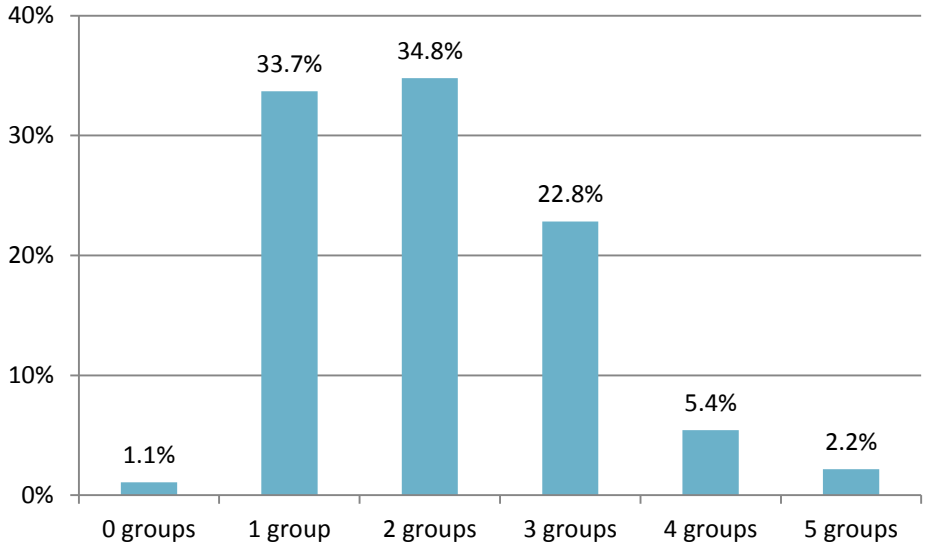

Figure 4-7. Number of community groups involved per household in Vatia.

4.3 Activities households depend on for food and/or income

Figure 4-8 presents the survey question about activities that households depend on for food and/or income in Vatia. Farming and government jobs are the most important activities, with over half of the respondents considering these activities very important (59% and 55%, respectively). The cannery, pension, private business and tourism are all activities considered not at all important in Vatia.

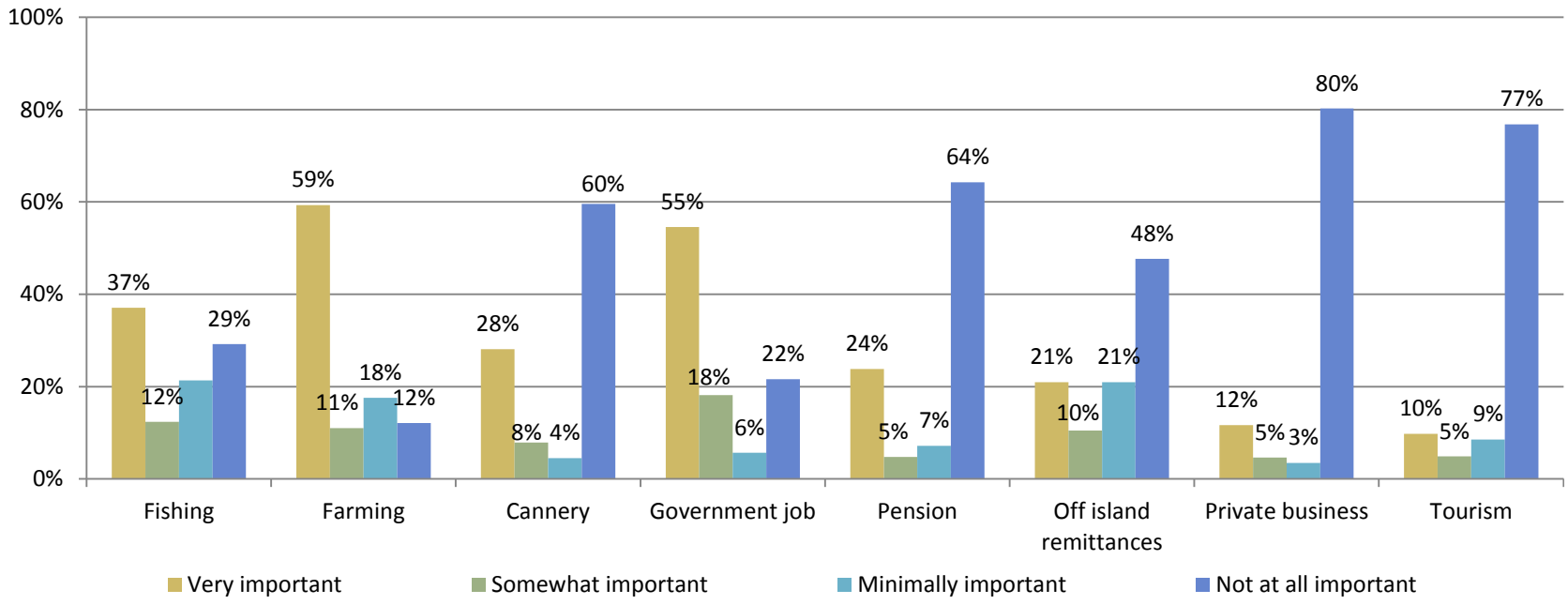

Figure 4-8. Activities households depends on for food and/or income in Vatia.

4.4 Fishing/harvesting frequency and patterns

Figures 4-9 through 4-, below, show the results from the survey questions about fishing frequency, methods of fishing, and targeted resources. Figure 4-9 presents the number of people in household who fish/harvest marine resources. Over half (45%) of people in Vatia fish/harvest marine resources. The average number in the household who fish/harvest in Vatia is 1.2 people. Figure 4-10 displays the primary reasons and frequency which members of the household fish/harvest marine resources (of those households who fish or harvest). Fishing and harvesting for food is very common, with 78% and 22% of respondents, respectively, frequently or sometimes fishing/harvesting for this reason. Fishing/harvesting for income is relatively uncommon, with 53% of respondents never selling their catch. Giving the catch to pastors or villages leaders and fishing/harvesting for fun are common reasons to fish/harvest, with 69% and 51% of respondents, respectively, frequently fishing/harvesting for these reasons. Figure 4-11 shows the frequency of fishing/harvesting for those households who fish/harvest. 59% of households in Vatia fish/harvest marine resources more than once/week.

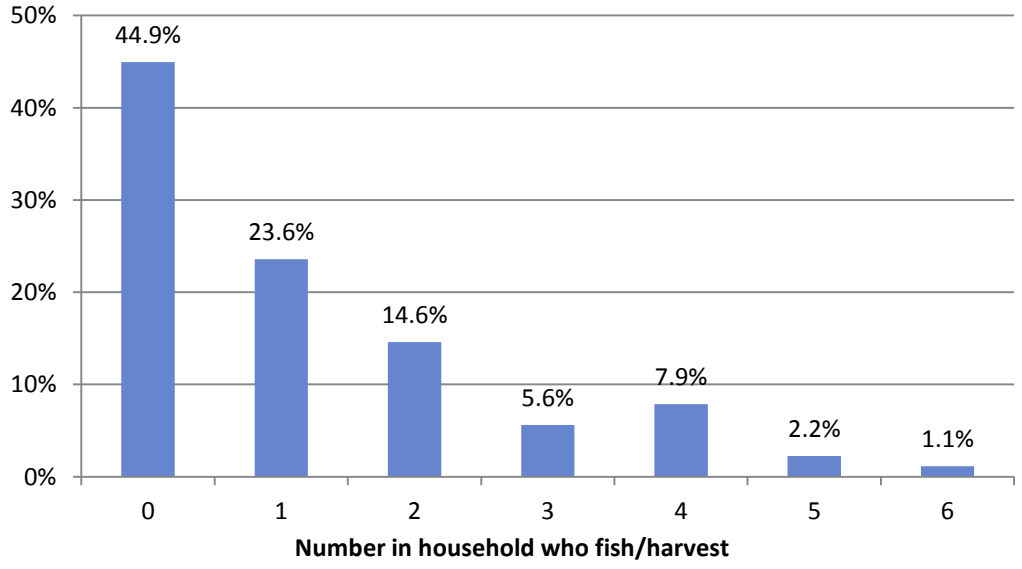

Figure 4-9. Number of people in Vatia households who fish/harvest

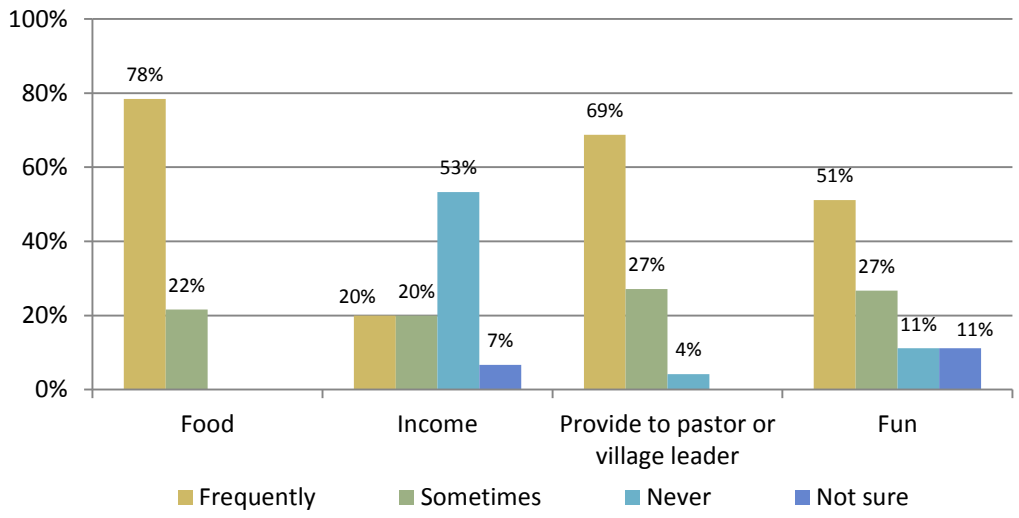

Figure 4-10. Primary reasons and frequency in households fishing/harvesting in Vatia.

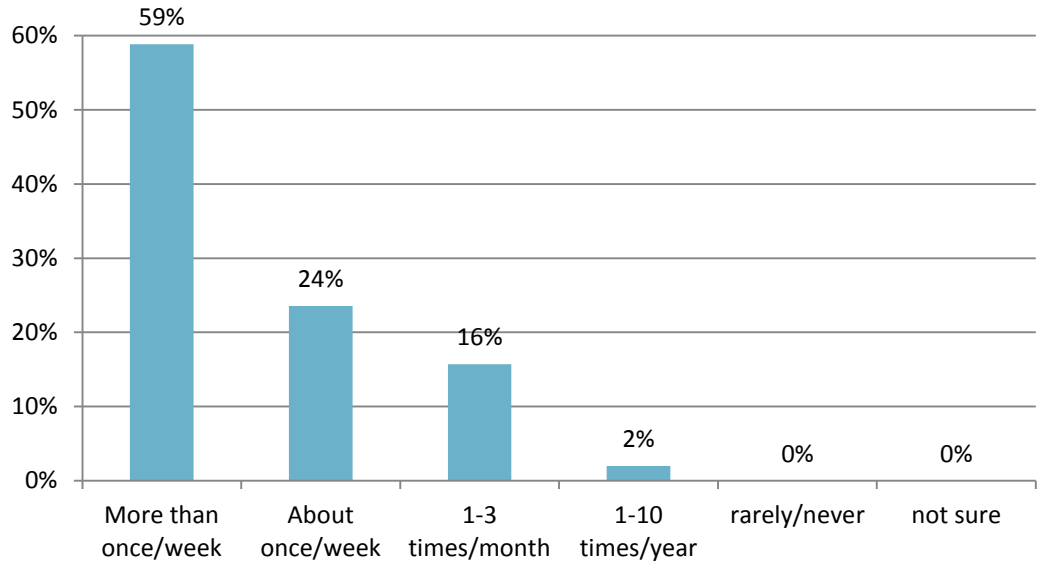

Figure 4-11. Frequency of fishing/harvesting marine resources in Vatia.

Of the various fish/resources that are targeted, fish from the reef flat are targeted most frequently in Vatia (with 69% of respondents listing this as their first targeted resource; Fig 4-12). Fish from the reef slope and invertebrates are also commonly targeted, with 53% and 55%, respectively. Figure 4-13 shows the types of fishing methods used by members of Vatia household. Rod and reel/handline/pole and line from shore and gleaning/gathering is the most common type of fishing method used, with 59% of respondents fishing with this method frequently. Spearfishing and gleaning/gathering are also common, with 49% and 43% of respondents using these methods frequently. Traps and trolling are uncommon methods used in Vatia, with 86% and 55%, respectively, of respondents never using these methods.

Figures 4-14 and 4-15, below, show household fishing frequency and catch/harvest has changed over the past 10 years. 44% of respondents in Vatia fish about the same amount over the past 10 years (Fig 4-14). Nearly an equal distribution fish more frequently (22%) and fish less frequently (28%). Figure 4-15 displays how the household total catch/harvest has changed over the past 10 years. In Vatia, 50% of households say they catch less.

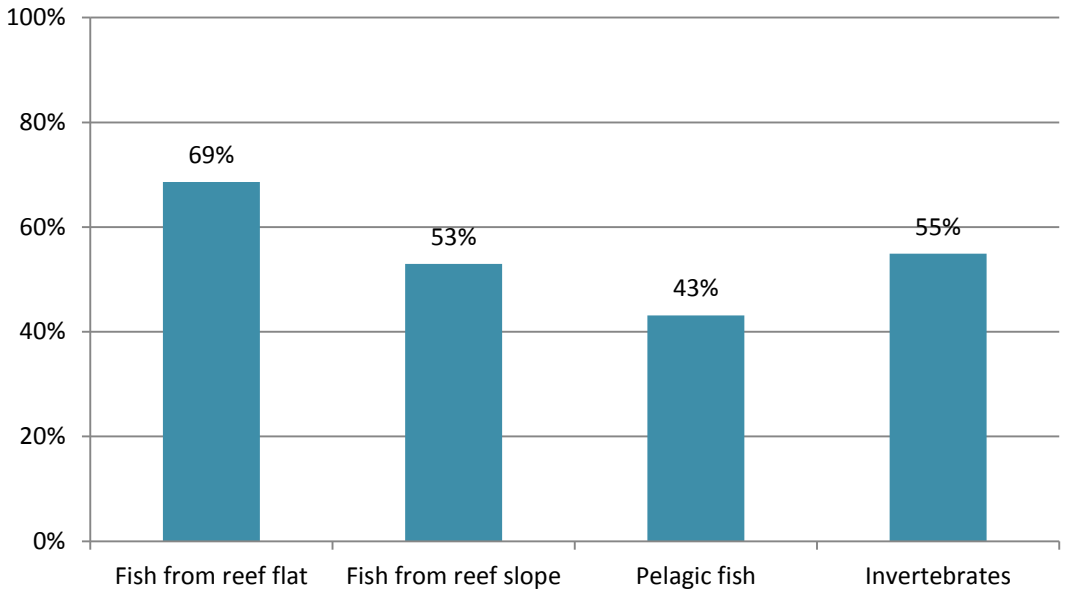

Figure 4-12. Types of fish/resources targeted in Vatia households. Totals are greater than 100% as respondents could chose multiple resources.

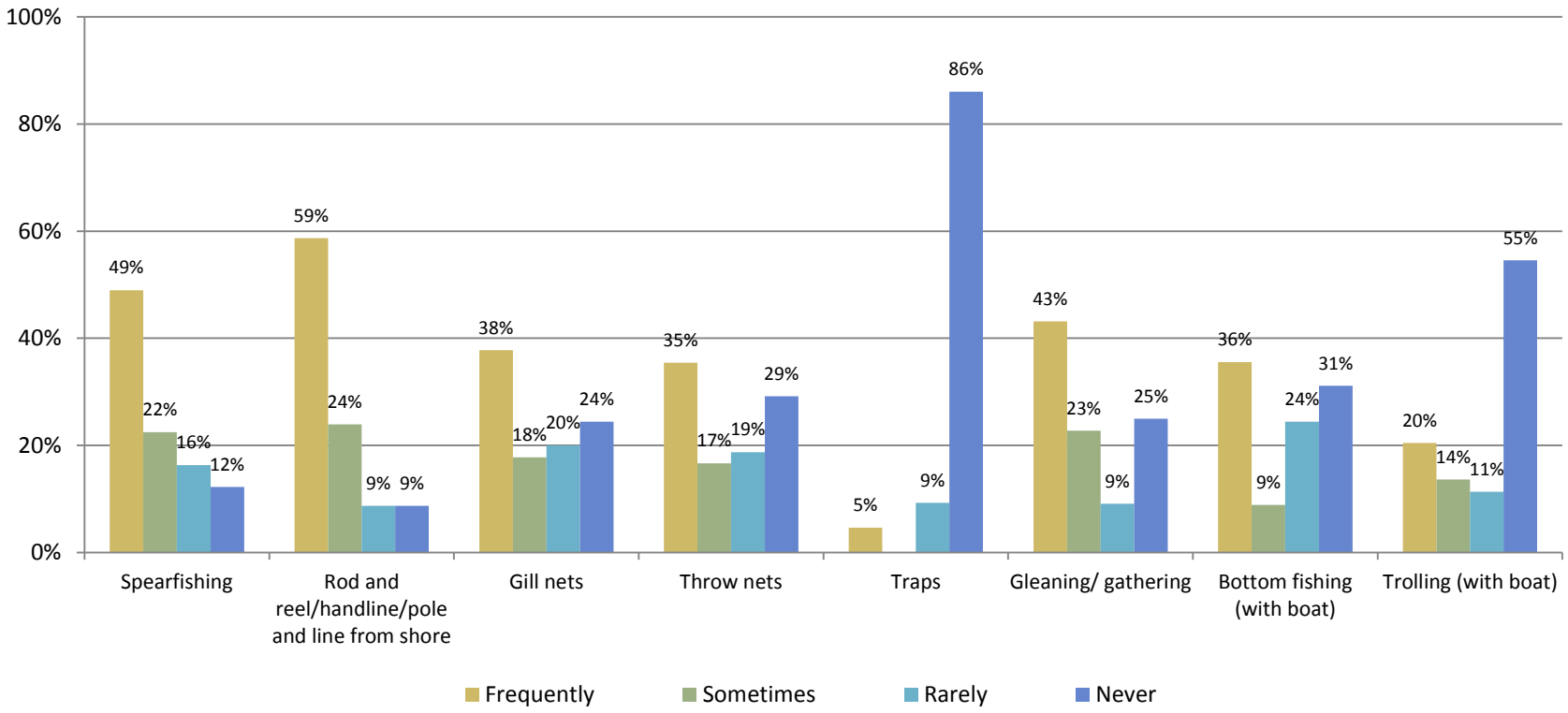

Figure 4-13. Types and frequency of fishing methods used in Vatia households.

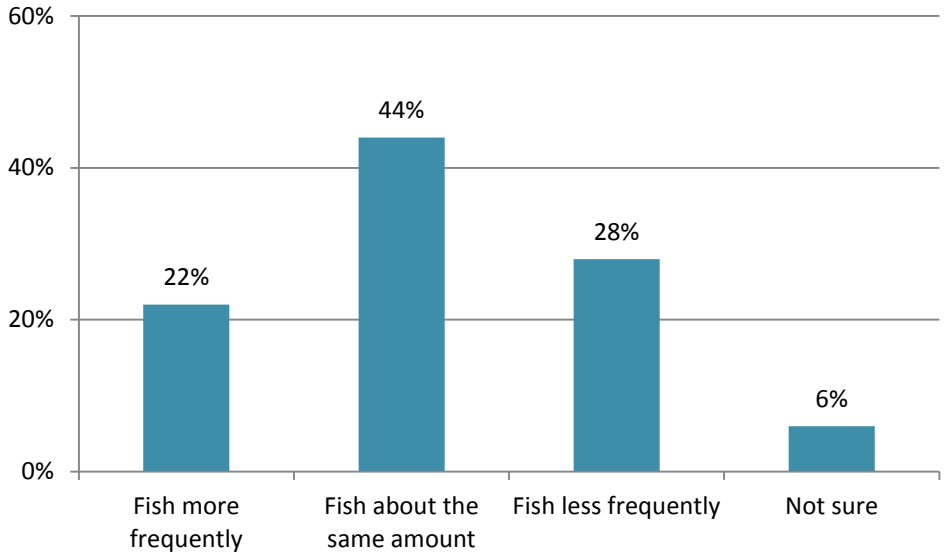

Figure 4-14. Change in frequency of fishing/harvesting over the past 10 years in Vatia.

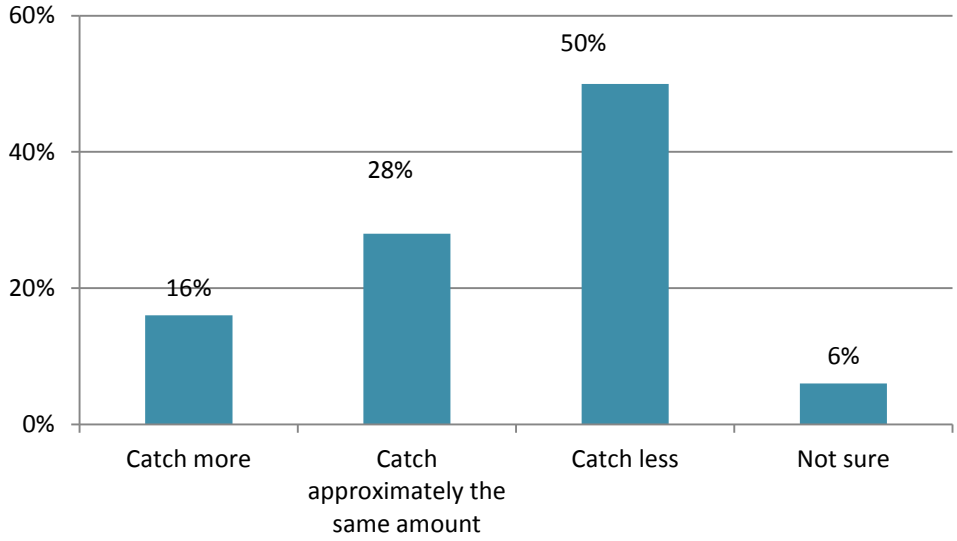

Figure 4-15. Change in household catch/harvest has changed over the past 10 years in Vatia.

4.5 Frequency of seafood consumption

Figure 4-16 shows the frequency of household consumption of fresh or frozen fish/invertebrates from various sources. The question specifically distinguished between canned fish and fresh or frozen fish. Of the various locations where fresh or frozen fish/seafood can be obtained, the most frequent location is caught in village waters (with 69% of survey respondents consuming marine resources from this source once a week or more). 48% of households in Vatia consume fresh or frozen marine resources from a store or restaurant once a week or more, while 29% of households rarely or never purchase fresh or frozen marine resources from this source. Marine resources from boats landing catch at the cannery and from outside of village waters, but in American Samoa are not common, with 48% and 38%, respectively, of respondents rarely or never obtaining resources from these sources.

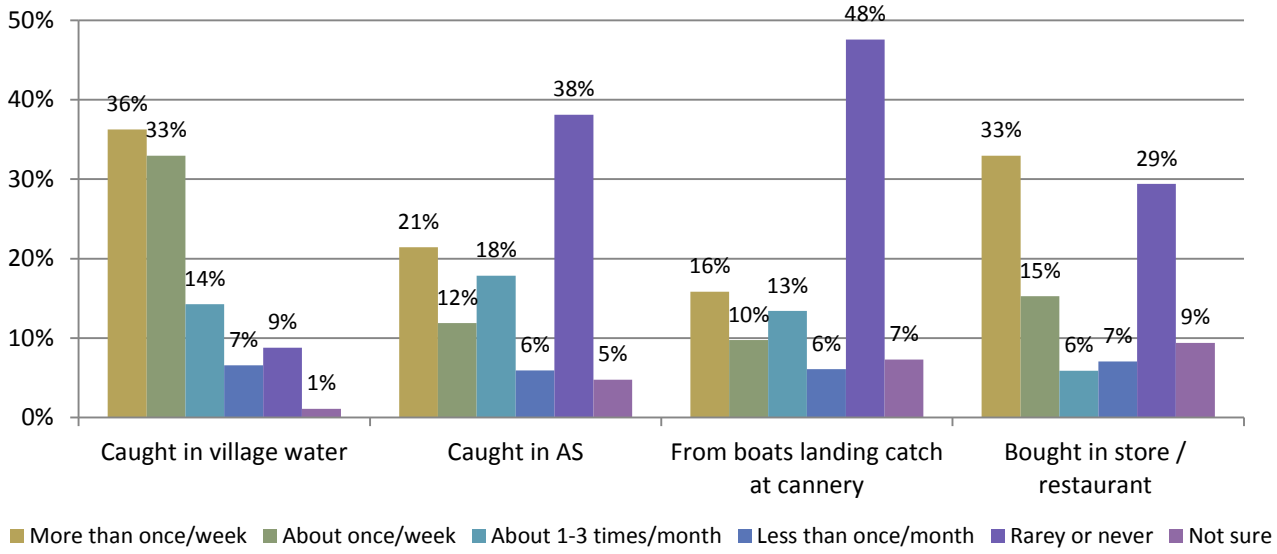

Figure 4-16. Frequency of eating fresh or frozen fish/invertebrates in Vatia

4.6 Perception of resource conditions

Figures 4-17 and 4-18 presents Vatia residents' opinions on how marine resources and the environment are doing, from very good to very bad. Marine

resources are generally perceived to be very good or good, with over half of the respondents thinking fish on the reef, fish on the reef slope, pelagic fish and invertebrates are very good or good (67%, 62%, 54% and 56%, respectively). Figure 4-18 shows residents' opinions on how the environment is doing. Vatia residents think ocean water quality is doing good or very good (44%), while 33% responded neither good nor bad. Stream water quality is perceived to be very bad or bad by 39% of Vatia residents and 30% of residents think the condition of the coral habitat is very good or good (with 31% not sure). Almost half (41%) of residents think beach quality is neither good nor bad, and 38% think it is very good or good.

One survey question asked respondents to list factors that have contributed to changes in the condition of ocean and fresh water resources. Vatia respondents stated concerns about trash accumulation – particularly in streams and due to runoff.

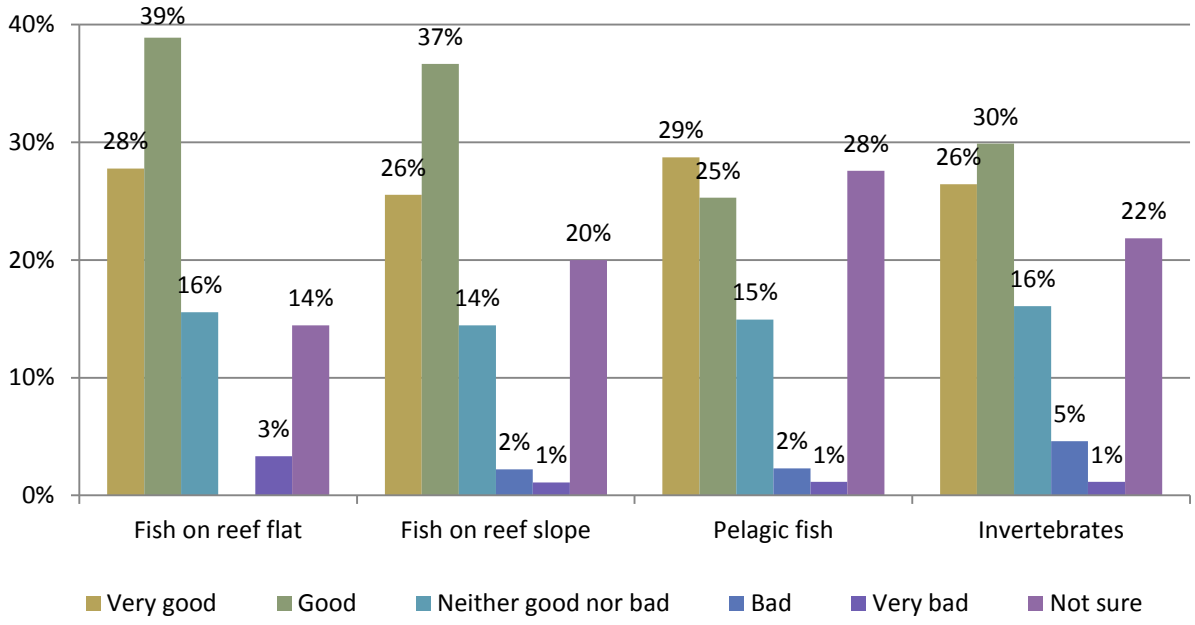

Figure 4-17. Vatia residents' opinions on the conditions of marine resources.

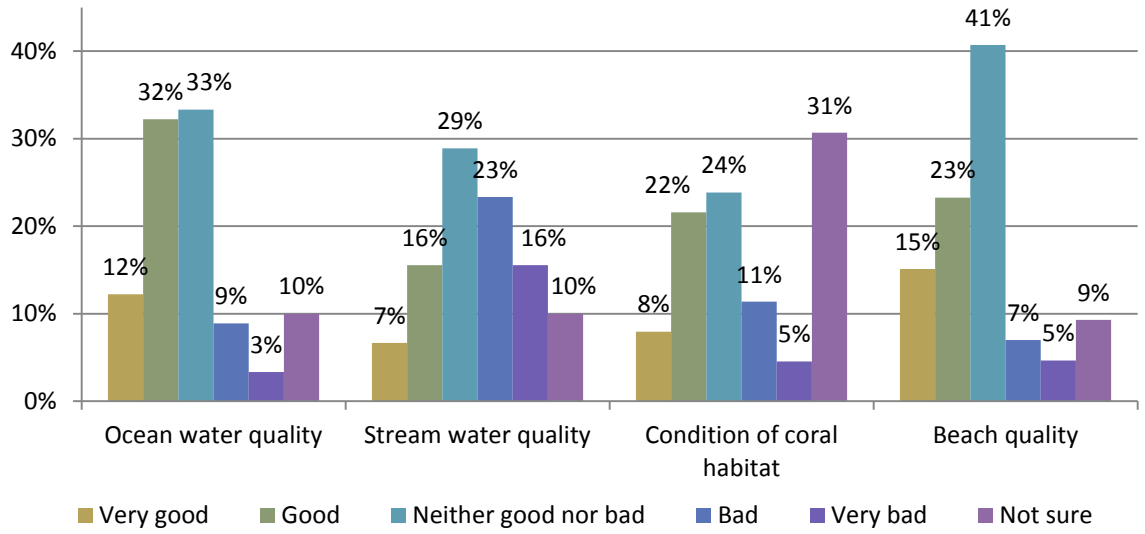

Figure 4-18. Vatia residents' opinions on the conditions of the environment.

4.7 Pollution and trash

Figures 4-19 through 4-22 present the results from the survey questions about pollution and trash. Most of the survey respondents think the following issues are a significant or moderate problem in Vatia: trash and pollution (74%), pollution in streams (74%), sediment in streams (73%), decreasing number of fish in the ocean (54%), and pollution in the ocean (61%; Fig. 4-19). Figure 4-20 presents residents' familiarity with systems in the village to reduce trash accumulation. Almost half (46%) of the respondents think there is a system in place in Vatia to reduce trash accumulation, while 35% think no and 17% don't know. Of those who think there is a system in place to reduce trash accumulation, programs by the mayor and village council, as well as youth group clean-up efforts and church efforts were cited. Of those who think there is a system in place, 77% participate in the activities to reduce trash in Vatia (Fig. 4-21).

Figure 4-22 presents the respondents opinion regarding the primary sources of trash in Vatia: 82% think local village members are a significant or moderate source. Just over half (52%) of Vatia residents think visitors to the village are a minor source or not a source of trash in the village. There is roughly an equal distribution of marine debris from the ocean being a significant or moderate

source (51%) and a minor or not a source (42%). Over half (51%) think a lack of cans/dumpsters for waste is a significant source of trash in Vatia.

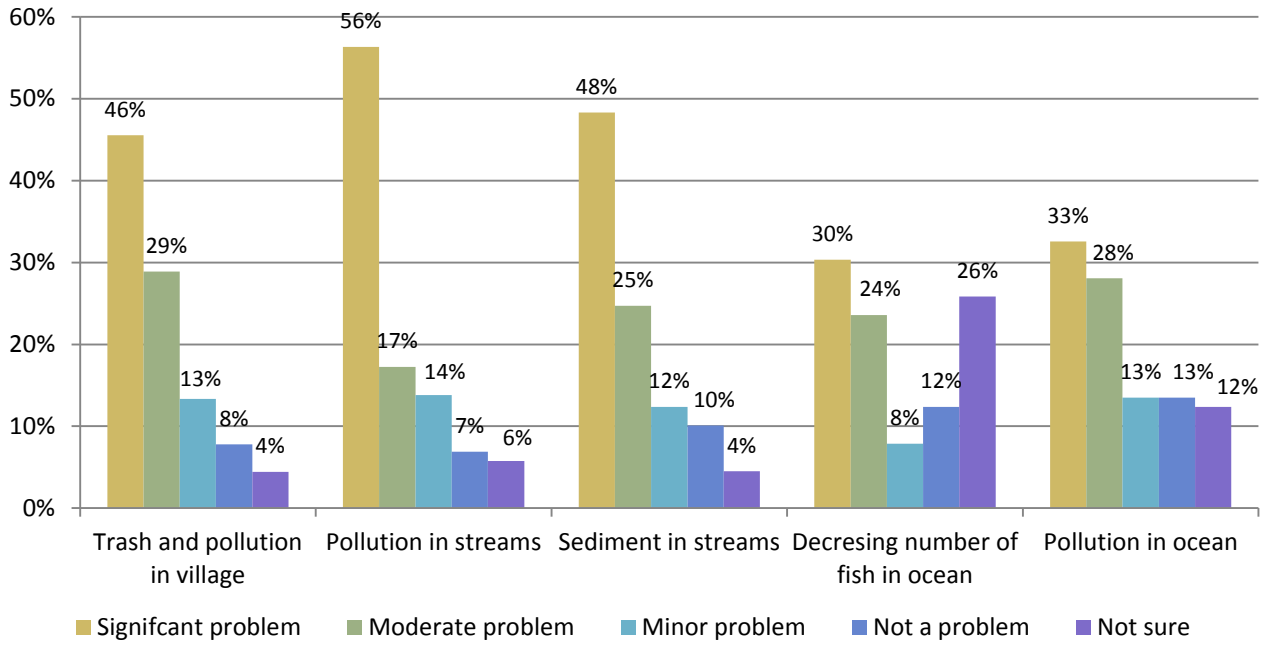

Figure 4-19. Vatia residents' opinions on pollution and trash issues.

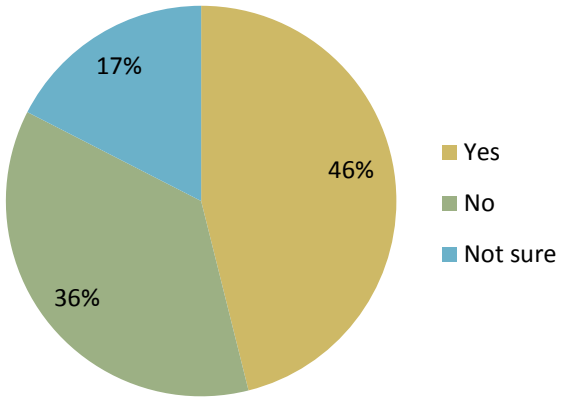

Figure 4-20. Residents' familiarity with systems to reduce trash accumulation.

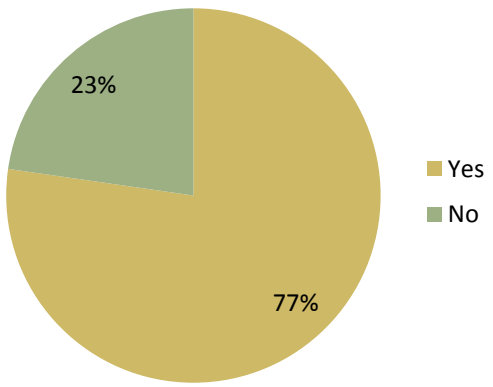

Figure 4-21. Vatia resident participation in activities to reduce trash in village.

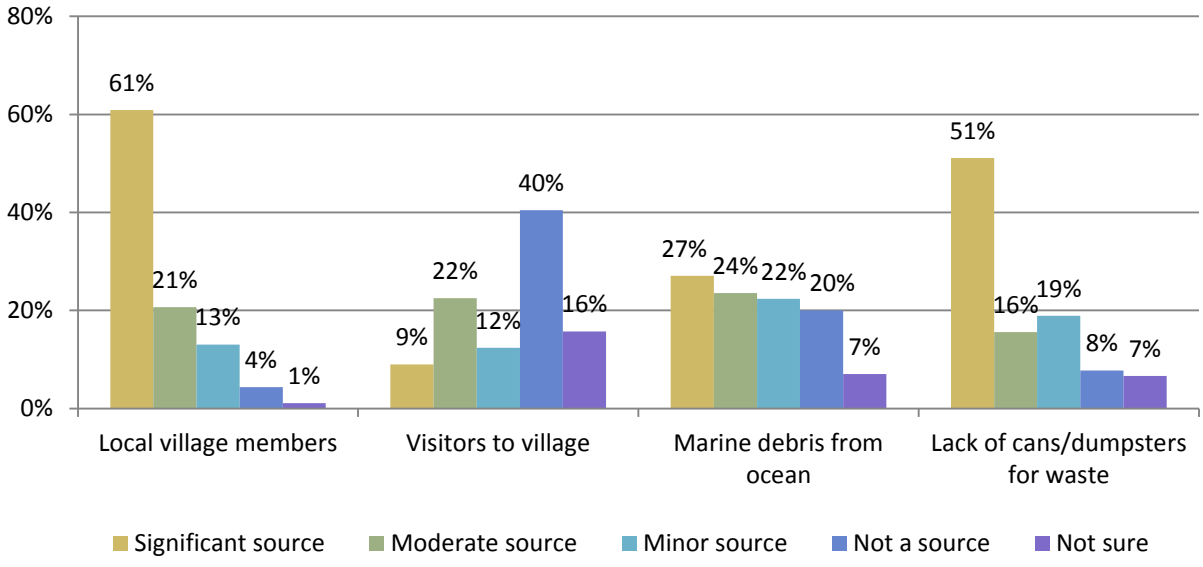

Figure 4-22. Vatia resident participation in activities to reduce trash in village.

4.8 Attitudes towards marine resource management strategies

Figures 4-23 and 4-24 present the results from the surveys pertaining to resident attitudes towards marine resource management strategies and enforcement. Figure 4-23 presents resident familiarity with systems in place to protect marine resources in Vatia. Nearly half (43%) of Vatia residents think there is a system in place to protect marine resources in Vatia. Of those who think yes, residents mentioned DMWR programs (27%), village leaders (7%), and church and youth efforts (7%) as systems in place to protect village marine resources.

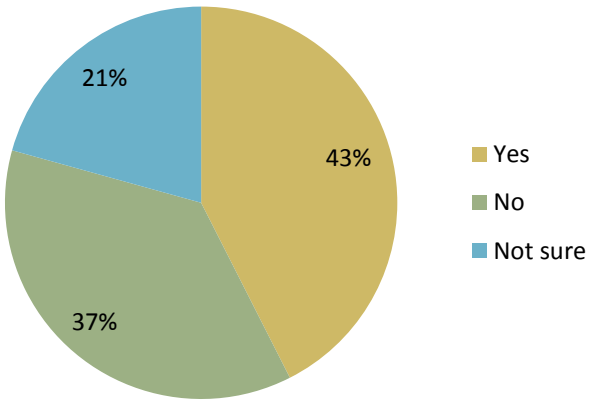

Figure 4-23. Resident's response to whether there is a system in place to protect marine resources in Vatia.

Figure 4-24 presents the results from survey questions about resident level of support with types of actions to protect village marine resources. In general, Vatia residents strongly support of actions to protect marine resources, with strong support for closed areas for 1-2 years (63%), seasonal restrictions (55%), gear restrictions (52%), size or catch limits (53%), limits on vulnerable or overfished marine resources (55%), and restrictions on non-villagers (59%). Two types of actions: areas closed for 3-5 years and no restrictions have similar support from by Vatia residents (44% and 42% strongly support and 21% and 22% somewhat support). Areas closed for 10 years or more is equally supported and not supported by Vatia residents.

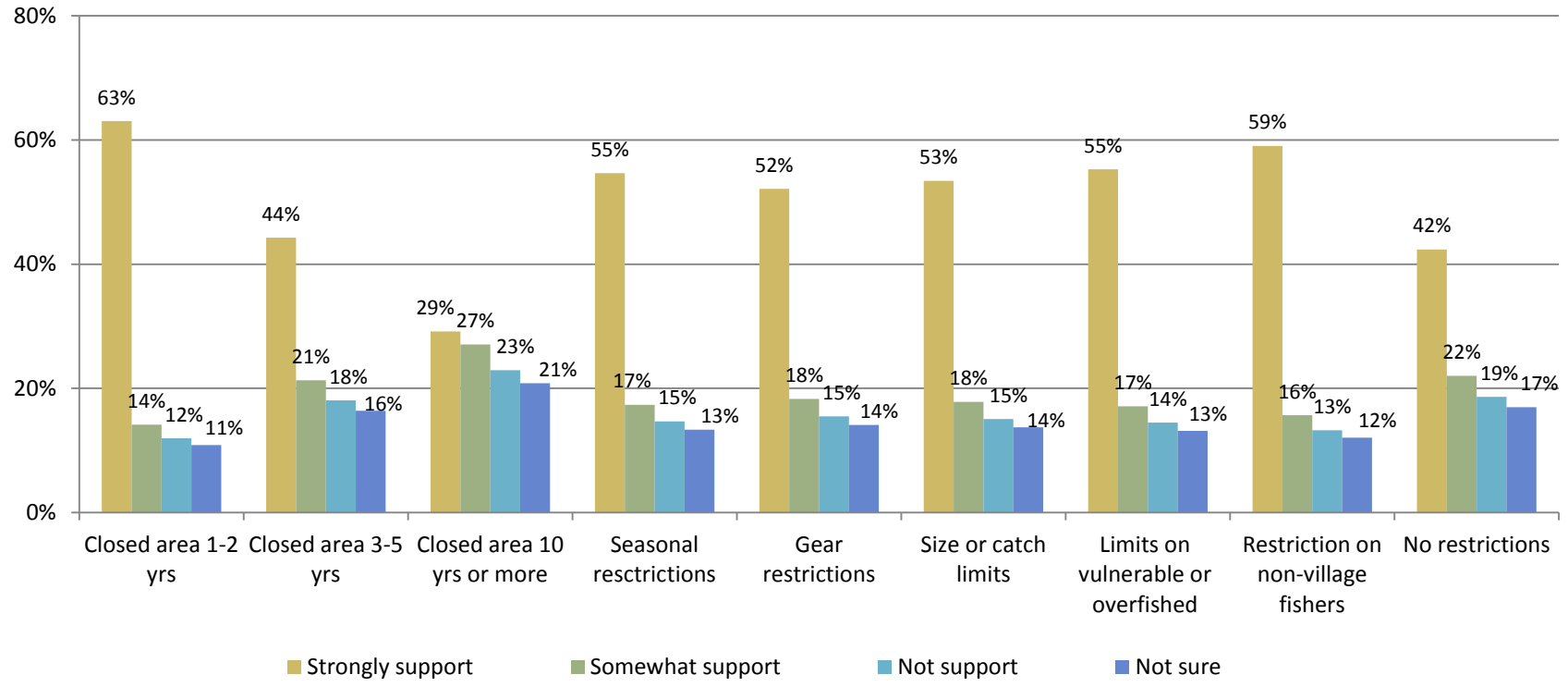

Figure 4-24. Resident level of support with types of actions to protect marine resources in Vatia

4.9 Access to resources

Figure 4-25 presents the results from the survey question about household access to various resources in Vatia. Nearly all (93%) of Vatia households have access to clean drinking water, while only 24% have access to back up drinking water. Very few Vatia residents have access to the following resources: back up electricity (12%), computer (17%), home internet (8%), cable (1%[2]) and air conditioning (16%). Back up drinking water and cell phones are more common, with 24% and 31%, respectively.

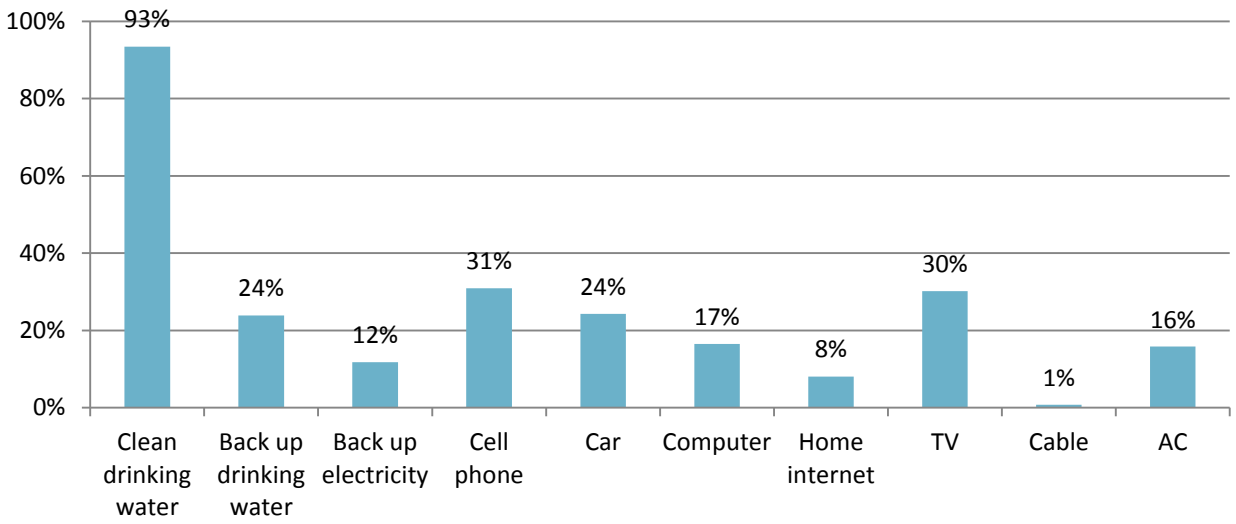

Figure 4-25. Access to resources in Vatia

4.10 Supplemental analyses

Income level with reliance on different sources of income

Figures 4-26 through 4-33 present results of income level analyzed across reliance on different sources of income in Vatia. Fishing is very important for over half of the respondents with annual income of less than $10,000 per year and nearly half of respondents with annual income of $30-39,999 per year (Fig. 4-26). Farming and government jobs are very important for food and/or income across all annual income levels (Fig. 4-27 and 4-30, respectively).

[2] The village of Vatia is not serviced by island cable networks, therefore this survey respondent is believed to have not interpreted the question properly.

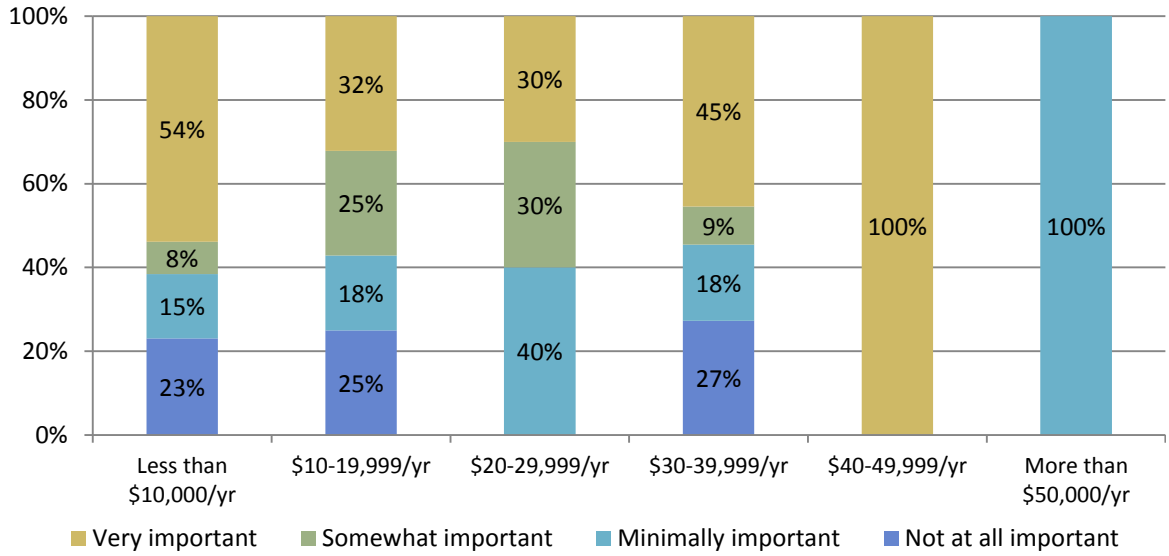

Figure 4-26. Income level and importance of fishing for food and/or income in Vatia.

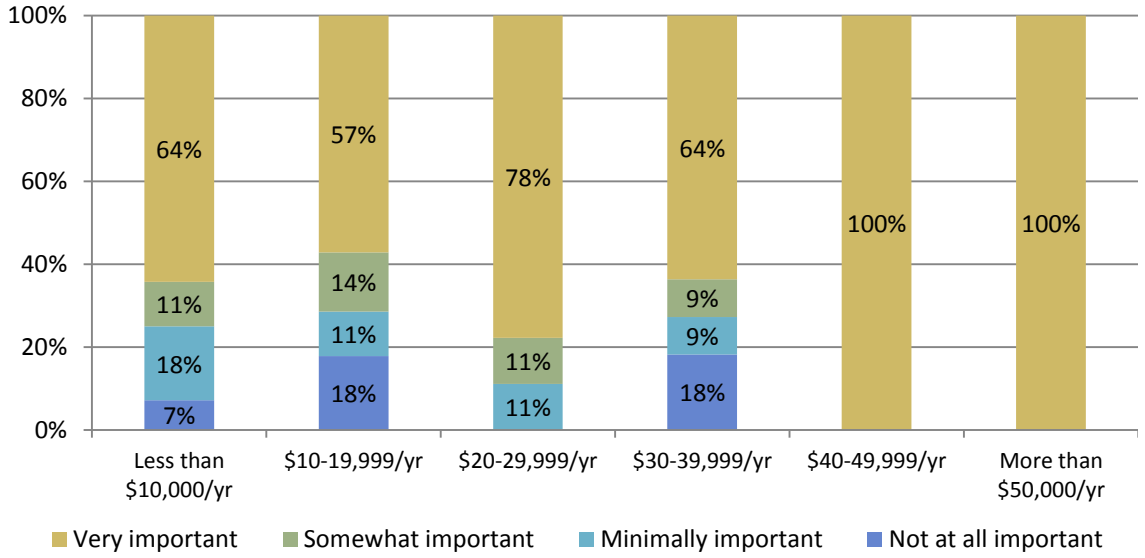

Figure 4-27. Income level and importance of farming for food and/or income in Vatia.

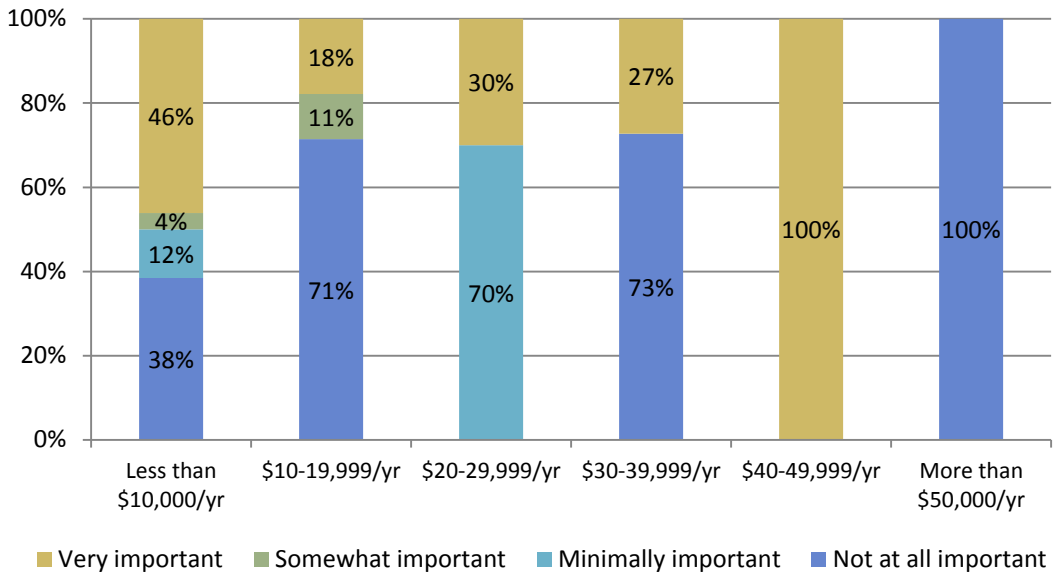

Figure 4-28. Income level and importance of the cannery for food and/or income in Vatia.

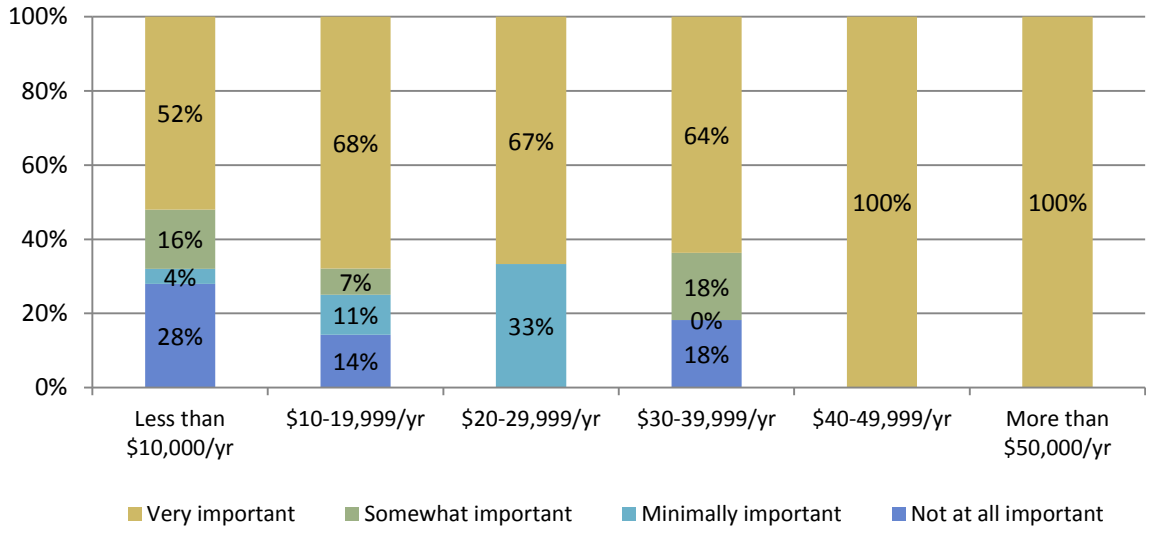

Figure 4-29. Income level and importance of government jobs for food and/or income in Vatia.

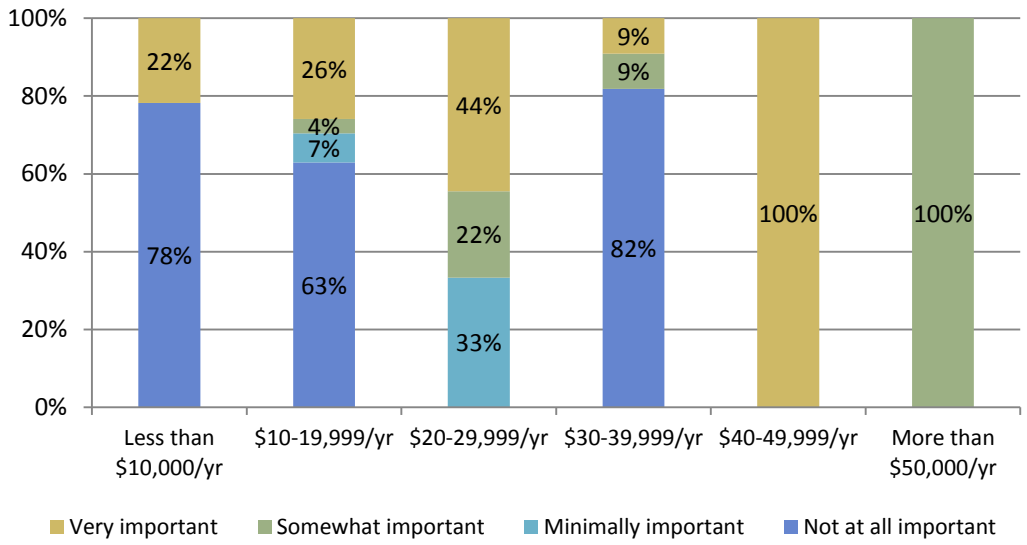

Figure 4-30. Income level and importance of pension (military or other) for food and/or income in Vatia.

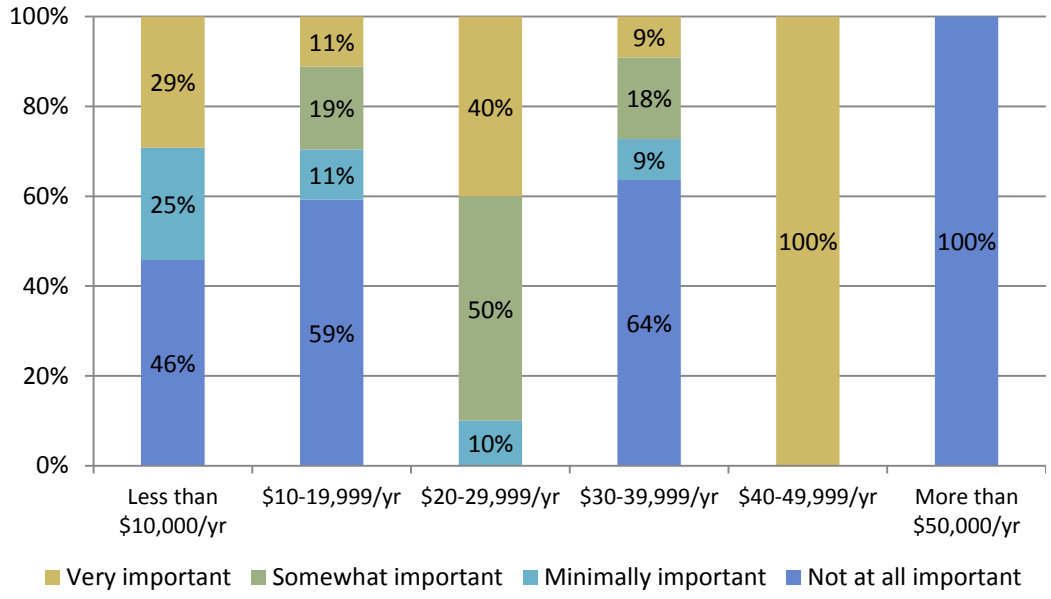

Figure 4-31. Income level and importance of off-island remittances for food and/or income in Vatia.

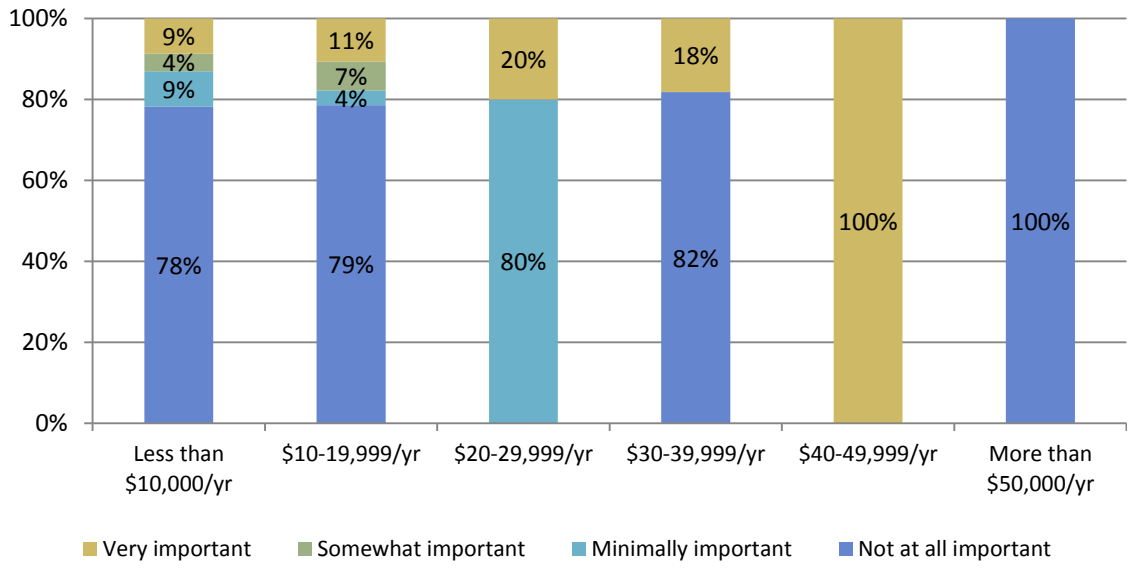

Figure 4-32. Income level and importance of private business for food and/or income in Vatia.

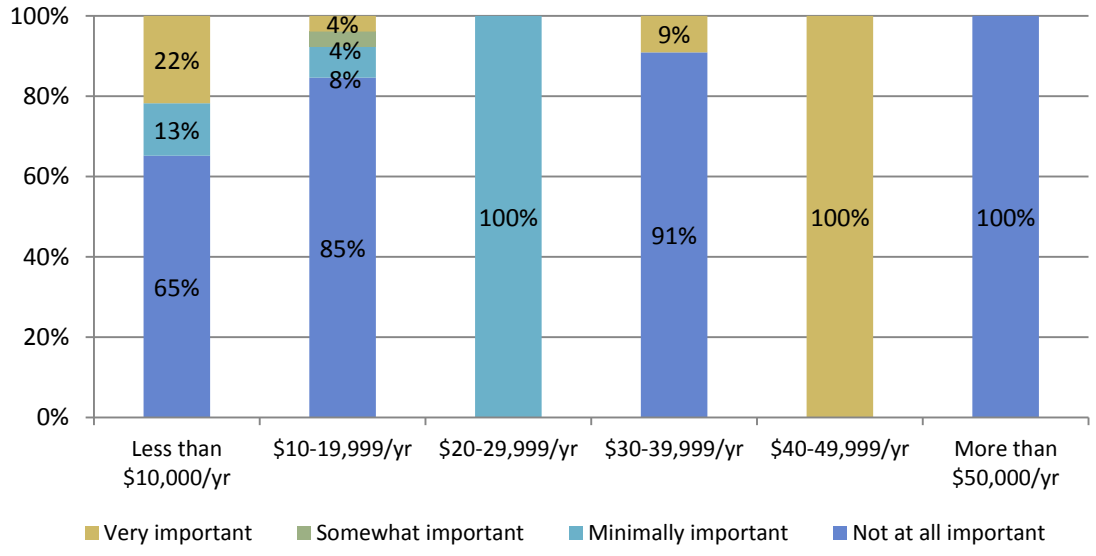

Figure 4-33. Income level and importance of tourism for food and/or income in Vatia.

Income level with fishing frequency

Figure 4-34, below presents the results of annual income level with fishing frequency in Vatia. Across all annual income levels (no respondent with greater than $50,000 per year), more than half of the respondents fish more than once/week.

Fishing frequency with reliance on fishing

Figure 4-35 presents the results of fishing frequency with the level of reliance on fishing for food and/or income in Vatia. Most (70%) of respondents who fish more than once/week also have a very important reliance on fishing for food and/or income. As reliance on fishing for food and/or income decreases, so too does fishing frequency.

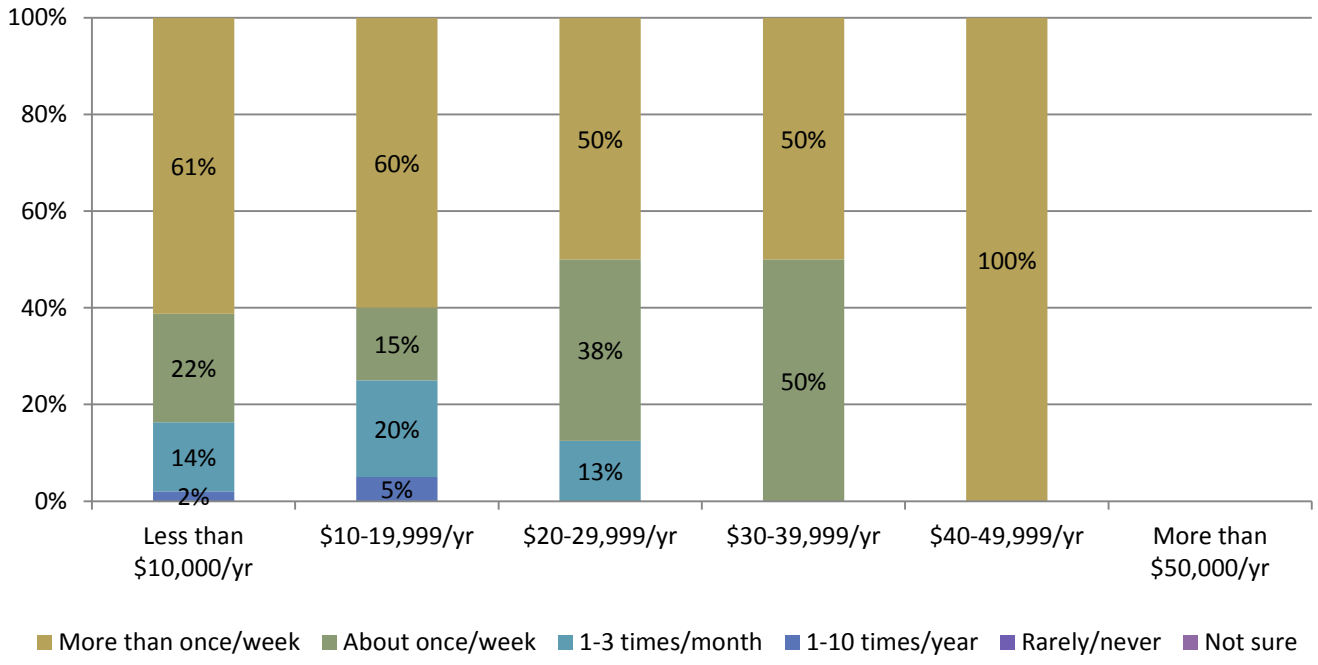

Figure 4-34. Fishing frequency by annual income level in Vatia.

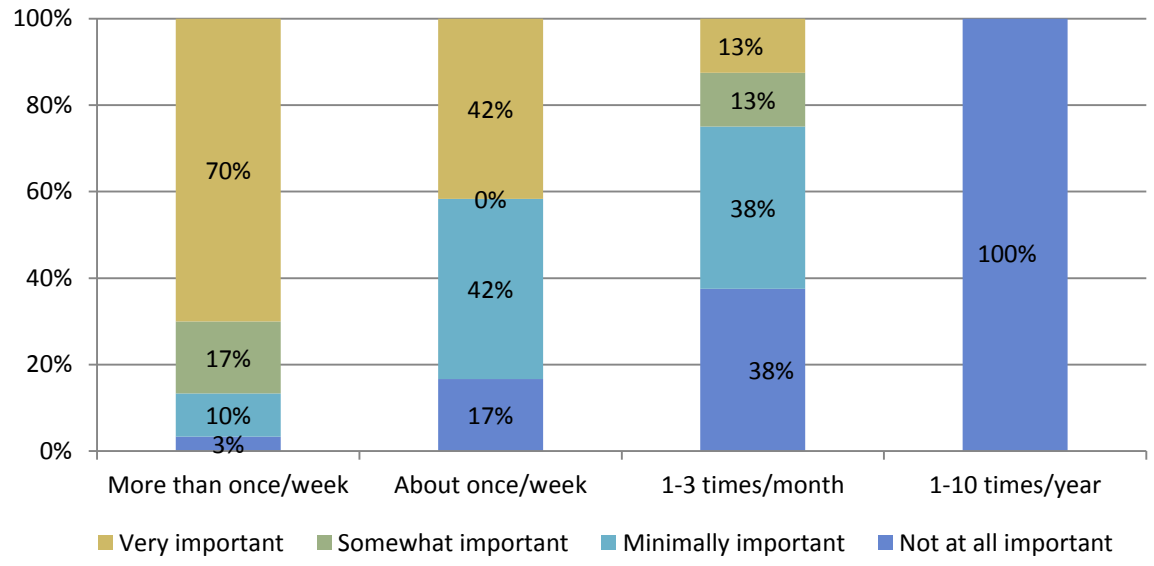

Figure 4-35. Fishing frequency with reliance on fishing for income/food in Vatia.

Fishing frequency with support for marine management strategies

Figures 4-36 through 4-44 present the results of fishing frequency with the level of support for various management strategies to protect marine resources. Across levels of fishing frequency, from more than once a week to 1-3 times a month, there is strong support for areas closed to fishing for 1-2 years (Fig. 4-36). As the length of time for fishing closures increases, level of support among all fishers/gathers decreases (Figs. 4-37 and 4-38). Level of support to areas closed to fishing for 10 years or more is not supported by the majority of frequent fishers: fish more than once/week (67%) and fish about once/week (73%). Figure 4-39 presents fishing frequency with the level of support to seasonal restrictions. Vatia fishers who fish/gather more than once week strongly support seasonal restrictions (67% of respondents), whereas most (73%) of fishers who fish about once/week do not support this management strategy. Figure 4-40 presents fishing frequency with level of support to gear restrictions. Half of the fishers who fish more than once/week and those who fish about once/week strongly support gear restrictions. Size or catch limits are also strongly or somewhat supported by 80% of fishers who fish more than once/week; 75% of fishers who fish about once/week, and 57% of fishers who fish 1-3 times/month).

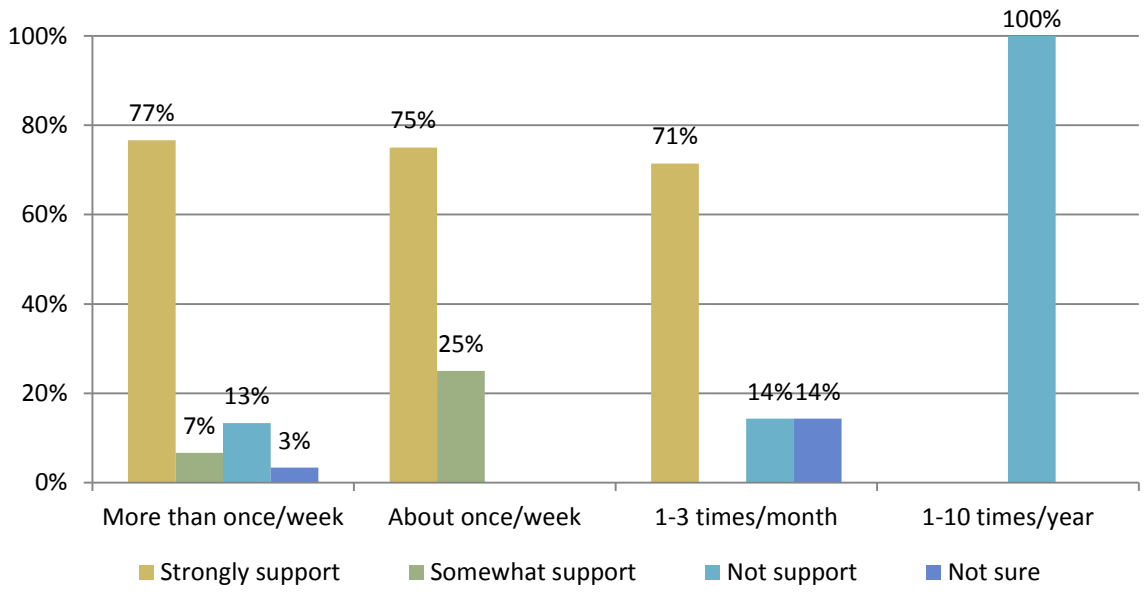

Figure 4-36. Fishing frequency with level of support to closed areas for 1-2 years.

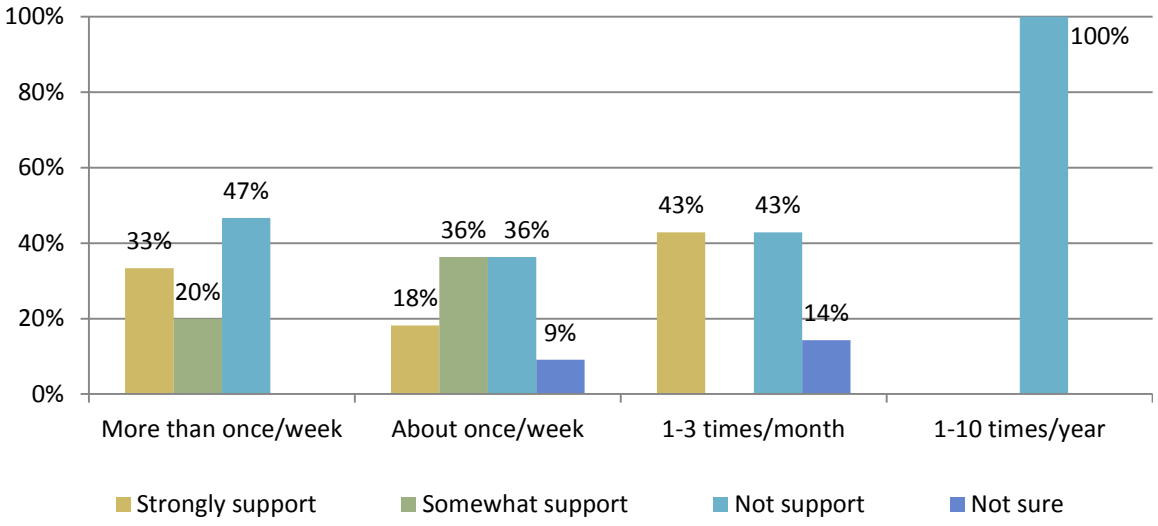

Figure 4-37. Fishing frequency with level of support to closed areas for 3-5 years.

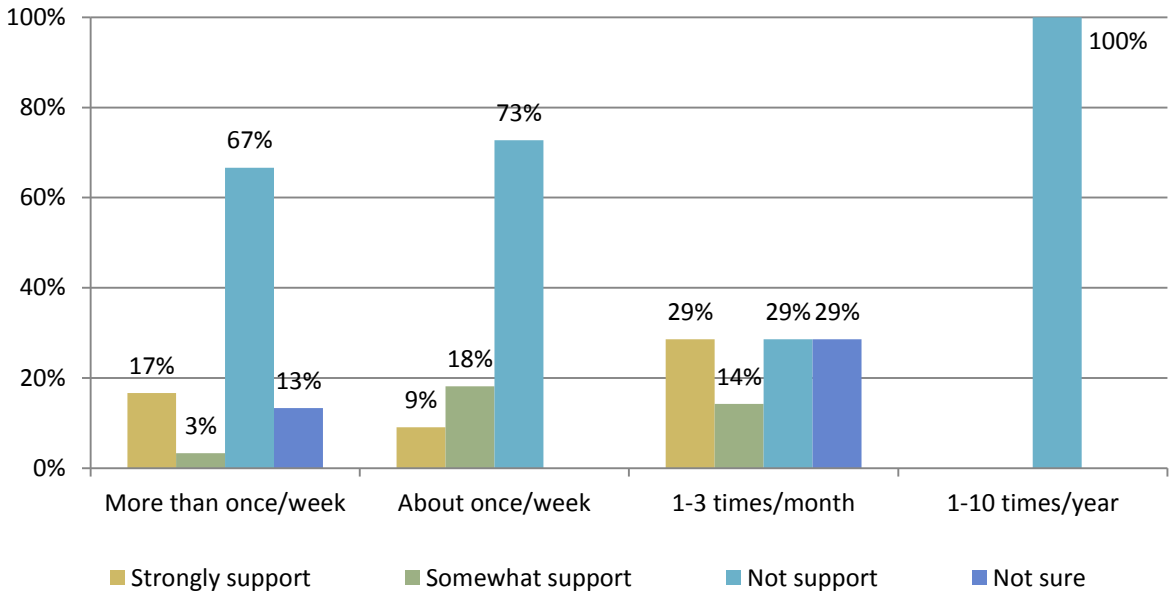

Figure 4-38. Fishing frequency with level of support to closed areas for more than 10 years.

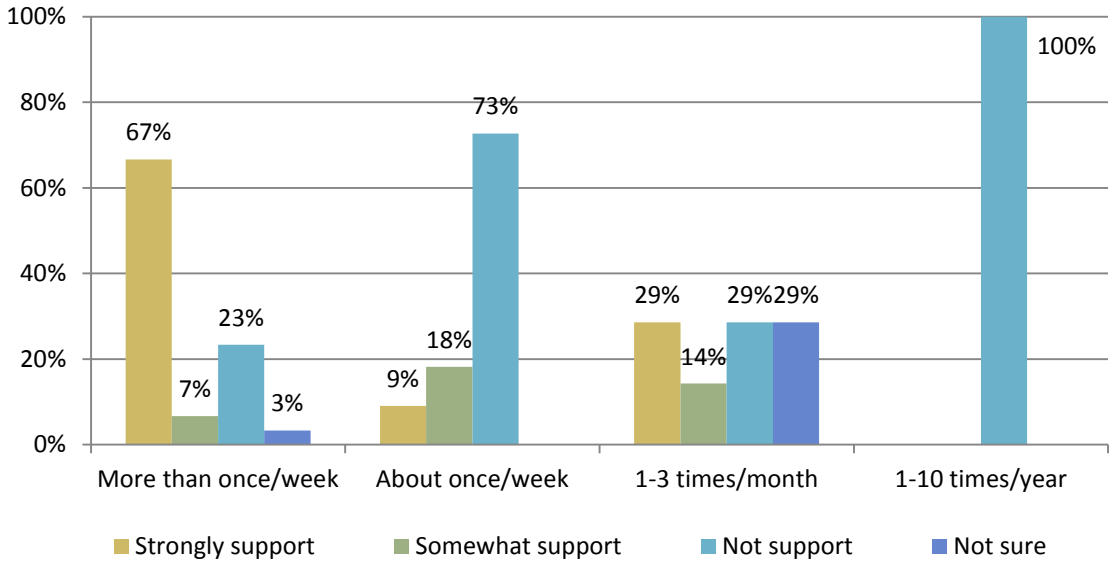

Figure 4-39. Fishing frequency with level of support to seasonal closures.

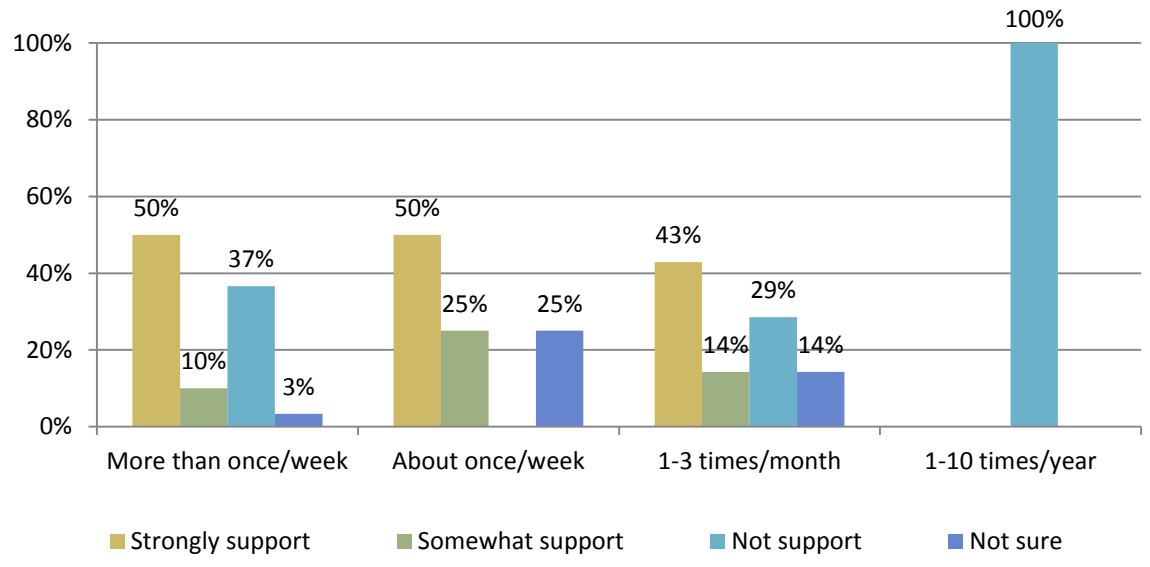

Figure 4-40. Fishing frequency with level of support to gear restrictions.

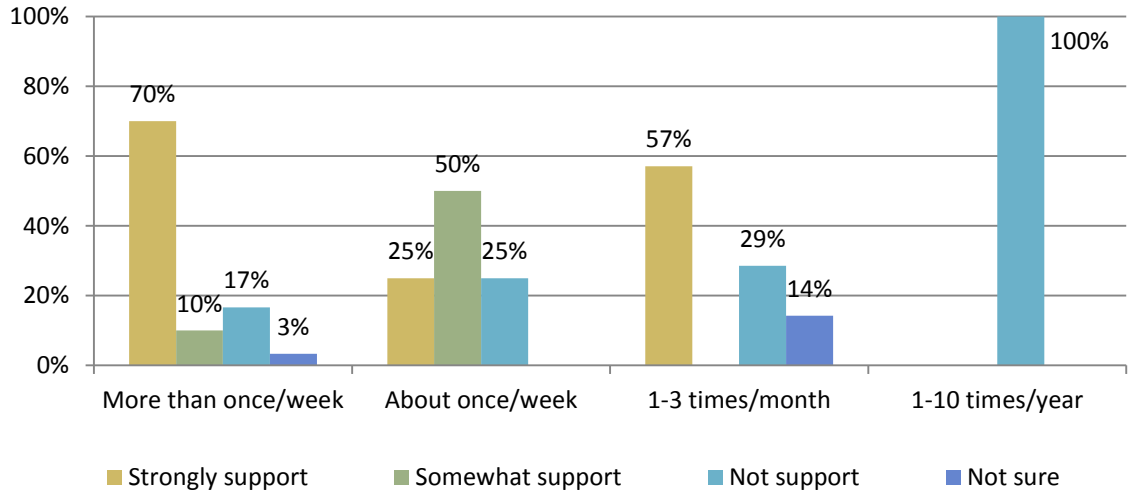

Figure 4-41. Fishing frequency with level of support to size or catch limits.

Figure 4-42, below, presents fishing frequency with level of support to limits on fishing certain vulnerable species that are overfished or whose numbers are very low. This management strategy is strongly supported by 67% of fishers who fish

more than once/week, 55% of fishers who fish about once/week and 57% of fishers who fish 1-3 times/month. Figure 4-43 presents fishing frequency with the level of support for restrictions on non-village fishers. The majority of fishers who fish 1-3 times/month or more strongly support restrictions on non-village fishers. No restrictions is nearly equally strongly supported (48%) and not supported (45%) by fishers who fish more than once/week (Fig. 4-44). The majority (55%) of fishers who fish about once/week do not support no restrictions.

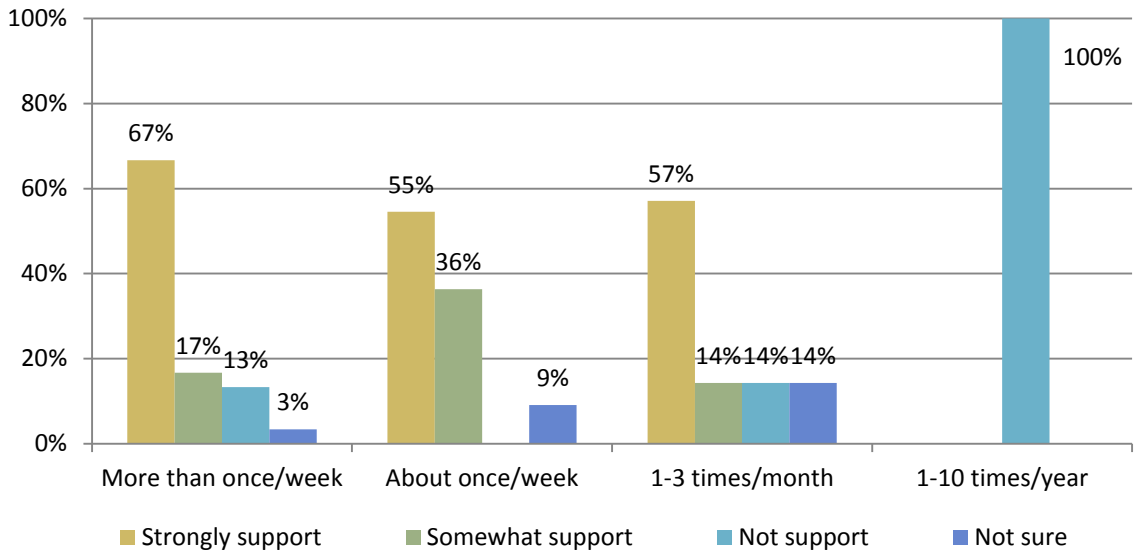

Figure 4-42. Fishing frequency with level of support to limits on fishing certain vulnerable species that are overfished or whose numbers are very low. .

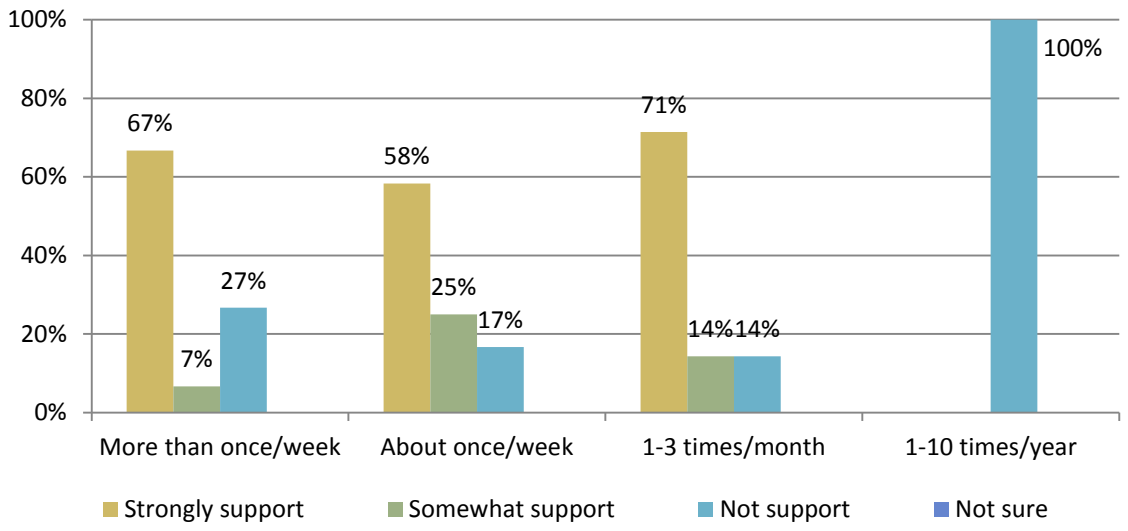

Figure 4-43. Fishing frequency with level of support to restrictions on non-village fishers.

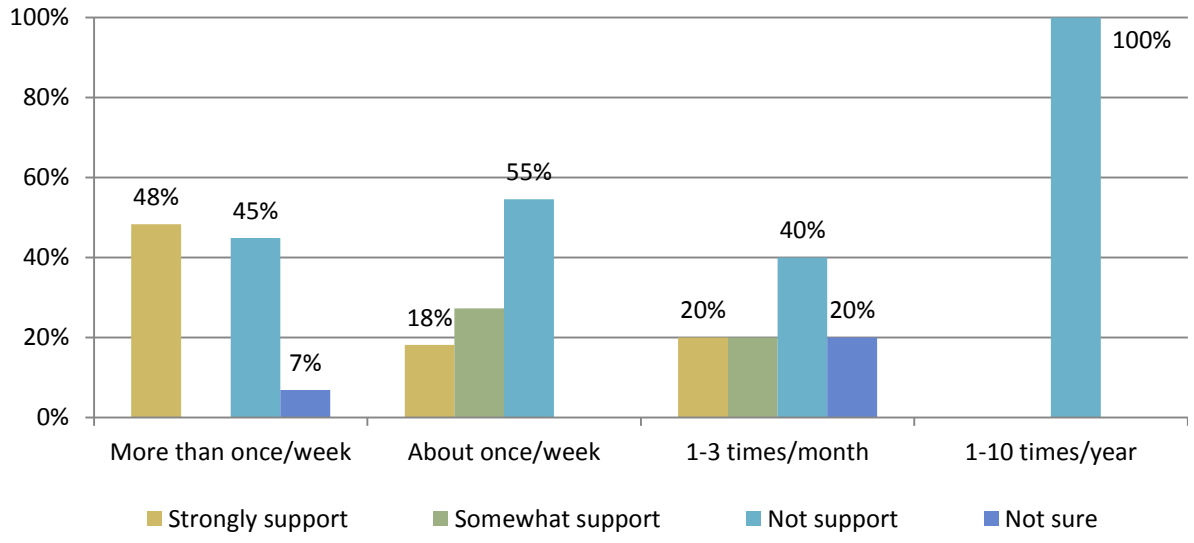

Figure 4-44. Fishing frequency with level of support to no restrictions.

Reliance on fishing for income with support for management strategies to protect marine resources

Figures 4-45 through 4-52 present the results from the questions on level of reliance on fishing for income (very important to not at all) with level of support for restrictions in Vatia. Across all levels of importance of reliance on fishing for income, closed areas for 1-2 years is strongly supported by the majority of respondents, and as the length of time for closures increases, level of support decreases (Figs. 4-45 through 4-47). Respondents who have a very important reliance on fishing for income generally strongly support management strategies to protect marine resources. An equal number of respondents who have a very important reliance on fishing for income (47%) strongly support and do not support no restrictions. Over half (59%) of respondents do not support closed areas for 10 years or more. Respondents who have some reliance on fishing for income generally do not support fishery restrictions. Only one management strategy, closed areas closed for 1-2 years, is strongly supported by over half (55%) of respondents who have some reliance on fishing for income. Limits on vulnerable or overfished species and restrictions on outside fishers are strongly supported by almost half (45% each) of respondents.

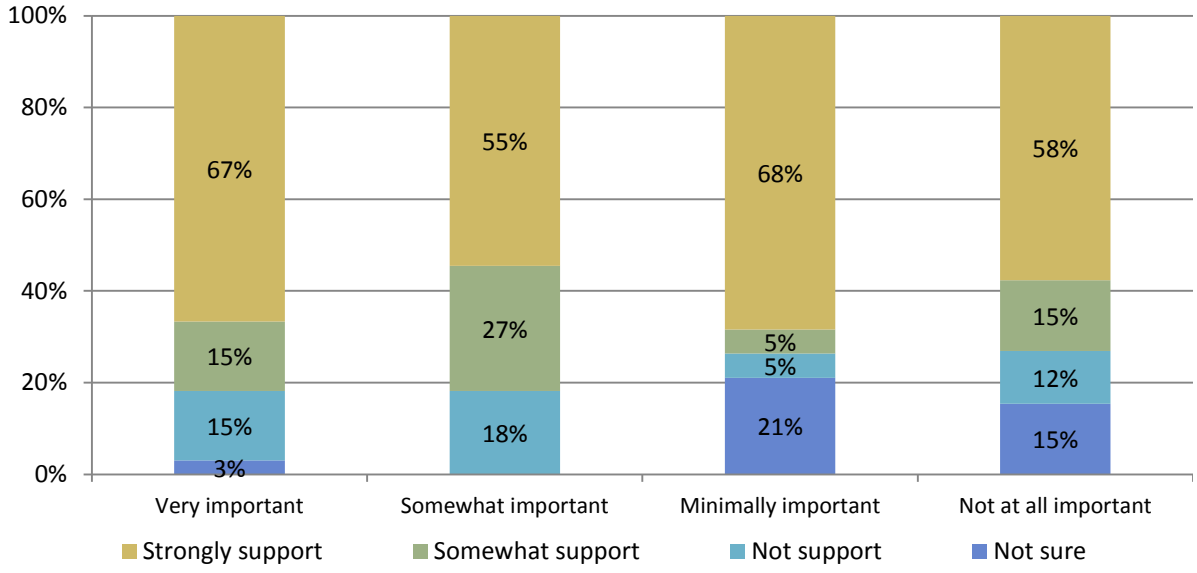

Figure 4-45. Reliance on fishing for income and level of support for closed areas 1-2 years.

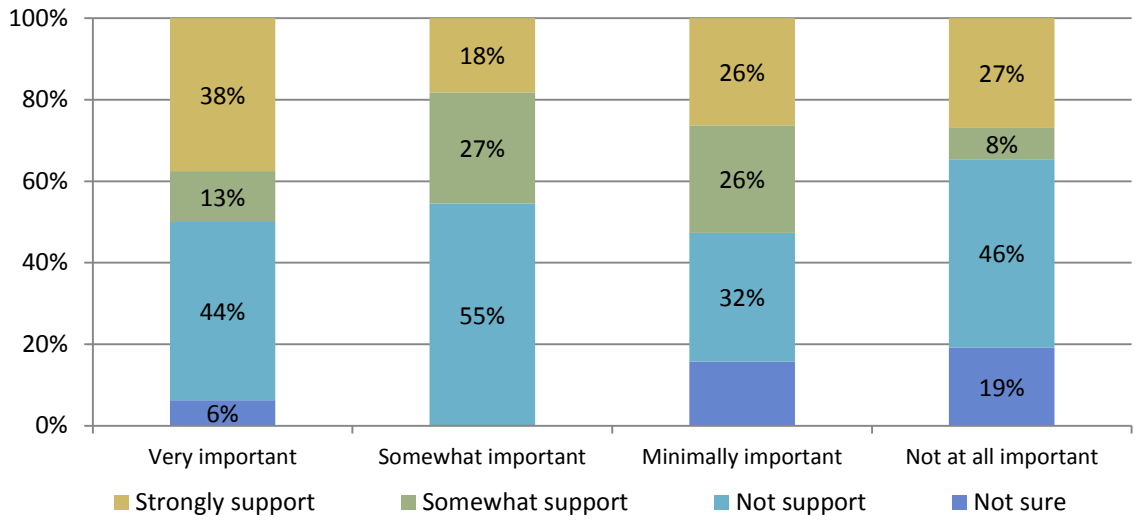

Figure 4-46. Reliance on fishing for income and level of support for closed areas 3-5 years.

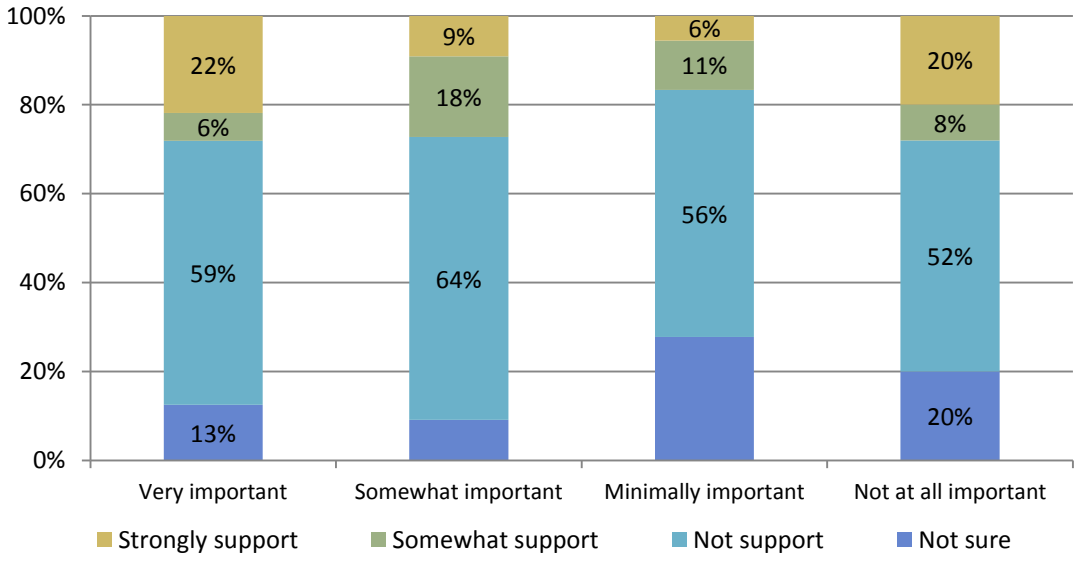

Figure 4-47. Reliance on fishing for income and level of support for closed areas for more 10 years or more.

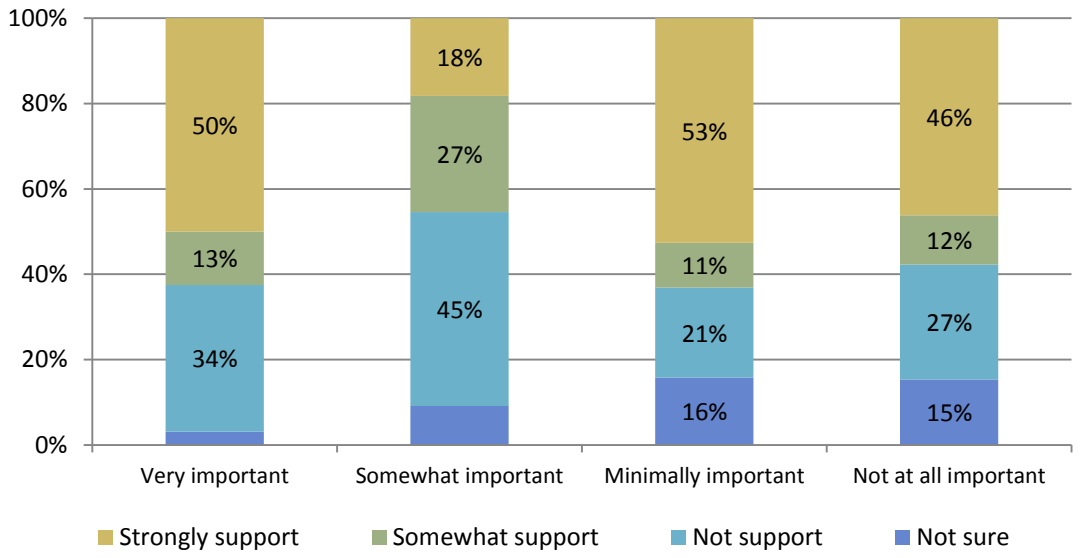

Figure 4-48. Reliance on fishing for income and level of support for seasonal closures.

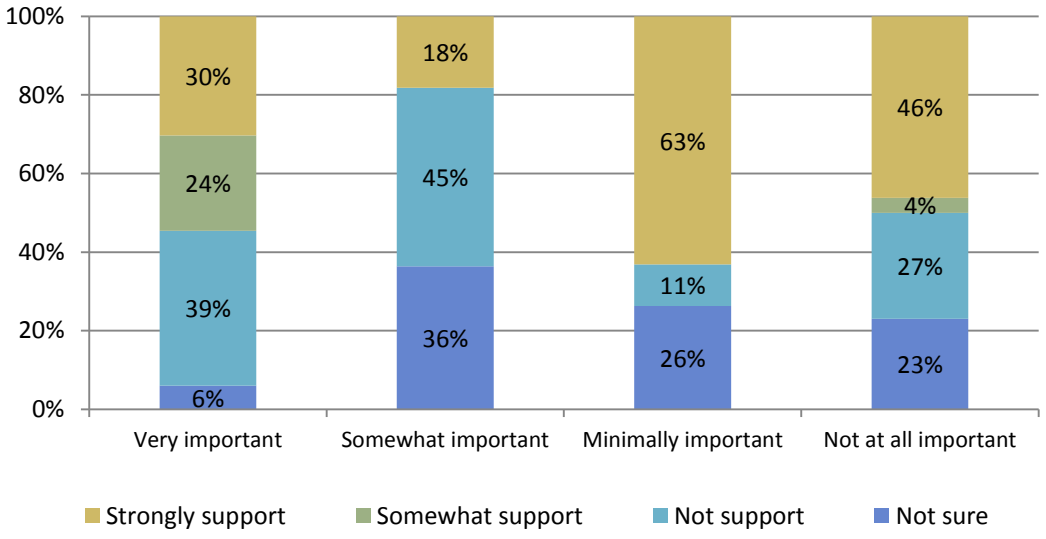

Figure 4-49. Reliance on fishing for income and level of support to gear restrictions.

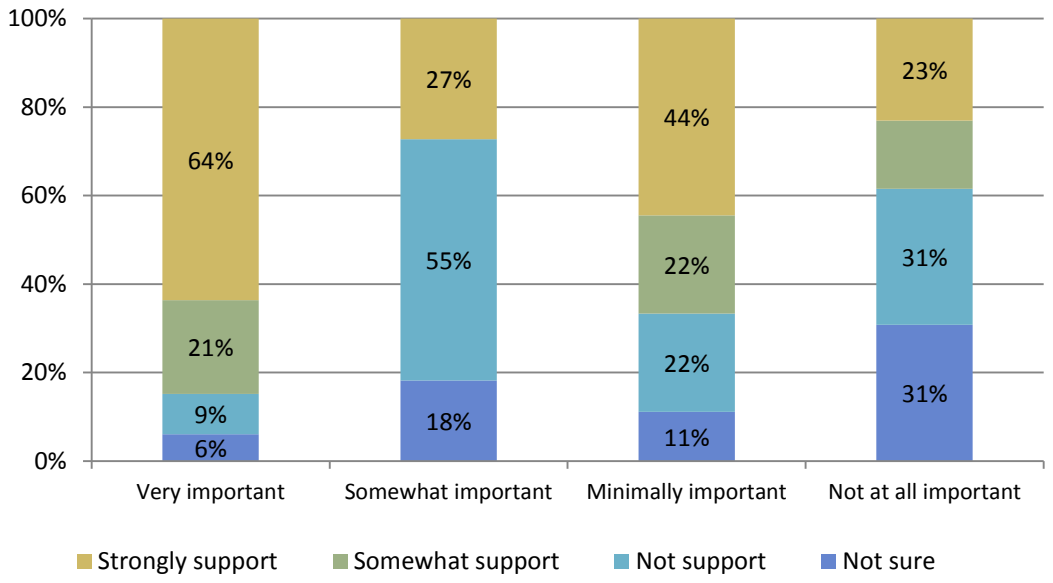

Figure 4-50. Reliance on fishing for income and level of support to size or catch limits.

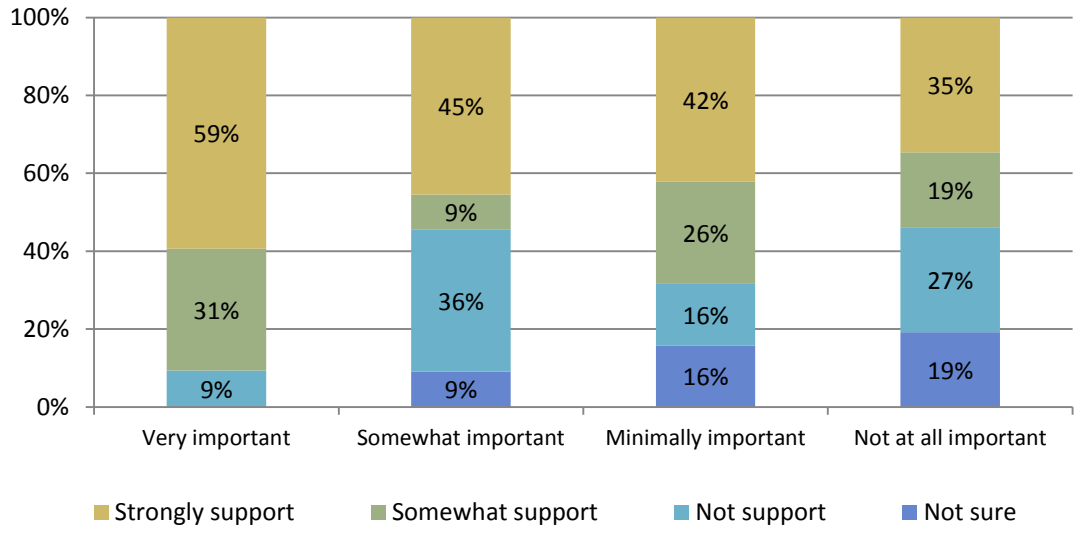

Figure 4-51. Reliance on fishing for income and level of support to limits on fishing certain vulnerable species that are overfished or whose numbers are very low. .

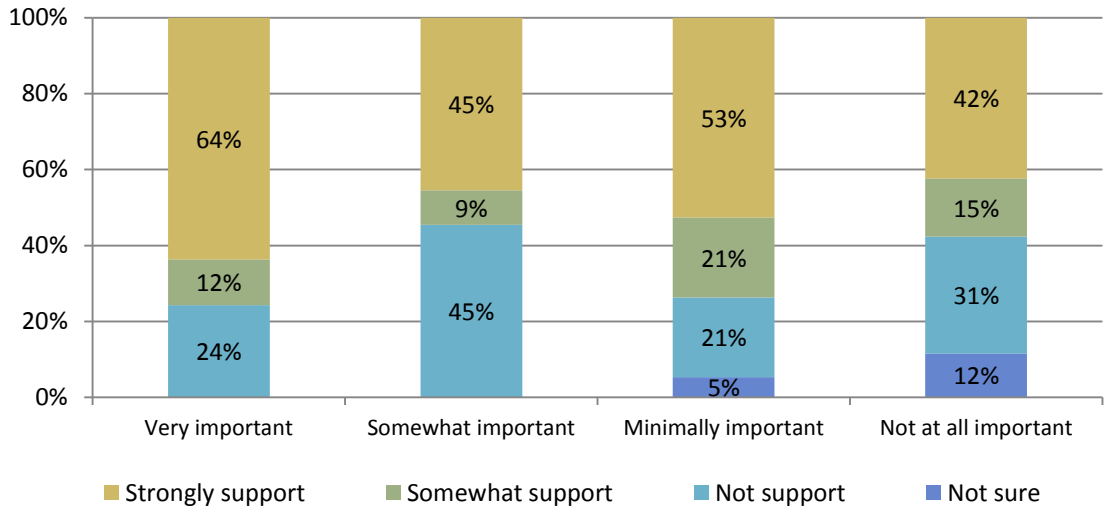

Figure 4-52. Reliance on fishing for income and level of support to restrictions on non-village fishers.

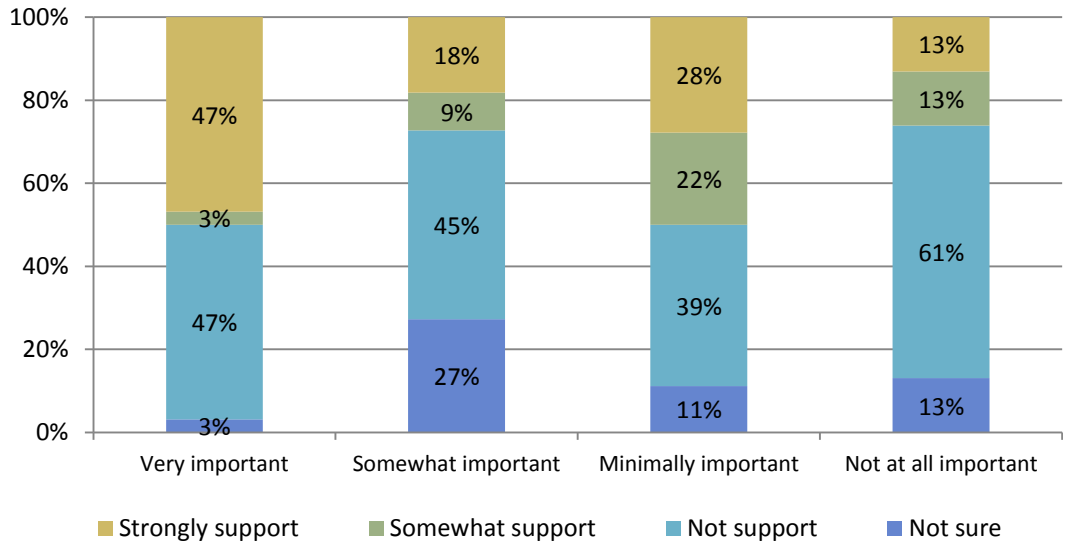

Figure 4-53. Reliance on fishing for income with level of support to no restrictions.

Fishing frequency and perception of resource conditions

Figures 4-54 through 4-61, below, present the results from the survey of fishing frequency and the perception of the condition of marine resources and the environment in Vatia. Fishers who fish more than once a week generally perceive marine resources to be very good or good, with well over half of these fishers thinking fish on the reef, fish on the reef slope, pelagic fish and invertebrates are very good or good (87%, 87%, 79% and 86%, respectively; Fig. 50). Vatia fishers who fish more than once a week think ocean water quality is doing good or very good (69%), while 24% responded neither good nor bad. Stream water quality is perceived to be neither good nor bad by 45% of Vatia fishers who fish more than once a week, and 52% think the condition of the coral habitat is very good or good. Almost half (42%) of fishers who fish more than once a week think beach quality is very good or good, and 35% think it is neither good nor bad. . Figure 52 and 53 present about once/week fishing frequency and perception of marine resources and the environment. In general, Vatia fishers who fish about once/week tend to think both marine resources and the environment are neither good nor bad.

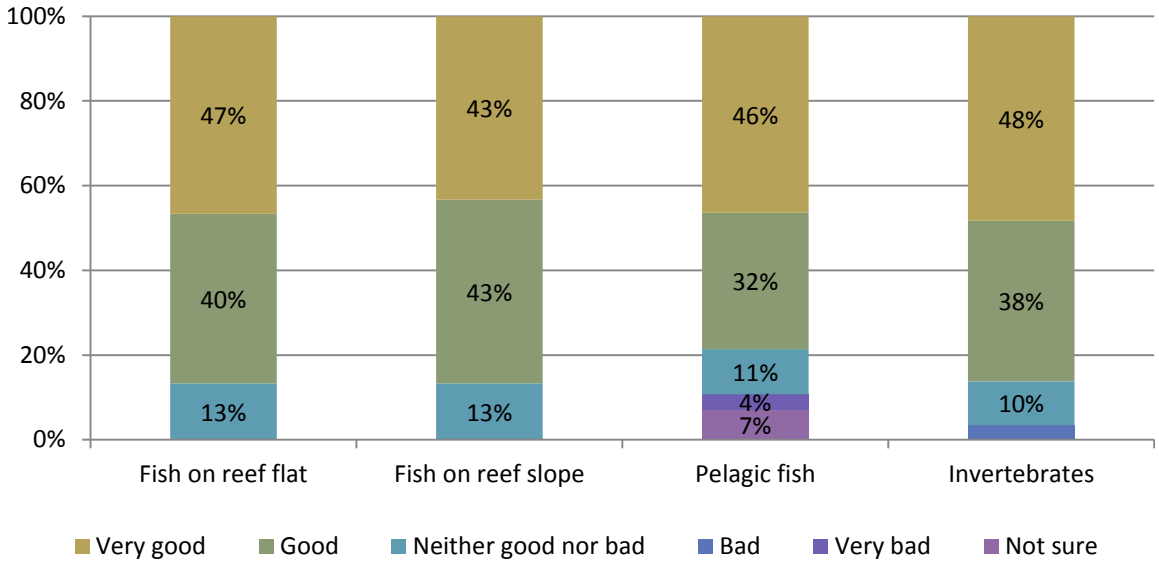

Figure 4-54. Vatia fishers who fish more than once a week and perception of marine resources.

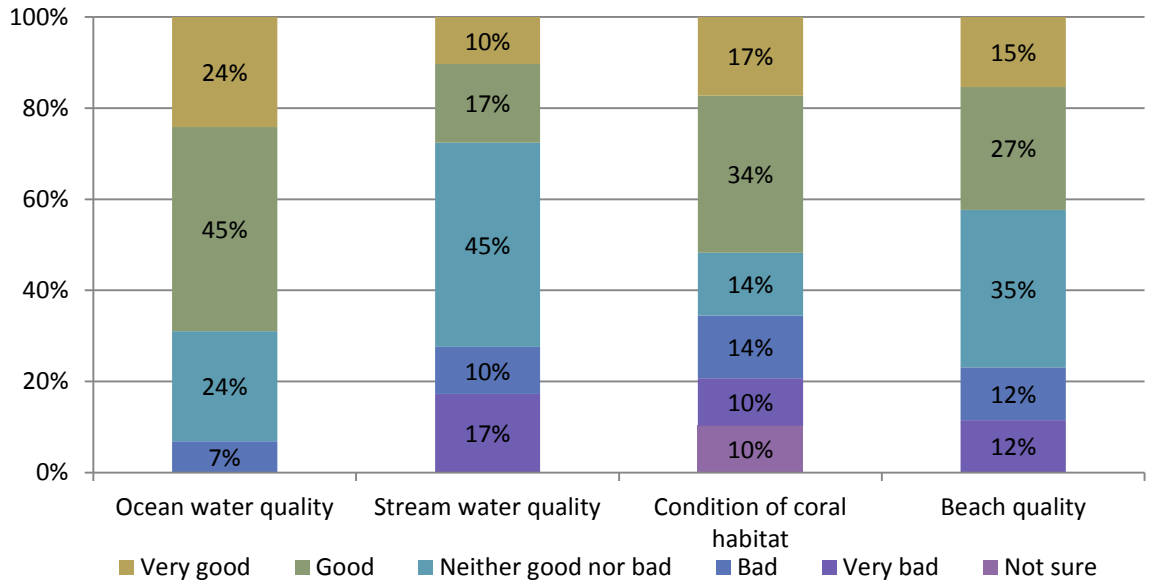

Figure 4-55. Vatia fishers who fish more than once a week and perception of the environment.

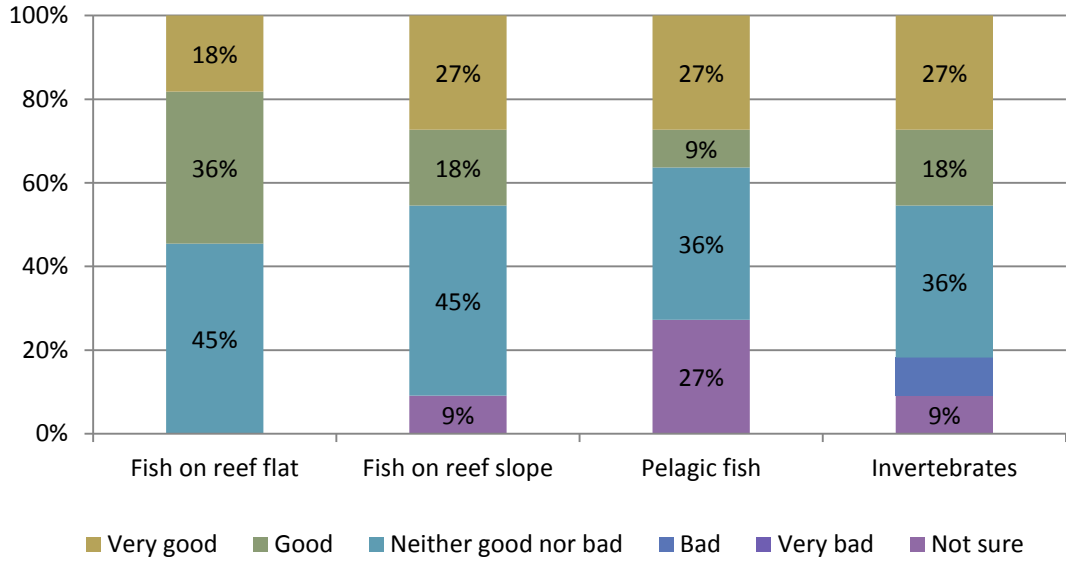

Figure 4-56. Vatia fishers who fish about once a week and perception of marine resources

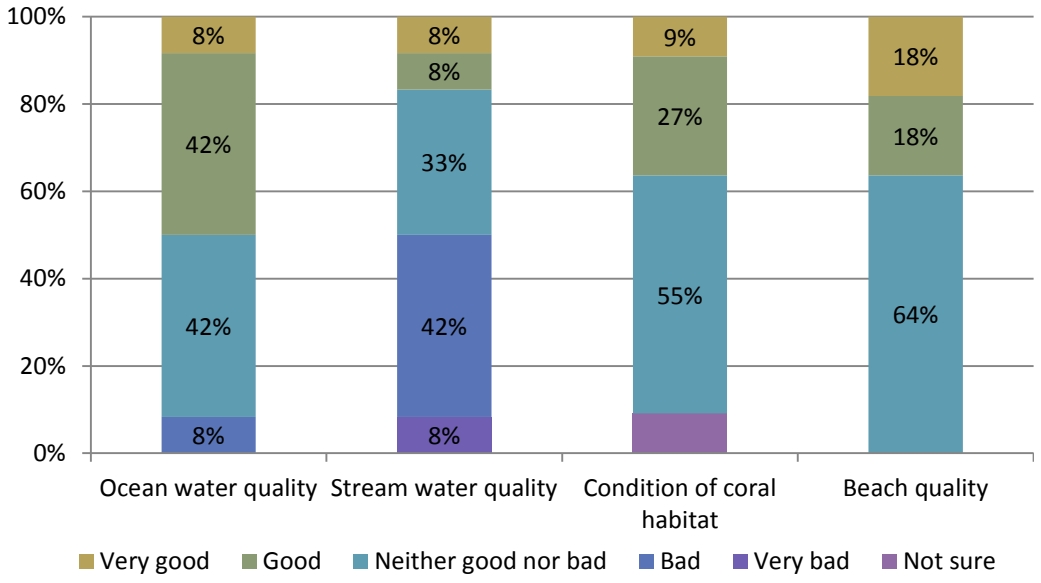

Figure 4-57. Vatia fishers who fish about once a week and perception of the environment

Figures 4-58 and 4-59, present fishers who fish 1-3 times/month and their perception of marine resources and the environment. Vatia fishers who fish 1-3 times/month think fish on the reef flat are doing very good or good (88%) and fish on the reef slope are doing good (75%). Half of these fishers think pelagic fish are doing good or very good and that invertebrates are neither good nor bad (Fig. 4-58). An equal number of Vatia fishers who fish 1-3 times/month (38%) think ocean water quality is neither good nor bad and bad. Stream water quality and beach quality is perceived to be neither good nor bad by the majority of these fishers, and half think the condition of coral habitat is bad (Fig. 4-59). Figures 4-60 and 4-61 show fishers who fish 1-10 times/year and their perception of marine resource conditions and the environment. Fish on the reef flat, fish on the reef slope, pelagic fish and invertebrates are thought to be very good or good (Fig. 4-60). Ocean water and stream water quality are perceived to be good, condition of the coral not sure and beach quality very good (Fig. 4-61).

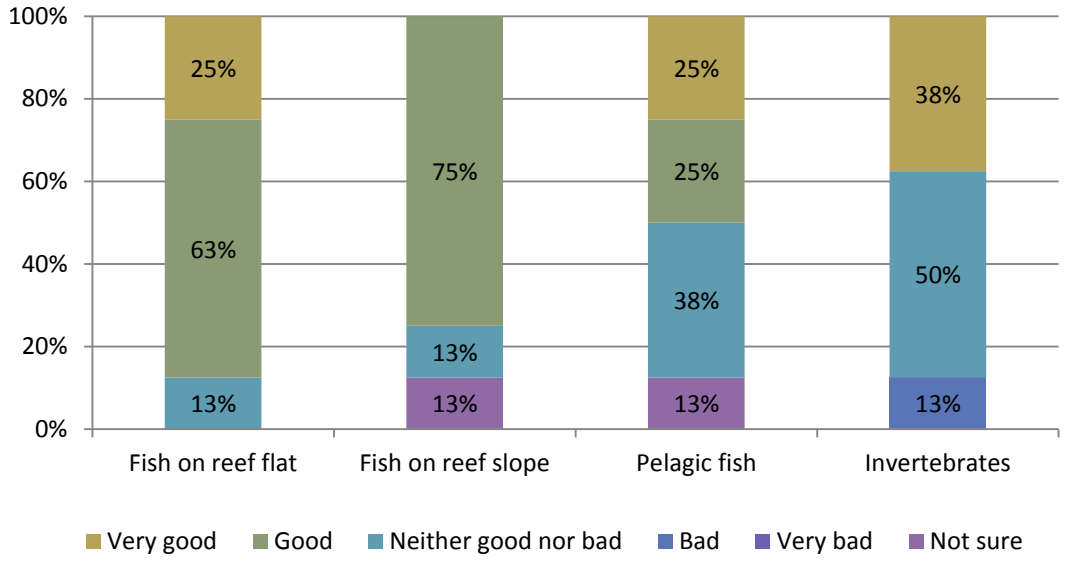

Figure 4-58. Vatia fishers who fish 1-3 times/month and perception marine resources.

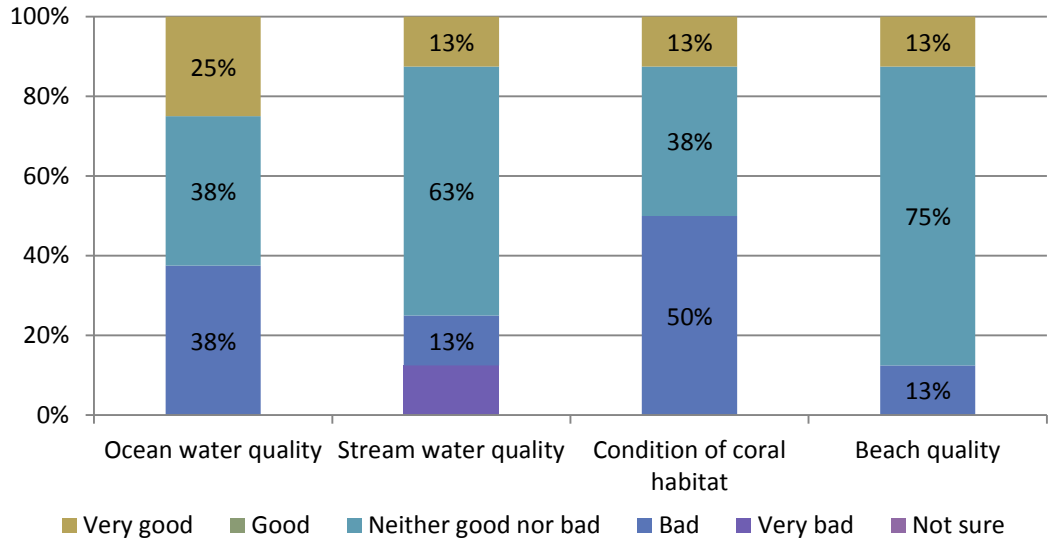

Figure 4-59. Vatia fishers who fish 1-3 times/month and perception of the environment.

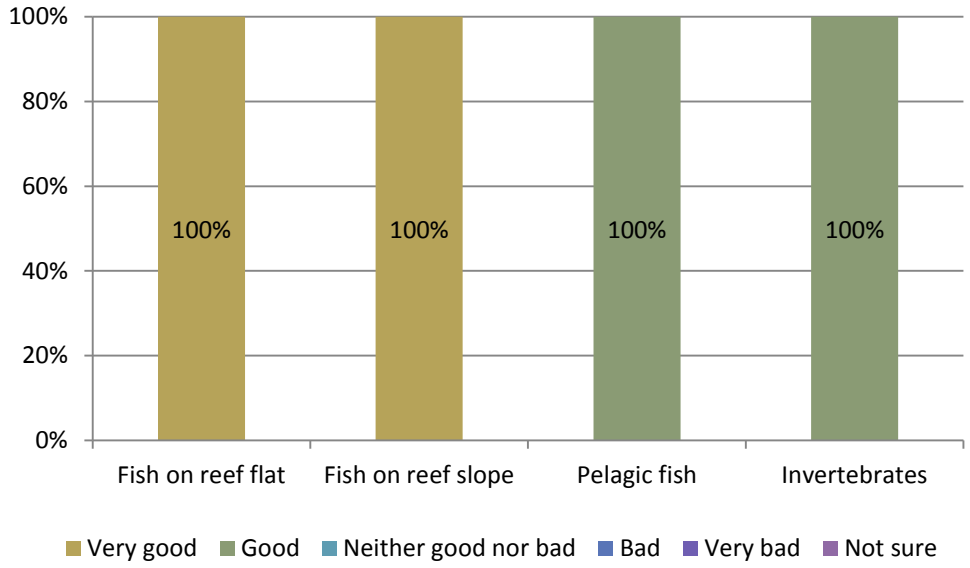

Figure 4-60. Vatia fishers who fish 1-10 times/year and perception of marine resources.

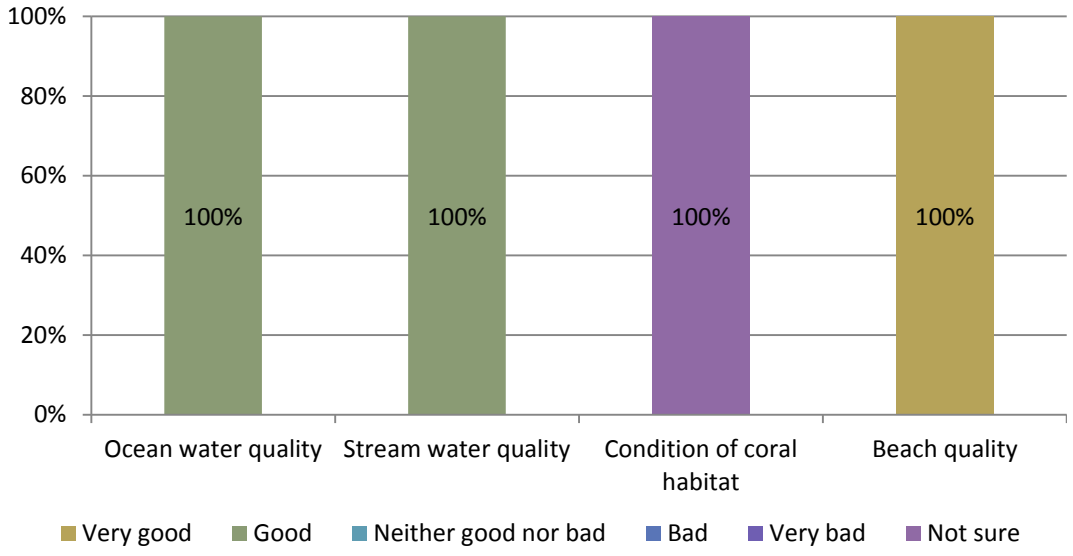

Figure 4-61. Vatia fishers who fish 1-10 times/year and perception of the environment.

5.0 Aunu'u

5.1 Demographics

Figures 5-1 through 5-5 present the results from the demographic survey questions in the 2015 survey of Aunu'u. Gender distribution is displayed in Figure 5-1; 44% female and 49% male). Age distribution is shown in Figure 5-2. The two most common age bins are 18-29 and 50-59 years old (33.3% and 23.8%, respectively). The small resident population over the age of 70 is not well represented in our sample as elderly residents are generally less accessible for in-person surveys due to personal health reasons or the physical exertion required. The number of people in households in Aunu'u range from 2 to 13, with an average household size of 6.2 people (Fig. 5-3). Of the three races/ethnicities of survey respondents in Aunu'u, most are some or part Samoan (95.3%; Fig. 5-4). The other ethnicities represented are Tongan (1.6%) Caucasian (1.6%) and Tokelau (1.6%). Annual income of survey respondents in Aunu'u is shown in Figure 5-5. Of those who responded (6 no response), over half (58.3%) have an annual income less than $10-000. Annual income of $10-19,999 was represented by 21.7% of respondents. Annual incomes of more than $50,000 was represented by 1.7% of respondents.

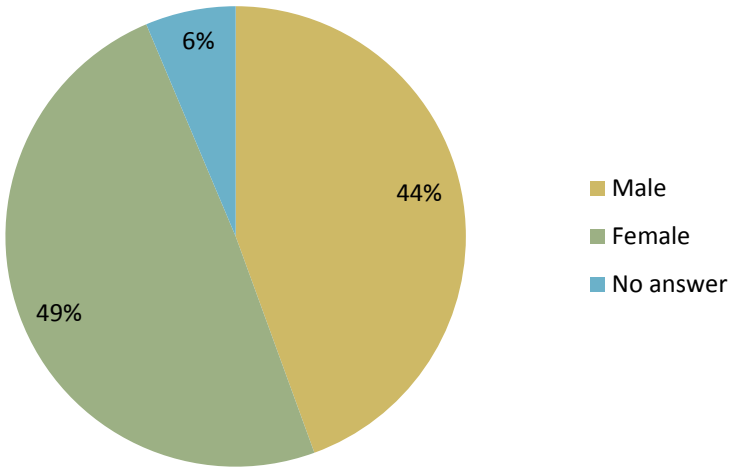

Figure 5-1 Gender distribution in survey sample in Aunu'u.

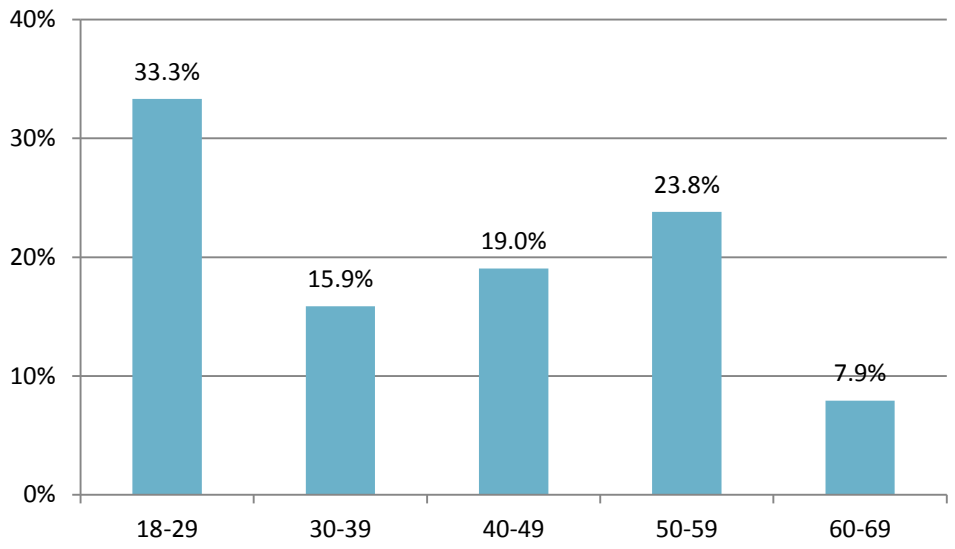

Figure 5-2. Age distribution in sample in Aunu'u.

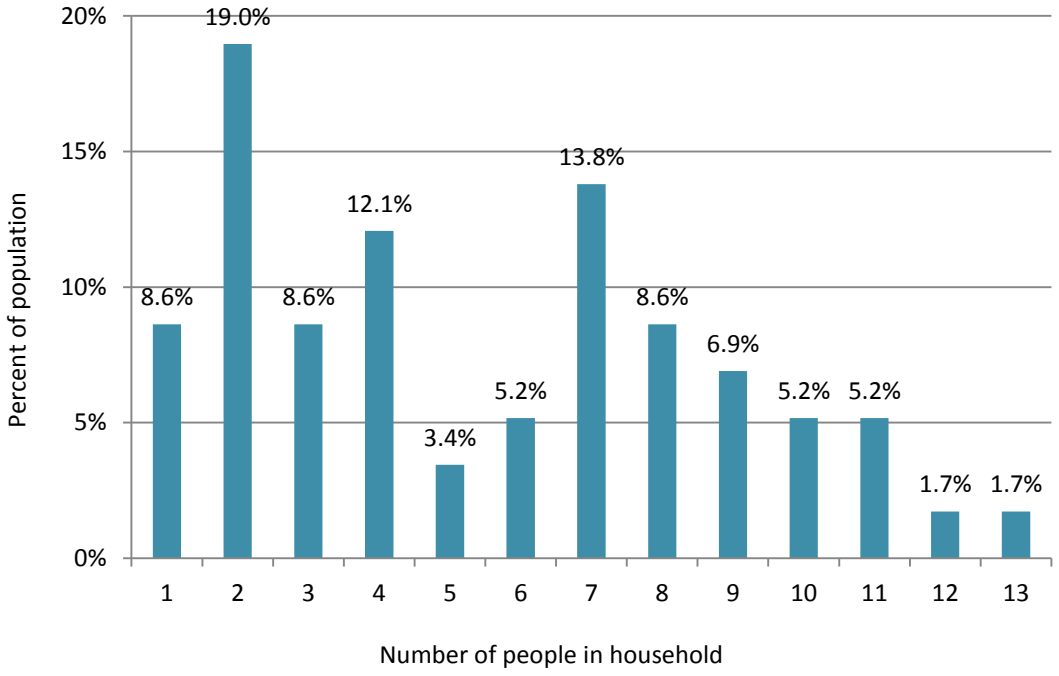

Figure 5-3 Number of people in households in Aunu'u.

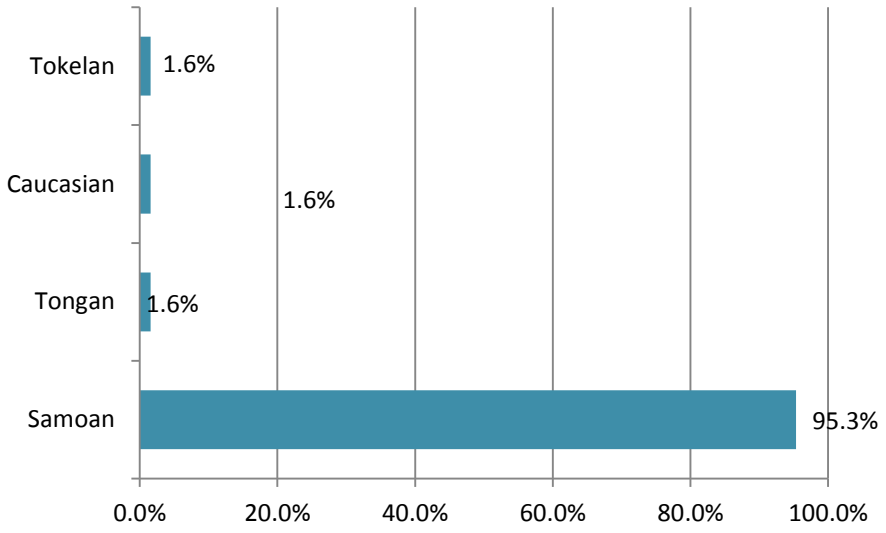

Figure 5-4. Race/ethnicity among survey respondents in Aunu'u.

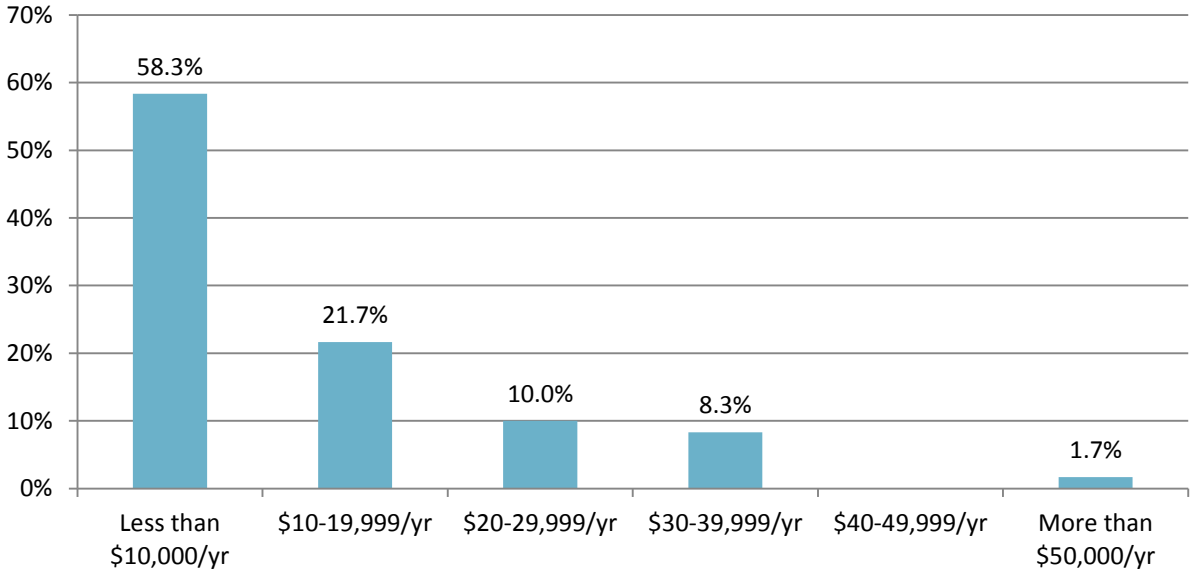

Figure 5-5 Annual income of survey respondents in Aunu'u.

5.2 Community Groups

Figures 5-6 and 5-7, below presents the results from the survey question pertaining to community group involvement and participation. Nearly all respondents (98%) belong to church and over half belong to village council (53%) and youth groups (66%; Fig 5-6). Other groups represented include ladies committee and parent school groups. Figure 5-7 presents the percent of people in Aunu'u belonging to different numbers of community groups. All residents in Aunu'u belong to at least one community group, and most people belong to three groups (27%). There is nearly equal involvement in one, two and four community groups (roughly 23% of respondents).

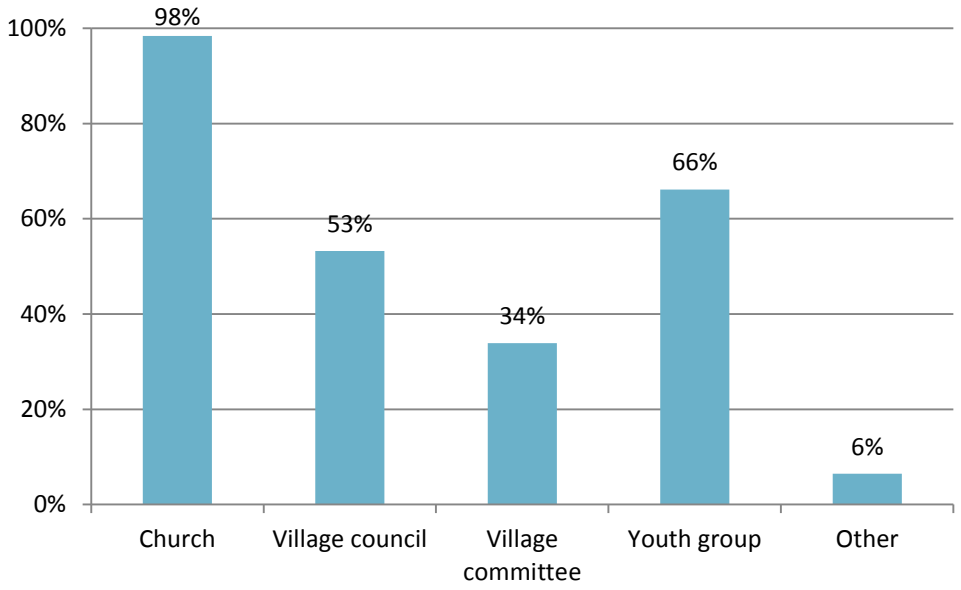

Figure 5-6. Household membership in community groups in Aunu'u.

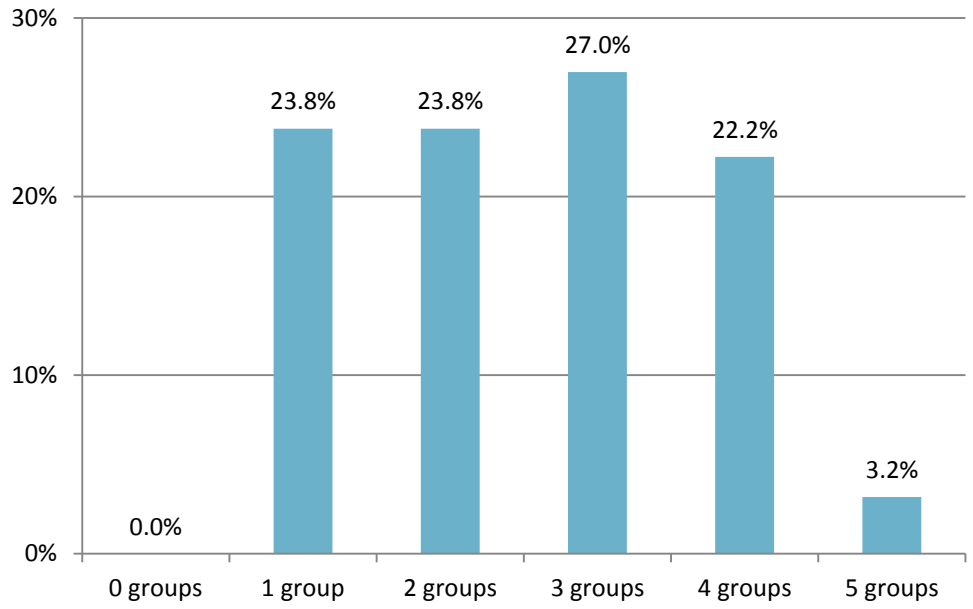

Figure 5-7. Number of community groups involved per household in Aunu'u.

5.3 Activities households depend on for food and/or income

Figure 5-8 presents the survey question about activities that households depend on for food and/or income in Aunu'u. Boat transport is highest ranked, with 89% of respondents considering this activity "very important". Farming and government jobs are also considered important activities, with 77% and 73%, respectively, of respondents considering this activity "very important". Cannery, pension, private business and tourism are all activities considered "not at all important" in Aunu'u.

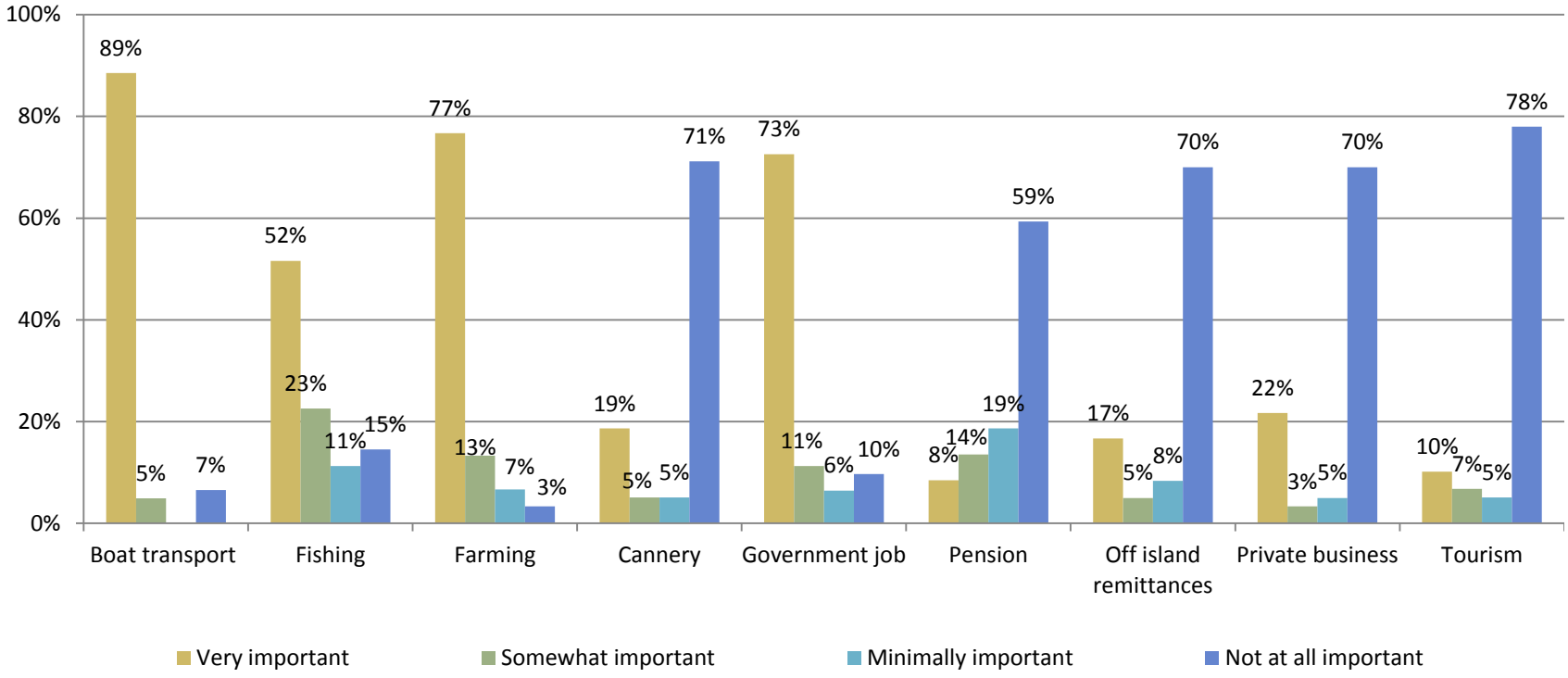

Figure 5-8. Activities households depends on for food and/or income in Aunu'u.

5.4 Fishing/harvesting frequency and patterns

Figures 5-9 through 5-, below, show the results from the survey questions about fishing frequency, methods of fishing and targeted resources. Figure 5-9 presents the number of people in household who fish/harvest marine resources. There is nearly an equal percent (approximately 20%) of households with none, one and two people in the household who fish /harvest marine resources. The average number in the household who fish/harvest in Aunu'u is two people. Figure 5-10 displays the primary reasons and frequency which members of the household fish/harvest marine resources (of those households who fish or harvest). Fishing and harvesting for food and for fun are common, with 64% and 66% of respondents, respectively, frequently fishing/harvesting for these reasons. However, giving the catch to pastors or villages leaders is even more common than fishing for food (74% vs 64%). Fishing/harvesting for income is very uncommon, with 71% of respondents never selling their catch.

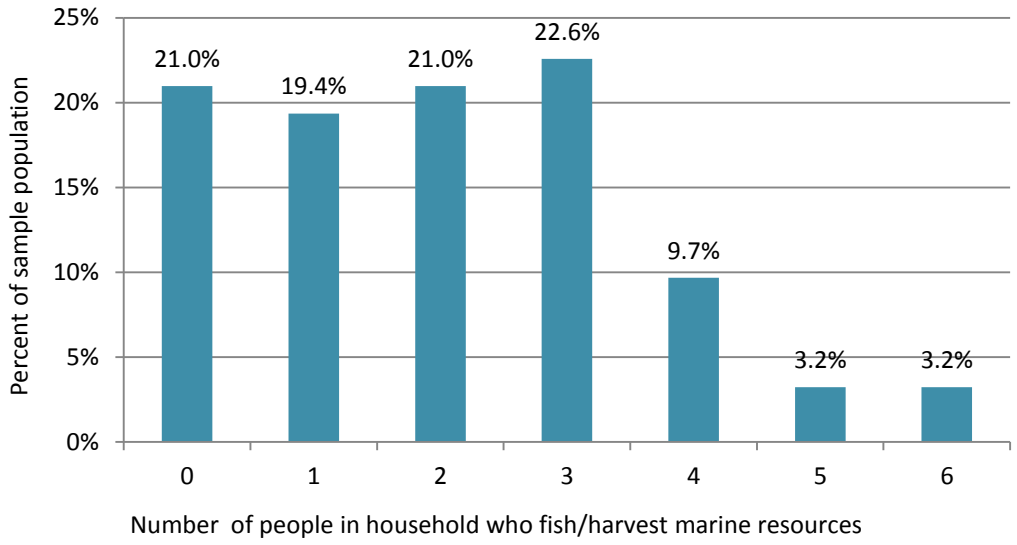

Figure 5-9. Number of people in Aunu'u households who fish/harvest

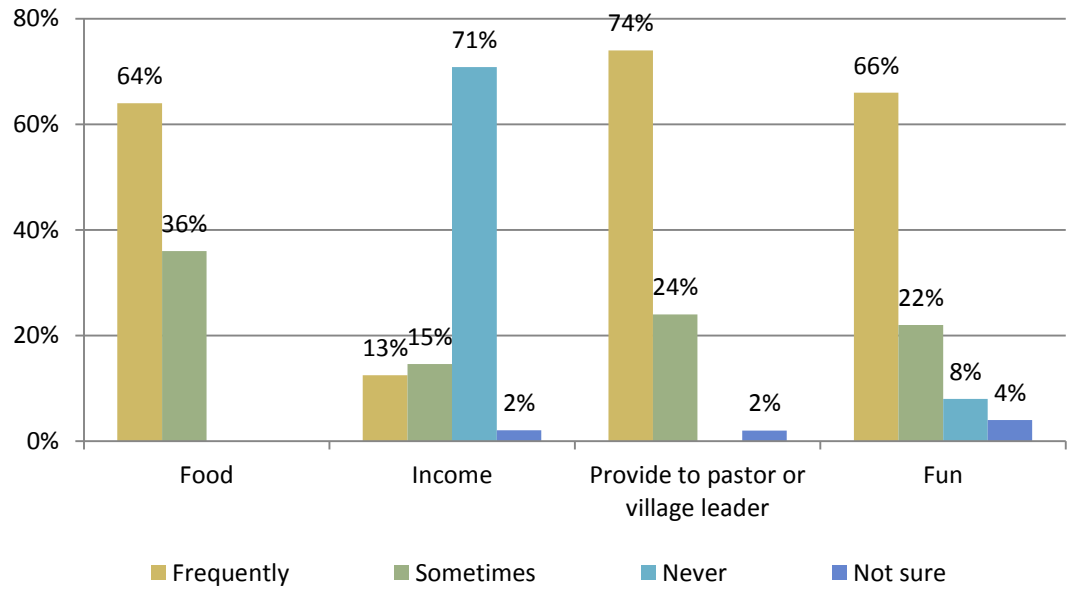

Figure 5-10. Primary reasons and frequency in households fishing/harvesting in Aunu'u.

Figure 5-11 shows the frequency of fishing/harvesting of those households who fish/harvest. 18% of households in Aunu'u fish/harvest marine resources more than once/week, 34% fish/harvest about once a week and 36% fish/harvest 1-3 times a month. Of the various fish/resources that are targeted, fish from the reef flat is targeted most frequently in Aunu'u (with 82% of respondents listing this as a targeted resource; Fig 5-12). Invertebrates are also commonly targeted, with 78% of respondents; pelagic fish are not commonly targeted, with 26% of respondents. Figure 5-13 shows the types of fishing methods used by members of Aunu'u household. Rod and reel/handline/pole and line from shore is the most common type of fishing method used, with 67% of respondents frequently fishing with these methods. Spearfishing and gleaning/gathering are also common, with 49% and 57% of respondents frequently using these methods. Traps, throw nets and trolling are uncommon methods used in Aunu'u,

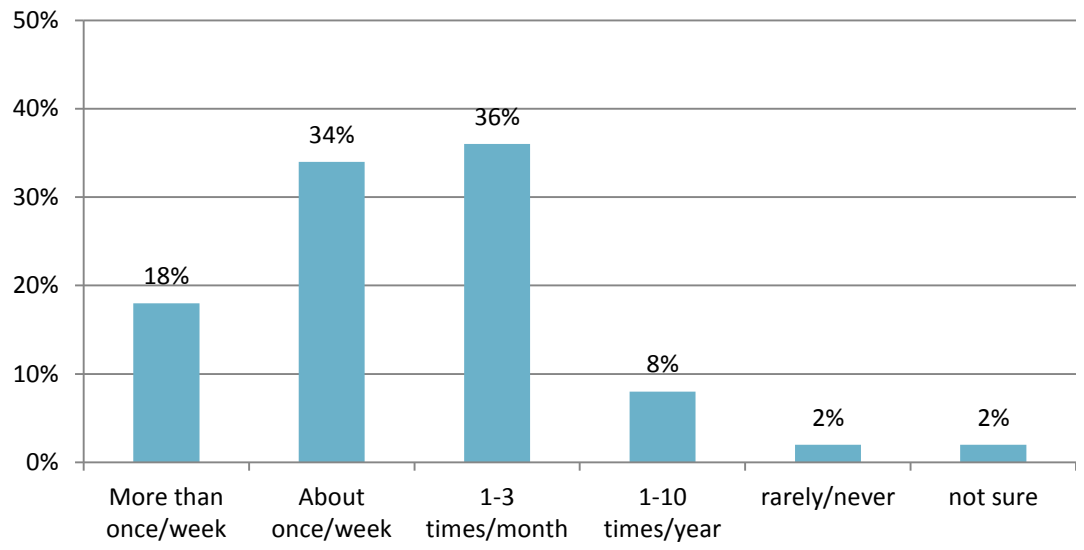

Figure 5-11. Frequency of fishing/harvesting marine resources in Aunu'u.

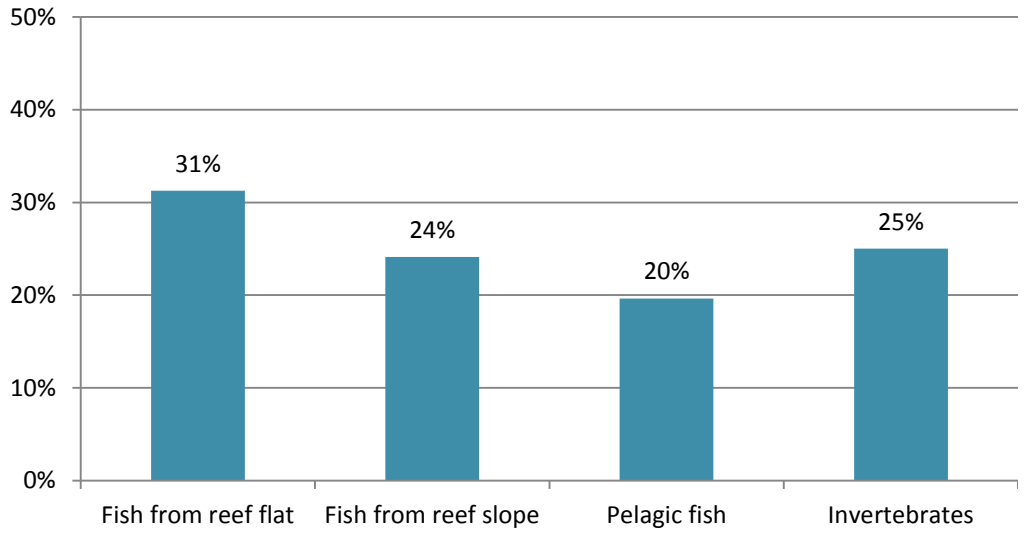

Figure 5-12. Types of fish/resources targeted in Aunu'u households.

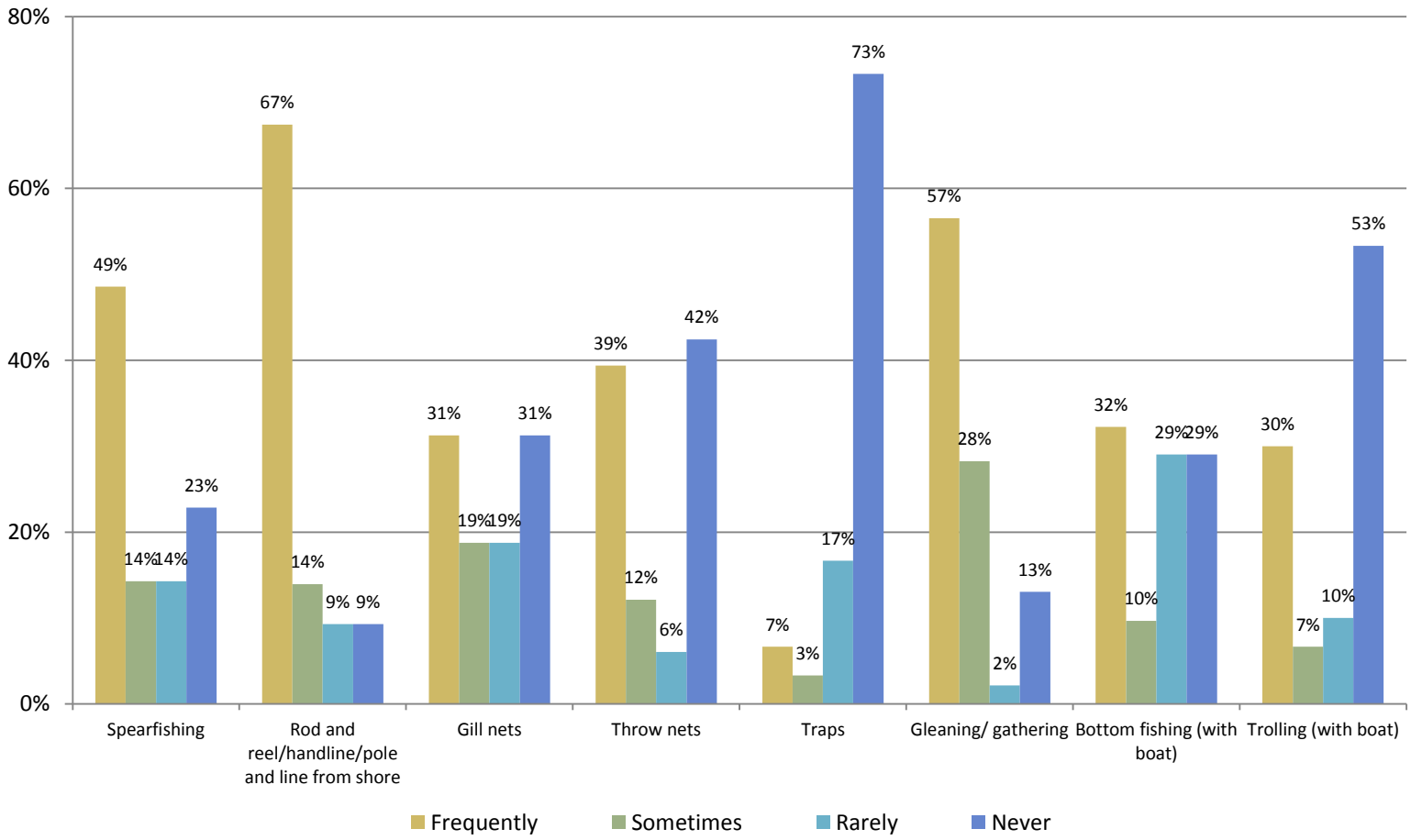

Figure 5-13. Types and frequency of fishing methods used in Aunu'u households.

Figures 5-14 and 5-15, below, show household fishing frequency and catch/harvest has changed over the past 10 years. 48% of respondents in Aunu'u fish less frequently over the past 10 years (Fig. 76). Figure 42 displays how the household total catch/harvest has changed over the past 10 years. In Aunu'u, 48% of households say they catch less.

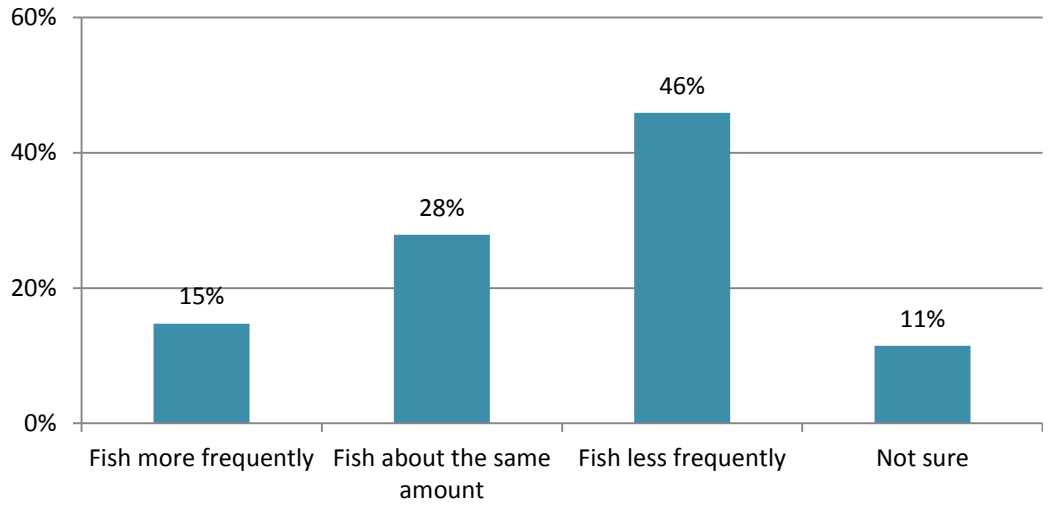

Figure 5-14. Frequency of fishing/harvesting over the past 10 years in Aunu'u.

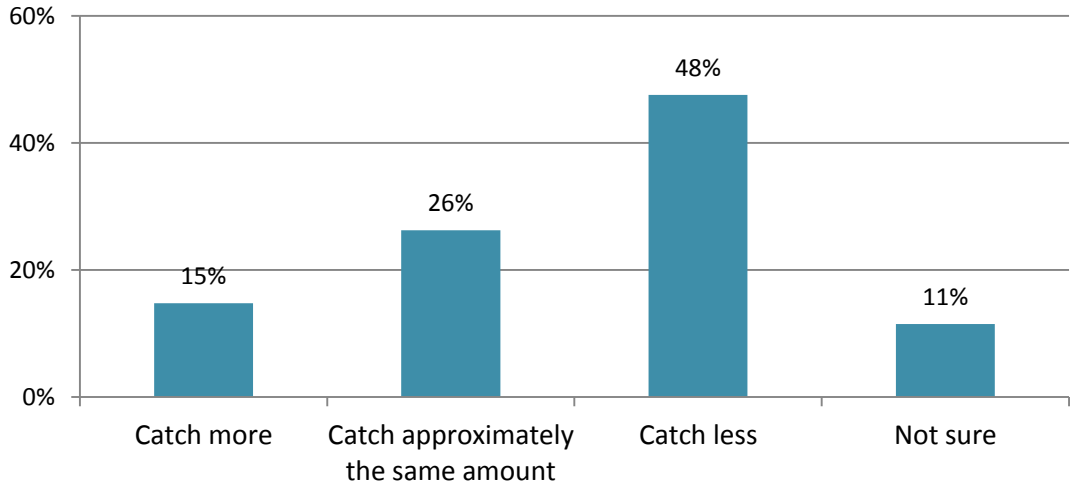

Figure 5-15. How Aunu'u household catch/harvest has changed over the past 10 years.

5.5 Frequency of seafood consumption

Figure 5-16 shows the frequency of household consumption of fresh or frozen fish/invertebrates from various sources. The question specifically distinguished between canned fish and fresh or frozen fish. Of the various locations where fresh or frozen fish/seafood can be obtained, caught in village waters and caught in American Samoa (outside village waters) are both common - 74% of survey respondents consume marine resources from village waters once a week or more, and 66% of survey respondents consume marine resources from American Samoa waters once a week or more. 53% of households in Aunu'u consume fresh or frozen marine resources from a store or restaurant once a week or more, while 19% of households rarely or never purchase fresh or frozen marine resources from this source. Marine resources from boats landing catch at the cannery are not common, with 29% of respondents rarely or never obtain resources from these sources.

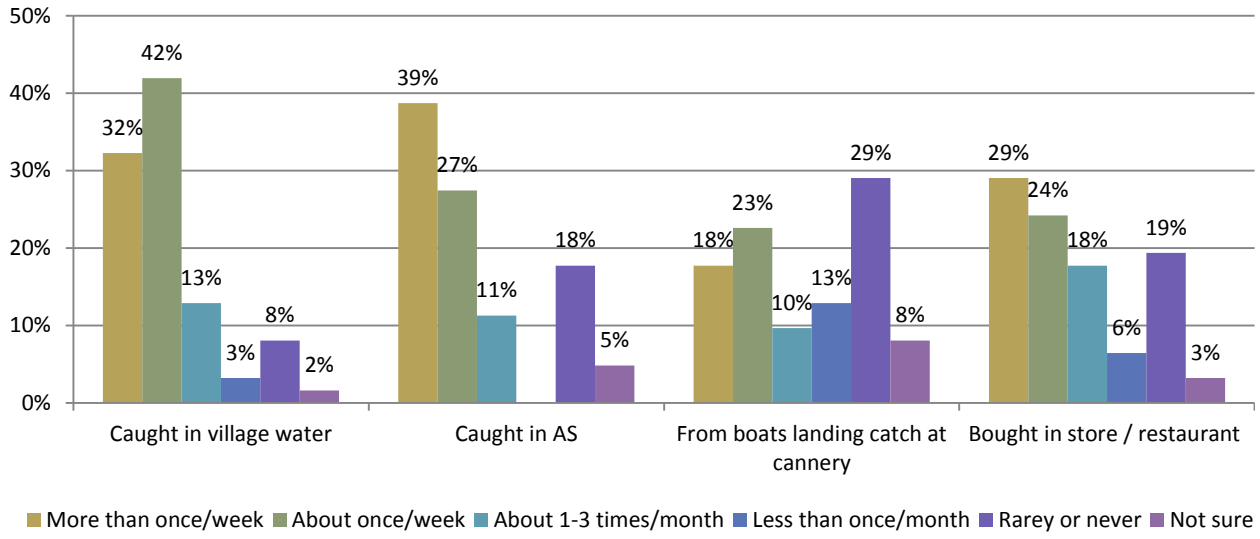

Figure 5-16. Frequency of eating fresh or frozen fish/invertebrates in Aunu'u

5.6 Perception of resource conditions

Figures 5-17 and 5-18 presents Aunu'u residents' opinions on how the marine resources and the environment are doing, from very good to very bad. Marine resources are generally perceived to be very good or good, with over half of the

respondents thinking fish on the reef, fish on the reef slope, pelagic fish and invertebrates are very good or good (78%, 80%, 83% and 83%, respectively; Fig. 5-17). No respondents think the condition of pelagic fish or invertebrates is very bad. Figure 5-18 shows residents' opinions on how the environment is doing. Aunu'u residents think ocean water quality is doing very good or good (80%). Stream water quality[3] is perceived to be very good or good by 47% of Aunu'u residents, with 20% thinking neither good nor bad. Over half of residents think the condition of the coral habitat and beach quality is very good or good (72% and 68%, respectively). No respondents think the condition of beach quality is very bad.

One survey question asked respondents to list factors that have contributed to changes in the condition of ocean and fresh water resources. Aunu'u respondents stated concerns about trash accumulation and great concern about sea level rise and salt in the water table.

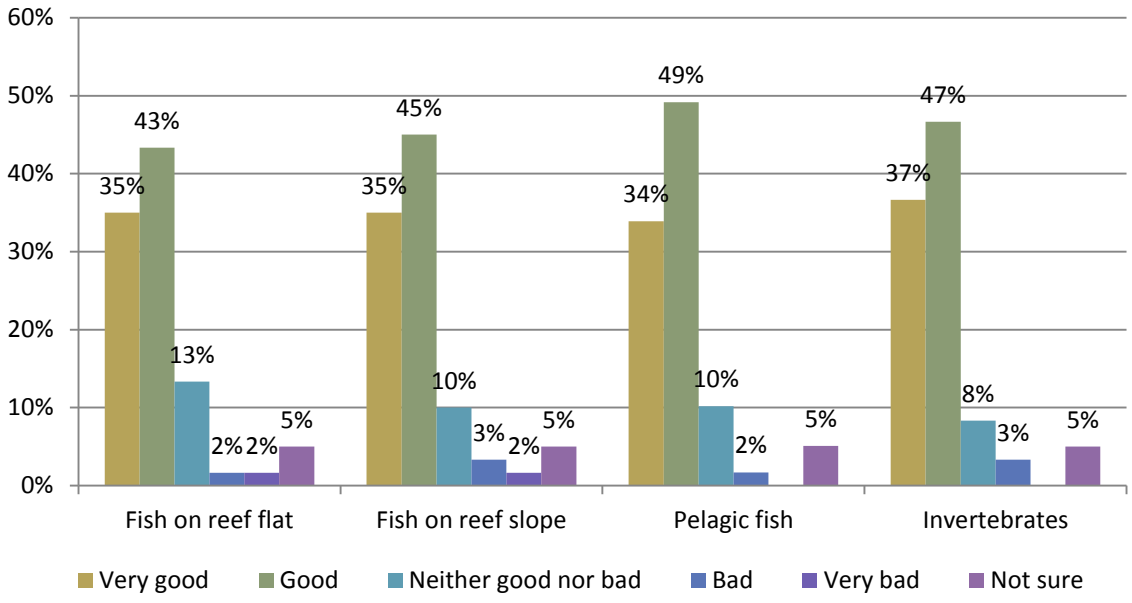

Figure 5-17. Aunu'u residents' opinions on the conditions of marine resources.

[3] This question may have been misunderstood by respondents, as there are no streams in Aunu'u.

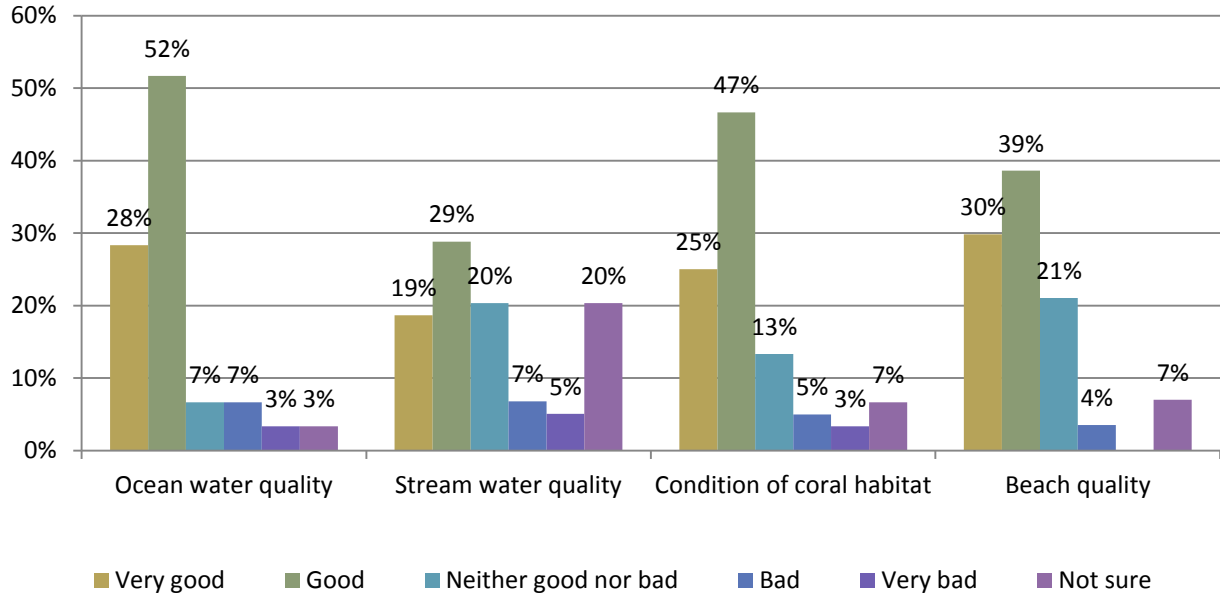

Figure 5-18. Aunu'u residents' opinions on the conditions of the environment.

5.7 Pollution and trash

Figures 5-19 through 5-22 present the results from the survey questions about pollution and trash. Over half of Aunu'u respondents (65%) think trash and pollution in the village is a significant problem. Other issues considered to be a significant or moderate problem in Aunu'u: decreasing number of fish in the ocean (62%), and pollution in the ocean (73%; Fig. 5-19). Figure 5-20 presents the residents of Aunu'u familiarity with systems in the village to reduce trash accumulation. Almost half (44%) of the respondents think there is no system in place in Aunu'u to reduce trash accumulation, while 37% think yes and 19% are not sure. Of those who think there is a system in place to reduce trash accumulation, programs by the mayor and village council, as well as youth group clean-up efforts and church efforts were cited. Additionally, 50% of those who think there is a system in place participate in the activities to reduce trash in Aunu'u (Fig. 5-21).

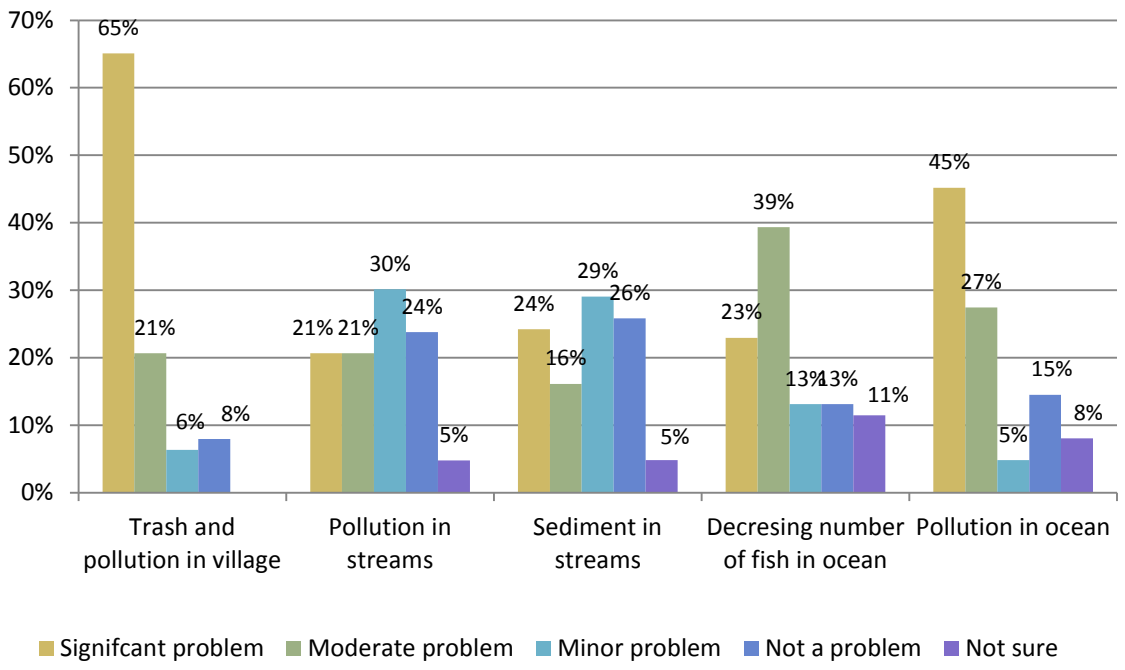

Figure 5-19. Aunu'u residents' opinions on pollution and trash issues.

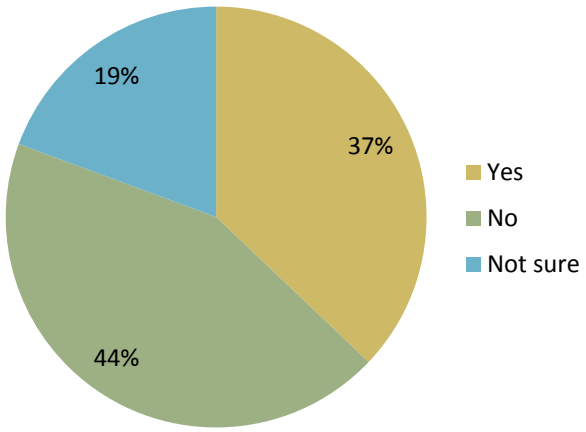

Figure 5-20. Residents' familiarity with systems to reduce trash accumulation.

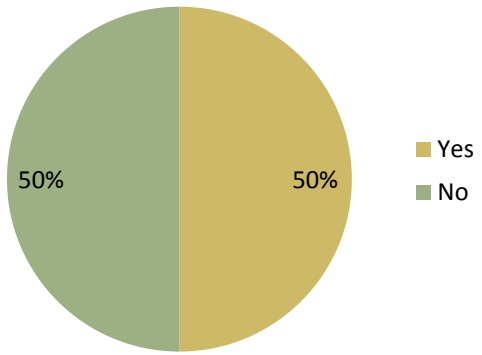

Figure 5-21. Aunu'u resident participation in activities to reduce trash in village.

Figure 5-22 presents the respondents opinion regarding the primary sources of trash in Aunu'u. The following sources are considered a significant or moderate source: local village members (89%), marine debris from the ocean (79%), and lack of cans/dumpsters for waste (74%). Visitors to the village is not considered much of a source of trash, with 23% thinking it a minor source, and 37% thinking it not a source.

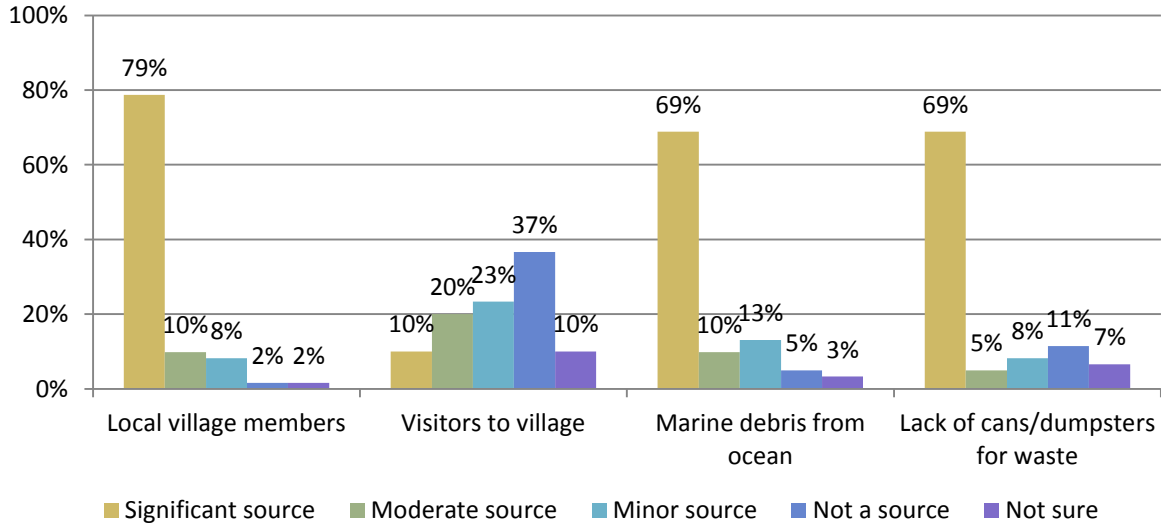

Figure 5-22. Aunu'u resident participation in activities to reduce trash in village.

5.8 Attitudes towards marine resource management strategies

Figures 5-23 and 5-24 present the results from the surveys pertaining to resident attitudes towards marine resource management strategies and enforcement. Figure 5-23 presents resident familiarity with systems in place to protect marine resources in Aunu'u. More Aunu'u residents think there is no system in place to protect marine resources (40%) than those who think there is a system (35%). Of those who think yes, residents mentioned the National Marine Sanctuary (19%) and church and youth efforts (6%) as systems in place to protect village marine resources.

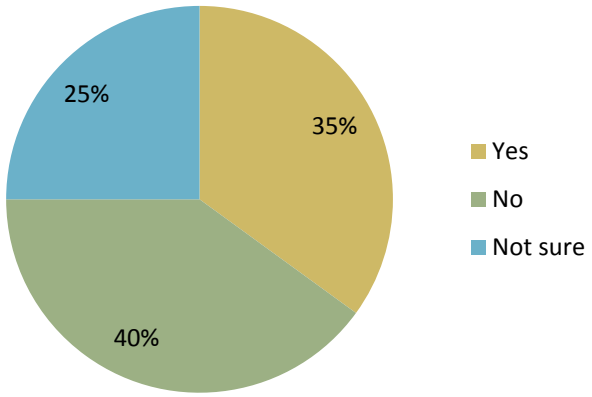

Figure 5-23. Resident's response to whether there is a system in place to protect marine resources in Aunu'u.

Figure5-246 presents the results from survey questions about resident level of support with types of actions to protect village marine resources. Aunu'u residents are strongly supportive of actions to protect marine resources, with strong support for closed areas for 1-2 years (65%), seasonal restrictions (68%), gear restrictions (65%), size or catch limits (81%), limits on vulnerable or overfished marine resources (81%), and restrictions on non-villagers (78%). Level of support for closed areas decrease with the length of time the area is closed. The majority of respondents (63%) do not support no restrictions..

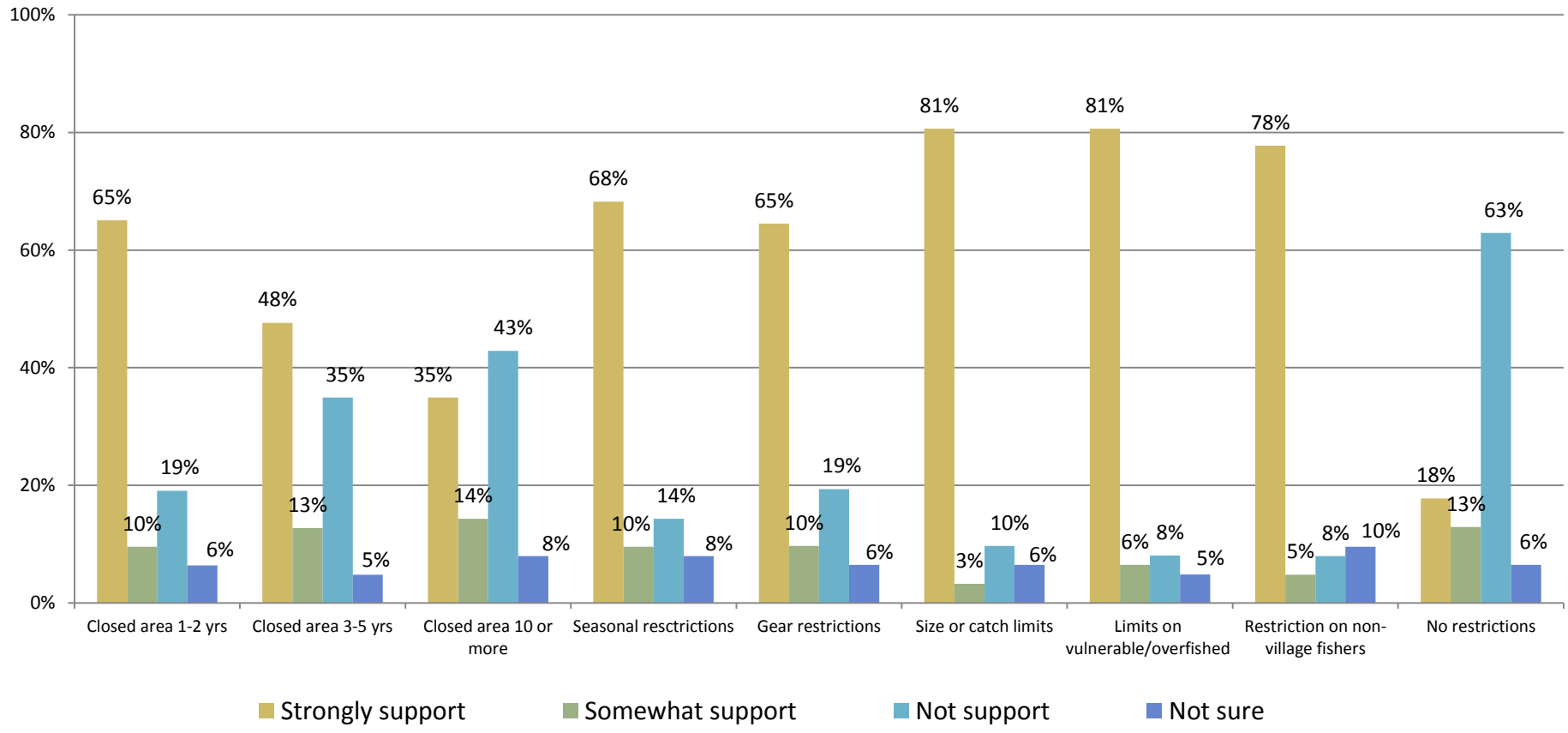

Figure 5-24. Resident level of support with types of actions to protect marine resources in Aunu'u

5.9 Access to resources

Figure 5-25 presents the results from the survey question about household access to various resources in Aunu'u. Just over half (57% and 56%, respectively) of Aunu'u households have access to clean drinking water and back up drinking water. Well over half Aunu'u residents have access to cell phone (84%) and TV (87%). Few residents of Aunu'u have access to the following resources: back up electricity (17%), computer (14%), home internet (11%), and cable (2%). Car and air conditioning are more common, with 48% and 31%, respectively.

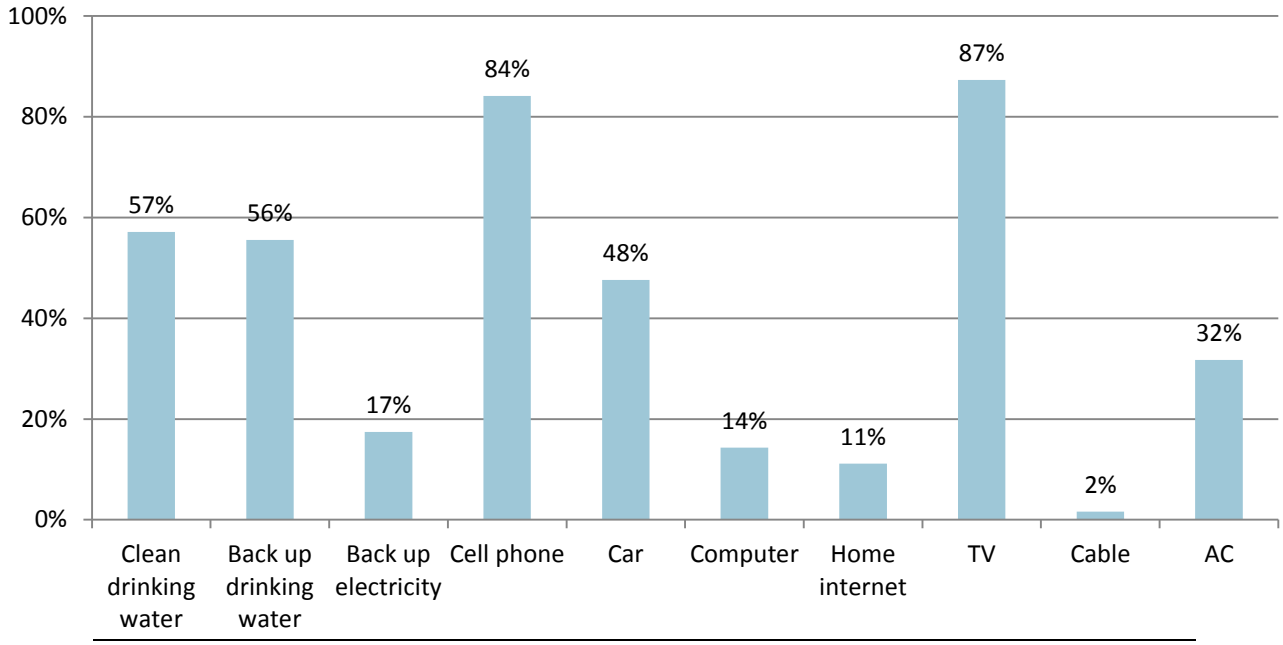

Figure 5-25. Access to resources in Aunu'u

5.10 Supplemental analyses

Income level with reliance on different sources of income

Figures 5-26 through 5-–34 present the results of income level analyzed across reliance on different sources of income in Aunu'u. Boat transportation and fishing are both very important for all residents of Aunu'u, across all annual income levels. Farming and government jobs are also very important for food and/or income across all annual income levels.

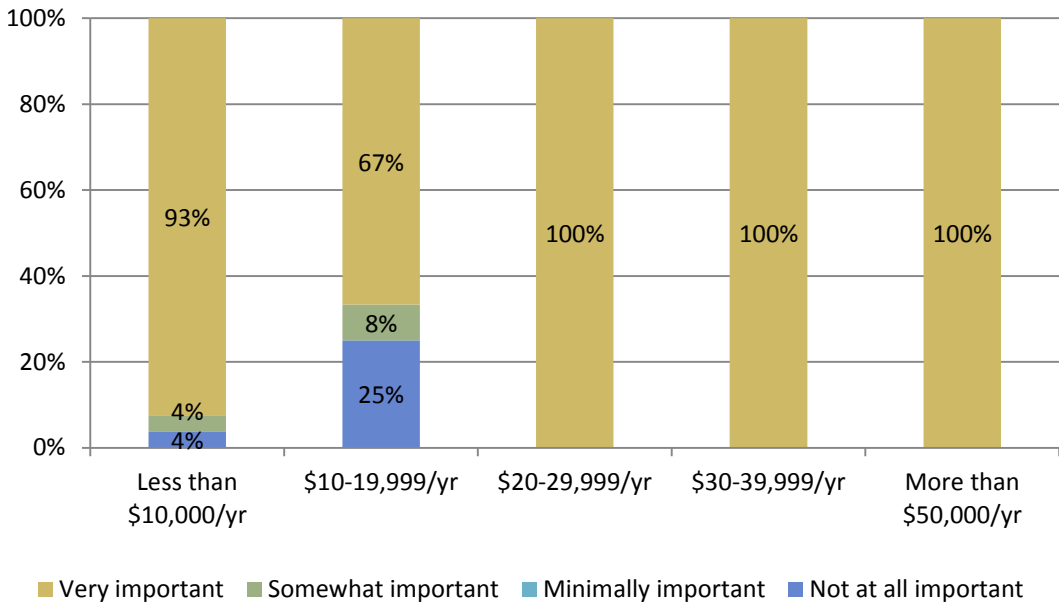

Figure 5-26. Income level and importance of boat transportation in Aunu'u.

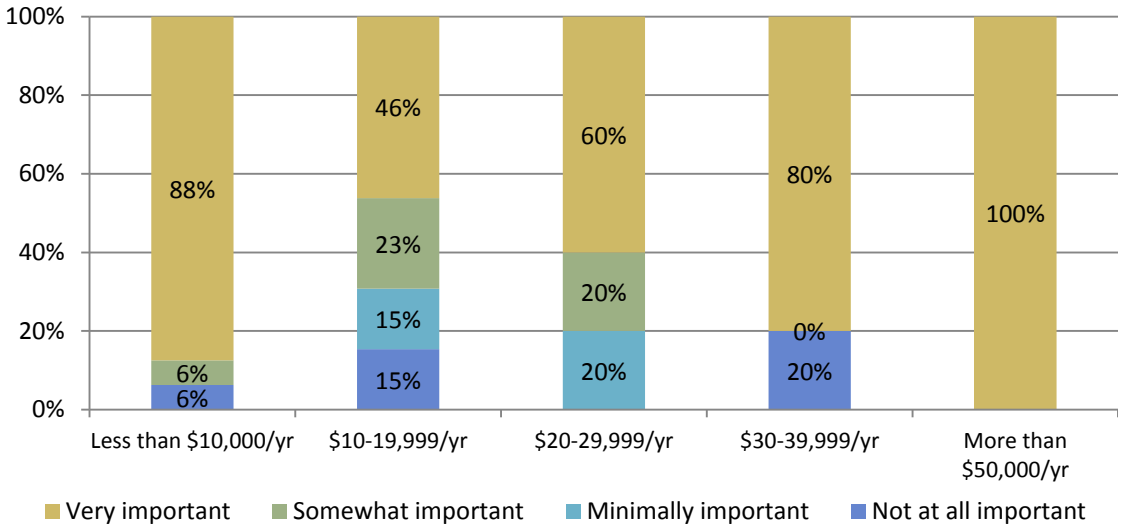

Figure 5-27. Income level and importance of fishing for food and/or income in Aunu'u.

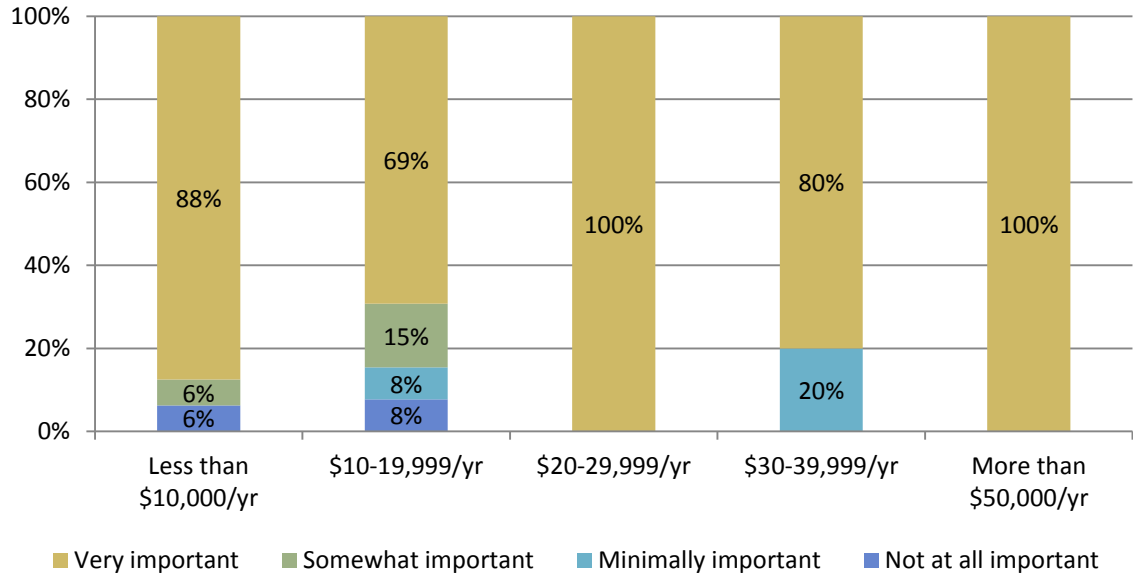

Figure 5-28. Income level and importance of farming for food and/or income in Aunu'u.

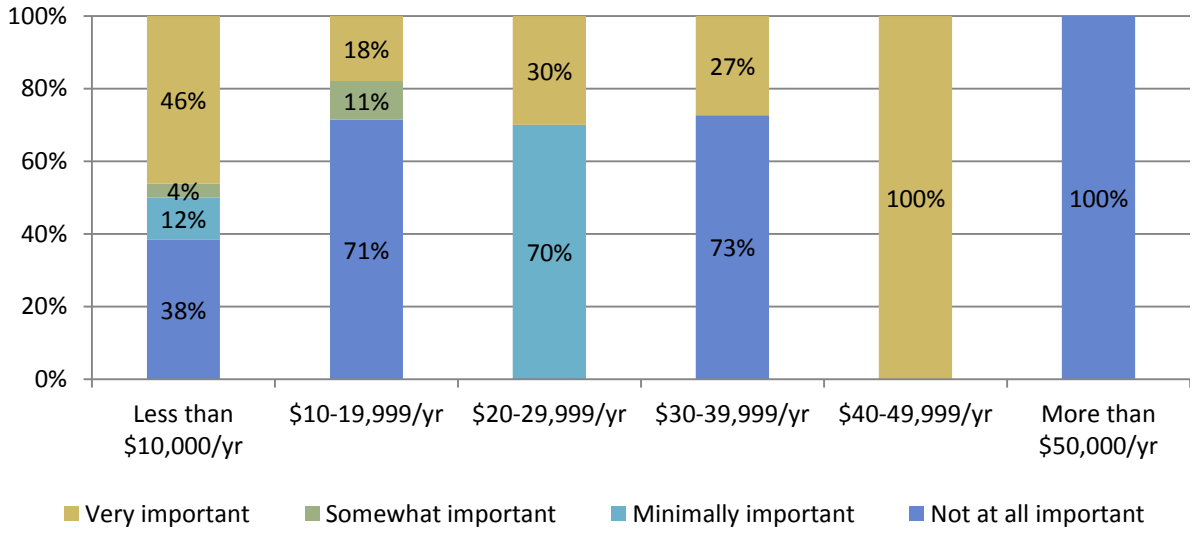

Figure 5-29. Income level and importance of the cannery for food and/or income in Aunu'u.

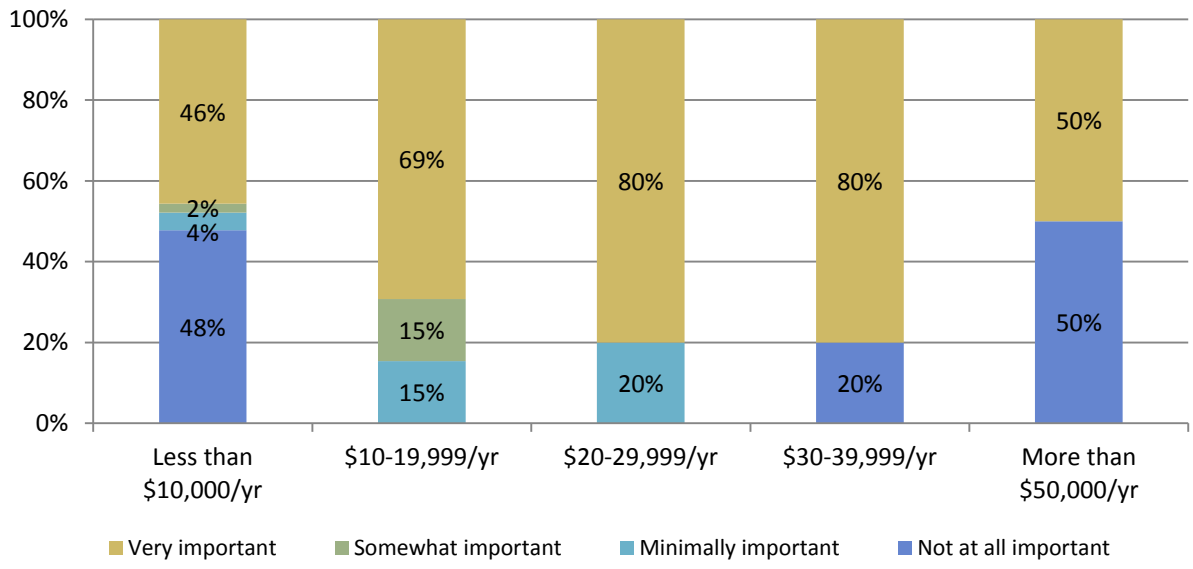

Figure 5-30. Income level and importance of government jobs for food and/or income in Aunu'u.

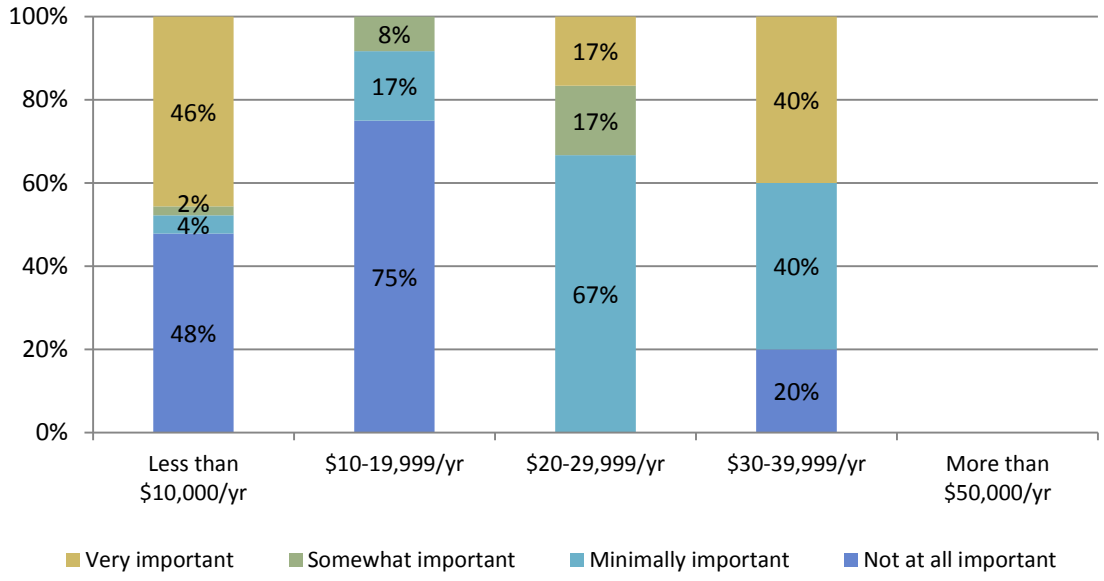

Figure 5-31. Income level and importance of pension (military or other) for food and/or income in Aunu'u.

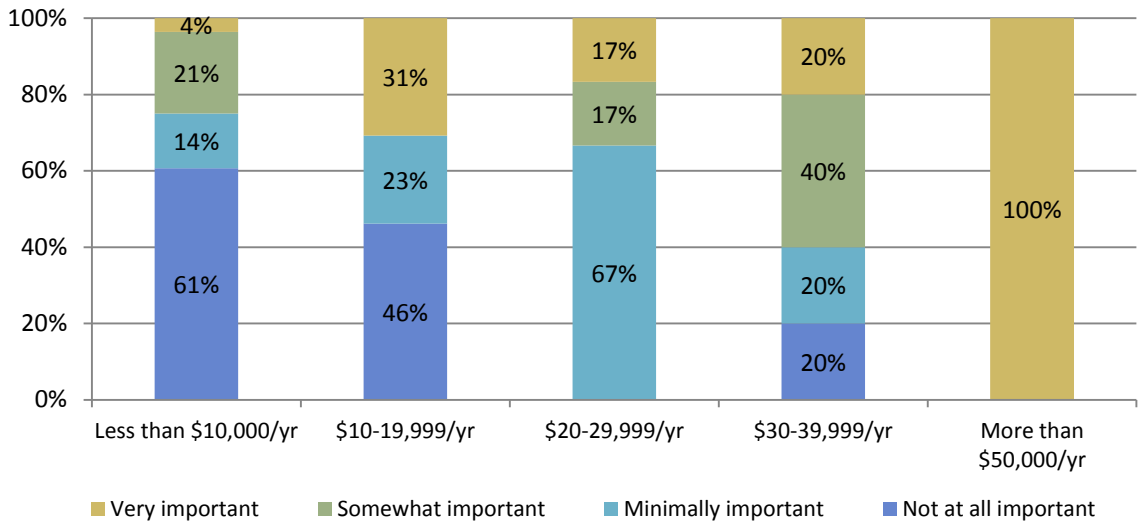

Figure 5-32. Income level and importance of off-island remittance for food and/or income in Aunu'u.

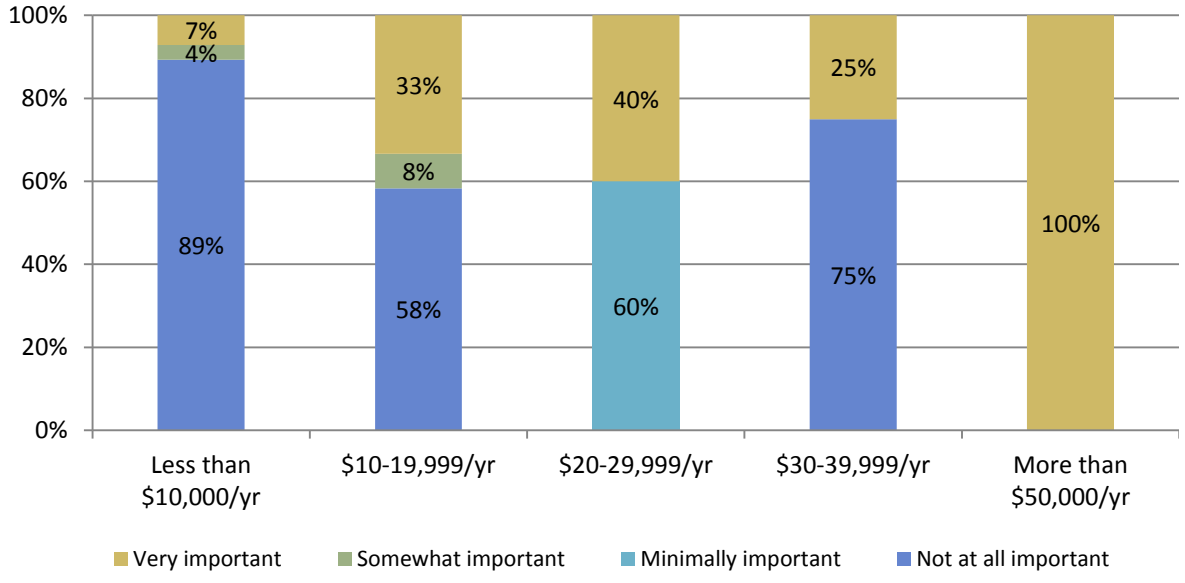

Figure 5-33. Income level and importance of private business for food and/or income in Aunu'u.

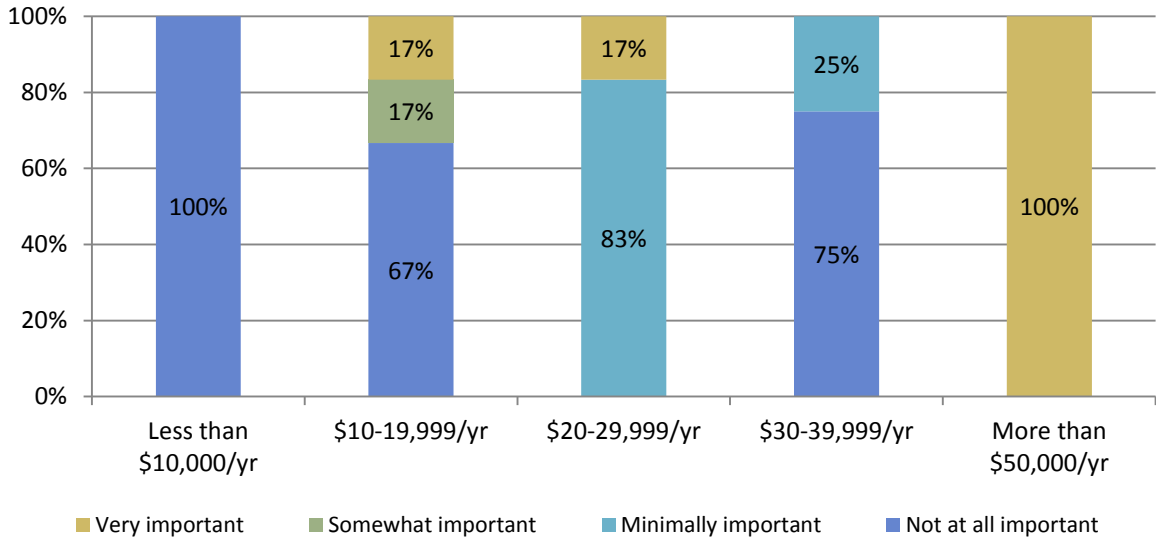

Figure 5-34. Income level and importance of tourism for food and/or income in Aunu'u.

Income with fishing frequency

Figure 5-35, below presents the results of annual income level with fishing frequency in Aunu'u. Across all annual income levels less than $10,000/year, $10-19,999/year, $20-29,999/year and $30-39,999/year, more than half of the respondents fish once/week or more.

Fishing frequency with reliance on fishing

Figure 5-36 presents the results of fishing frequency with the level of reliance on fishing for food and/or income in Aunu'u. Most of respondents who fish more than once/week, about once/week and 1-3 times a month also have a very important reliance on fishing for food and/or income (78%, 53%, and 72%, respectively).

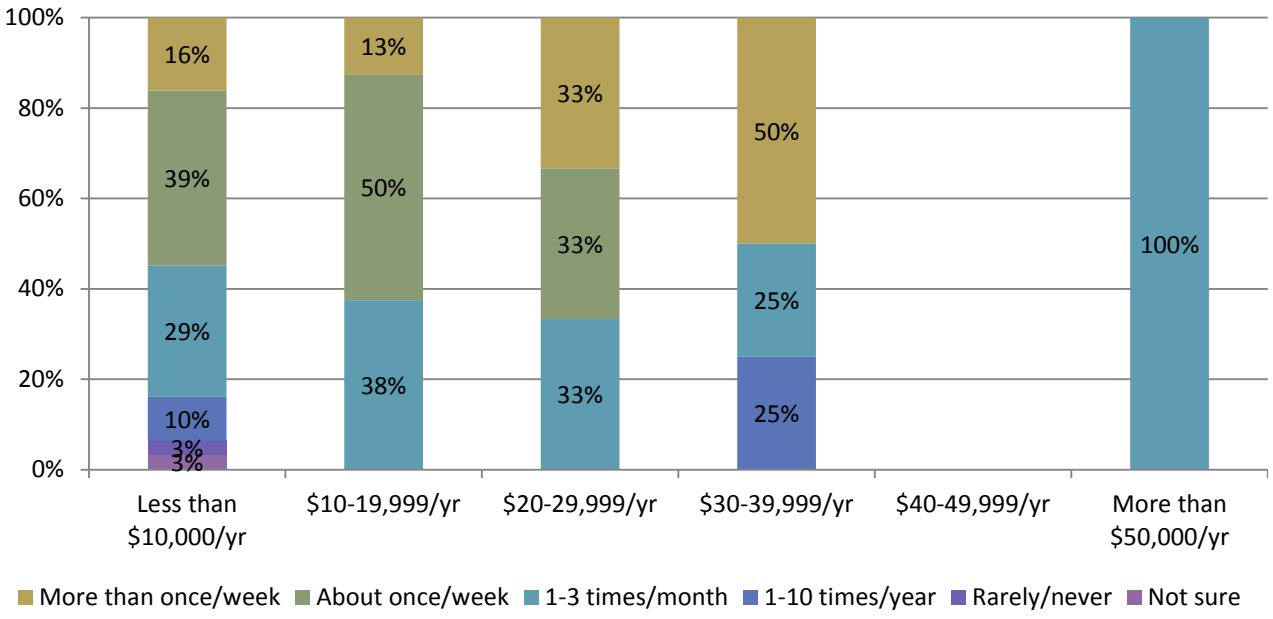

Figure 5-35. Fishing frequency by annual income level in Aunu'u.

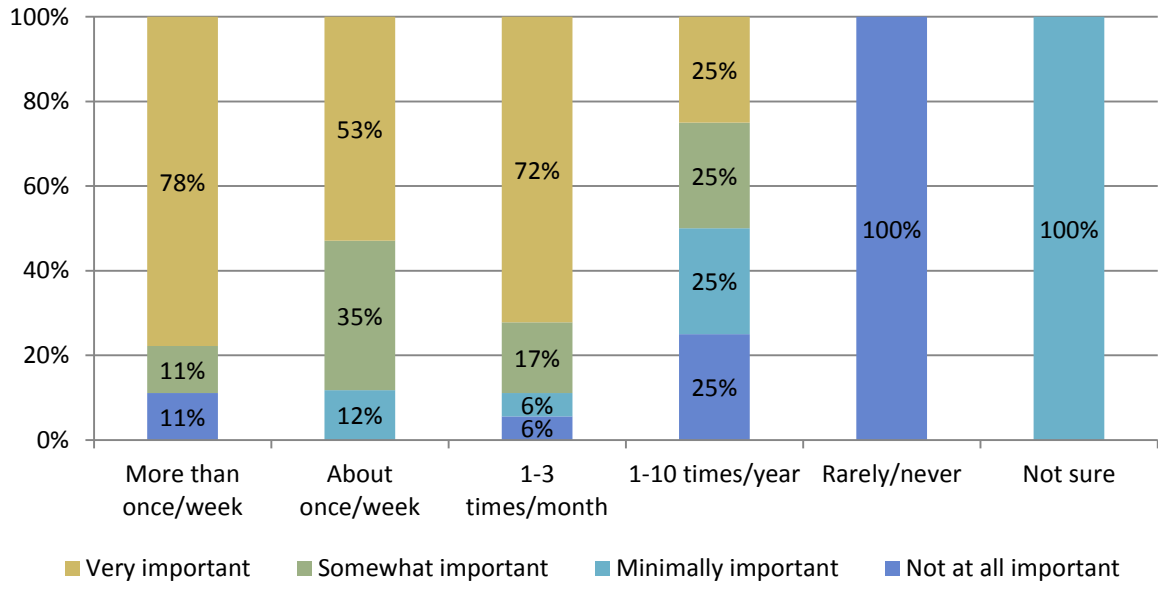

Figure 5-36. Fishing frequency with reliance on fishing for income/food in Aunu'u.

Fishing frequency with support for marine management strategies

Figures 5-37 through 5- present the results of fishing frequency with the level of support for various management strategies to protect marine resources. Across all levels of fishing frequency, except more than once a week, there is strong support for areas closed to fishing for 1-2 years (Fig. 5-37). For fishers who fish more than once a week, there is an equal number (44%) who strongly support and who do not support closed areas for any length of time (1 to more than 10 years in length; Figs. 5-37 through 5-39). In general, as the length of time for fishing closures increases, level of support among all fishers/gathers decreases. Figure 5-40 presents fishing frequency with the level of support to seasonal restrictions. Aunu'u fishers who fish/gather 1-3 times/month or more strongly support seasonal restrictions. Figure 5-41 presents fishing frequency with level of support to gear restrictions; similar to seasonal restrictions. Across all levels of fishing frequency, size or catch limits are strongly supported (Fig. 5-42)..

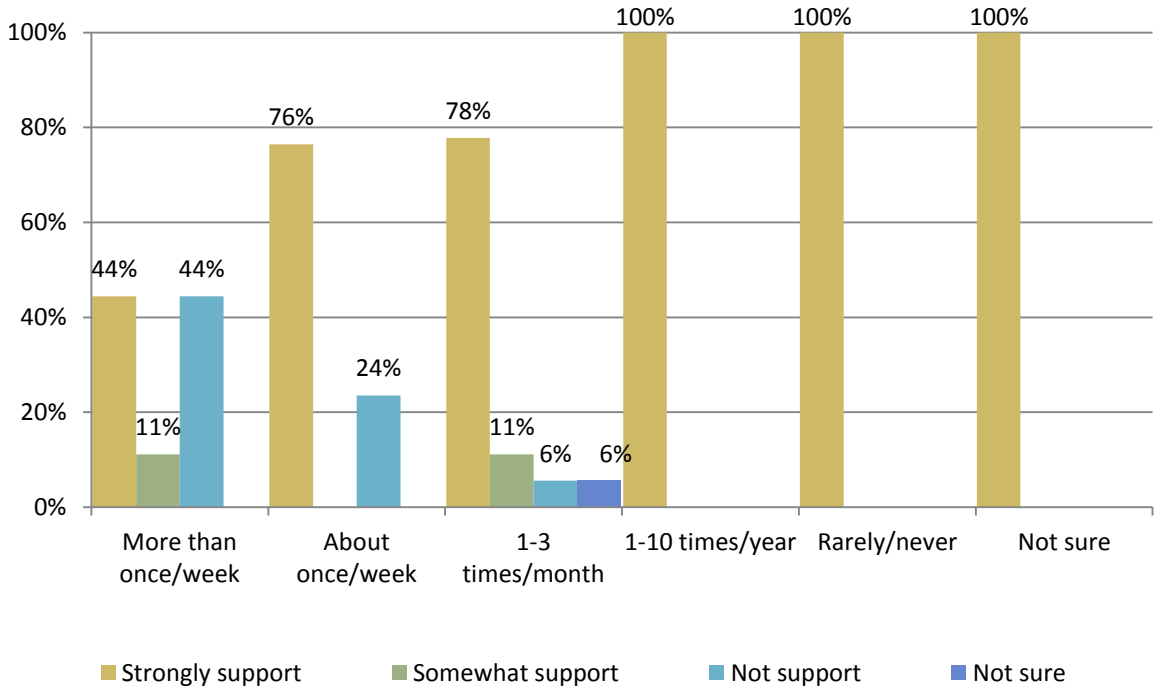

Figure 5-37. Fishing frequency with level of support to closed areas for 1-2 years.

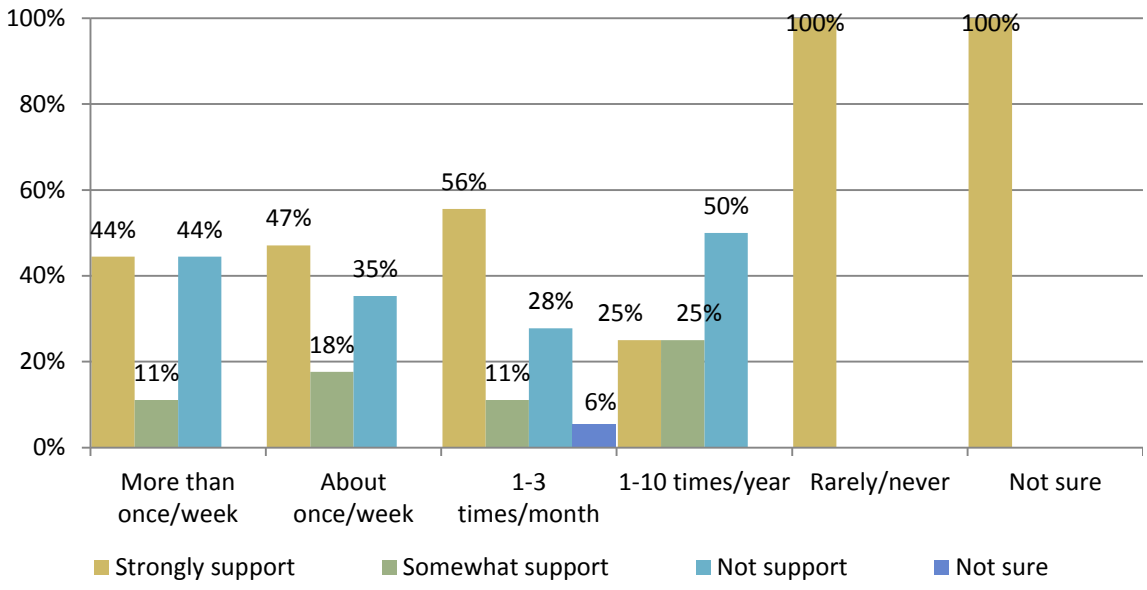

Figure 5-38. Fishing frequency with level of support to closed areas for 3-5 years.

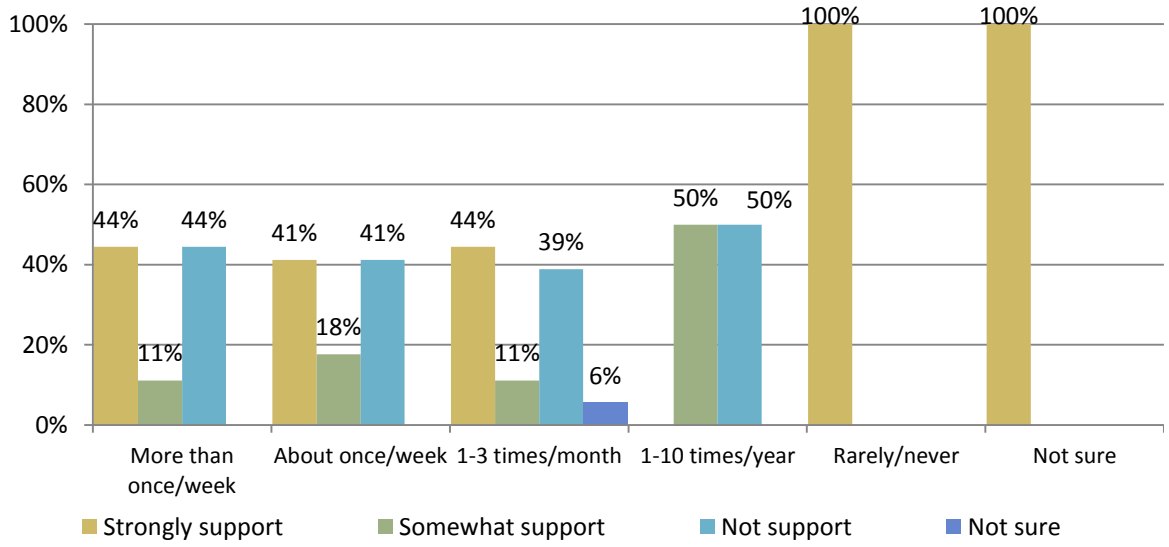

Figure 5-39. Fishing frequency with level of support to closed areas for more than 10 years.

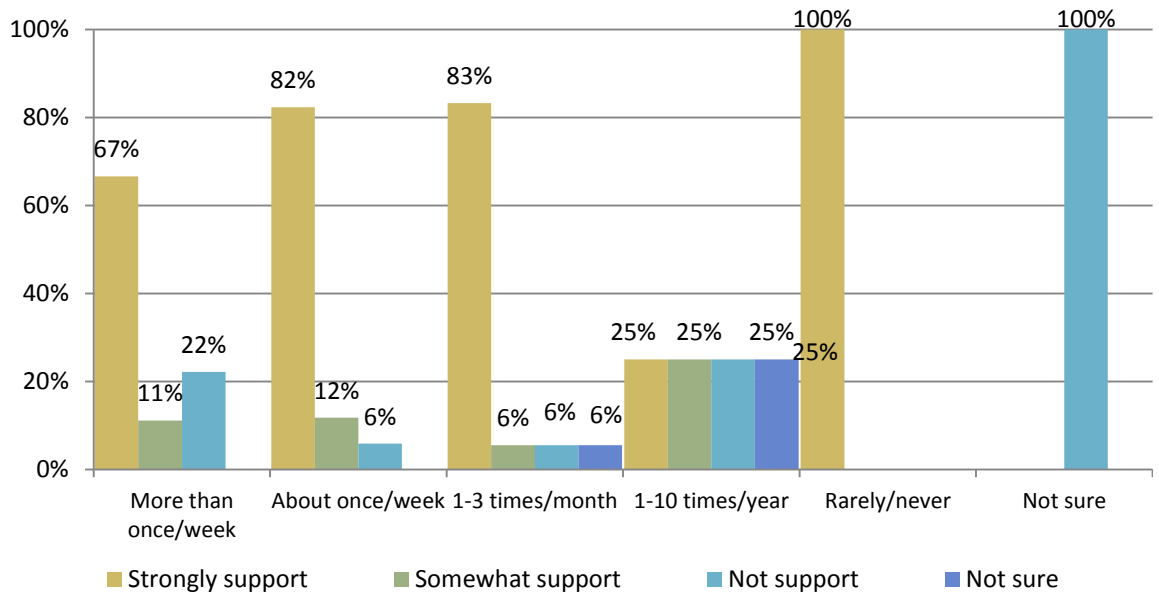

Figure 5-40. Fishing frequency with level of support to seasonal closures.

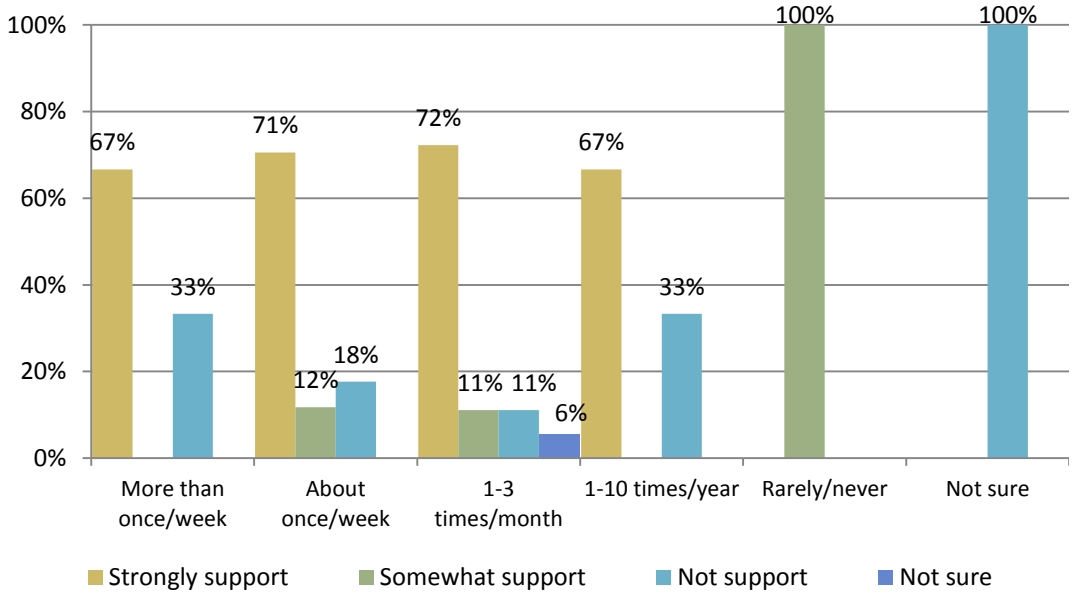

Figure 5-41. Fishing frequency with level of support to gear restrictions.

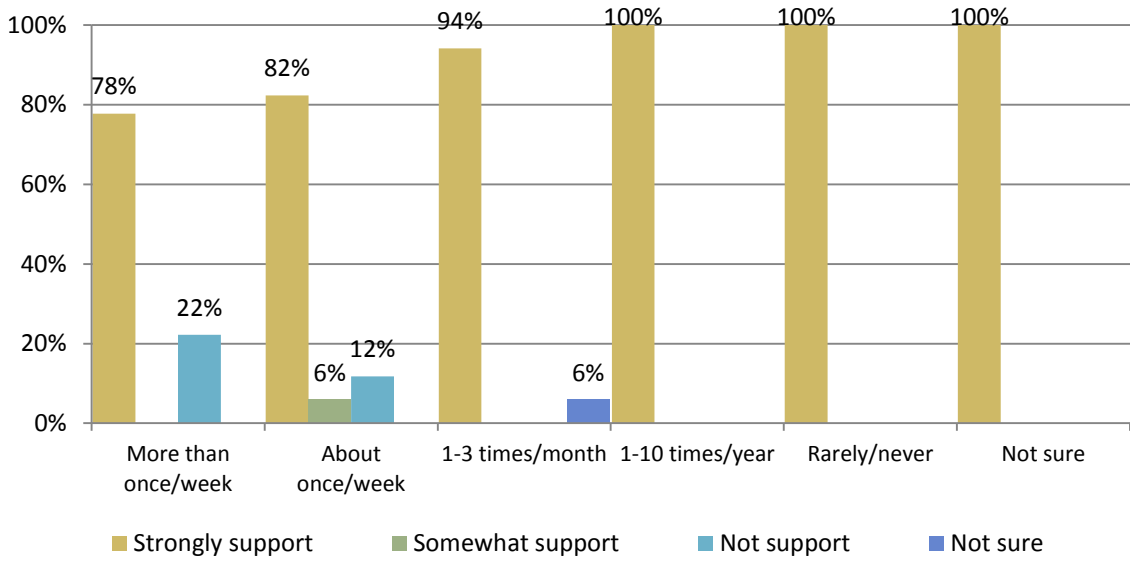

Figure 5-42. Fishing frequency with level of support to size or catch limits.

Figure 5-43, below, presents fishing frequency with level of support to limits on fishing certain vulnerable species that are overfished or whose numbers are very low. This management strategy is strongly supported by 78% of fishers who fish more than once/week, 88% of fishers who fish about once/week, 82% of fishers who fish 1-3 times/month, and 100% of fishers who fish 1-10 times/year. Figure 5-44 presents fishing frequency with the level of support for restrictions on non-village fishers. The majority of all fishers strongly support restrictions on non-village fishers. No restrictions is not supported by the majority of all fishers (Fig. 5-45).

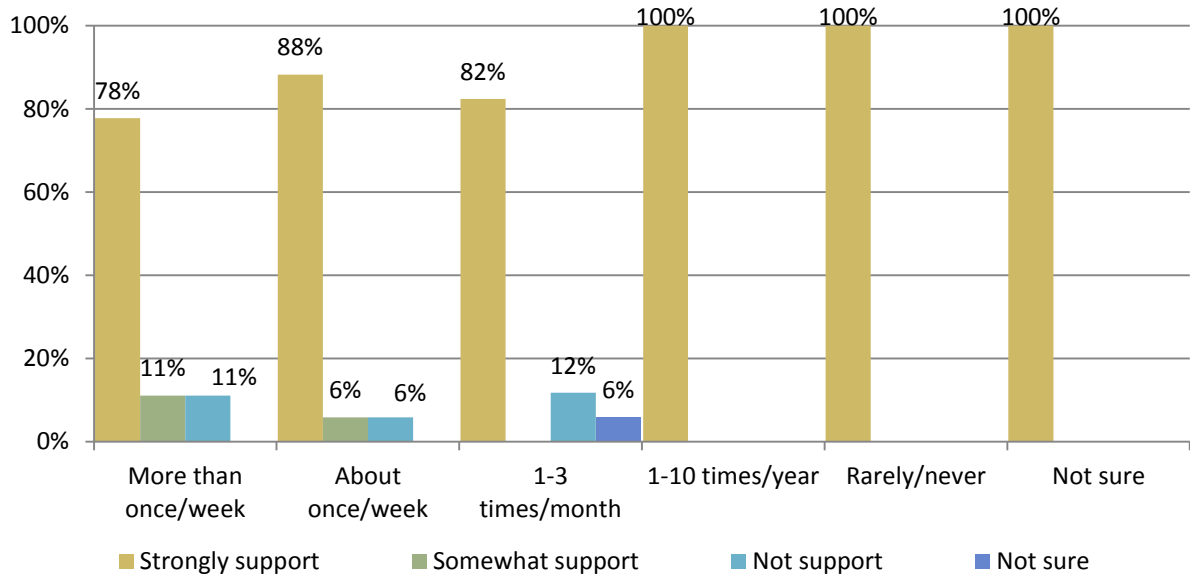

Figure 5-43. Fishing frequency with level of support to limits on fishing certain vulnerable species that are overfished or whose numbers are very low. .

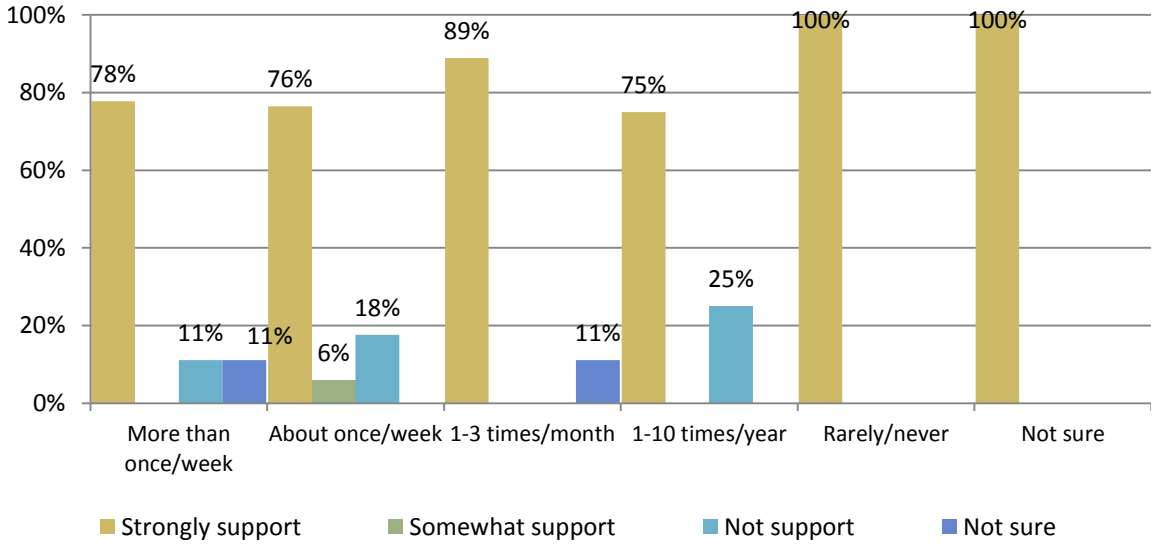

Figure 5-44. Fishing frequency with level of support to restrictions on non-village fishers.

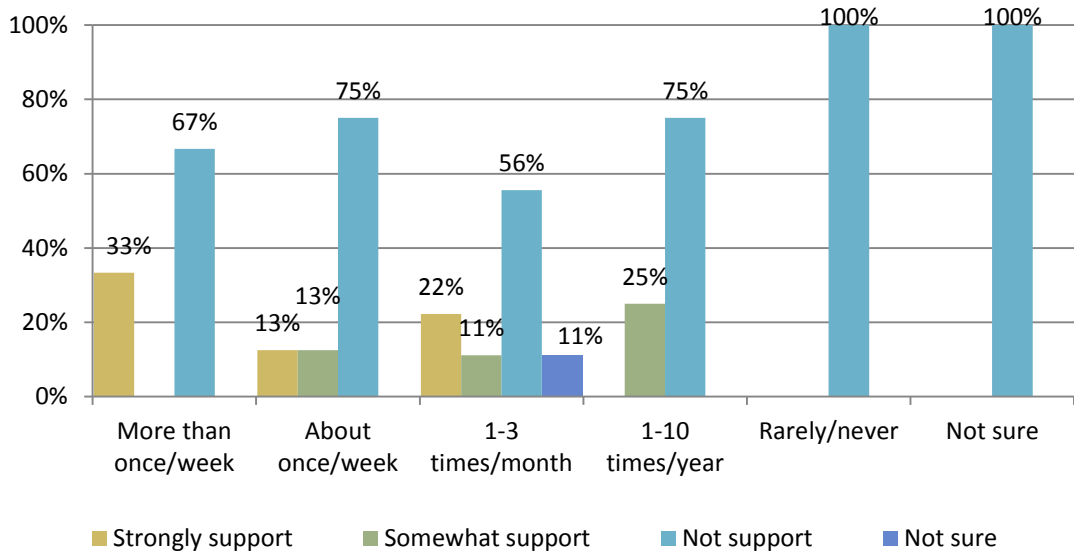

Figure 5-45. Fishing frequency with level of support to no restrictions.

Reliance on fishing for income with support for management strategies to protect marine resources

Figures 5-46 through 5-54 present the results from the questions on level of reliance on fishing for income (very important to not at all) with level of support for restrictions (strongly to not sure). Across all levels of importance of reliance on fishing for income, closed areas for 1-2 years is strongly supported by the majority of respondents (Fig. 5-46), and as the length of time for closures increases, level of support decreases. Respondents who have a very important or somewhat important reliance on fishing for income generally have strong support for management strategies to protect marine resources, with only two management strategies: closed areas for 10 or more years and no restrictions not supported by the majority of these respondents. Seasonal closures are supported by the majority of respondents who have a very important, somewhat important and minimally important reliance on fishing for income (Fig. 5-49). Gear restrictions, size or catch limits, limits on vulnerable or overfished species, and restrictions on non-village members are strongly supported by all levels of importance of reliance on fishing for income. No restrictions is not supported by all levels of importance of reliance on fishing for income (Fig. 5-54).

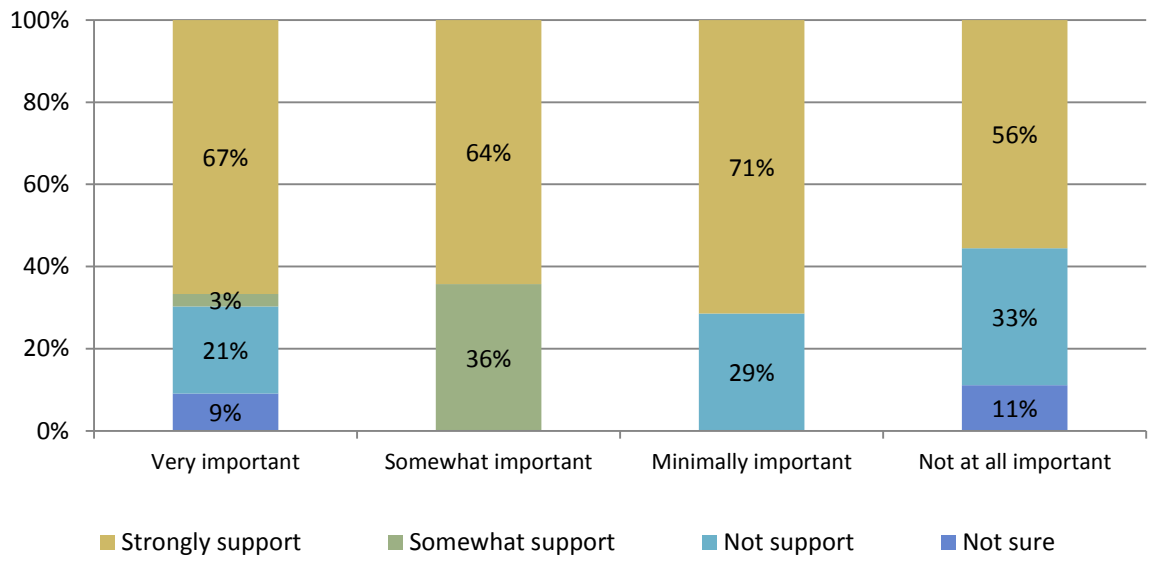

Figure 5-46. Reliance on fishing for income and level of support for closed areas 1-2 years.

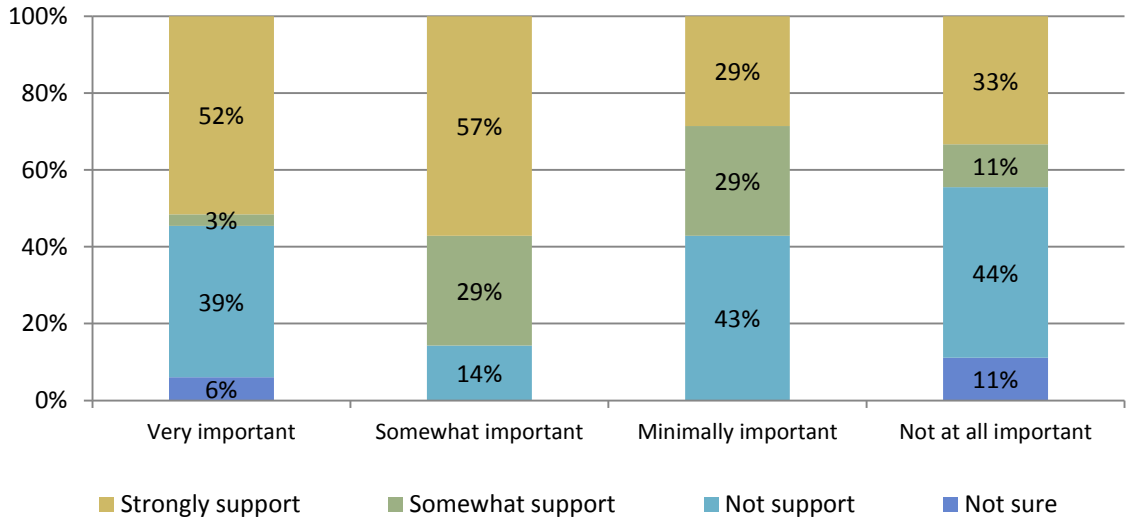

Figure 5-47. Reliance on fishing for income and level of support for closed areas 3-5 years.

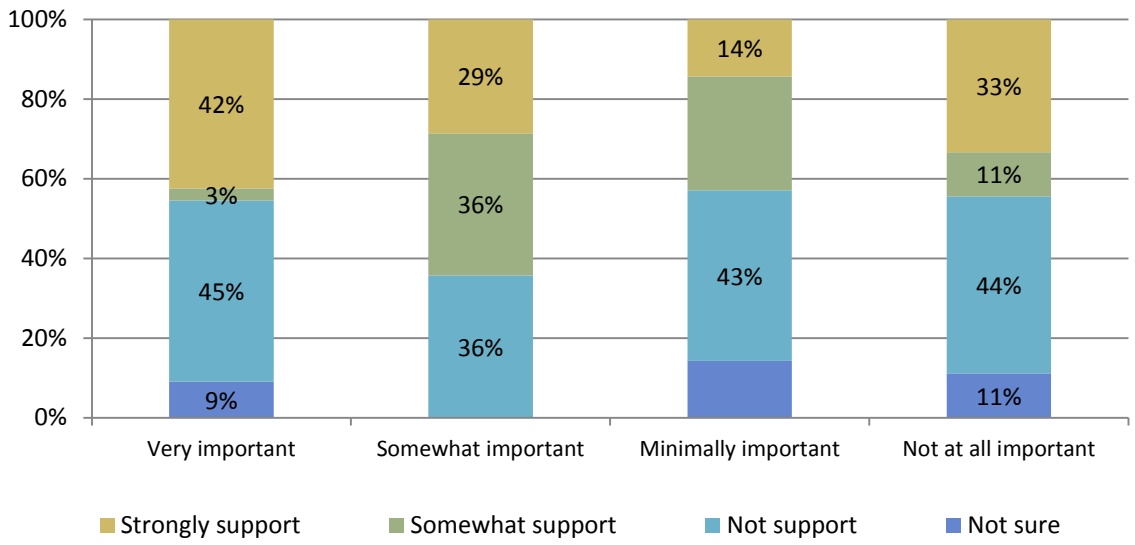

Figure 5-48. Reliance on fishing for income and level of support for closed areas for more 10 years or more.

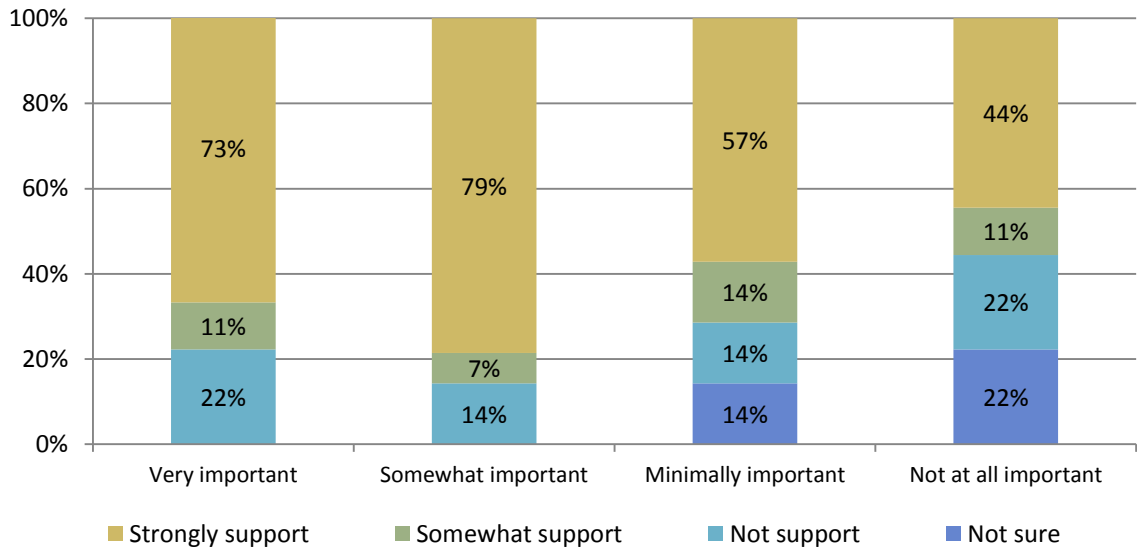

Figure 5-49. Reliance on fishing for income and level of support for seasonal closures.

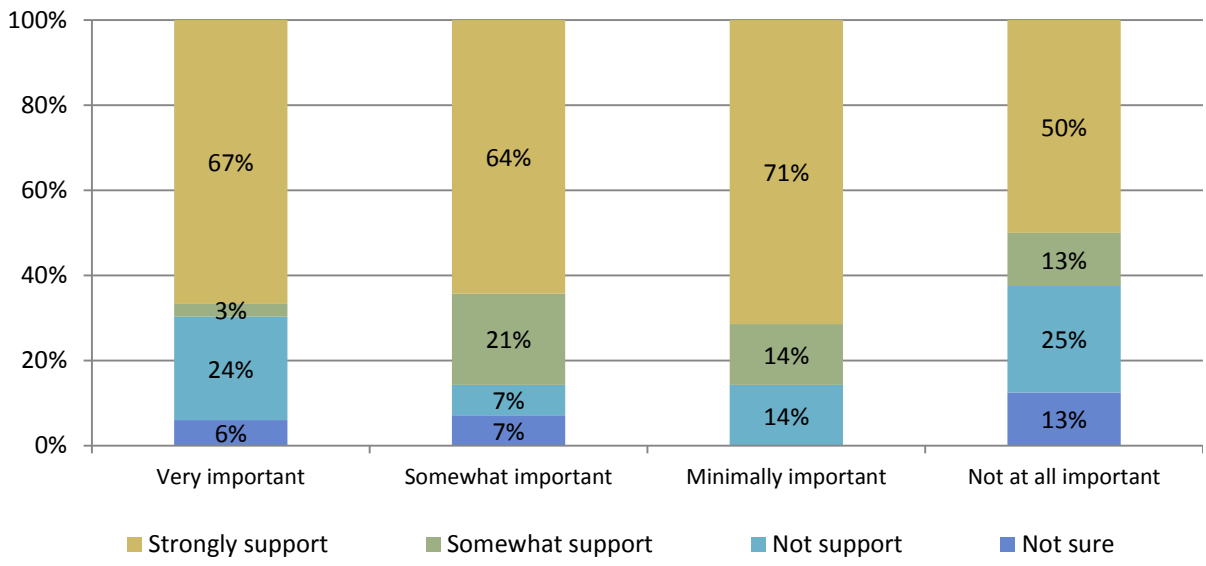

Figure 5-50. Reliance on fishing for income and level of support to gear restrictions.

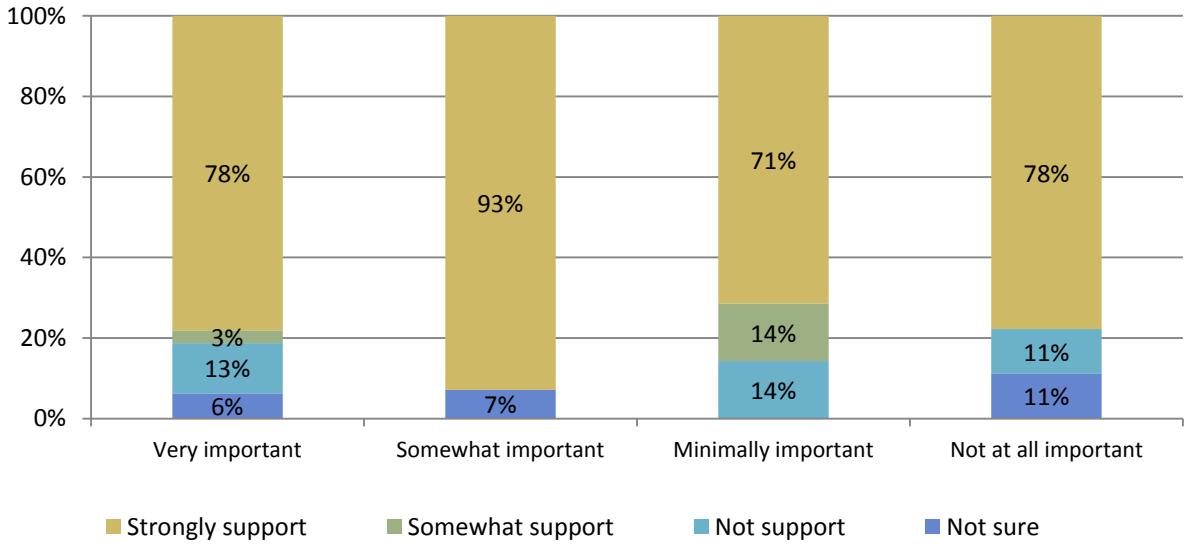

Figure 5-51. Reliance on fishing for income and level of support to size or catch limits.

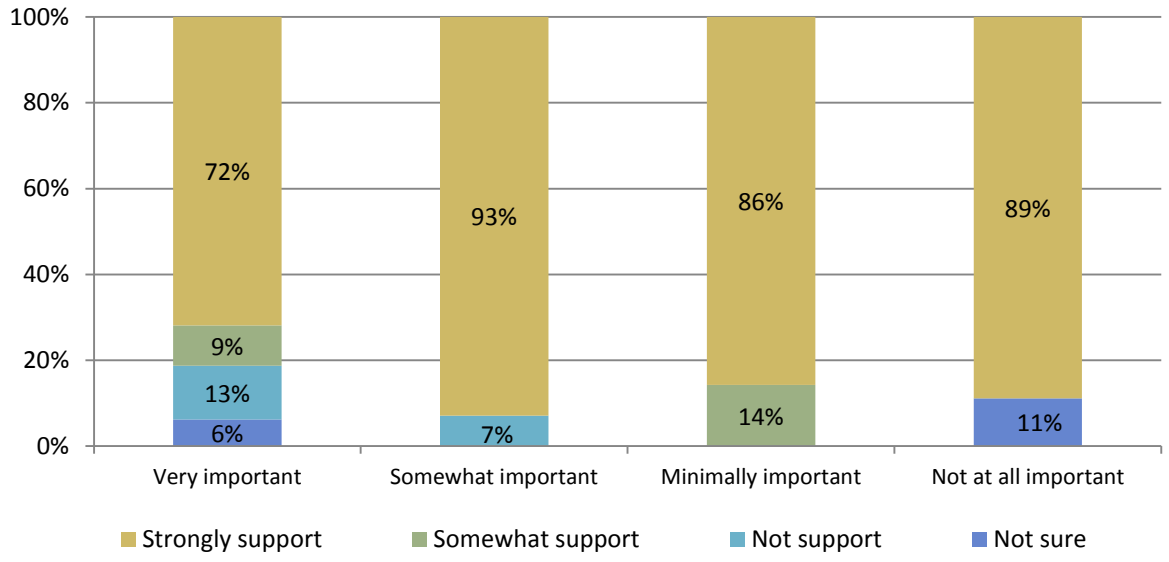

Figure 5-52. Reliance on fishing for income and level of support to limits on fishing certain vulnerable species that are overfished or whose numbers are very low. .

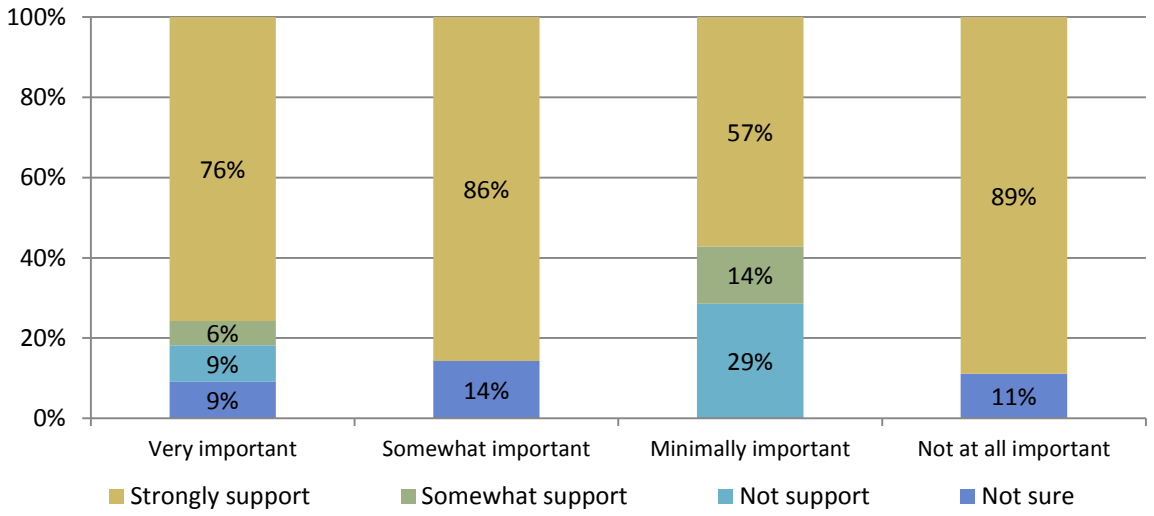

Figure 5-53. Reliance on fishing for income and level of support to restrictions on non-village fishers.

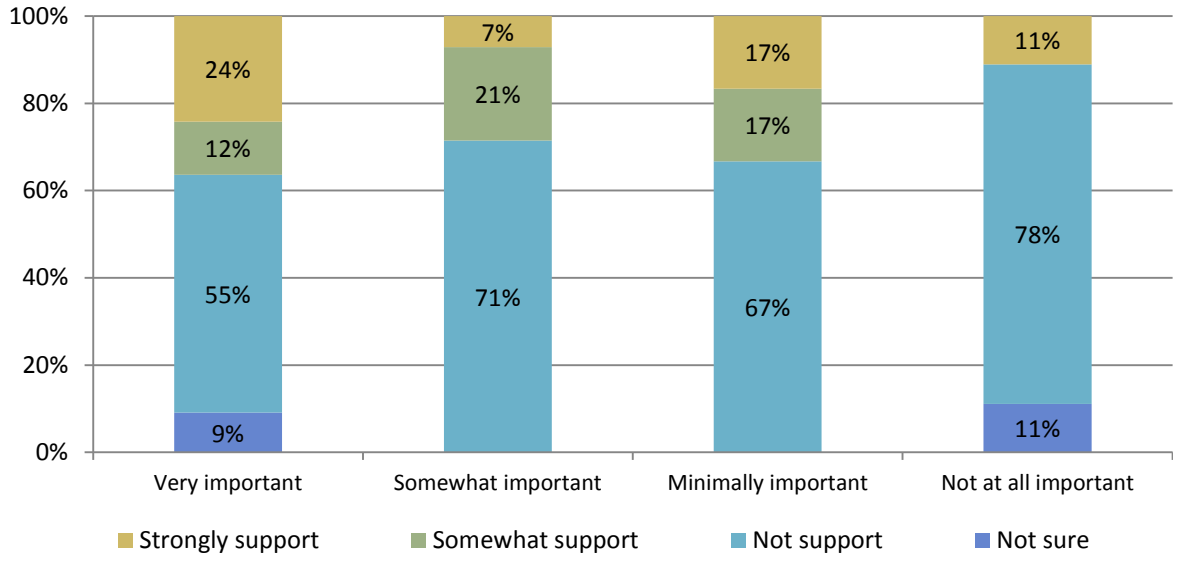

Figure 5-54. Reliance on fishing for income with level of support to no restrictions.

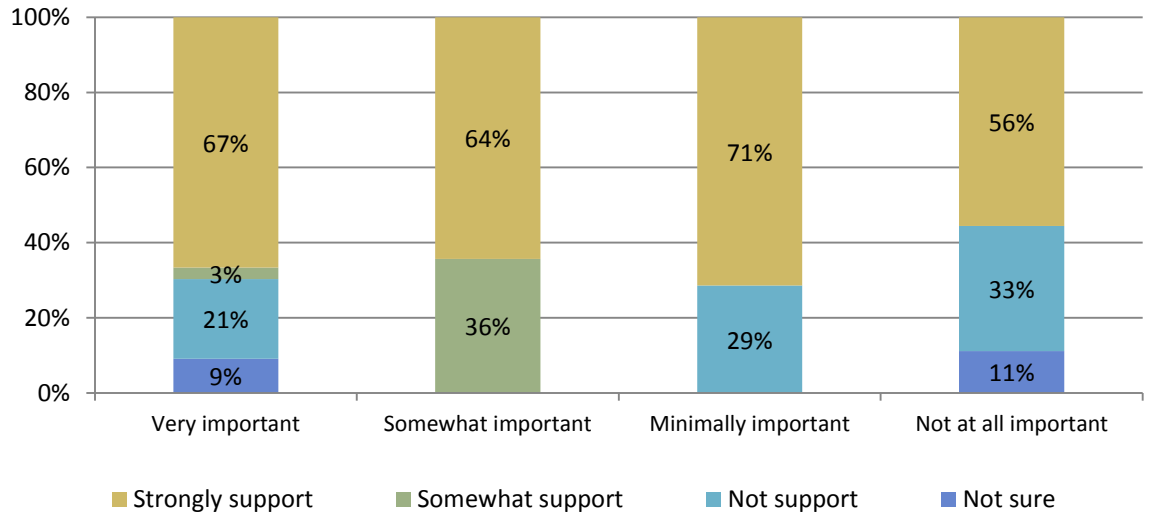

Figure 5-46. Very important reliance on fishing for income and level of support with various management strategies.

Fishing frequency and perception of resource conditions

Figures 5-47 through 5-56, below, present the results from the survey of fishing frequency and the perception of the condition of marine resources and the environment in Aunu'u. Fishers who fish more than once a week generally perceive marine resources to be very good or good, with all of fishers thinking fish on the reef slope, pelagic fish and invertebrates are very good or good, and 88% thinking fish on the ref flat are good or very good, with 11% not sure (Fig. 5-47). Aunu'u fishers who fish more than once a week think ocean water quality is doing good (78%). Stream water quality, condition of coral habitat and beach quality are perceived to be very good or good by the majority of Aunu'u fishers who fish more than once a week (Fig. 5-48). Figures 5-49 and 5-50 present Aunu'u fishers who fish once/week and their perception of marine resources and the environment. In general, Aunu'u fishers who fish about once/week think marine resources are very good or good. An equal number of fishers who fish about once/week (42%) think ocean water quality is good or neither good nor bad. Stream water quality is considered very bad or bad by half of these fishers. The condition of coral habitat and beach quality are thought to be neither good nor bad (Fig. 5-50).

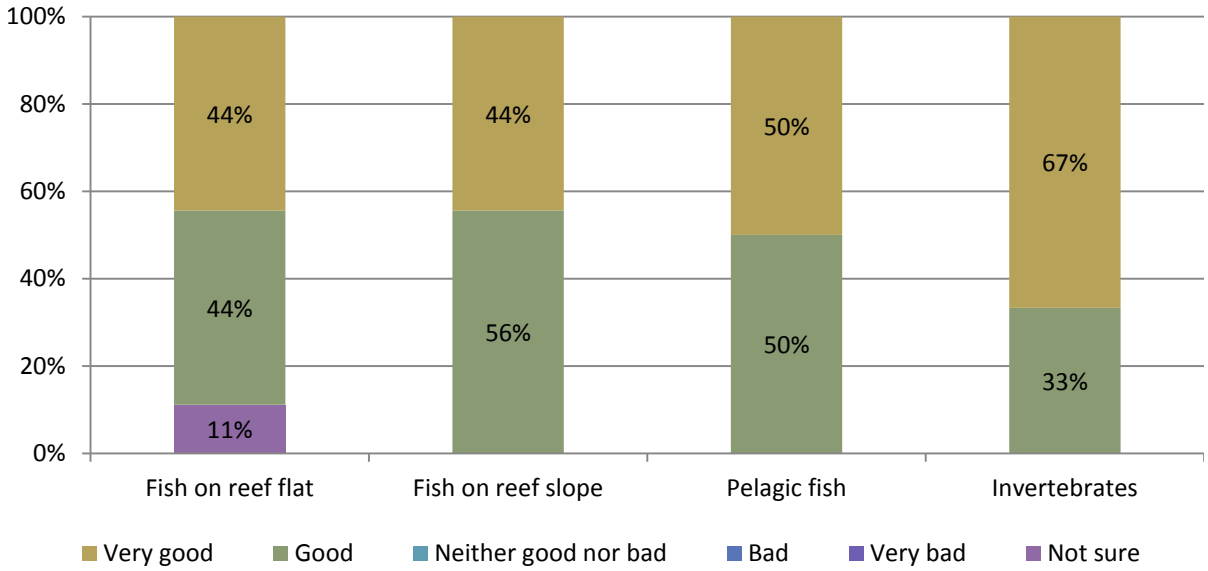

Figure 5-47 Aunu'u fishers who fish more than once a week and their perception of marine resources.

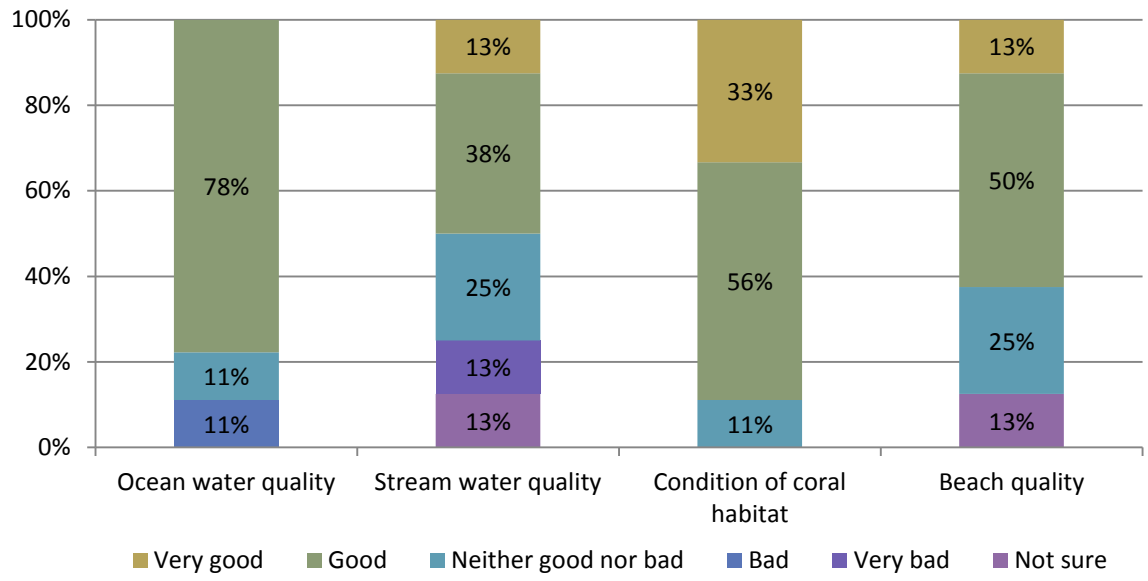

Figure 5-48. Aunu'u fishers who fish more than once a week and their perception of the environment.

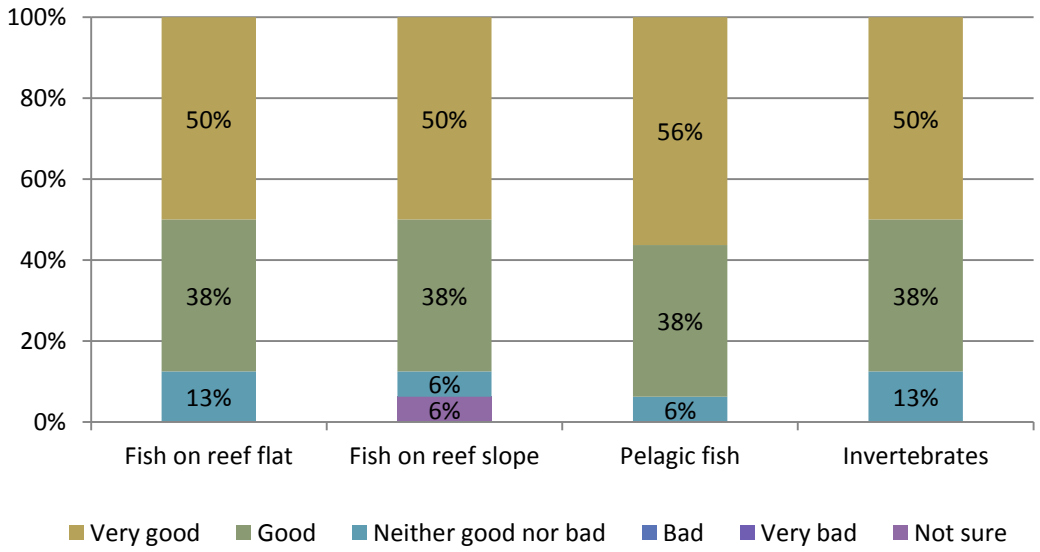

Figure 5-49. Aunu'u fishers who fish about once a week and their perception of marine resources

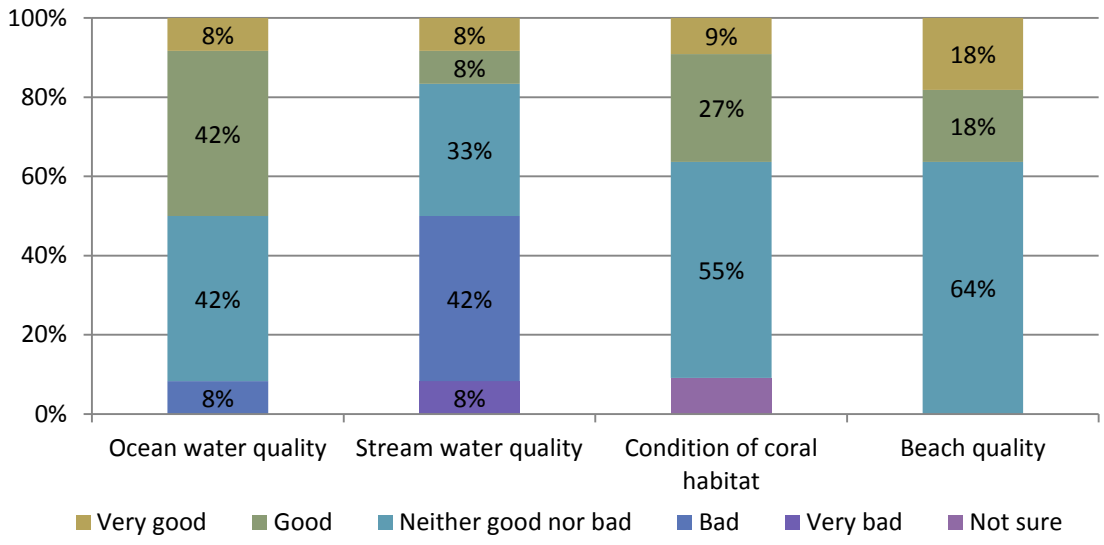

Figure 5-50. Aunu'u fishers who fish about once a week and their perception of the environment

Figures 5-51 and 5-52 below, present fishers who fish 1-3 times/month and their perception of marine resources and the environment. In general, Aunu'u fishers who fish 1-3 times/month think fish on the reef flat, fish on the reef slope, pelagic fish and invertebrates are doing very good or good (Fig. 5-51). Aunu'u fishers who fish 1-3 times/month think ocean water quality, condition of coral habitat and beach quality is very good or good (85%, 69%, and 75%, respectively). Stream water quality is perceived to be very good or good by 46% of fishers who fish 1-3 times/month, and 31% think it is neither good nor bad and bad. Figures 5-53 and 5-54 show fishers who fish 1-10 times/year and their perception of marine resource conditions and the environment. Fish on the reef flat, fish on the reef slope, pelagic fish and invertebrates are thought to be very good or good (Fig. 5-53). Ocean water quality and condition of coral habitat are perceived to be good by 75% of fishers who fish 1-10 times/year. There is an equal distribution of perception of stream water quality (25% each good, neither good nor bad, bad and not sure). Beach quality is thought to very good or good (50% of each). Figures 5-55 and 5-56 below, present fishers who rarely/never and their perception of marine resources and the environment. Aunu'u fishers who rarely or never fish think marine resources and the environment are good.

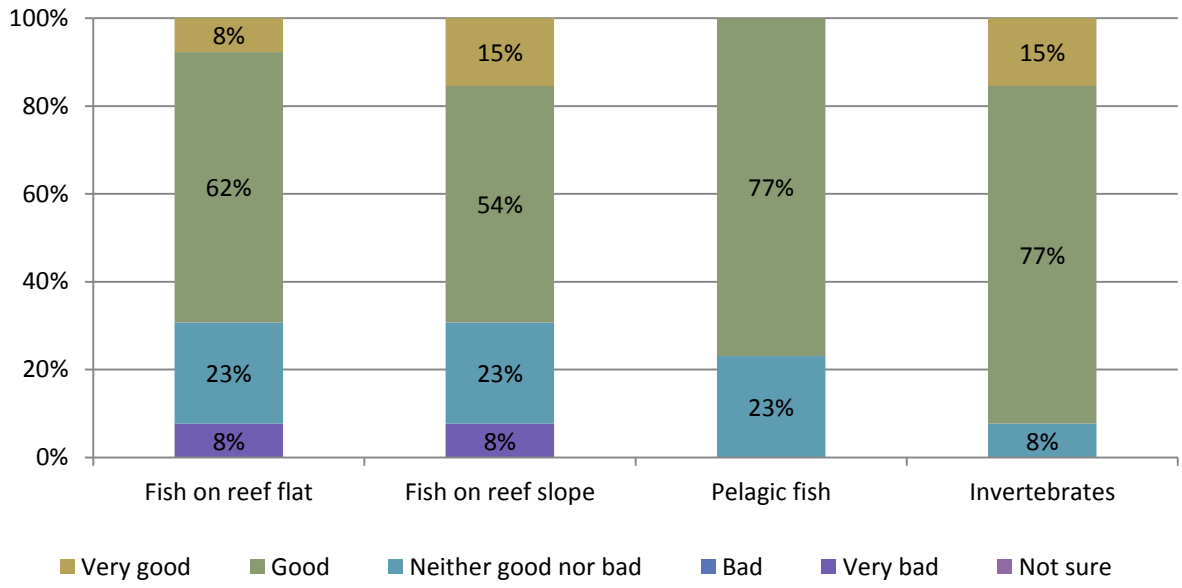

Figure 5-51. Aunu'u fishers who fish 1-3 times/month and their perception marine resources.

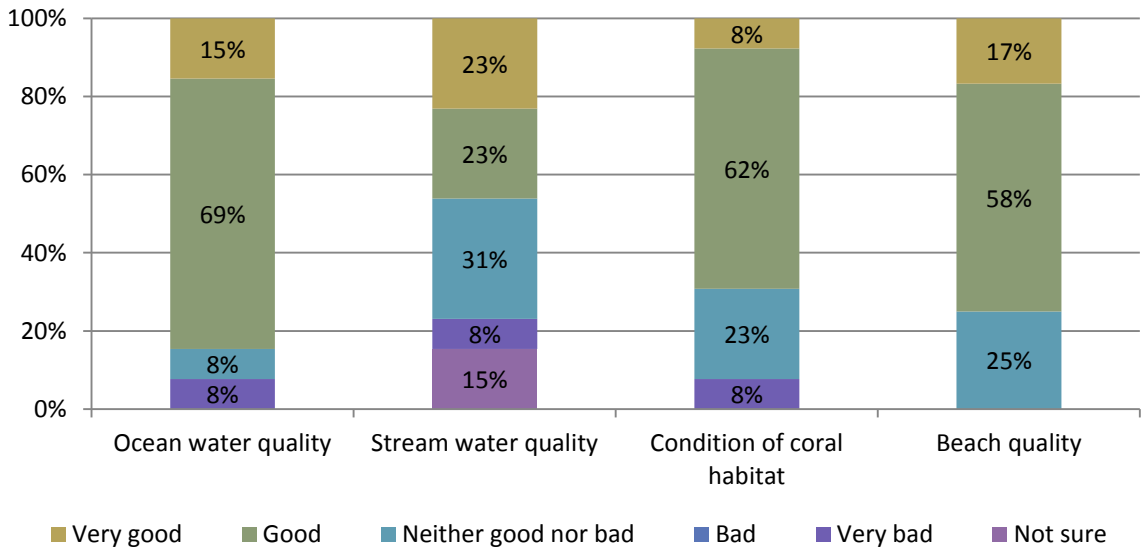

Figure 5-52. Aunu'u fishers who fish 1-3 times/month and their perception of the environment.

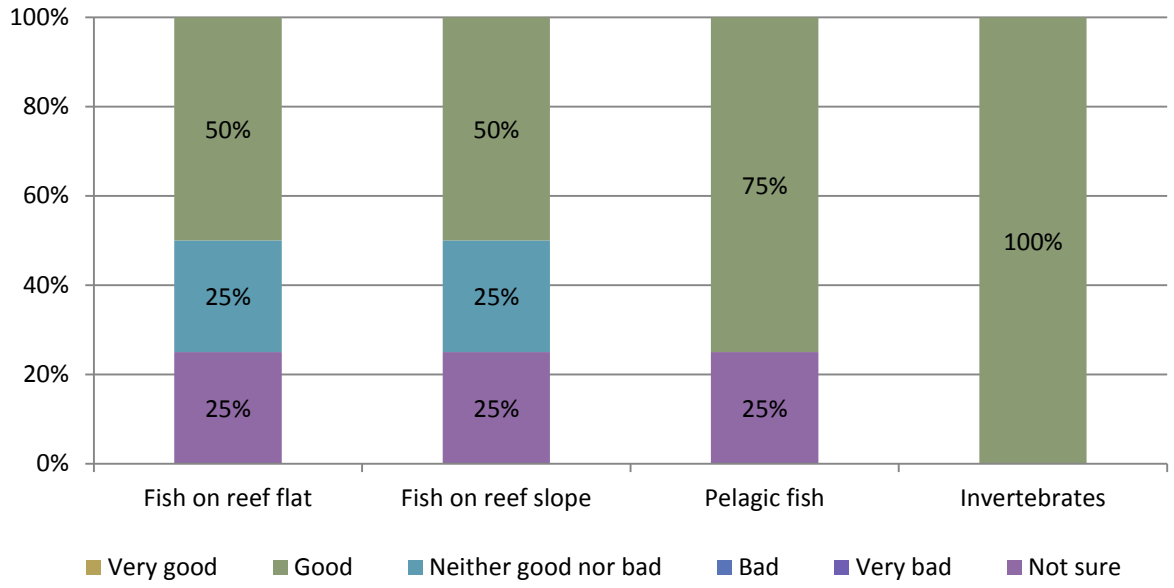

Figure 5-53. Aunu'u fishers who fish 1-10 times/year and their perception of marine resources.

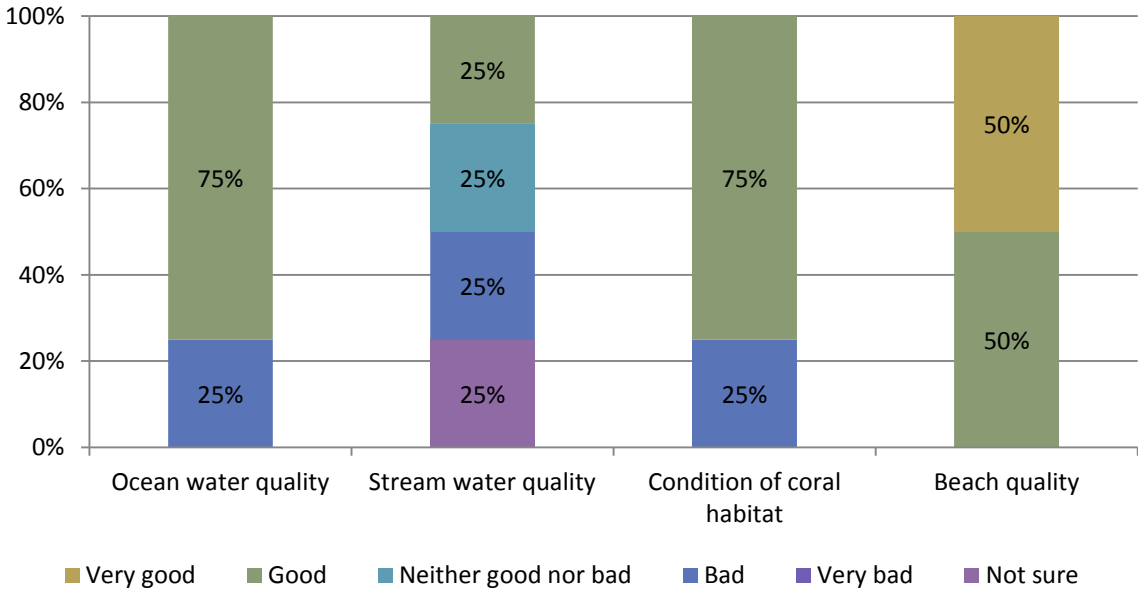

Figure 5-54. Aunu'u fishers who fish 1-10 times/year and their perception of the environment.

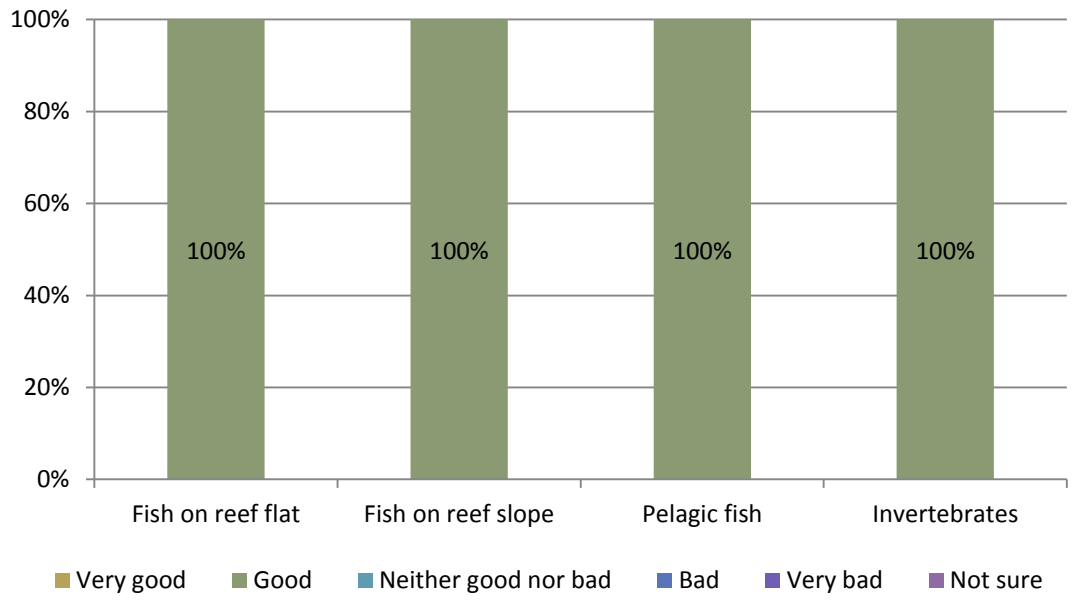

Figure 5-55. Aunu'u fishers who never/rarely fish and perception marine resources.

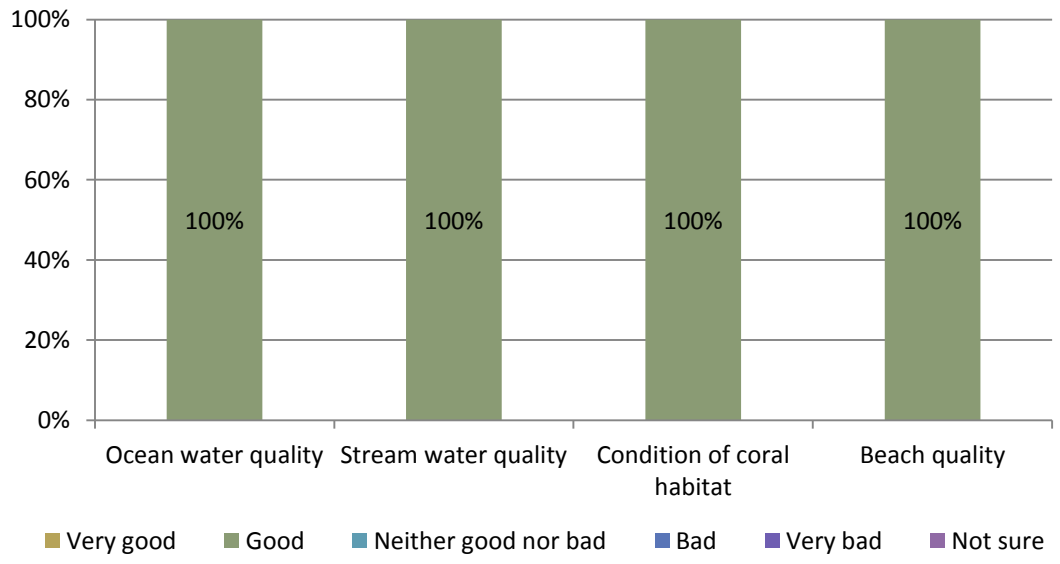

Figure 5-56. Aunu'u fishers who never/rarely fish and perception of the environment.

6.0 Faga'alu

6.1 Demographics

Figures 6-1 through 6-5 present the results from the demographic survey questions in the 2015 survey of Faga'alu. Gender distribution is displayed in Figure 6-1; 41% female and 55% male). Age distribution is shown in Figure 6-2. The most common age bin is 18-29. There is an equal distribution of residents in the 30-39 and 40-49 age bins (23.1%). The small resident population over the age of 70 is not well represented in our sample as elderly residents are generally less accessible for in-person surveys due to personal health reasons or the physical exertion required. The number of people in households in Faga'alu range from 1 to 15, with an average household size of 6.3 people (Fig. 6-3). Of the three races/ethnicities of survey respondents in Faga'alu, most are some or part Samoan (97.5%; Fig. 6-4). The other ethnicities represented are Tongan (4.6%) Native Hawaiian (1.5%), Chinese (2.3%), Filipino, Korean, Niue and Japanese (each 0.8%). Annual income of survey respondents in Faga'alu is shown in Figure 6-5. Of those who responded (4 no response), almost half (41.2%) have an annual income less than $10-000. Annual income of $10-19,999 and $20-20,999 are almost equally represented, with 20.2% and 21.1%, respectively. Annual incomes of $40-49,999 and more than $50,000 were represented by 2.6% of respondents.

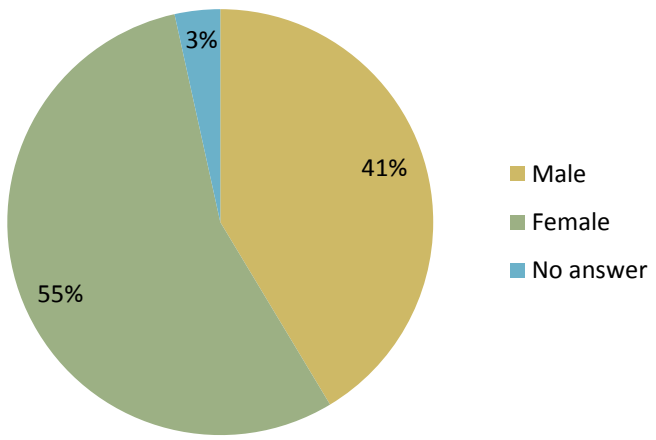

Figure 6-1. Gender distribution in survey sample in Faga'alu.

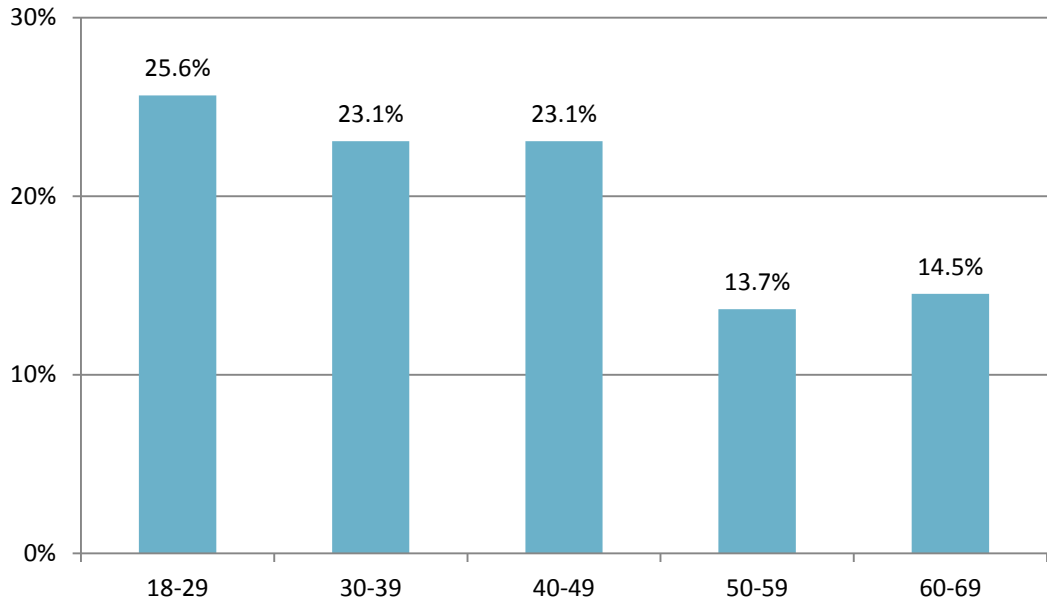

Figure 6-2. Age distribution in sample in Faga'alu.

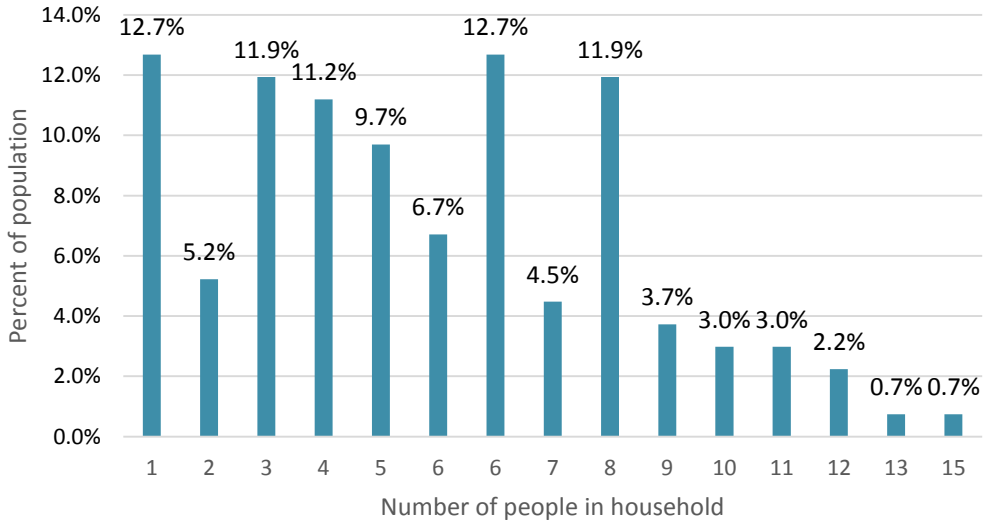

Figure 6-3. Number of people in households in Faga'alu.

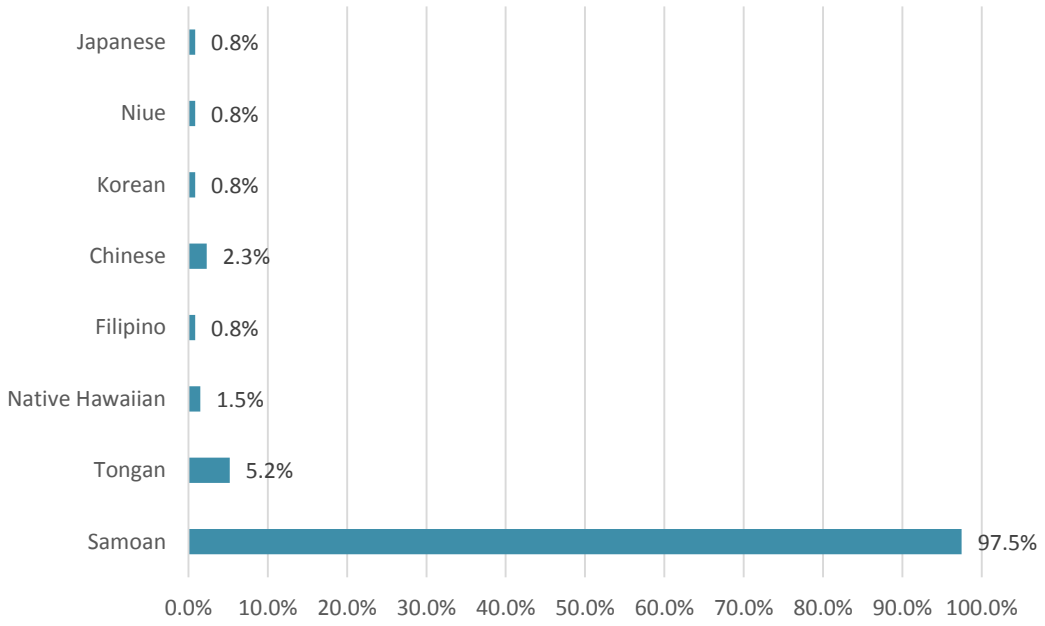

Figure 6-4. Race/ethnicity among survey respondents in Faga'alu.

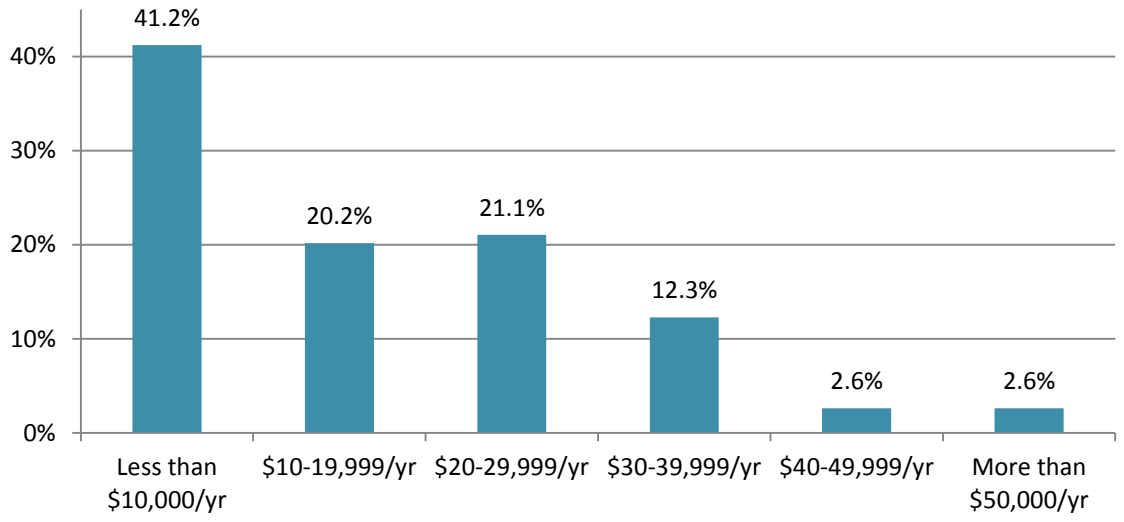

Figure 6-5. Annual income of survey respondents in Faga'alu.

6.2. Community Groups

Figures 6-6 and 6-7 present the results from the survey questions pertaining to community group involvement and participation. Nearly all respondents (97%) belong to church and over half belong to youth groups (54%; Fig 122). Other groups represented include Bible study, choir, Figure 6-7 presents the percent of people in Faga'alu belonging to different numbers of community groups. Few residents in Faga'alu belong to no community group (1.7%). Most people belong to one community group (37.6%). 29.9% of Faga'alu residents belong to two groups.

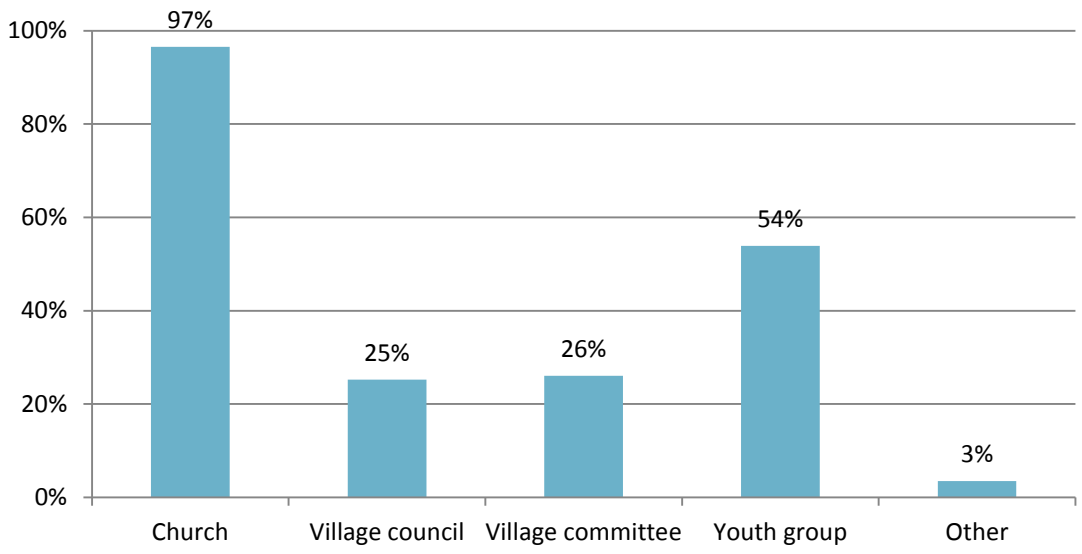

Figure 6-6. Household membership in community groups in Faga'alu.

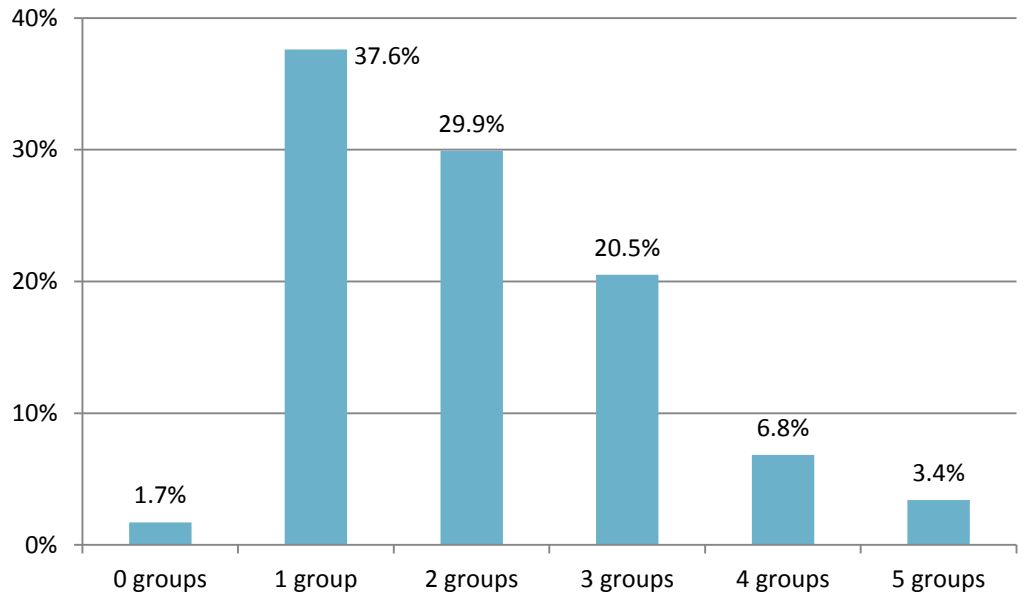

Figure 6-7. Number of community groups involved per household in Faga'alu.

6.3 Activities households depend on for food and/or income

Figure 6-8 presents the survey question about activities that households depend on for food and/or income in Faga'alu. Government jobs are considered very important by 56% of respondents in Faga'alu. Fishing and farming are activities considered very important and somewhat important by half the respondents (51.4% and 55%, respectively). Farming and government jobs are also considered important activities, with 77% and 73%, respectively, of respondents considering this activity "very important". Cannery, pension, private business and tourism are all activities considered "not at all important" in Faga'alu.

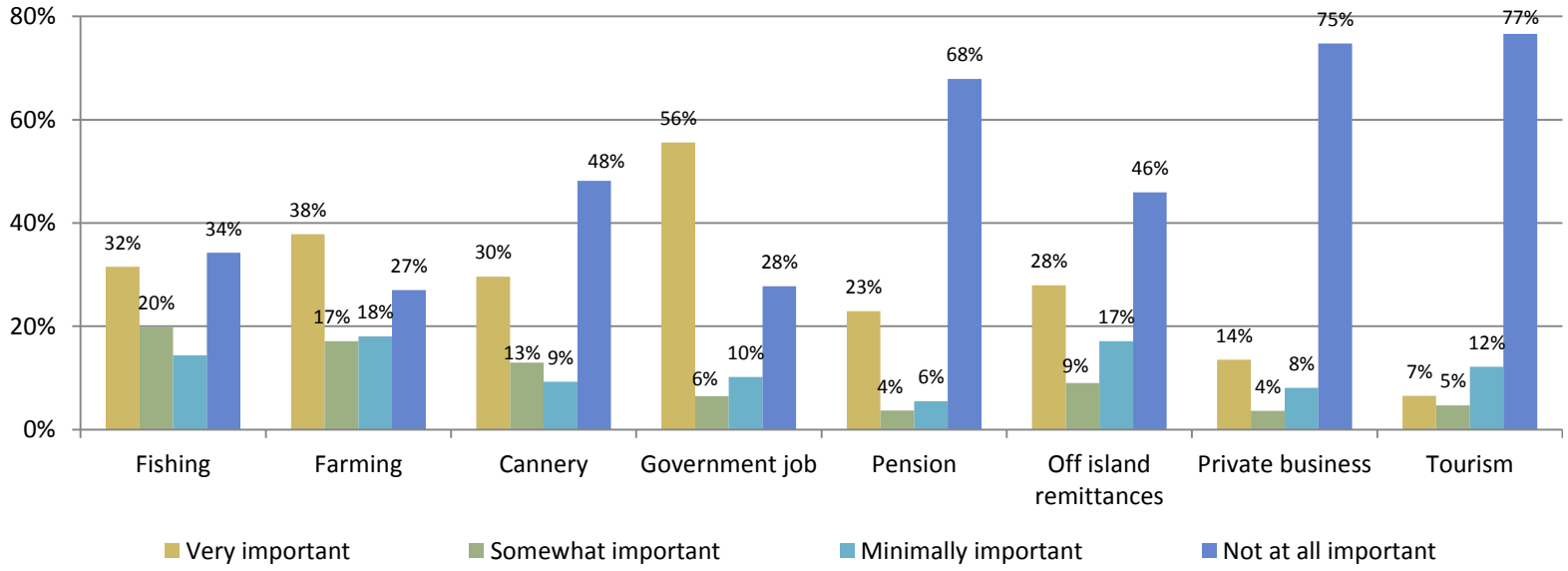

Figure 6-8. Activities households depends on for food and/or income in Faga'alu.

6.4 Fishing/harvesting frequency and patterns

Figures 6-9 through 6-15, below, show the results from the survey questions about fishing frequency, methods of fishing and targeted resources. Figure 6-9 presents the number of people in household who fish/harvest marine resources. Almost half (48.2%) of Faga'alu households have no people in the household who fish/harvest marine resources. The average number in the household who fish/harvest in Faga'alu is 1 person. Figure 6-10 displays the primary reasons and frequency which members of the household fish/harvest marine resources (of those households who fish or harvest). Fishing and harvesting for food is most common, with 72% of respondents, followed by providing to pastor or village leaders (56%). Fishing/harvesting for income is very uncommon, with 55% of respondents never selling their catch.

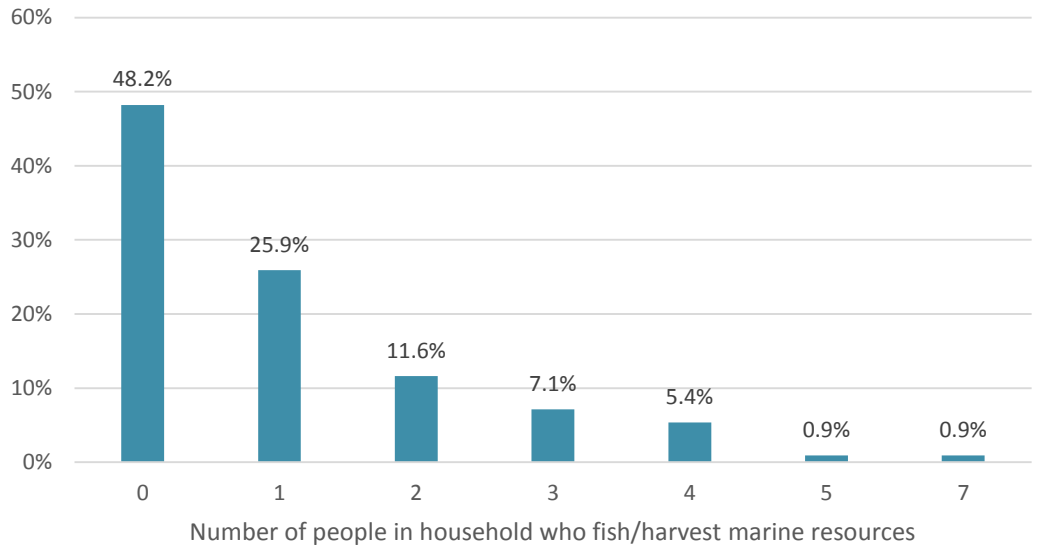

Figure 6-9. Number of people in Faga'alu households who fish/harvest

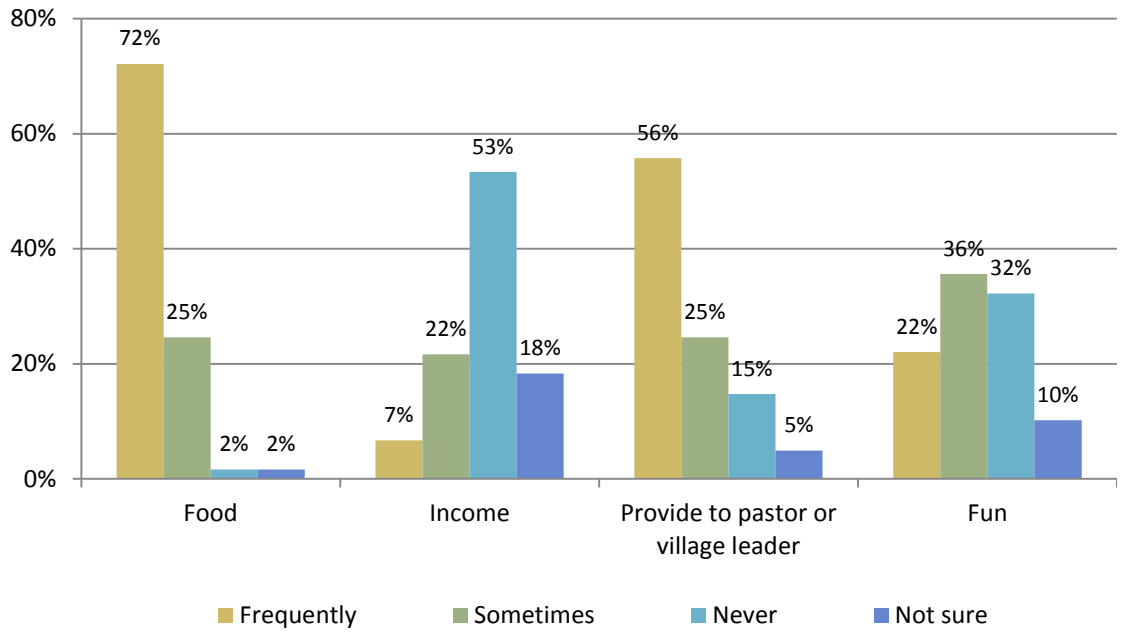

Figure 6-10. Primary reasons and frequency in households fishing/harvesting in Faga'alu.

Figure 6-11 shows the frequency of fishing/harvesting of those households who fish/harvest. 27% of households in Faga'alu fish/harvest marine resources more than once/week, 32% fish/harvest about once a week and 27% fish/harvest 1-3 times a month. Of the various fish/resources that are targeted, fish from the reef flat is targeted most frequently in Faga'alu (with 71% of respondents listing this as a targeted resource; Fig 6-12). Invertebrates are also commonly targeted, with 54% of respondents; fish from the reef slope and pelagic fish are nearly equally targeted, with 42% and 46% of respondents, respectively. Figure 6-13 shows the types of fishing methods used by members of Faga'alu household. Rod and reel/handline/pole and line from shore is the most common type of fishing method used, with 56% of respondents frequently fishing with these methods. Spearfishing, gleaning/gathering and nets (gill and throw) are almost equally frequently used and never used by residents of Faga'alu. Traps and trolling are never used by 76% and 62% or respondents, respectively.

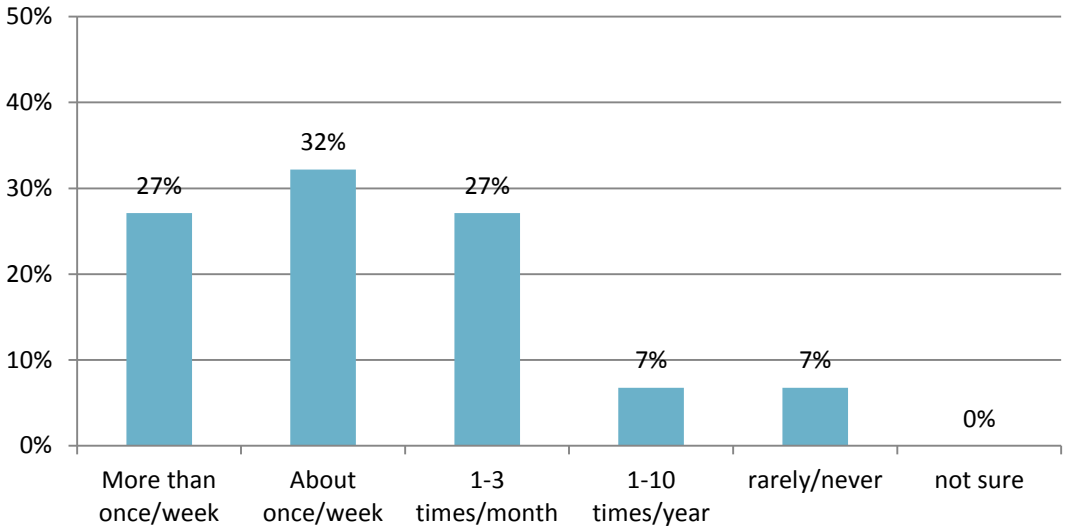

Figure 6-11. Frequency of fishing/harvesting marine resources in Faga'alu.

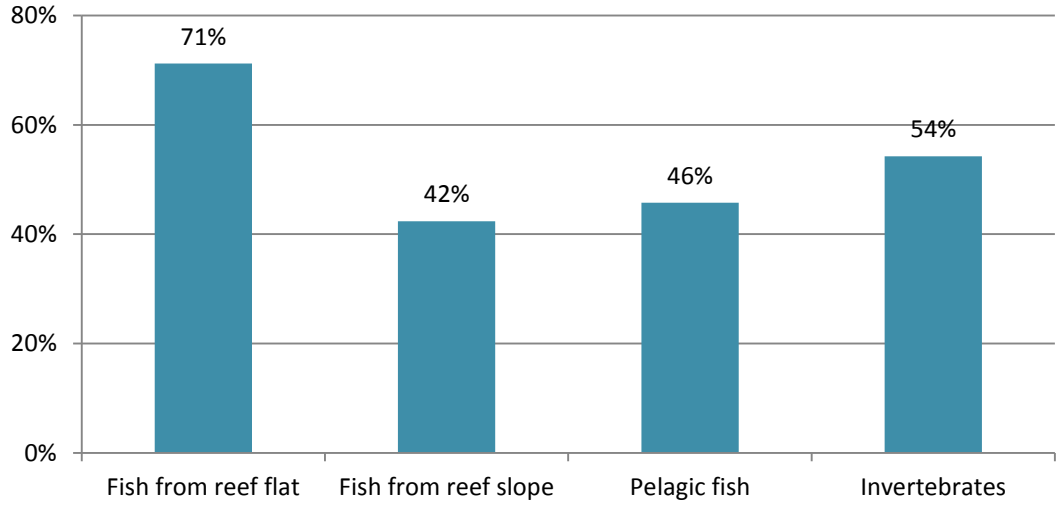

Figure 6-12. Types of fish/resources targeted in Faga'alu households.

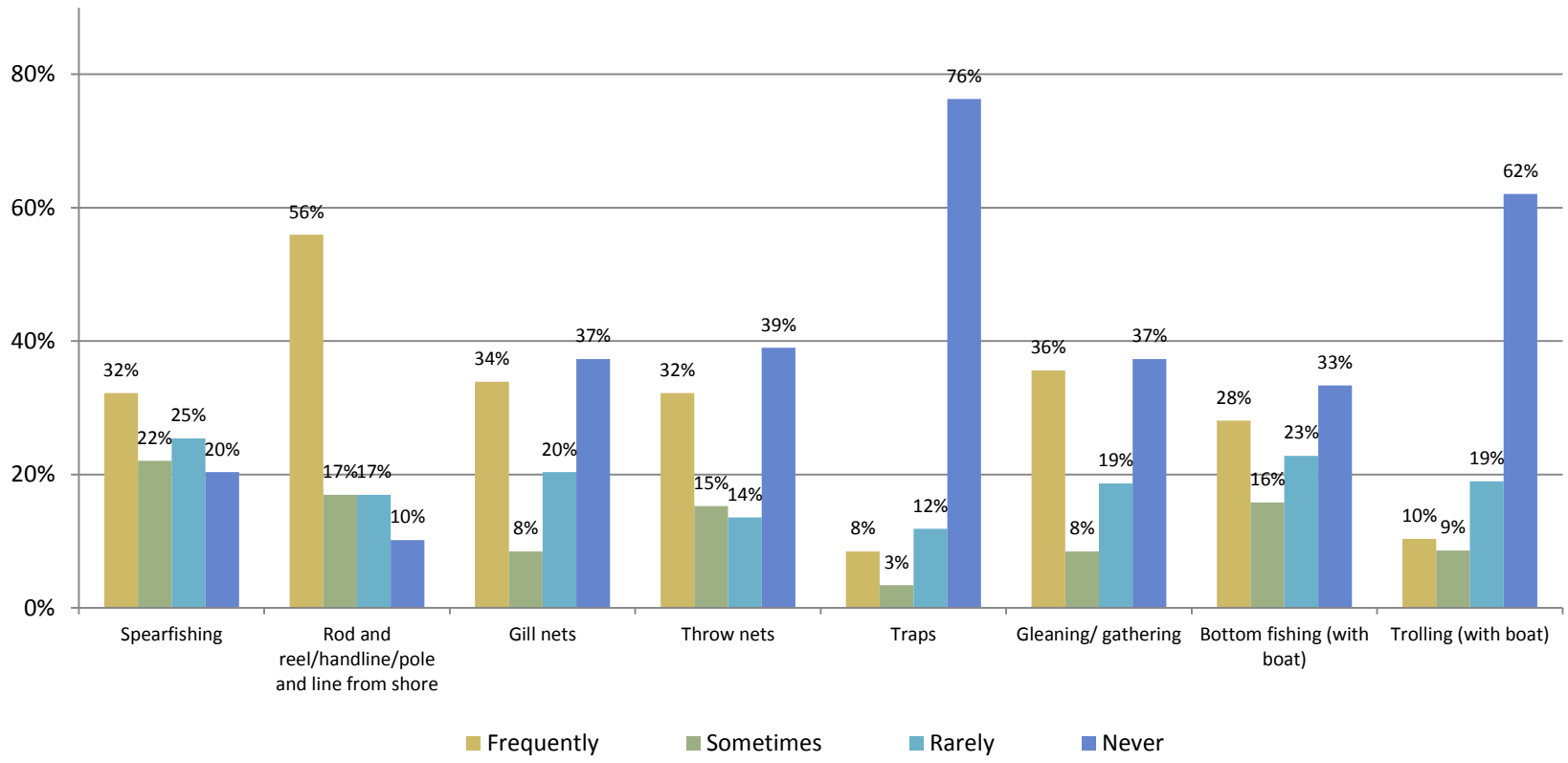

Figure 6-13. Types and frequency of fishing methods used in Faga'alu households.

Figures 6-14 and 6-15, below, show respondent opinions on how household fishing frequency and catch/harvest has changed over the past 10 years. 47% of respondents in Faga'alu fish less frequently over the past 10 years and 39% of households say they catch less.

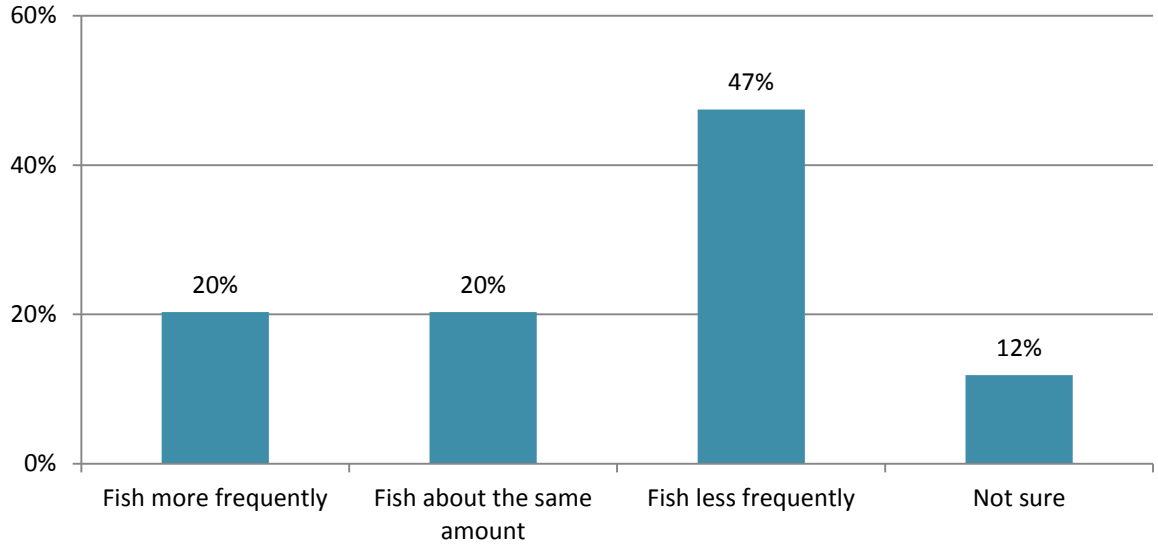

Figure 6-14. Frequency of fishing/harvesting over the past 10 years in Faga'alu.

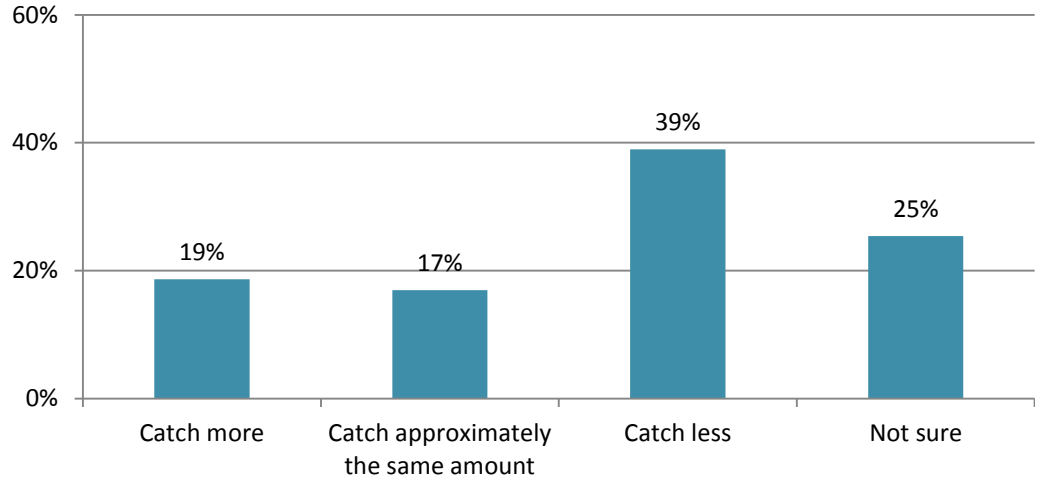

Figure 6-15. How Faga'alu household catch/harvest has changed over the past 10 years.

6.5 Frequency of seafood consumption

Figure 6-16 shows the frequency of household consumption of fresh or frozen fish/invertebrates from various sources. The question specifically distinguished between canned fish and fresh or frozen fish. Of the various locations where fresh or frozen fish/seafood can be obtained, bought in a store or restaurant is most common, with 55% of survey respondents consuming marine resources from this source once a week or more. 52% of survey respondents consume marine resources from village waters once a week or more. Marine resources from American Samoa waters (outside of village waters) and boats landing catch at the cannery are not common, with 37% and 47% of respondents rarely or never obtain resources from these sources.

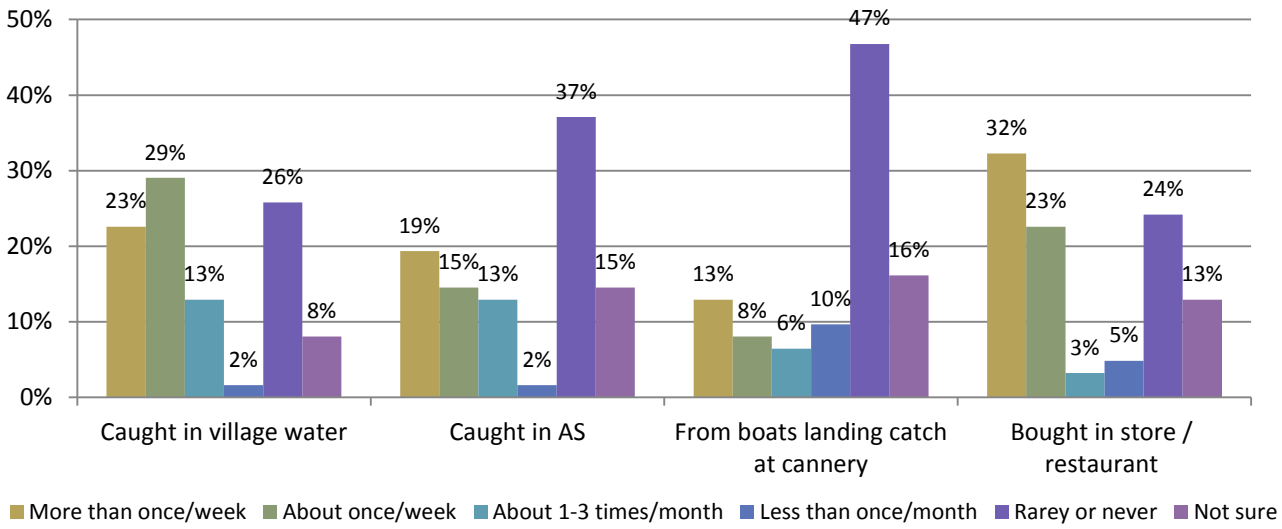

Figure 6-16. Frequency of eating fresh or frozen fish/invertebrates in Faga'alu

6.6 Perception of resource conditions

Figures 6-17 and 6-18 presents Faga'alu residents' opinions on how the marine resources and the environment are doing, from very good to very bad. Marine resources are generally perceived to be very good or good, with half of the respondents thinking fish on the reef slope and pelagic fish are very good or good, and just under half of the respondents thinking fish on the reef flat (46%) and invertebrates (43%) are very good or good (Fig. 6-17).. No respondents think the condition of fish on the reef flat is very bad. Figure 6-18 shows residents' opinions

on how the environment is doing. 32% of Faga'alu residents think ocean water quality is doing very good or good. Stream water quality is almost equally considered good and bad (22% and 24%, respectively). More residents think the condition of the coral habitat is bad (20%) than good (15%). Perception of beach quality is mixed, with 33% thinking it is good or very good and 22% thinking it is bad or very bad.

One survey question asked respondents to list factors that have contributed to changes in the condition of ocean and fresh water resources. Faga'alu respondents stated concerns about trash accumulation, particularly in streams and due to runoff.

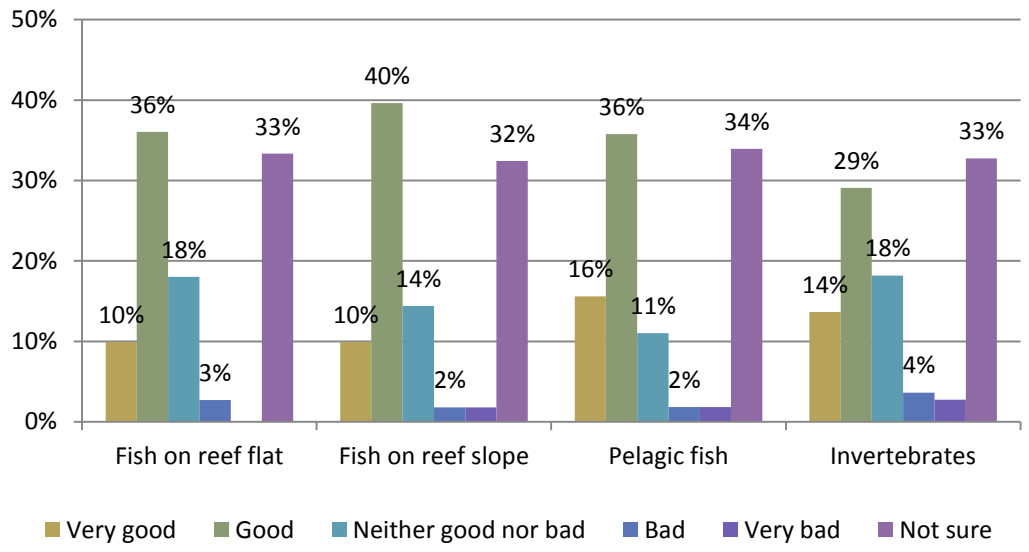

Figure 6-17. Faga'alu residents' opinions on the conditions of marine resources.

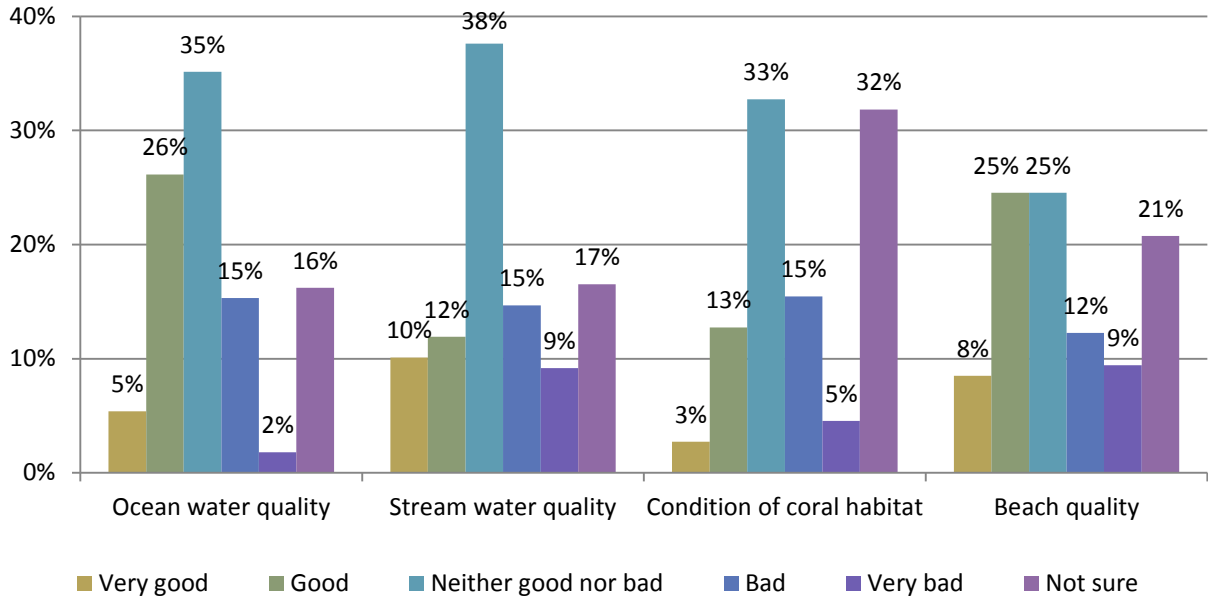

Figure 6-18. Faga'alu residents' opinions on the conditions of the environment.

6.7 Pollution and trash

Figures 6-19 through 6-22 present the results from the survey questions about pollution and trash Most of the survey respondents think the following issues are a significant or moderate problem in Vatia: trash and pollution (86%), pollution in streams (80%), sediment in streams (72%), decreasing number of fish in the ocean (50%), and pollution in the ocean (75%; Fig. 6-19). Figure 6-20 presents the residents of Faga'alu familiarity with systems in the village to reduce trash accumulation. Almost half (42%) of the respondents think there is a system in place in Faga'alu to reduce trash accumulation, while 38% think no and 20% are not sure. Of those who think there is a system in place to reduce trash accumulation, programs by the mayor and village council, as well as youth group clean-up efforts and church efforts were cited. Additionally, 56% of those who think there is a system in place participate in the activities to reduce trash in Faga'alu (Fig. 6-21).

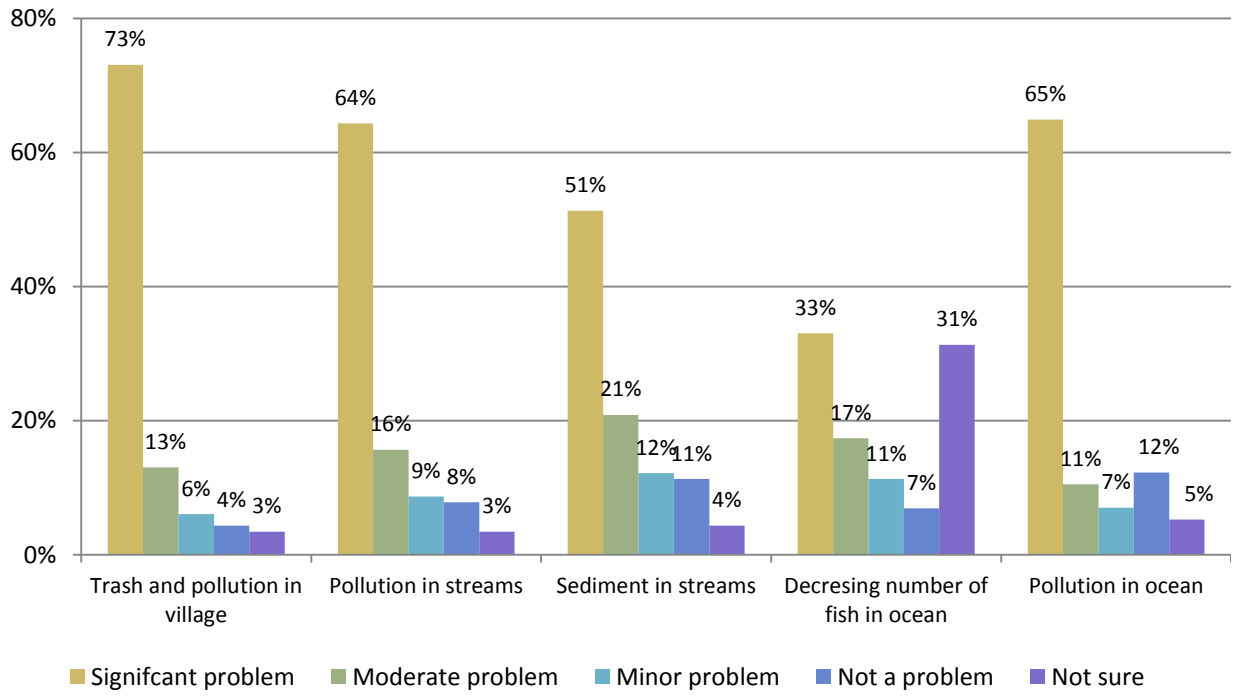

Figure 6-19. Faga'alu residents' opinions on pollution and trash issues.

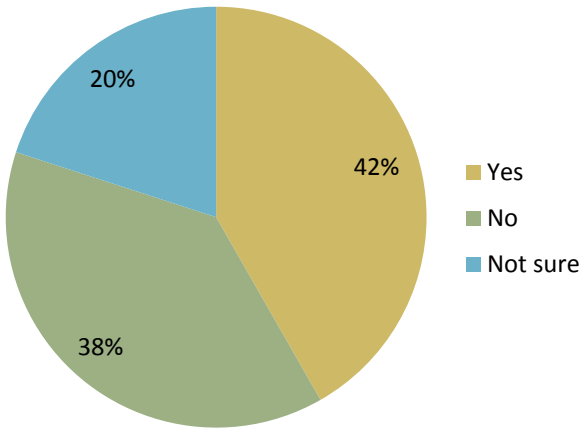

Figure 6-20. Residents' familiarity with systems to reduce trash accumulation.

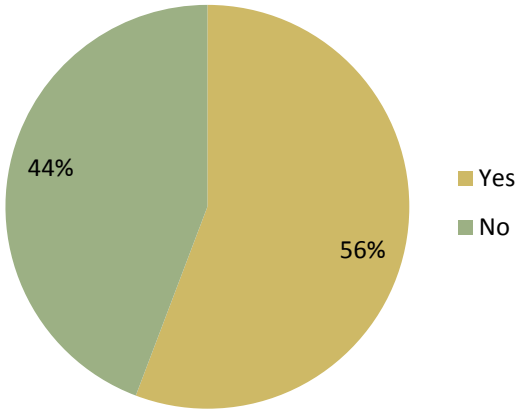

Figure 6-21. Faga'alu resident participation in activities to reduce trash in village.

Figure 6-22 presents the respondents opinion regarding the primary sources of trash in Faga'alu. The following sources are considered a significant or moderate source: local village members (79%), visitors to village (57%) and lack of cans/dumpsters for waste (64%). Marine debris from the ocean is considered a significant or moderate source by 47% of the residents. The hospital is not considered much of a source of trash, with 32% thinking it a minor source, and 24% thinking it not a source.

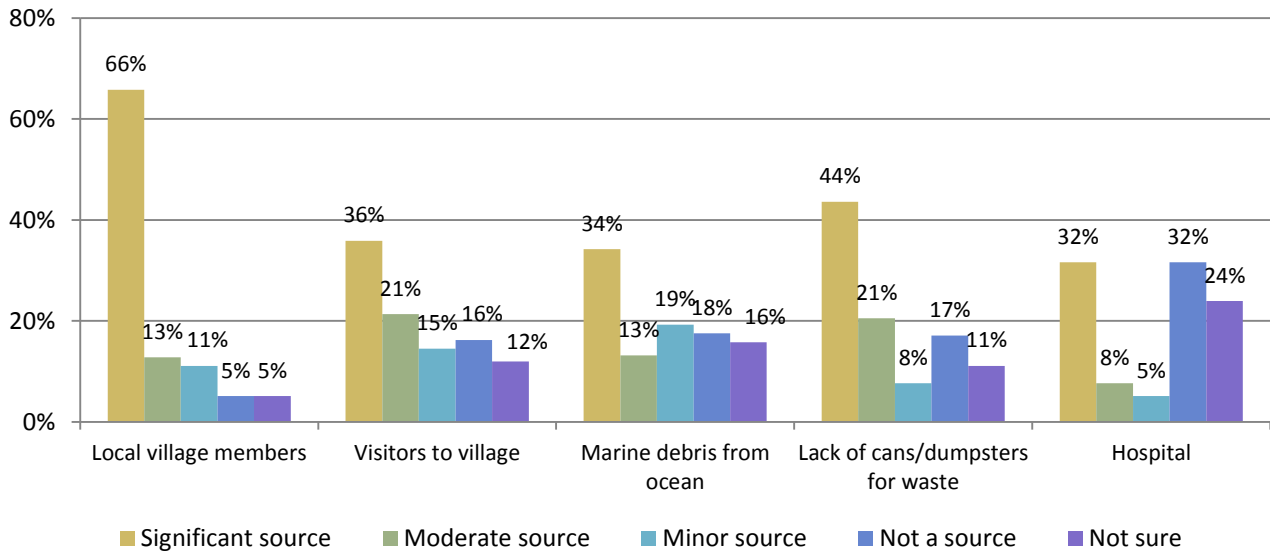

Figure 6-22. Faga'alu resident participation in activities to reduce trash in village.

6.8 Attitudes towards marine resource management strategies

Figures 6-23 and 6-24 present the results from the survey pertaining to resident attitudes towards marine resource management strategies and enforcement. Figure 6-23 presents resident familiarity with systems in place to protect marine resources in Faga'alu. More Faga'alu residents think there is no system in place to protect marine resources (50%) than those who think there is a system (23%), with 27% not sure. Of those who think yes, residents mentioned the government efforts (13%), particularly DMWR (9%).

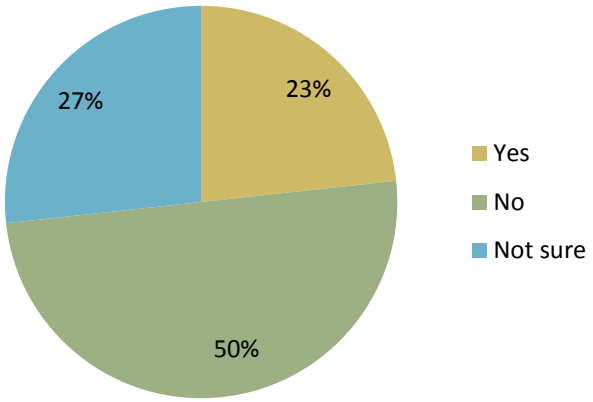

Figure 6-23. Resident's response to whether there is a system in place to protect marine resources in Faga'alu.

Figure 6-24 presents the results from survey questions about resident level of support with types of actions to protect village marine resources. Faga'alu residents are strongly supportive of actions to protect marine resources, with strong support for closed areas for 1-2 years (64%), gear restrictions (60%), size or catch limits (57%), limits on vulnerable or overfished marine resources (55%), and restrictions on non-villagers (54%). Level of support for closed areas decrease with the length of time the area is closed, and there is strong no support (68%) for areas closed for 10 years or more. Nearly half of respondents (48%) do not support no restrictions..

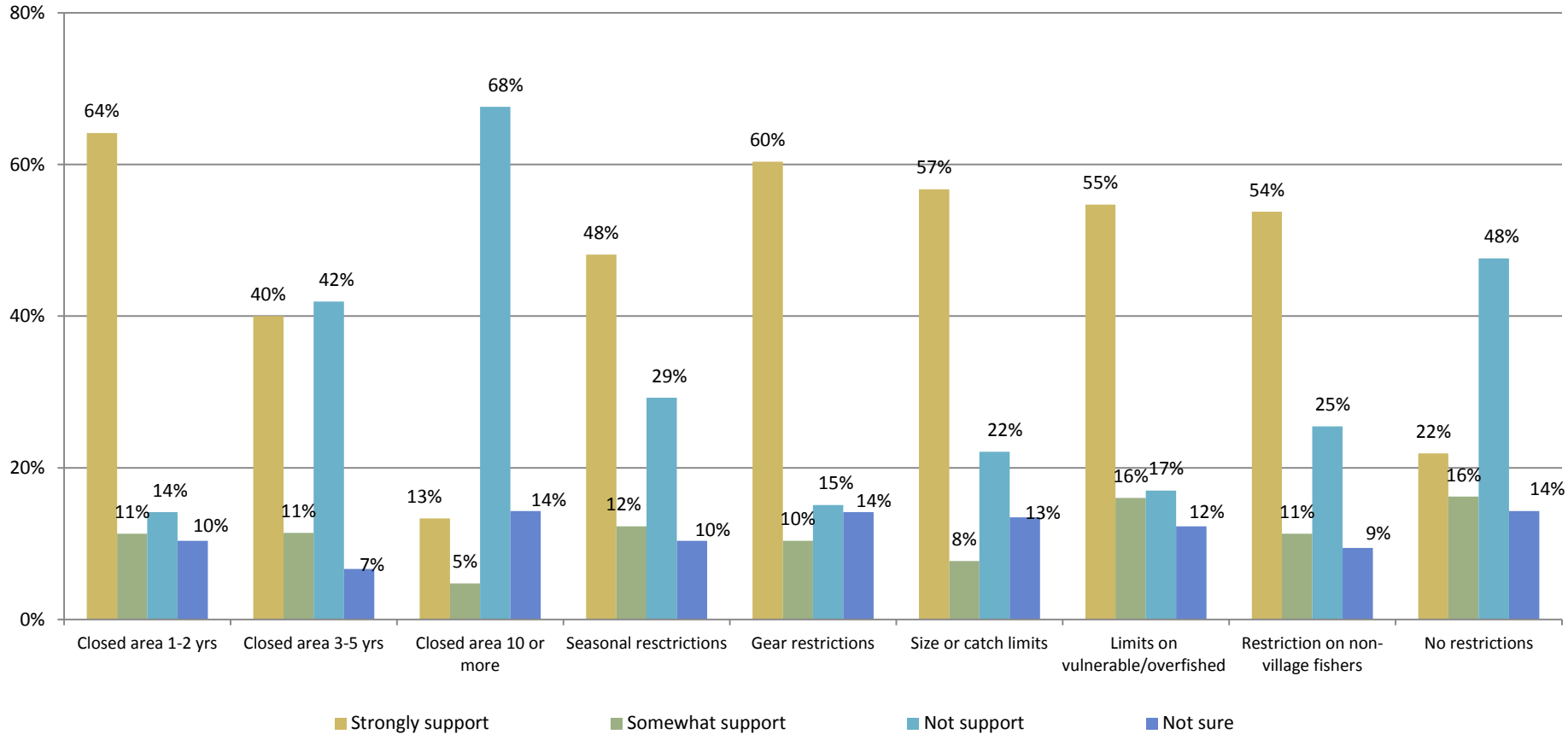

Figure 6-24. Resident level of support with types of actions to protect marine resources in Faga'alu

6.9 Access to resources

Figure 6-25 presents the results from the survey question about household access to various resources in Faga'alu. The majority of Faga'alu households have access to clean drinking water (97%), cell phone (97%), car (70%), and television (95%). Over half Faga'alu residents have access to back up drinking water (62%), computer (53%), and cable (56%).

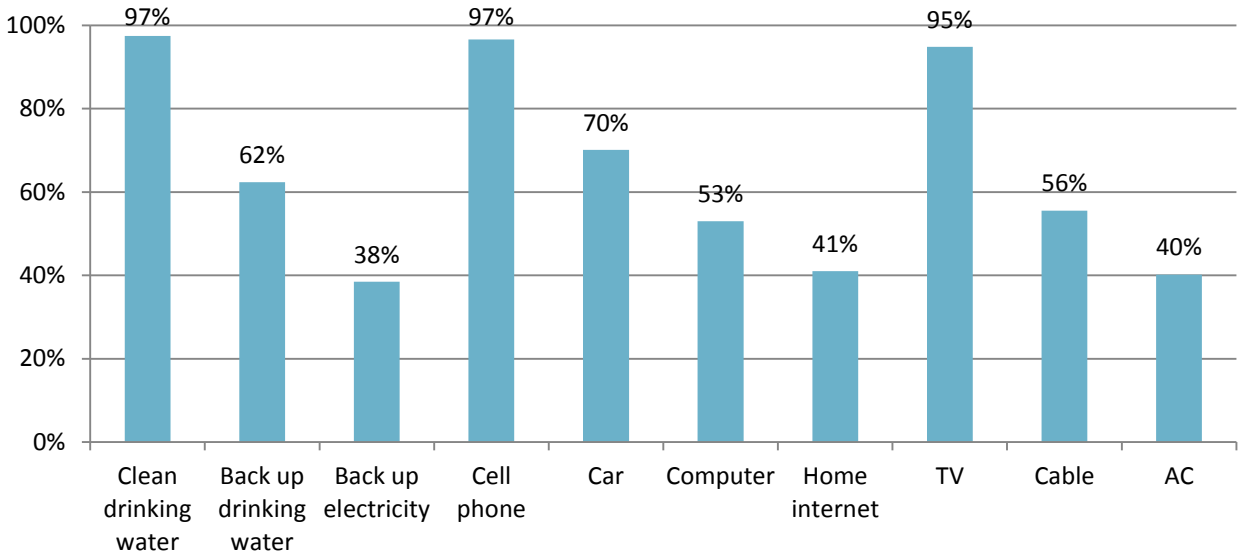

Figure 6-25. Access to resources in Faga'alu

6.10 Supplemental analyses

Income level with reliance on different sources of income

Figures 6-26 through 6-33 present results of income level analyzed across reliance on different sources of income in Faga'alu. Fishing is very important of important for the two lowest annual income groups, but less important to not at all important for residents with annual incomes of $20,000 or greater (Fig. 6-26). Farming and government jobs are very important or somewhat important for food and/or income for most annual income levels (Fig. 6-27 and 6-29, respectively). Cannery jobs are very important for food and/or income for residents with annual incomes less than $10,000/year, and as annual income levels increase, importance on cannery jobs for food and/or income decreases

(Fig. 6-28). In general, across all levels of income, pension, off-island remittance and tourism are not important sources of income.

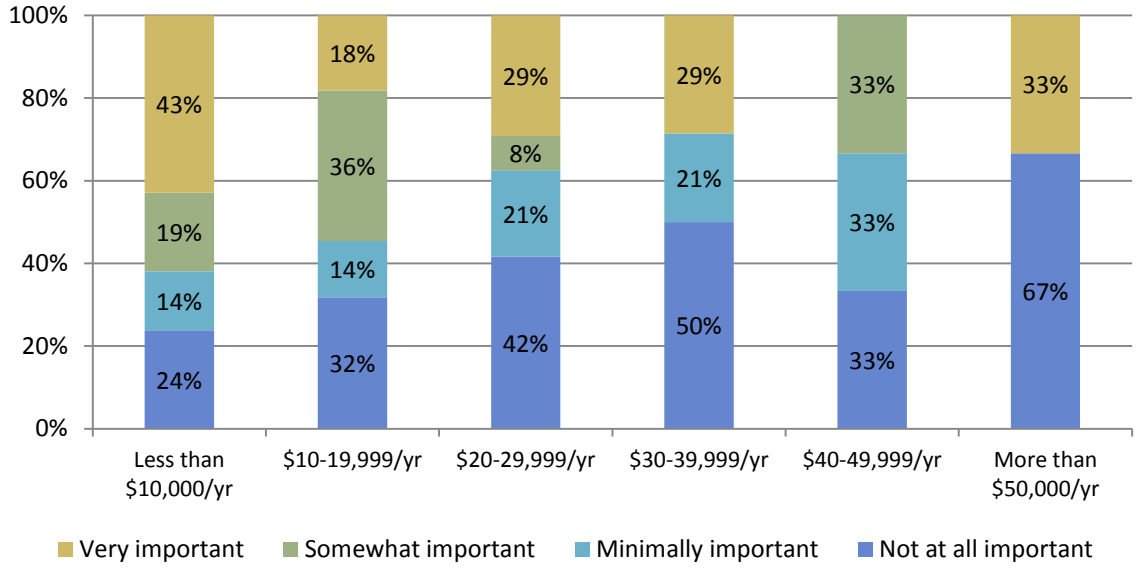

Figure 6-26. Income level and importance of fishing for food and/or income in Faga'alu.

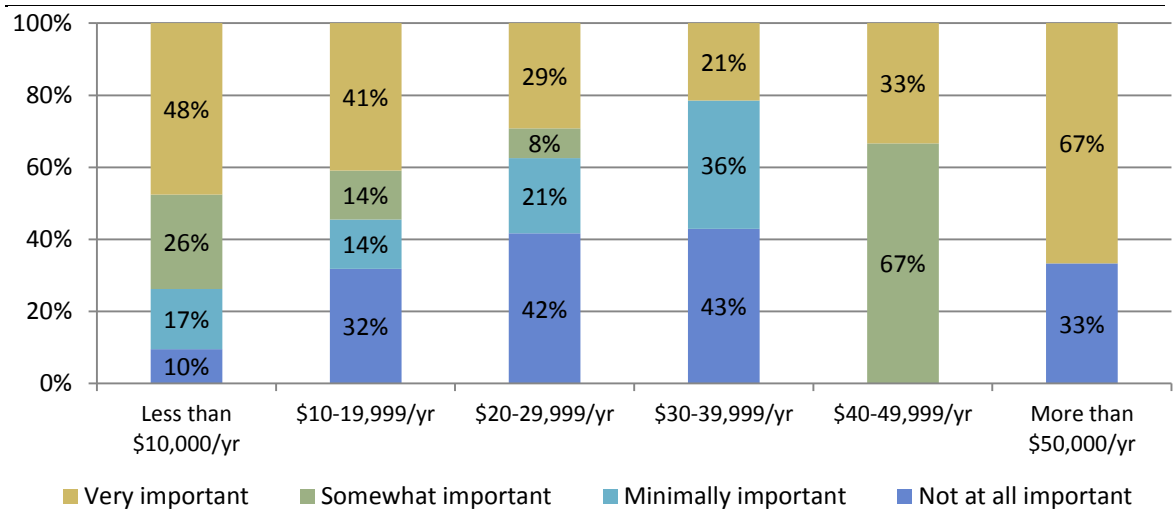

Figure 6-27. Income level and importance of farming for food and/or income in Faga'alu.

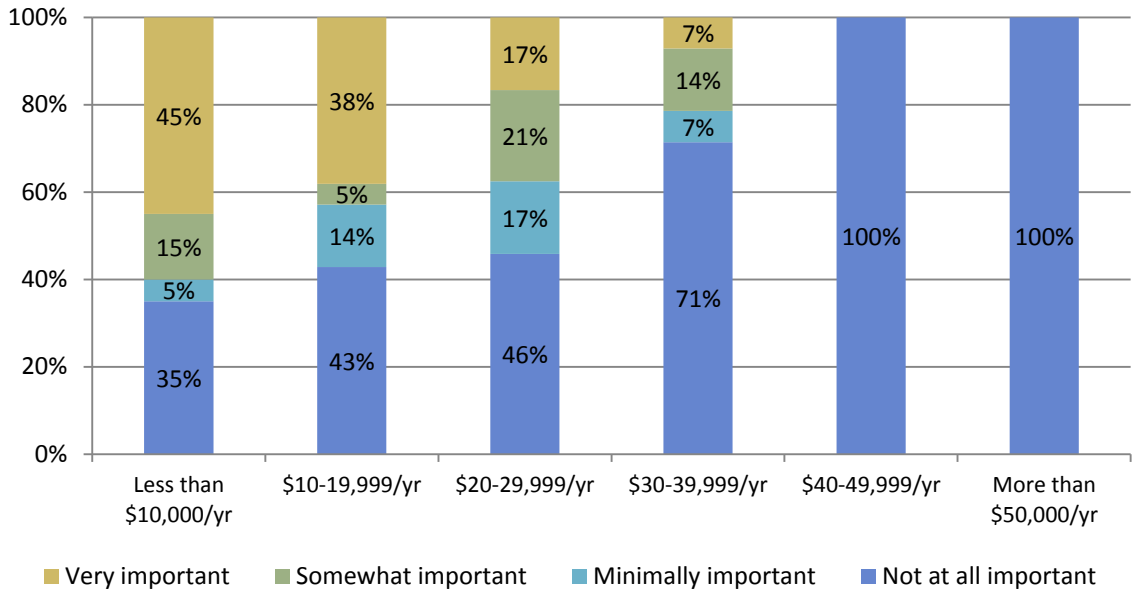

Figure 6-28. Income level and importance of the cannery for food and/or income in Faga'alu.

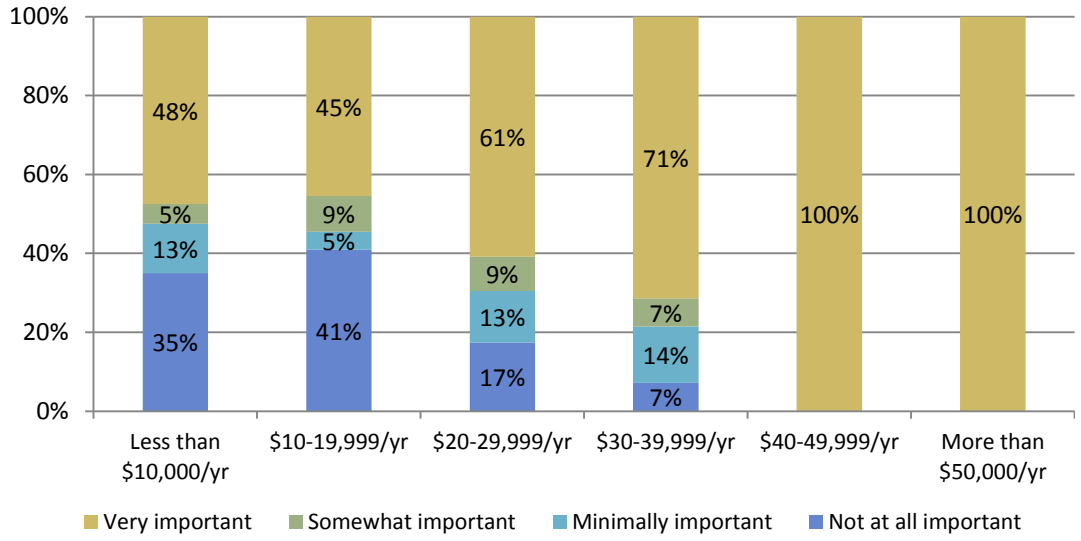

Figure 6-29. Income level and importance of government jobs for food and/or income in Faga'alu.

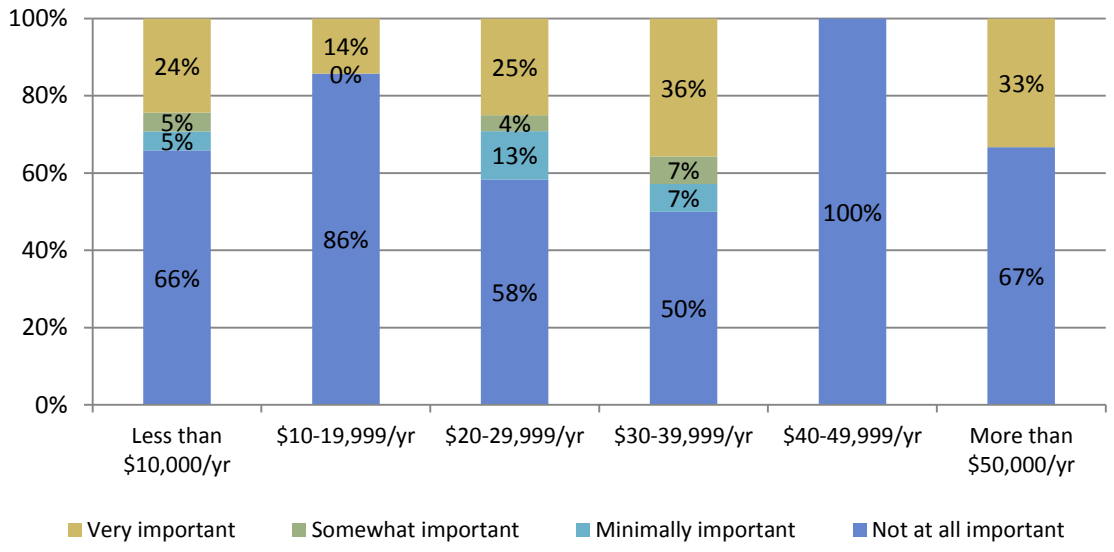

Figure 6-30. Income level and importance of pension (military or other) for food and/or income in Faga'alu.

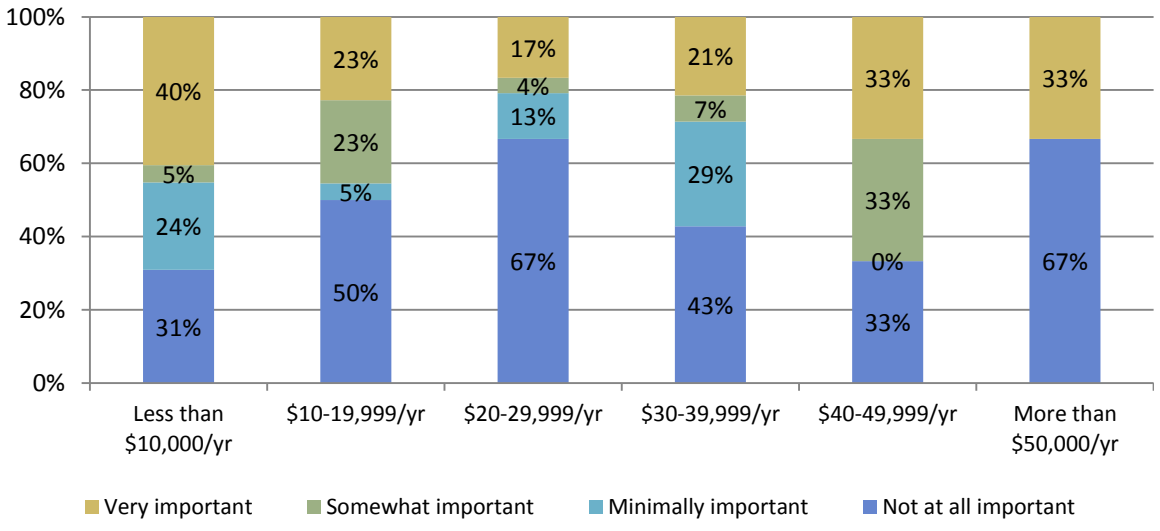

Figure 6-31. Income level and importance of off-island remittance for food and/or income in Faga'alu.

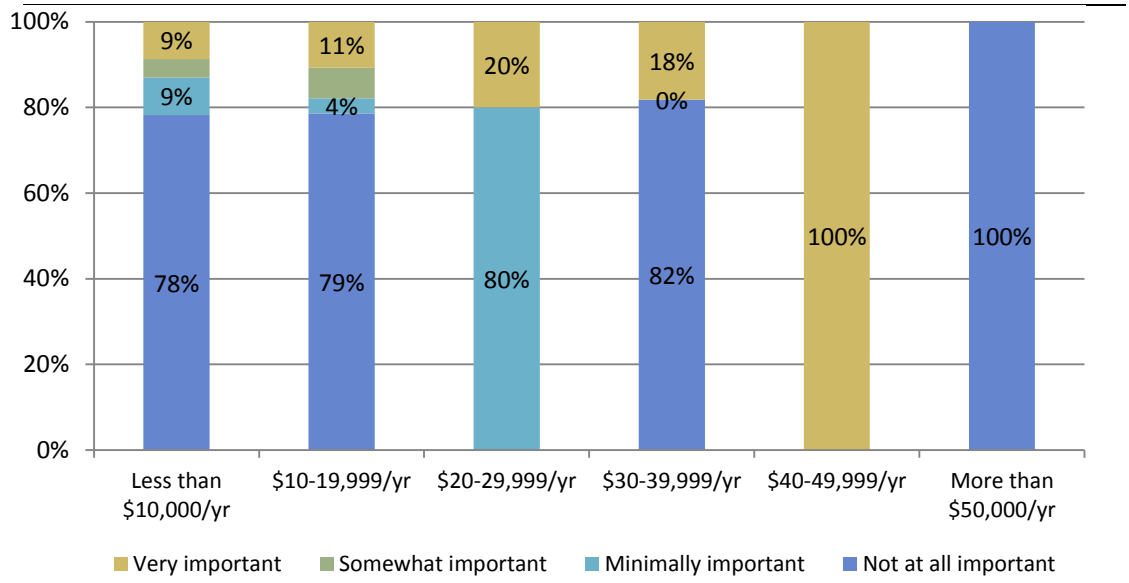

Figure 6-32. Income level and importance of private business for food and/or income in Faga'alu.

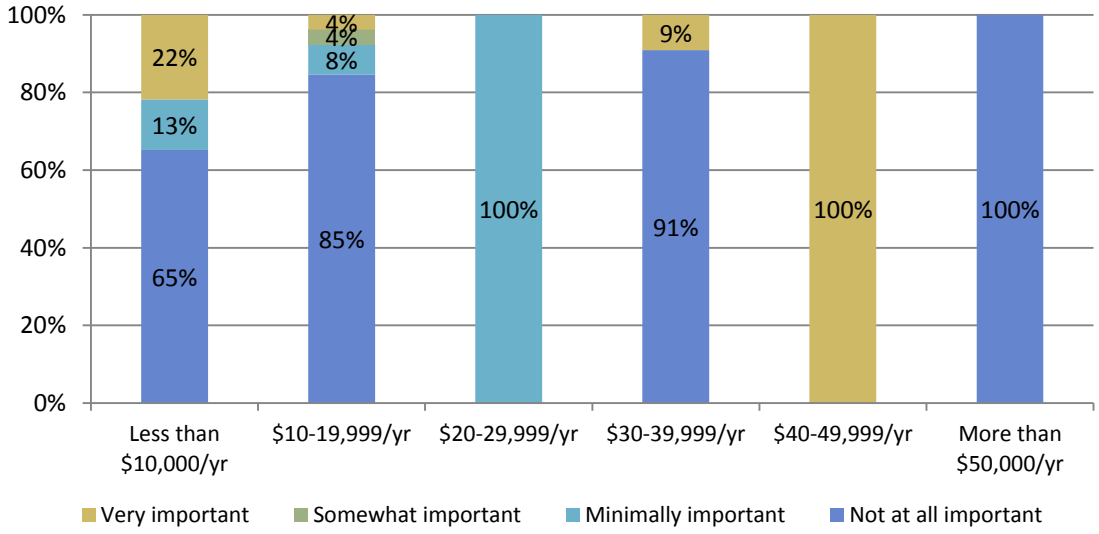

Figure 6-33. Income level and importance of tourism for food and/or income in Faga'alu.

Income with fishing frequency

Figure 6-34, below presents the results of annual income level with fishing frequency in Faga'alu. Across all annual income levels (except $20-29,999/year), more than half of the respondents fish once/week or more.

Fishing frequency with reliance on fishing

Figure 6-35 presents the results of fishing frequency with the level of reliance on fishing for food and/or income in Faga'alu. Over half of the respondents who fish more than once/week, about once/week, 1-3 times a month or rarely/never have a very important reliance on fishing for food and/or income. Most respondents who fish 1-10 times/year have a minimal reliance on fishing for food and/or income..

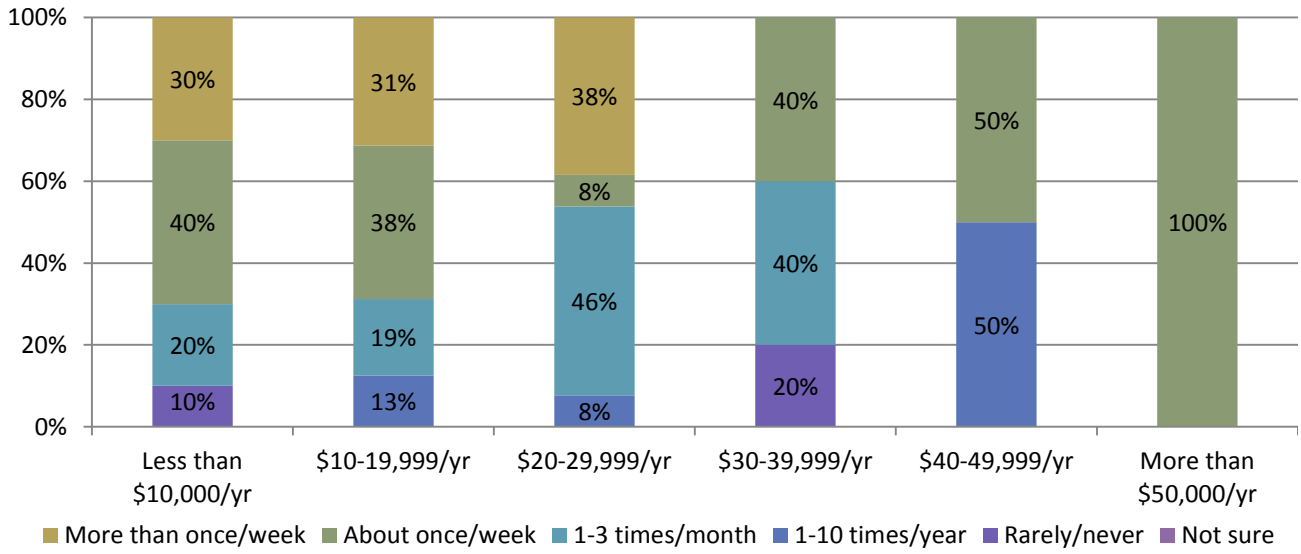

Figure 6-34. Fishing frequency by annual income level in Faga'alu.

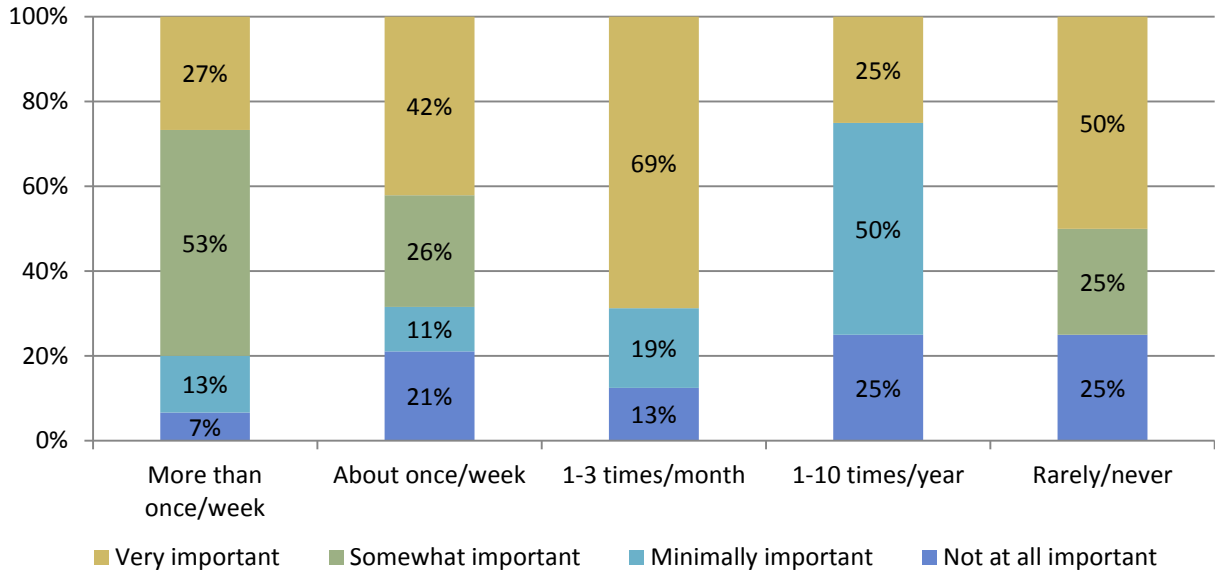

Figure 6-35. Fishing frequency with reliance on fishing for income/food in Faga'alu.

Fishing frequency with support for marine management strategies

Figures 6-36 through 6-44 present the results of fishing frequency with the level of support for various management strategies to protect marine resources. Across all levels of fishing frequency, except those who rarely/never fish, there is strong support for areas closed to fishing for 1-2 years (Fig. 6-36). In general, there is not support for closed areas 3-5 years or more than 10 years in length from fishers in Faga'alu. As the length of time for fishing closures increases, level of support among all fishers/gathers decreases, with the vast majority of fishers of all frequency not supporting closed areas for 10 years or longer (Fig. 6-38). Over half of Faga'alu fishers who fish/gather more than once a week strongly or somewhat support seasonal restrictions (Fig. 6-39), and over half of these fishers strongly support gear restrictions (Fig 6-40). Figure 6-41 presents levels of fishing frequency and level of support to size or catch limits. Similar to seasonal or gear restrictions, the majority of Faga'alu fishers support size or catch limits.

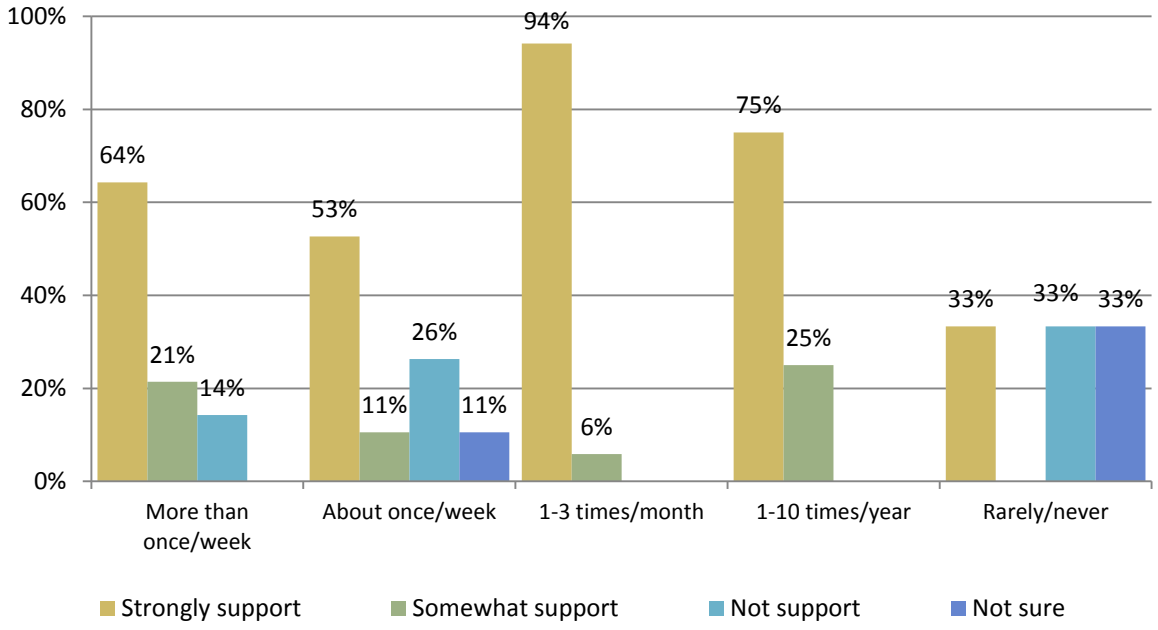

Figure 6-36. Fishing frequency with level of support to closed areas for 1-2 years.

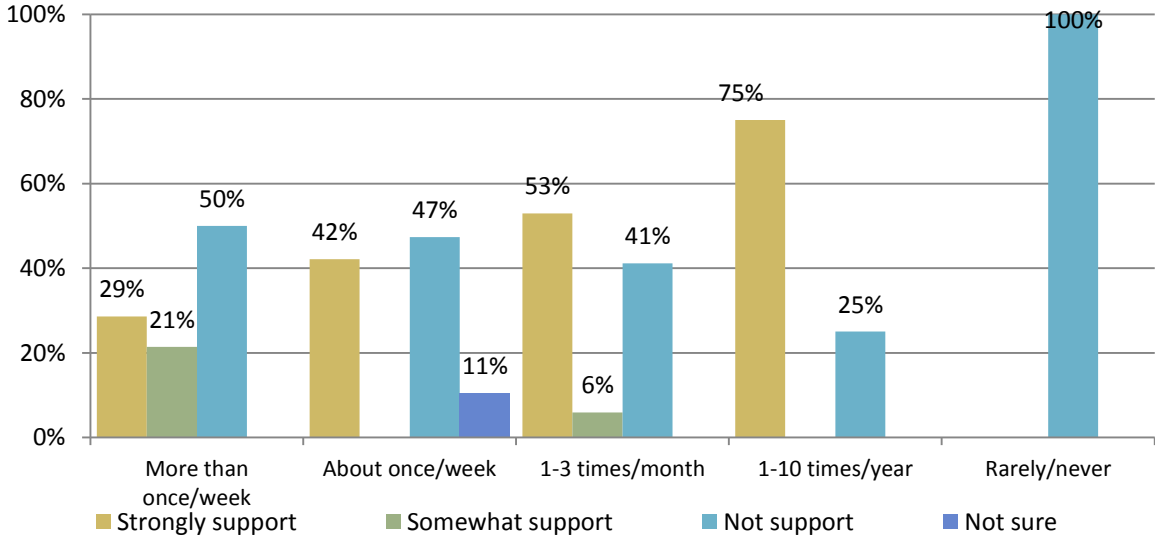

Figure 6-37. Fishing frequency with level of support to closed areas for 3-5 years.

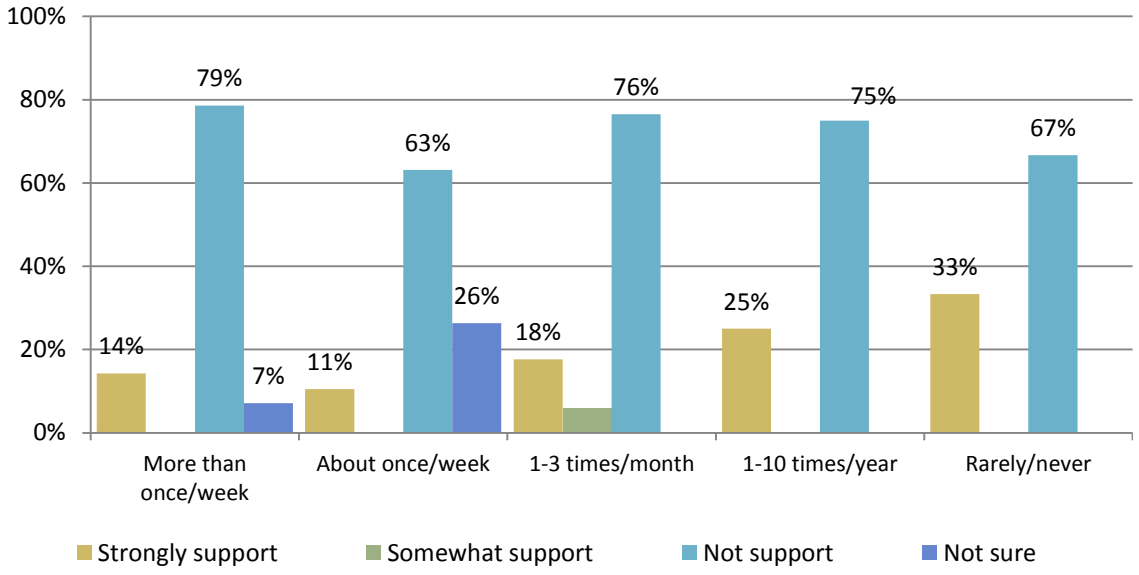

Figure 6-38. Fishing frequency with level of support to closed areas for more than 10 years.

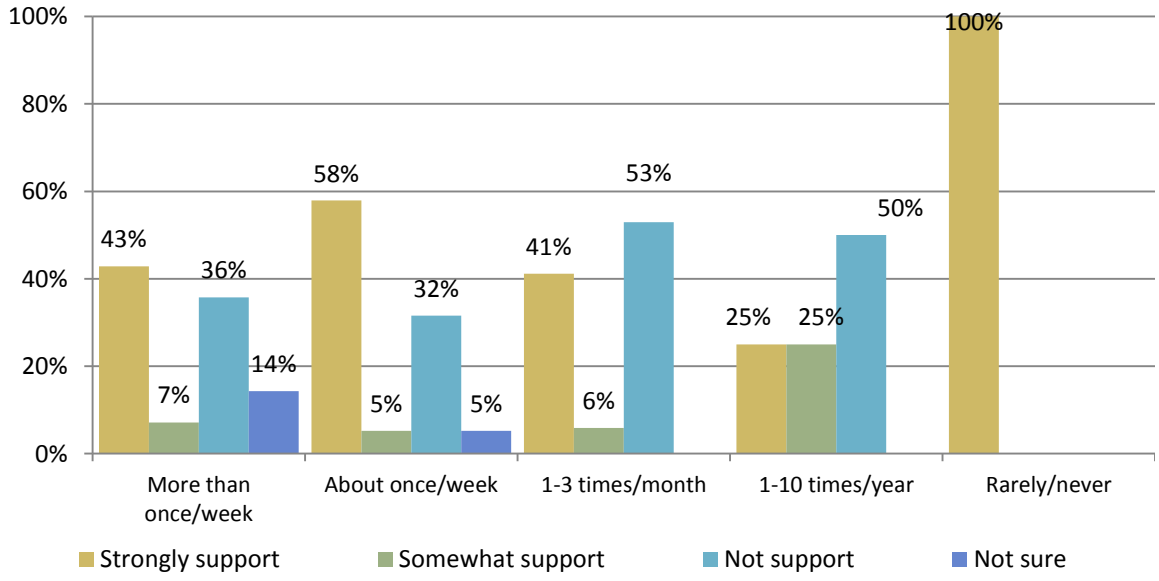

Figure 6-39. Fishing frequency with level of support to seasonal closures.

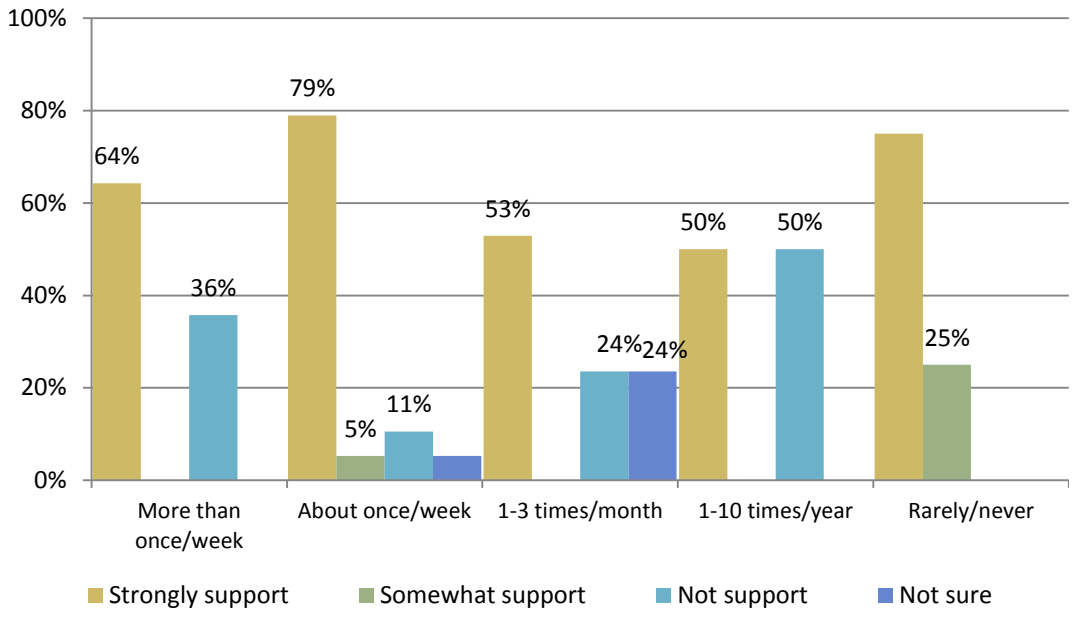

Figure 6-40. Fishing frequency with level of support to gear restrictions.

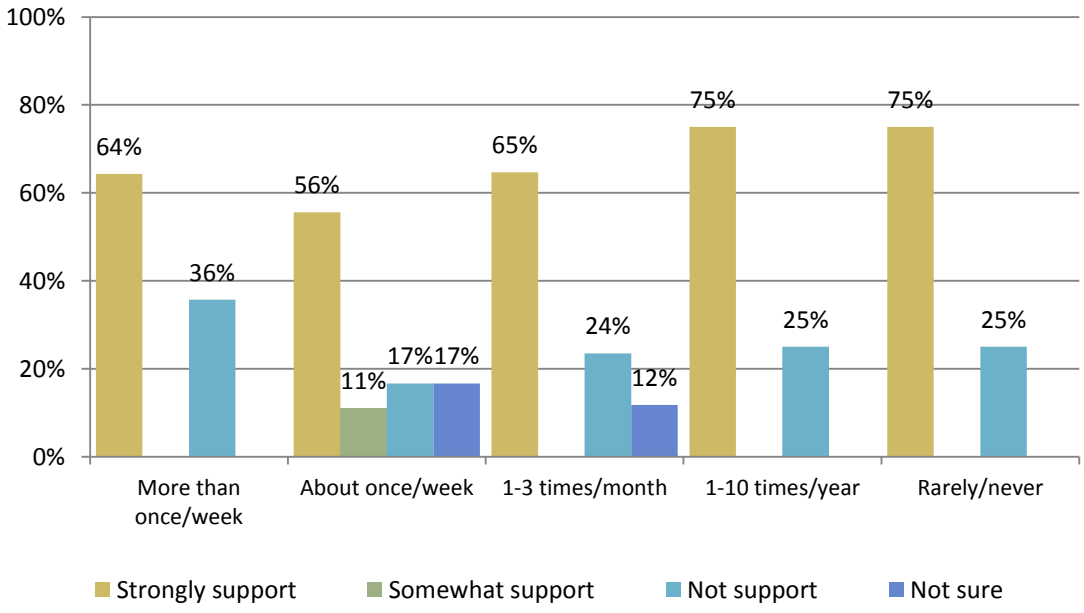

Figure 6-41. Fishing frequency with level of support to size or catch limits.

Figure 6-42, below, presents fishing frequency with level of support to limits on fishing certain vulnerable species that are overfished or whose numbers are very low. This management strategy is strongly supported by 50% of fishers who fish more than once/week, 68% of fishers who fish about once/week, 53% of fishers who fish 1-3 times/month, 50% of fishers who fish 1-10 times/year and 75% of fishers who rarely/never fish. Figure 6-43 presents fishing frequency with the level of support for restrictions on non-village fishers. The majority of fishers, except those who fish 1-3 times/month, strongly support restrictions on non-village fishers. The majority of fishers do not support no restrictions (Fig. 6-44).

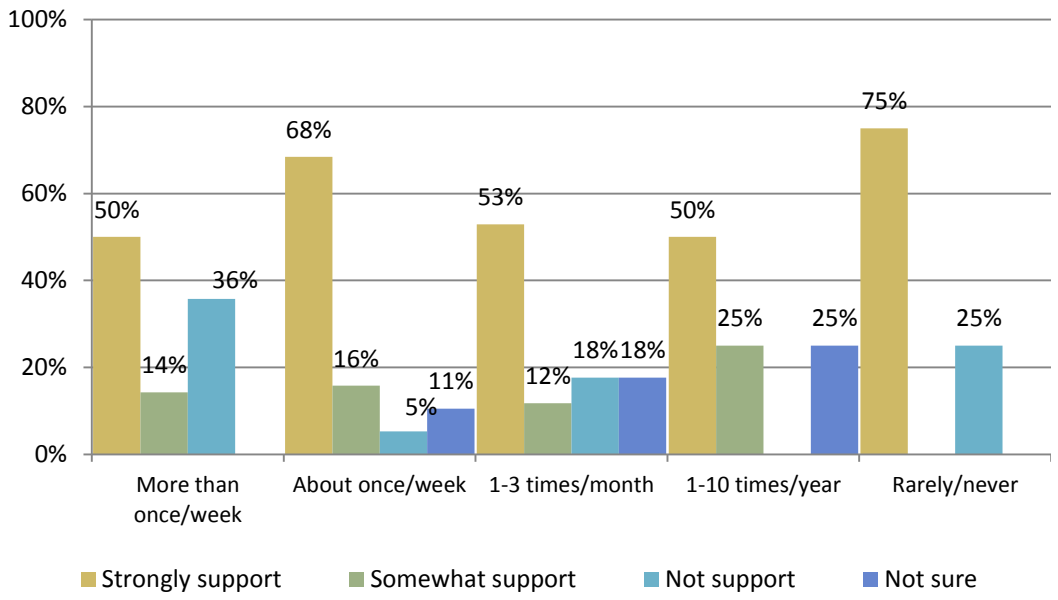

Figure 6-42. Fishing frequency with level of support to limits on fishing certain vulnerable species that are overfished or whose numbers are very low. .

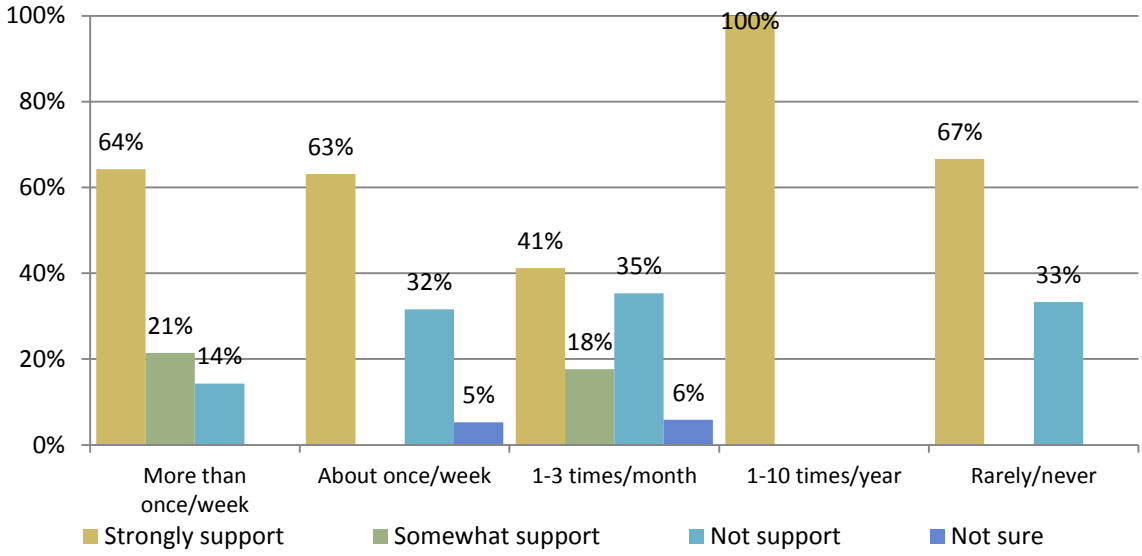

Figure 5-43. Fishing frequency with level of support to restrictions on non-village fishers.

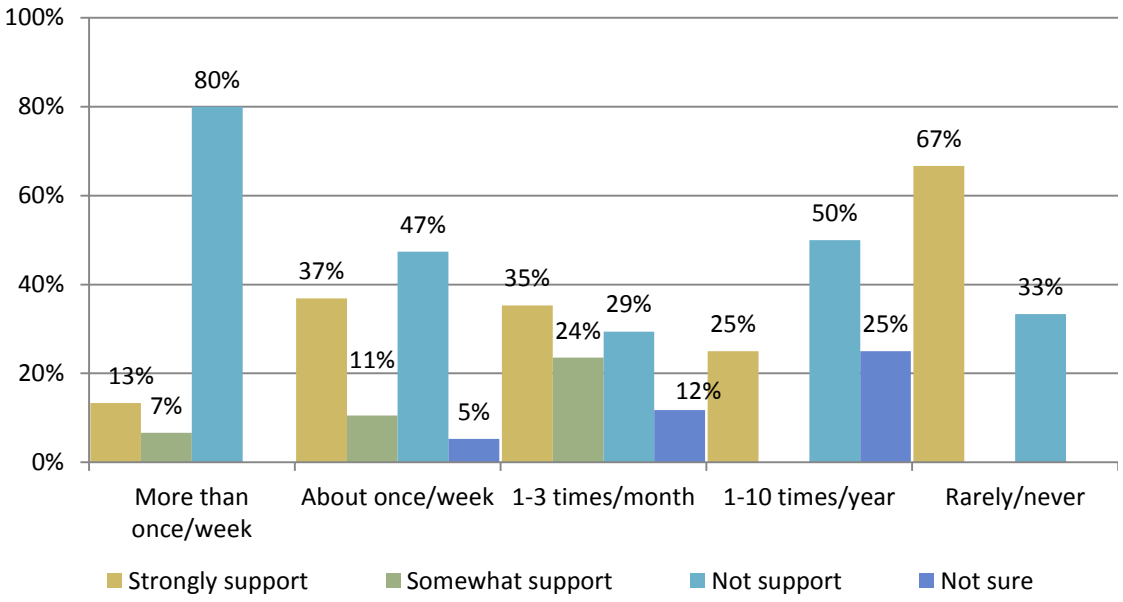

Figure 6-44. Fishing frequency with level of support to no restrictions.

Reliance on fishing for income with support for management strategies to protect marine resources

Figures 6-46 through 6-53 present the results from the questions on level of reliance on fishing for income (very important to not at all) with level of support for restrictions. Across all levels of importance of reliance on fishing for income, closed areas for 1-2 years is strongly supported by the majority of respondents, and as the length of time for closures increases, level of support decreases. Respondents who have a very important reliance on fishing for income generally have strong support for management strategies to protect marine resources, with only two management strategies: closed areas for 10 or more years and no restrictions not supported by the majority of respondents. Respondents who have some reliance on fishing for income also generally strongly support fishery restrictions. No restrictions is not supported by over half (64%) of respondents who have some reliance on fishing for income. Respondents with minimally important reliance no reliance on fishing for income are less supportive of most management strategies than all other levels of fishing reliant respondents.

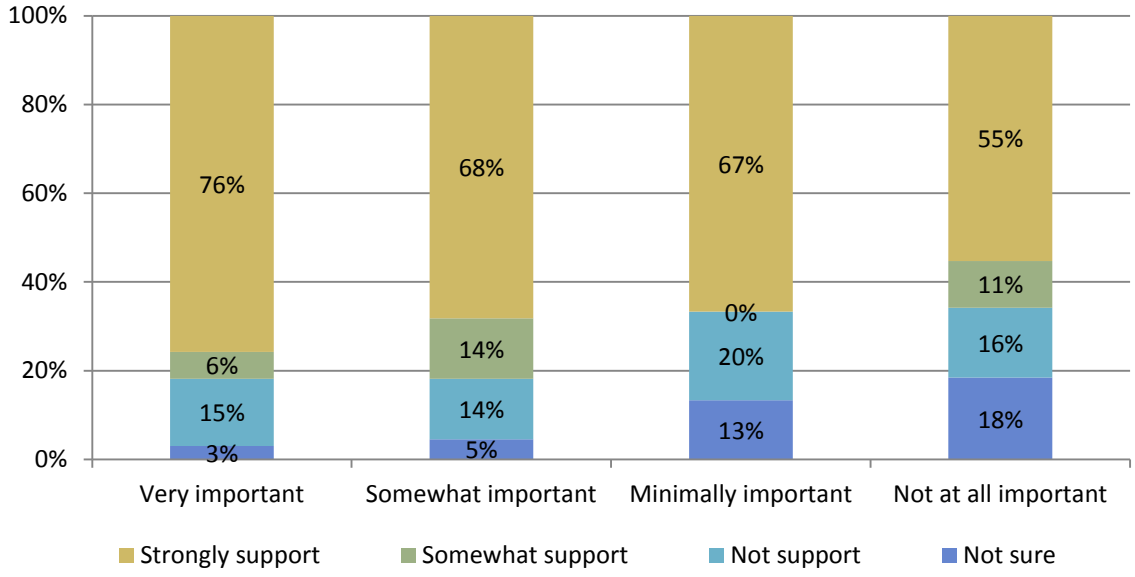

Figure 6-45. Reliance on fishing for income and level of support for closed areas 1-2 years.

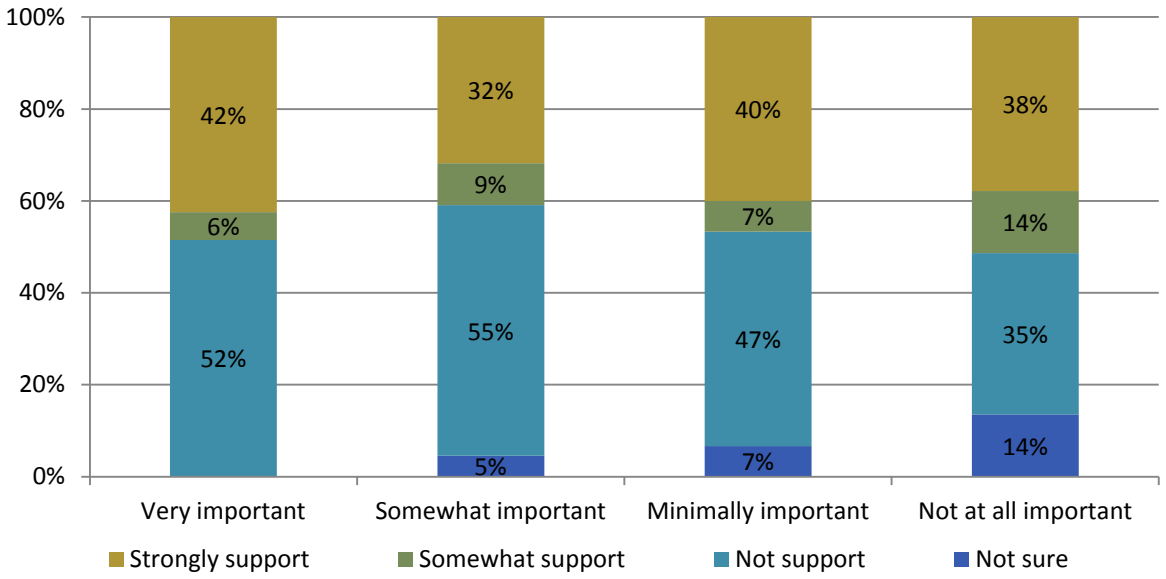

Figure 6-46. Reliance on fishing for income and level of support for closed areas 3-5 years.

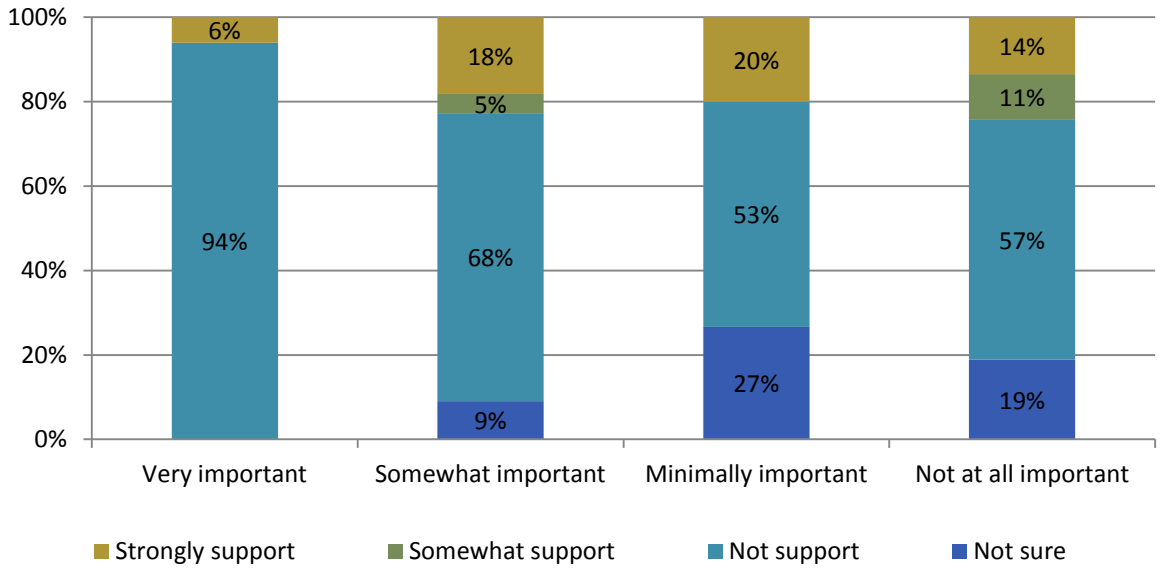

Figure 6-47. Reliance on fishing for income and level of support for closed areas for7more 10 years or more.

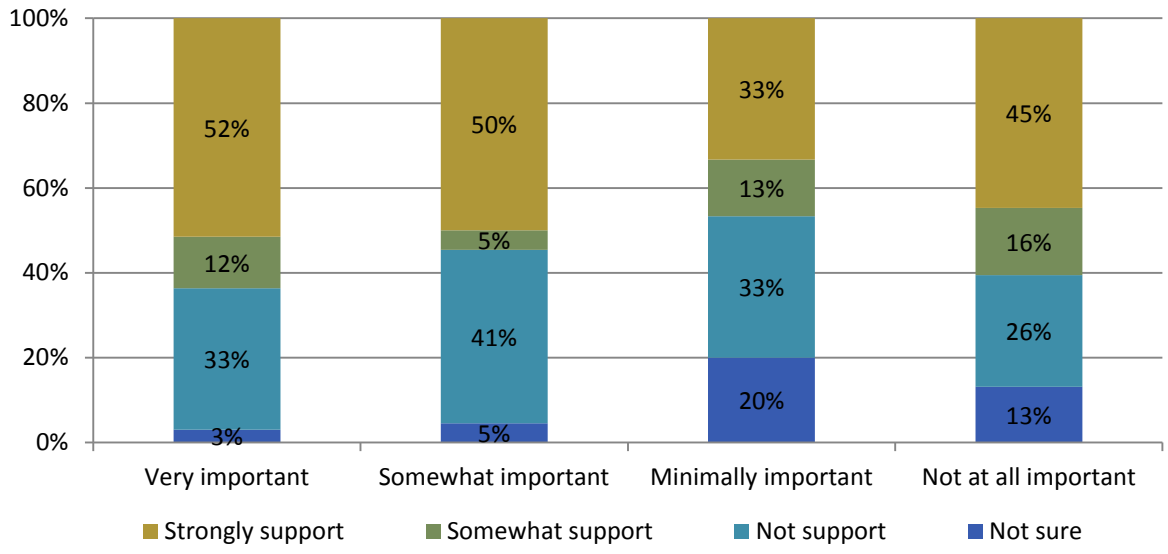

Figure 6-48. Reliance on fishing for income and level of support for seasonal closures.

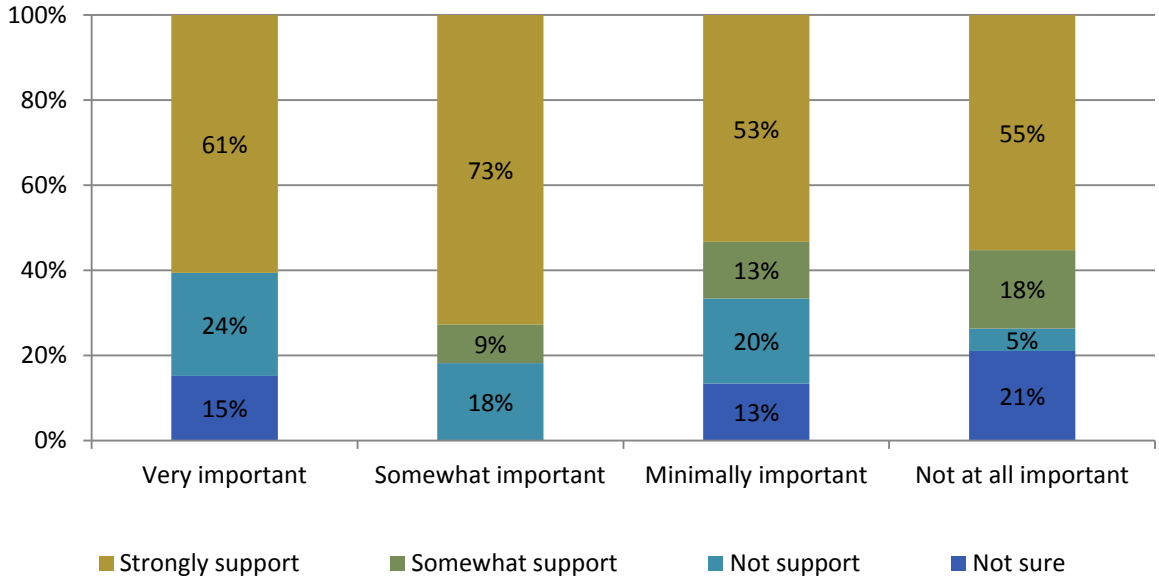

Figure 6-59. Reliance on fishing for income and level of support to gear restrictions.

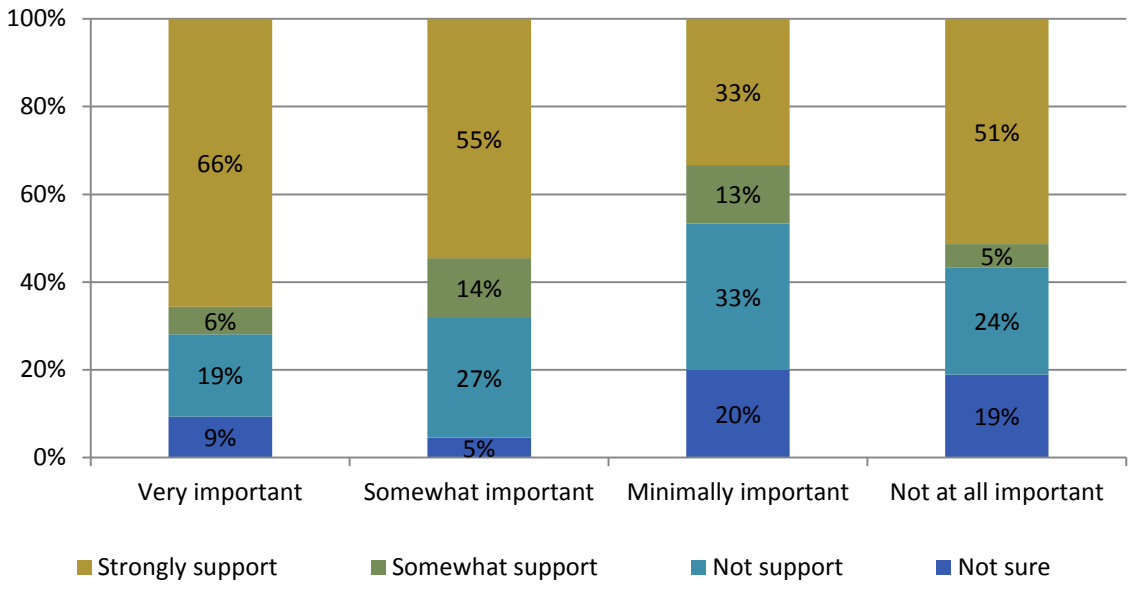

Figure 6-50. Reliance on fishing for income and level of support to size or catch limits.

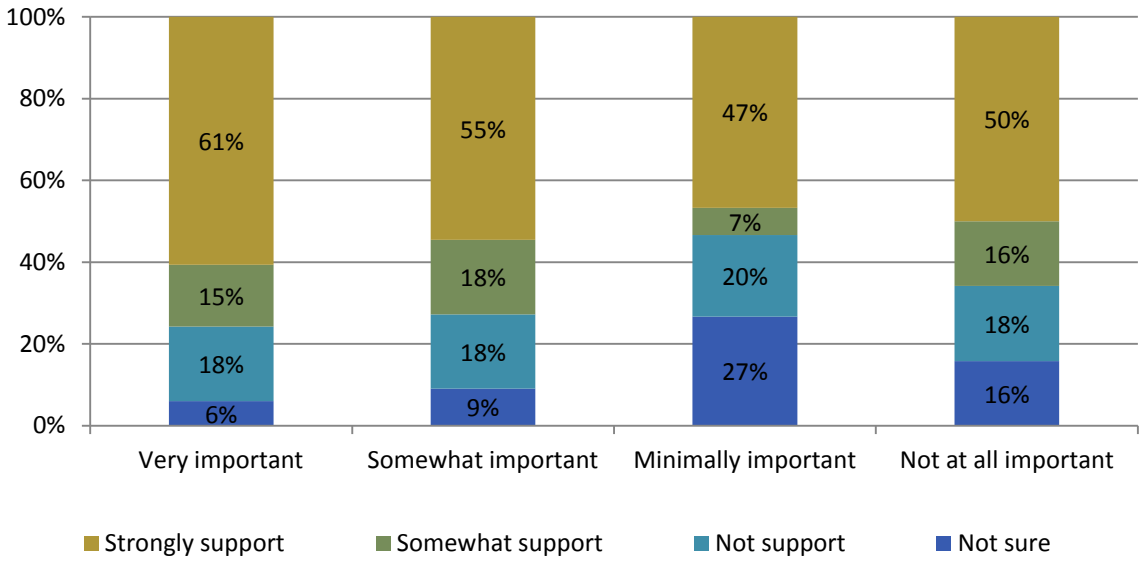

Figure 6-51. Reliance on fishing for income and level of support to limits on fishing certain vulnerable species that are overfished or whose numbers are very low. .

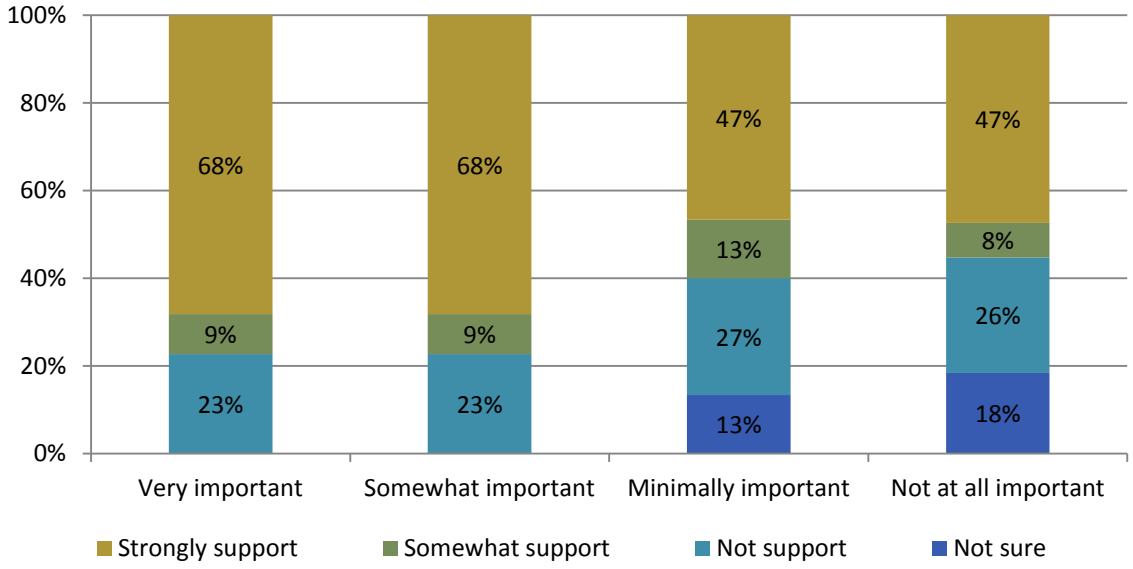

Figure 6-52. Reliance on fishing for income and level of support to restrictions on non-village fishers.

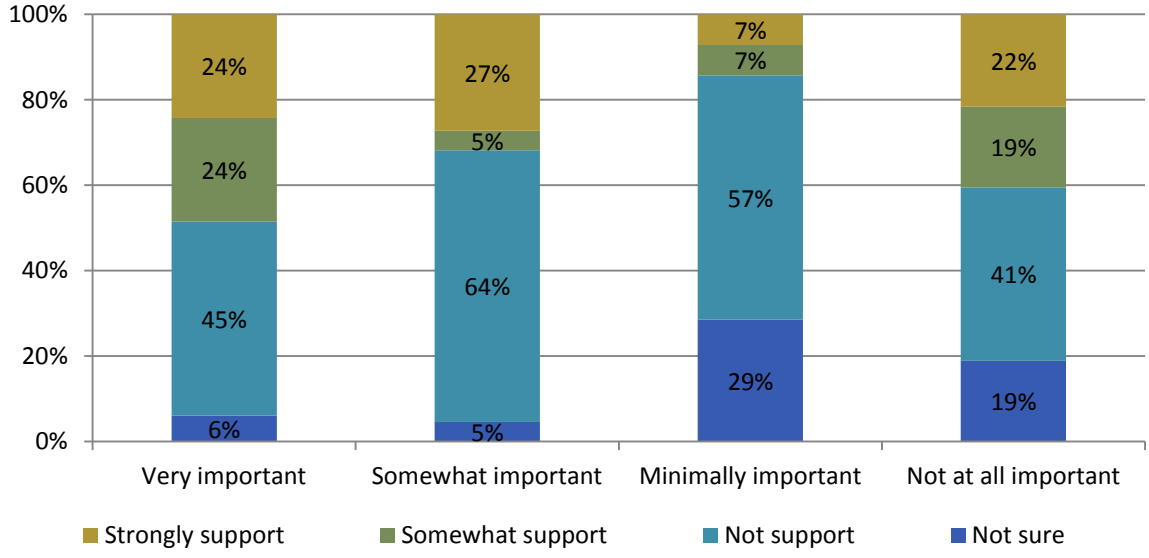

Figure 6-53. Reliance on fishing for income with level of support to no restrictions.

Fishing frequency and perception of resource conditions

Figures 6-54 through 6-63 below, present the results from the survey of fishing frequency and the perception of the condition of marine resources and the environment in Faga'alu. Fishers who fish more than once a week generally perceive marine resources to be good, with the majority of fishers thinking fish on the reef slope and reef flat are very good or good (62% and 69%, respectively). Pelagic fish and invertebrates are considered to be in good condition (with no fishers who fish more than once a week thinking they are in very good condition). The majority of Faga'alu fishers who fish more than once a week think ocean and stream water quality are neither good nor bad (50% each). No general consensus on the condition of both the coral habitat and beach quality can be made from fishers who fish more than once a week (Fig. 6-55). Figures 6-56 and 6-57 present residents in Faga'alu who fish once/week and their perception of marine resources and the environment. Faga'alu fishers who fish about once/week think fish from the reef flat and pelagic fish are very good or good, while there is mixed perceptions on fish from the reef slope and invertebrates. In general, fishers who fish about once/week think ocean water quality is good or neither good nor bad.

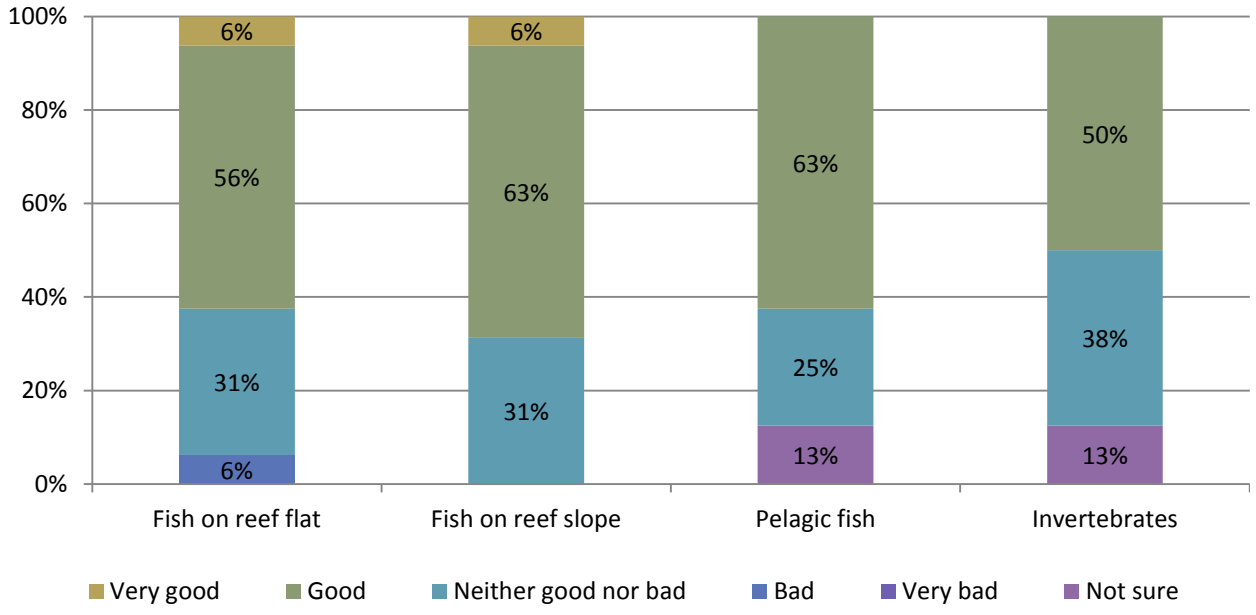

Figure 6-54. Faga'alu fishers who fish more than once a week and perception of marine resources.

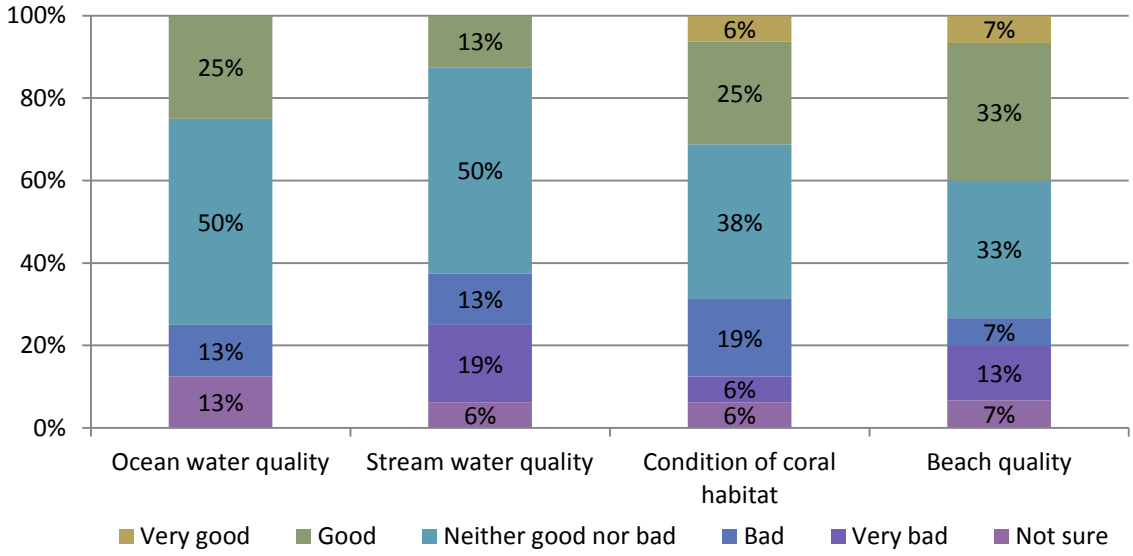

Figure 6-55. Faga'alu fishers who fish more than once a week and perception of the environment.

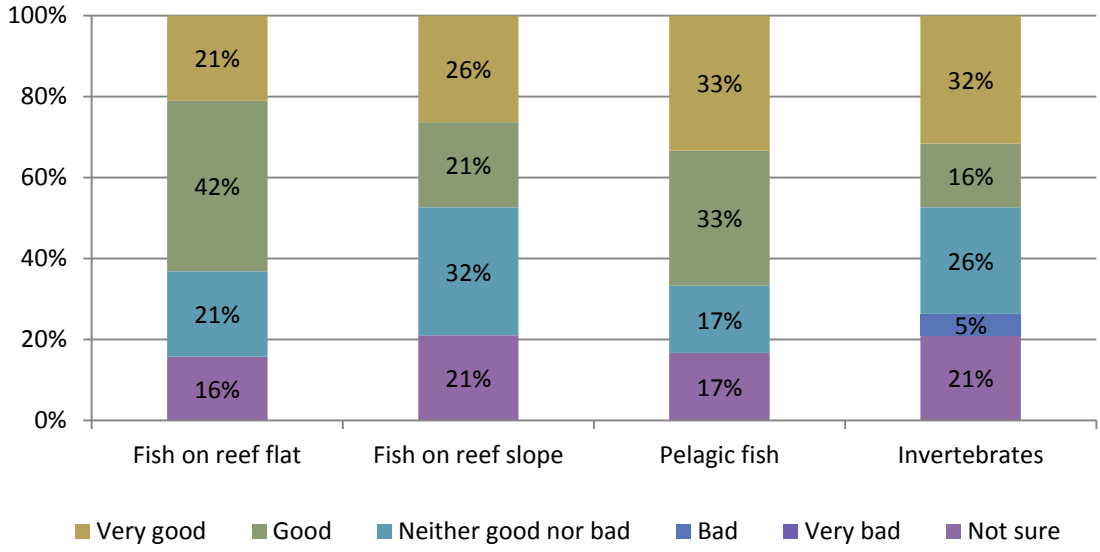

Figure 6-56. Faga'alu fishers who fish about once a week and perception of marine resources

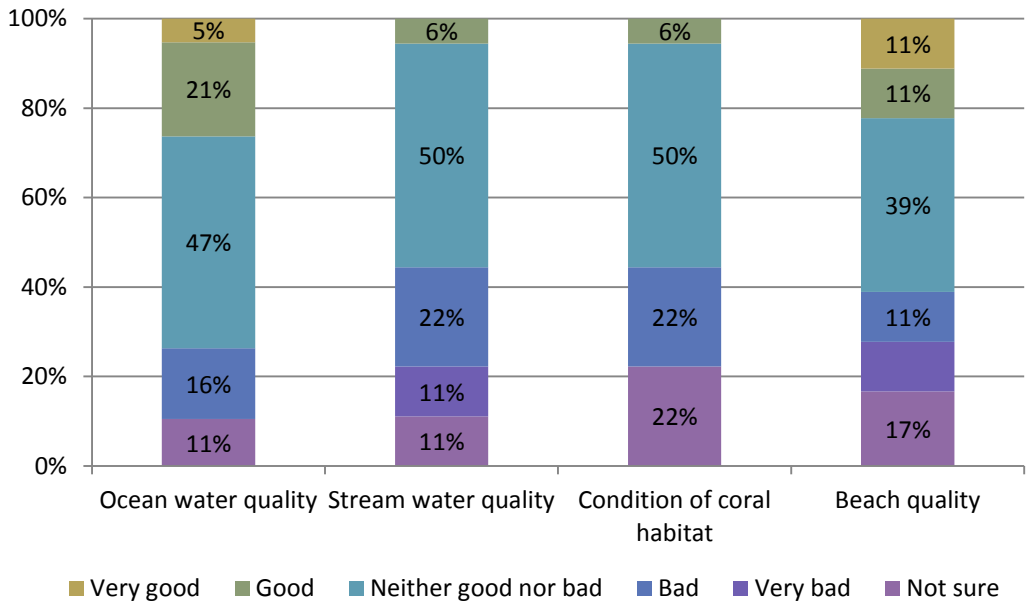

Figure 6-57. Faga'alu fishers who fish about once a week and perception of the environment

Figures 6-58 and 6-59 below, present fishers who fish 1-3 times/month and their perception of marine resources and the environment. In general, Faga'alu fishers who fish 1-3 times/month think fish on the reef flat, fish on the reef slope, pelagic fish and invertebrates are doing very good or good (Fig. 6-58). Half of the Faga'alu fishers who fish 1-3 times/month think ocean water quality is very good or good. Stream water quality, condition of coral habitat and beach quality are perceived to neither good nor bad or bad.

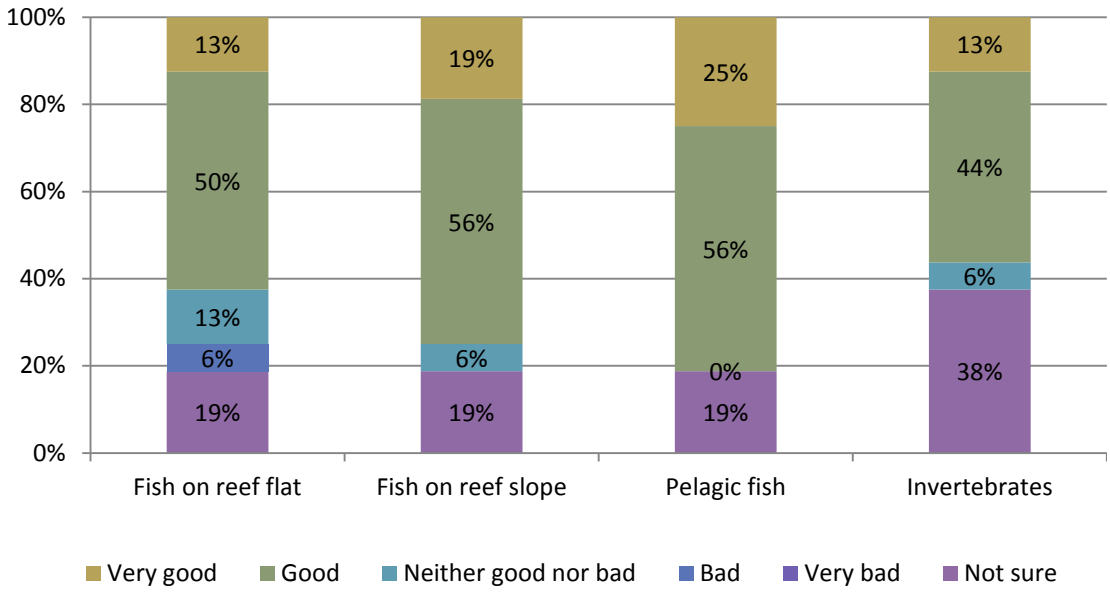

Figure 6-58. Faga'alu fishers who fish 1-3 times/month and perception marine resources.

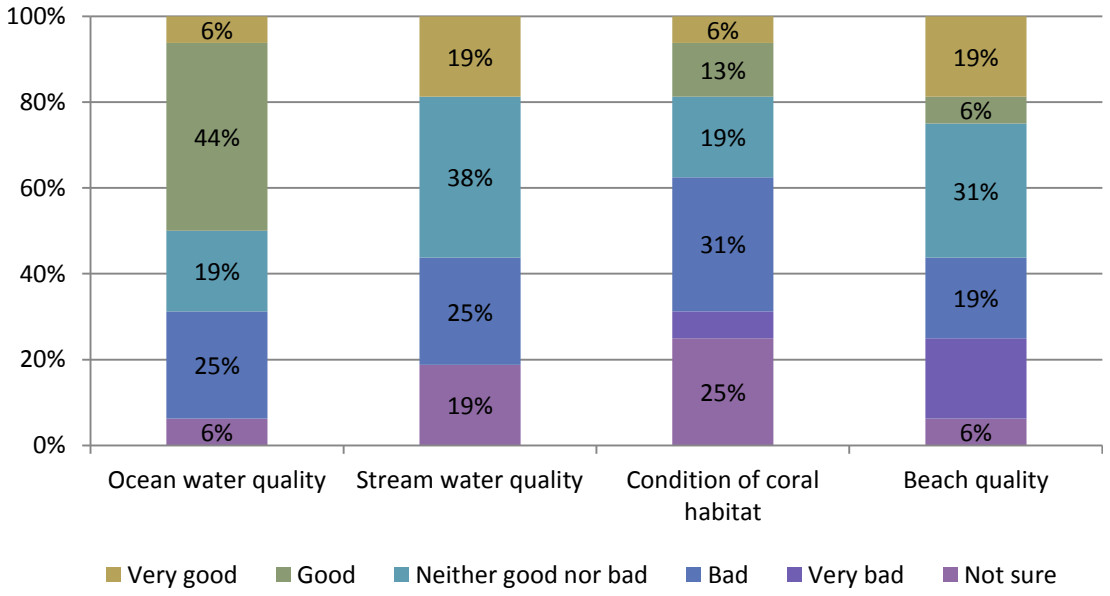

Figure 6-59. Faga'alu fishers who fish 1-3 times/month and perception of the environment.

Figures 6-60 and 6-61 show fishers who fish 1-10 times/year and their perception of marine resource conditions and the environment. Half of the fishers who fish 1-10 times/year think fish on the reef flat are neither good nor bad. An equal distribution (25%) think fish on the reef slope are very good, good, bad and very bad. The majority of these fishers are not sure about the condition of pelagic fish and invetebrates (Fig. 6-60). In general, fishers who fish 1-10 times/year think the condition of the marine environment is neither good nor bad or bad. An equal distribution (25%) of fishers who fish 1-10 times/year think ocean water quality is neither good nor bad, bad, very bad and not sure. Half of these fishers are not sure about the condition of stream water quality, half think condition of the coral habitat is good and there is an equal number of respondents (50%) who think beach quality is good and bad (Fig. 6-61). Figures 6-62 and 6-63 below, present fishers who rarely/never and their perception of marine resources and the environment. Faga'alu fishers who rarely or never fish are not sure of the condition of fish on the reef flat and pelagic fish. In general, fishers who rarely or never fish are not sure of the condition of the environment.

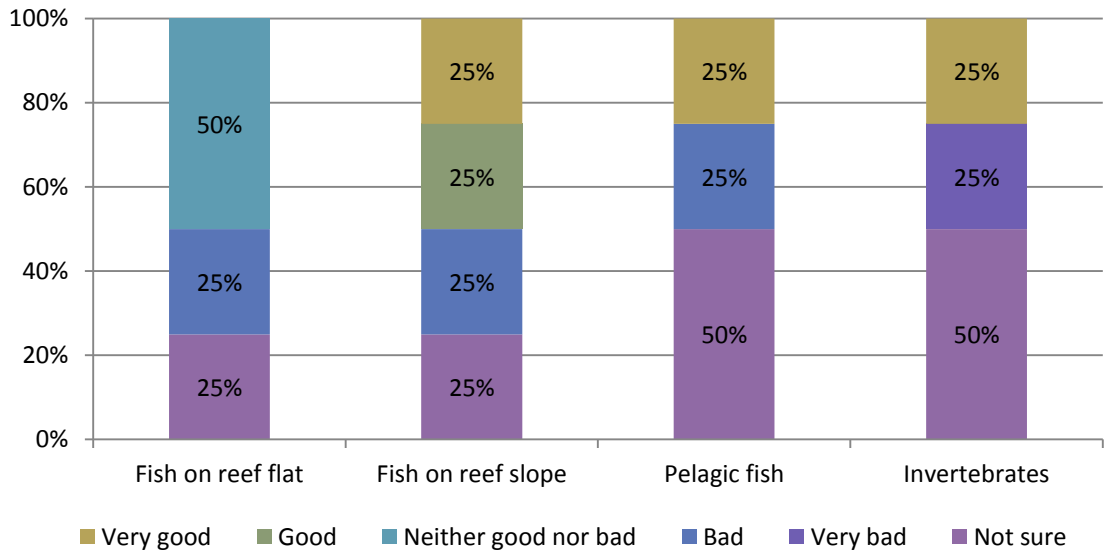

Figure 6-60. Faga'alu fishers who fish 1-10 times/year and perception of marine resources.

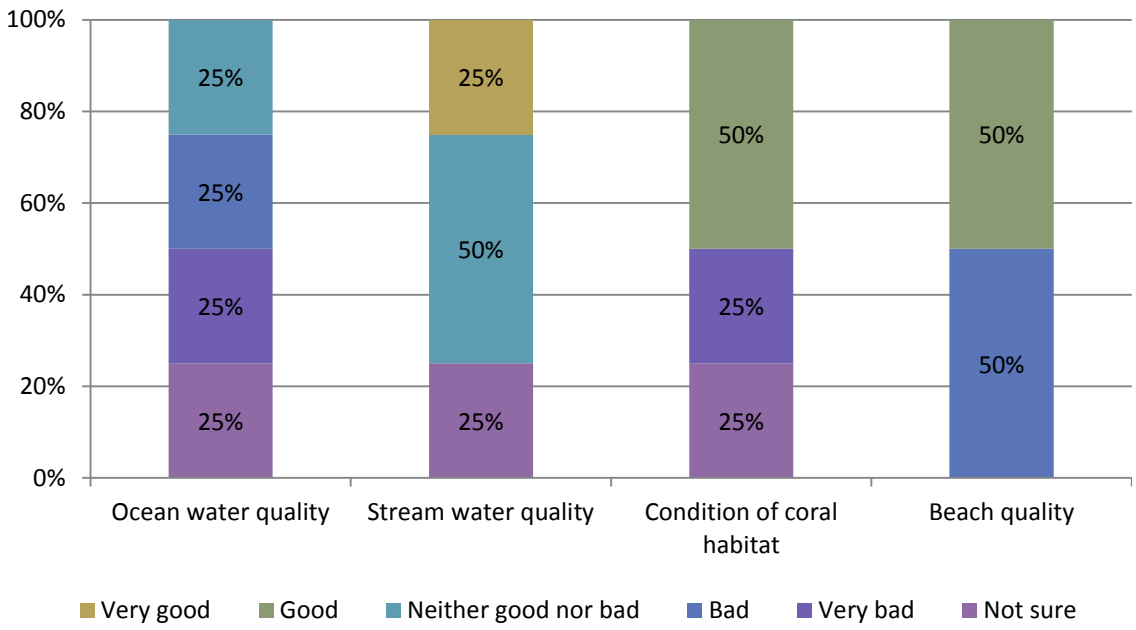

Figure 6-61. Faga'alu fishers who fish 1-10 times/year and perception of the environment.

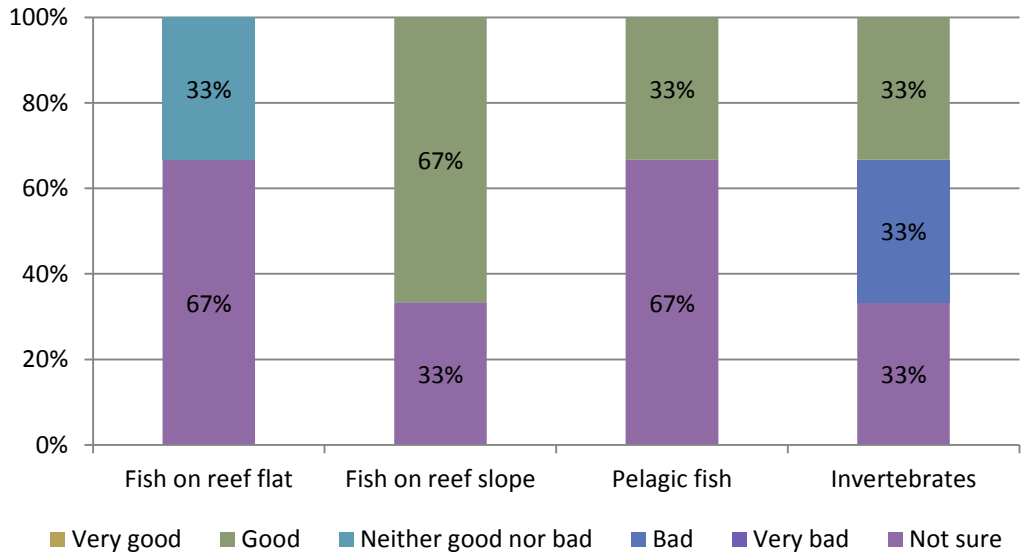

Figure 6-62. Faga'alu fishers who never/rarely fish and perception marine resources.

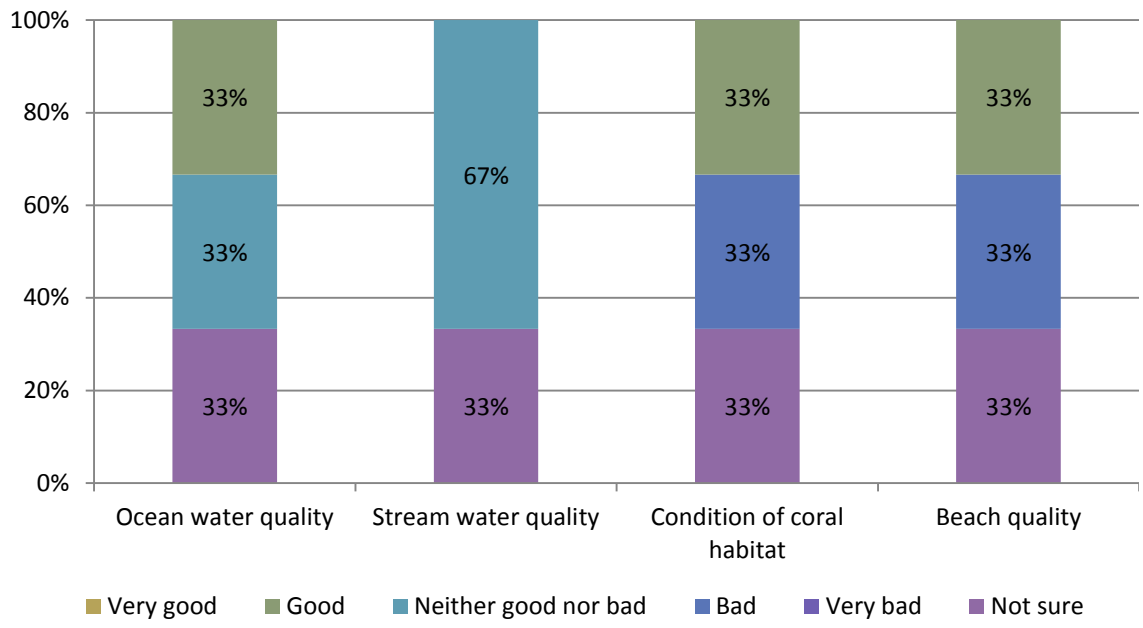

Figure 6-63. Faga'alu fishers who never/rarely fish and perception of the environment.

7.0 Conclusions

This report represents a summary of data collected in the villages of Vatia, Aunu'u, and Faga'alu, which are all priority management sites in American Samoa. It can be used to inform site-specific management strategies in each of these villages. We anticipate that this information will feed into future management planning, resilience assessments, and can be used to track changes in social indicators over time in each of the villages. The survey results and format will inform planned socioeconomic assessments in additional priority management sites in American Samoa (such as additional Community-based Fisheries Management Program villages or villages affiliated with the National Marine Sanctuary), so that information can be compared across locations and across the different types of management programs being implemented in the territory.

Appendix

Following is the copy of the survey instrument used in American Samoa.

Surveyor(s):_____ Date: _____

Socioeconomic survey questions: Trash, the Marine Environment, and Village Adaptive Capacity

Village: _____ Gender: Male / Female Age: _____

1. How many people live in your household (total number under one roof)? _____
   E to'afia tagata o lo'o nonofo fa'atasi i le fale?

2. Do you (and other members of your household) belong to any community groups?
   E te iai (fa'apea nisi o lo outou nonofo fa'atasi) i se fa'alapotopotoga?
   a. Church - Ekalesia
   b. Village council – Pulega a le nu'u
   c. Village committee – Komiti o le nu'u:
      _____
   d. Youth group - Autalavou
   e. Other – O nisi: _____
   f. Other – O nisi: _____

3. Which of the following activities does your household depend on for food and/or income?
   O fea o mea nei o lo'o fa'amoemoe ai lou aiga mo mea'ai ma/po'o tupe maua?

	Highly important source of food or income Matua fa'amoemoe iai	Somewhat important source of food or income E fa'amoemoe iai	Minimally important source of food or income E fa'amoemoe itiiti iai	Not at all important source of food or income E lē fa'amoemoe iai
Boat transportation (**Aunu'u only) Faigamalaga o va'a (mo Aunu'u)				
Fishing / gathering Fagota				
Farming Fai fa'atoaga				
Cannery Kamupani I'a				
Government job Galuega a le malo				
Pension (military or other) Tupe maua mai le militeli				
Off-island remittances O nisi o tupe maua mai fafo				
Private business Pisinisi				
Tourism				

Surveyor(s):_____ Date: _____

Tagata tafafao mai fafo				
Other- O nisi: _____				
Other- O nisi _____				

4. Do you or anyone in your household fish / harvest marine resources?
E iai se isi mai lou aiga po'o o oe fo'I e fagota?
   a. I fish, plus ____ household members
      Out e fagota, fa'apea _____ tagata o le matou aiga o lo'o matou nonofo fa'atasi
   b. I do not fish, but ____ household members fish
      Ou te lē fagota, ae _____tagata o le matou aiga o lo'o matou nonofo fa'atasi e fagogota
   c. No (if no, go to question 11)
      Leai (A leai, alu I le fesili 11)

5. If yes, what are the primary reasons and frequency which members of your household fish/harvest (check all that apply)?
A Ioe, o a ni mafua'aga e fagogota ai tagta o lou aiga o lo'o outou nonofo fa'atasi? (Maka mai mea uma o lo'o mafua ai ona fagogota)

	Frequently Fa'ateleina	Sometimes E lē fa'ateleina	Never Leai lava	Not sure E lē mautinoa
a. Food (eat or share fish with family) Mea'ai (Mo taumafataga po'o le fa'asoa atu i aiga)				
b. Income (sell fish) Tupemaua (Fa'atau atu)				
c. Provide to pastor or village leaders Fa'asoa mo faifeau po'o matai				
d. Fun Mo se fiafiaga e fa'atino lea tulaga				
e. Other: _____ O nisi:_____				

6. How often do members of your family fish/harvest marine resources?
E fa'afia ona fagotaina tamaoaiga mai le sami e tagata o lou aiga?
   a. More than once/week
      I luga atu iI le fa'atasi i le vaiaso
   b. About once/week
      Fa'atasi iI le vaiaso
   c. 1-3 times/month
      Fa'atasi i le tolu taimi I le masina
   d. 1-10 times/year
      Fa'atasi I le 10 taimi i le tausaga
   e. Rarely/never
      Seāseā lava pe leai fo'i
   f. Not sure

Surveyor(s):_____ Date: _____

E lē mautinoa
(Notes on this question (eg. seasonal variation, etc.): _____)

7. What types of fish/resources does your household target (check all that apply)?
O a ituaiga tamaoaiga mai le sami e masani ona fagotaina ? (maka mai mea uma e fa'ailoa mai ai ituaiga tamaoaiga o fagotaina)

a. Fish from reef flat
O I'a mai le a'au
b. Fish from reef slope
O I'a mai tua a'au
c. Pelagic (deep water) fish
O I'a mai le loloto
d. Invertebrates (snails, clams, lobster, octopus)
O figota (sisi, faisua, fe'e, ula)
e. Other: _____
O nisi:_____

8. What types of fishing methods are used by all members of your household combined?
O a ituaiga metotia e fa'aaoga e tagata uma o lou aiga o lo'o outou nonofo fa'atasi mo fagotaga?

	Frequently Fa'ateleina	Sometimes E lē fa'ateleina	Rarely Seāseā lava	Never Leai lava
a. Spearfishing Fa'aaogaina o le mata tao				
b. Rod and reel/ handline/pole and line from shore Fa'aaogaina o le ofe vili				
c. Gill nets Neti kili				
d. Throw nets Neti lafo				
e. Traps Mailei				
f. Gleaning/gathering Fagota I luga o le aloalo i le pe o le tai				
g. Bottom fishing (with boat) Fagota I le fa'aaogain o le va'a				
h. Trolling (with boat) Laina toso (fa'aaogaina o le va'a)				
i. Other: - _____ O nisi:_____				

9. How has your household's fishing frequency changed over the past 10 years?
O iai se suiga i tulaga o fagotaga a lou aiga i le 10 tausaga ua tuana'i?

a. Fish more frequently
Fagotaga ua fa'ateleina
b. Fish about the same amount

Surveyor(s):_____ Date: _____

Fagotaga o lo'o tutusa lava mai le taimi nei

c. Fish less frequently
   Fagotaga ua fa'aitiitia
d. Not sure
   E lē mautinoa

10. How has your household's total fish catch/harvest changed over the past 10 years?
O iai se suiga i tulaga o tamaoaiga mai le sami o fagotaina i le 10 tausaga ua tuana'i?

a. Catch more
   Fa'ateleina le tamaoaiga ua fagotaina
b. Catch approximately the same amount
   E tutusa le tamaoaiga ua fagotaina mai le taimi nei
c. Catch less
   Ua fa'aitiitia le tamaoaiga ua fagotaina
d. Not sure
e. E lē mautinoa

11. How often do you and your family eat fresh or frozen fish/invertebrates from the following sources: (note: not canned fish – just fresh or frozen)
E fa'afia ona e taumafa, po'o lau aiga, i ni i'a po'o figota o tu'uaisa mai tulaga ia o lo'o taua i lalo:
(E lē aofia ai i'a tu'uapa)

	More than once/week I luga atu i le fa'atasi i le vaiaso	About once/week Fa'atasi i le vaiaso	About 1-3 times/month Fa'atasi i le tolu taimi I le masina	Less than once/month Lalo mai I le fa'atasi I le masina	Rarely or never Seāse ā lava pe leai fo'i	Not sure E lē mautinoa
Caught in your village waters Fagota mai I le ogasami po'o le gataifale o lou nu'u						
Caught in American Samoa Fagota mai i totonu o Amerika Samoa						
From boats landing catch at the cannery boats Fagota mai va'a fagota						
Bought in a store / restaurant (uncertain origin)						

Surveyor(s):_____ Date: _____

Fa'atau mai I le faleoloa po'o le faleaina						
Other:_____ _ O nisi:_____ _						

12. To the best of your knowledge, please rate the condition of the following resources for you village:
Fa'ailoa mai le tulaga o tamaoaiga ua taua mo lou nu'u:

	Very good Lelei tele	Good Lelei	Neither good nor bad E lē o lelei pe leaga	Bad Leaga	Very bad Matua leaga	Not sure E lē mautinoa
Fish on reef flat O I'a mai le aloalo po'o le a'au						
Fish on reef slope O I'a ma tua a'au						
Pelagic fish O I'a mai le loloto						
Invertebrates Figota						
Ocean water quality Tulaga o le suasami						
Stream water quality Tulaga o auvai						
Condition of coral habitat Tulaga o le a'au 'amu						
Beach quality Tulaga o le matafaga						

13. What factors have contributed to changes in the condition of ocean and fresh water village resources (open-ended)?
O a ni tulaga ua mafua ai ni suiga i tulaga o le suasami ma auvai i totonu o lou nu'u?

_____
_____
_____
_____

14. Are any of these issues a problem in your village?
O ni fa'afitauli nei i totonu o lou nu'u?

	Significant problem	Moderate problem	Minor problem	Not a problem	Not sure

Surveyor(s):_____ Date: _____

	Fa'afitauli matuiā	Fa'afitauli feololo	Fa'afitauli la'ititi	E lē o se fa'afitauli	E lē mautinoa
Trash and pollution in village O lapisa ma otaota i totonu o lou nu'u					
Pollution in streams O otaotai totonu o auvai					
Sediment in streams O le pefu po'o le toa o le palapala i totonu o auvai					
Decreasing numbers of fish in the ocean Ua fa'aitiitia numera o i'a i totonu o le gataifale					
Pollution in ocean Otaota i totonu o le sami					
Other: _____ O nisi:_____					
Other:_____ Onisi:_____					

15. Are there any systems in place to reduce trash accumulation in your village?
O iai se tulaga po'o se polokalama e fa'aitiitia ai tulaga o le otaota i totonu o lou nu'u?
   a. Yes (Describe: _____
   _____)
   Ioe
   (Fa'amatala:_____
   _____)
   b. No - Leai
   c. Not sure – E lē mautinoa

16. If yes, do you participate in these activities to reduce trash in your village?
A fa'apea e Ioe, e te auai i nei tulaga e fa'aitiitia ai le otaota i totonu o lou nu'u?
   a. Yes - Ioe
   b. No - Leai

17. What are the primary sources of trash in your village? (select all that apply)
O le a le mafua'aga tonu o le lapisi po'o le otaota i totonu o lou nu'u? (Maka uma mai tulaga e fa'ailoa mai ai lou tali)

	Significant source O le mafua'aga tonu e matuiā le a'afiaga	Moderate source O se tasi o mafua'aga ae feololo lona a'afiaga	Minor source O se mafua'aga e fa'aitiitia le a'afiaga	Not a source E lē o se mafua'aga	Not sure E lē mautinoa
a. Local village members O tagatanu'u o lo'u nu'u					

Surveyor(s):_____ Date: _____

b. Visitors to the village area O tagata mai fafo e asiasi mai i totonu o le nu'u					
c. Marine debris from ocean O otaota mai le sami					
d. Lack of cans/dumpsters for waste disposal O lē lava o kalone lapisi e lafoa'i ai le otaota					
e. Hospital (**Faga'alu only) O le falema'i (Faga'alu)					
f. Not sure E lē mautinoa					
g. Other: _____ O nisi: _____					

18. Are there any systems in place to protect marine resources in your village?
O iai se tulaga po'o se polokalama mo le fa'asaoina po'o le puipuiina o tamaoaiga o le sami i totonu o lou nu'u?

a. Yes (explain): _____
_____

Ioe (Fa'amatala):_____

b. No - Leai
c. Not sure – E lē mautinoa

19. Would you support any of the following types of actions to protect marine resources in your village (check all that apply)?
E te lagolagoina tulaga nei aua le fa'asaoina po'o le puipuiina o tamaoaiga o le sami i totonu o lou nu'u? (Maka uma mai tulaga e ta'u mai ai lau tali)

	Strongly support	Support somewhat	Not support	Not sure
a. Establish areas closed to fishing for 1-2 years to replenish fish Fa'atulaga se ogasami fa'asao e fa'asaina ai le fagota mo ni tausaga e 1-2				
b. Establish areas closed to fishing for 3-5 years to replenish fish Fa'atulagaina se ogasami fa'asao e fa'asaina ai le fagota mo ni tausaga e 3-5 e toe fa'aolaola ai le tamaoaiga				
c. Establish areas closed to fishing for 10 or more years to replenish fish Fa'atulagaina se ogasami fa'asao e fa'asaina ai le fagota m o ni tausaga e 10 pe luga atu				

Surveyor(s):_____ Date: _____

d. Establish seasonal restrictions on fishing in village area Fa'atulaga se sa i fagotaga i vaitaimi o i'a a'e i totonu o le nu'u				
e. Restrict certain gear types for fishing near village Ia fa'asa tulaga o ni metotia e fa'aaoga i fagotaga i lou nu'u				
f. Size or catch limits on fish caught near village Fa'atapula'a le tele o il'a e fagotaina				
g. Limits on fishing certain vulnerable species that are overfished or whose numbers are very low Fa'atapula'a le fagotaina o i'a o lo'o so'ona fagotaina po'o fa'aitiitia le fainumera				
h. Non-village residents should not be allowed to fish in village waters Fa'asa tagata mai fafo o le nu'u e fagota I totonu o le gataifale a le nu'u				
i. No restrictions on fishing in my village (open to everyone and all types of fishing) Leai ni tulafono e fa'asa ai le fagota i totonu o lo'u nu'u (e tatalaina le fagota mo se isi)				
j. Other: _____ O nisi:_____				

20. Do you have access to the following for your household:
E mafai ona e maua pe fa'aaogaina nei tulaga mo lou aiga:

a. Regular clean drinking water
Vai taumfaga mama ma lelei
b. Back-up drinking water sources
Se isi tulaga e maua le vai taumafa
c. Back-up electricity
Se isi tulaga e maua le uila
d. Cell phone
Telefoni feavea'i
e. Car (# in household?): _____
Ta'avale (# o lou aiga?) : _____
f. Computer
Komeputa
g. Home internet
Itaneti i le fale (Upega tafa'ilagi i le fale)
h. Television
Televise
i. Cable

j. Air conditioner
Ea malūlū

Surveyor(s):_____ Date: _____

Demographics

21. What are the primary ethnicities in your household? (check all that apply)
Fa'ailoa mai po'o le a le ituaiga tagatanu'u o lo'o iai I lou aiga? (maka uma mai tulaga e fa'ailoa ai lou tali)

a. Samoan
b. Tongan
c. Native Hawaiian
d. Caucasian
e. Filipino
f. Chinese
g. Korean
h. Other: _____
O nisi:_____

22. What is your approximate annual household income?
O lea le aofaiga o le tupe maua i totonu o lou aiga?

a. Less than $10,000/yr
Lalo mai le $10,000 I le tausaga
b. $10-19,999/yr
$10-19,999 I le tausaga
c. $20-29,999/yr
$20-29,999 I le tausaga
d. $30-39,999/yr
$30-39,999 I le tausaga
e. $40-49,999/yr
$40-49,999 I le tausaga
f. More than $50,000/yr
I luga atu o le $50,000 I le tausaga